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Dr. M. Veysel Kaya

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Editors
Patrycja Chodnicka – Jaworska
M. Veysel Kaya

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Impact of Board Composition and Monitoring on UK Bank Performance

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Abstract

This paper examines the effects of board composition and monitoring on the performance in the UK banking sector from 2000 to 2014. To get preliminary results, this study uses pooled OLS model. It further employs the fixed effects (FE) and random effects (RE). Two-step system generalized method of moments (SGMM) is employed to check the robustness of the results. The study finds CEO duality, CEO pay and board size to have a positive and significant effect on performance of the UK banks. However, board independence and female directors on board have a negative and significant influence on bank performance. Further analysis using sub-samples divided into pre-financial crisis, during the financial crisis and post crisis reinforce the robustness of our findings. Overall, this paper sheds light on the effects of within-board governance on performance and support the multi-theoretical framework that draws from the insights of agency and stewardship theory.

Keywords: Agency Theory, Stewardship Theory, Corporate Governance, Board Composition, Board Monitoring, Performance

Jel Codes: G34, G32, G21

1. Introduction

Corporate boards play a vital role on the effectiveness of a firm’s performance because the board constitutes an important internal governance mechanism that oversees the management strategies and actions, protect the interests of shareholders and ensure conformity with regulatory requirements (Khanchel, 2007; Salim et al., 2016). Some prior studies have examined the effect of boards on performance (see Andres and Vallelado, 2008; Conheady et al., 2015; Cornett et al., 2010). However, researchers have given much less attention to the effects of the board on performance in banks because most empirical studies have focused on non-financial firms (Adams and Mehran, 2008). Studying bank governance is essential because it is unique and different from other non-financial corporate governance (Zulkafli and Samad, 2007). Additionally, the evidence presented to date on the effect of the board on bank performance is mixed.

In this study, we attempt to explore the impact of board composition (board size, board independence and board gender) and monitoring on performance in the UK banks over the period 2000-2014 by using multi-theories including agency theory and stewardship theory. Our research question is: to what extent do board composition and monitoring account for performance in the UK banks? We do so by using three statistical models under the panel dataset estimation, namely, pooled ordinary least square (OLS), fixed effects (FE) and random effects (RE). We then check the robustness of our results with the two-step system generalized methods of moments (SGMM) (Arellano and Bover, 1995; Blundell and Bond, 1998), which utilizes the orthogonality conditions that exists between the lagged dependent variable and the error term to address the endogeneity problem often associated corporate governance variables (Wintoki et al., 2012).

This study makes a number of contributions to the extant literature. First, this study puts forward a case for a multi-theoretical model that integrates two theories including agency theory and stewardship theory to explore the impact of CEO power and board composition on performance. The use of agency theory in this study shows that board composition (board size, board independence, board gender) and monitoring as important governance mechanisms play an essential role to influence bank performance. Thus, this study shows agency theory needs to be retained as the primary theory, which is in line with the studies of Aguilera and Jackson (2003) and Aguilera et al. (2008). This study also deepens our understanding of the effects of within-board governance on bank performance, and thereby contributing to the agency theory. In addition, our results also appear to be in line with stewardship theory. Second, recent studies have given much less attention on the effects of board on bank performance as most of the empirical studies tend to focus on non-financial firms (Adams and Mehran, 2008). For example, in the context of the UK, the studies of Weir et al. (2002); Guest (2009); and more recently, Muravyev et al. (2016) on the relationship between internal and external corporate governance mechanisms and the performance were in respect...
of non-financial firms. To the best of our knowledge, there is one relevant study undertaken by Tanna et al. (2011) in the UK context, examining the influence of board structure (board size and non-executive directors) on bank performance based on a sample of 17 UK banks over the period 2001-2006. Employing a relatively large dataset of 79 UK domestic banks, this study makes a significant contribution to an under-researched topic.

2. Theoretical framework and hypotheses development

This section develops the hypotheses regarding the effects of board composition and monitoring mechanisms on bank performance. Figure 1 below outlines the framework for testing the hypotheses.

**Figure 1:** Hypotheses - Board Composition, Monitoring and performance

CEO duality and performance

CEO duality has been documented using two competing perspectives based on whether a firm is best served by strong leadership (stewardship theory), or by effective monitoring (agency theory) (see Goyal and Park, 2002; Palmon and Wald, 2002; Suarez and Santana, 2015). In agency theory, the central argument about CEO duality is that it may lead to the concentration of excessive power in one person’s hands and allow the CEO to pursue their own interests rather than those of shareholders (Grove et al., 2011). At this point, monitoring effectiveness is likely to be reduced (Kor, 2006), board independence seems to decrease (Cerboni and Parbonetti, 2007), and decision-making is considered less effective (Krause et al., 2014). Prior studies have argued that the presence of CEO duality has a negative impact on performance (e.g. Bozec, 2005; Chahine and Goergen, 2011; Jermias and Gani, 2014; Veprauskaite and Adams, 2013).

Nevertheless, stewardship theory states that CEO duality can provide internal efficiency, achieve strong and unambiguous leadership, and offer greater autonomy and response capacity (Uadiale, 2010). Moreover, CEO duality is more likely to develop a series of specific advantages related to greater opportunities for learning and acquiring knowledge (Sacristan-Navarro and Gomez-Anson, 2009). Empirical evidence has been presented which portrays the positive impact of CEO duality on performance (e.g. Almanaseer et al., 2012; Conheady et al., 2015; Kiel and Nicholson, 2003). In the light of the above argument, we posit CEO duality may hinder board’s ability to
monitor management, reduce board independence, increase agency cost and likely reduce performance. Therefore, the first hypothesis is:

**Hypothesis 1: CEO duality has negative influence on performance in the UK banks.**

**CEO pay and performance**

Agency theory links management compensation to the separation of ownership and control (Luo, 2015). Excessive compensation has been viewed as a significant contributor to the recent global financial crisis (see Choe et al., 2014; Hagendorff and Vallascas, 2011). In support of this perspective, Balafas and Florackis (2014) and Morse et al. (2011) argue that CEO pay is more likely to expropriate wealth from shareholders directly. Furthermore, Chen et al. (2006) and Grove et al. (2011) point out a drawback of excessive compensation, which is that it may create incentives for managers to pursue short-term profits. This view is also supported by Brick et al. (2006) and Peng and Roell (2008) who all report excessive pay is negatively related to performance.

However, stewardship theory suggests that if managerial discretion and CEO pay are aligned well, firm performance is more likely to be higher (Crossland and Hambrick, 2011; Hambrick and Quigley, 2014). In the same spirit, Luo (2015) shows that it is important for owners to establish incentive contracts for the managers and effective monitoring mechanisms within the firm in order to align the interests of the managers and the owners. The majority of the empirical evidence has shown that the relationship is positive between CEO pay and performance (e.g. Conyon and He, 2012; Cunat and Guadalupe, 2009; Livne et al., 2011). Based on the above, we posit that high rewards of CEO compensation are associated with high performance. Consequently, the second hypothesis is:

**Hypothesis 2: Higher CEO pay has positive influence on performance in the UK banks.**

**Board size and performance**

From the agency perspective, board of directors is seen as an important tool to align their respective competing interests (Jensen and Meckling, 1976; Fama and Jensen, 1983). Consequently, it is argued that, a board with a large number of members could exercise better control on managers than those with a smaller number (Donaldson and Preston, 1995). Moreover, the effectiveness of board monitoring increase with board size because larger boards of directors are expected to give better supervision and monitoring (Coles et al., 2008; Klein, 2002). A number of studies have found a positive relationship between board size and performance in Australia (Kiel and Nicholson, 2003), Canada (McIntyre, 2007), Portugal (Alves and Mendes, 2004), and Spain (Barroso et al., 2010).

In contrast, stewardship theory is in favor of smaller boards in that smaller boards are more effective in decision-making because of greater coordination and fewer communication problems (Jensen, 1993). Smaller boards do not suffer from social loafing and free riding (Yermack, 1996). This means that as board size decreases, free riding decreases and the efficiency of the board increases in terms of monitoring management. This has been echoed by some empirical evidence, which report that smaller boards are related to better performance (see Staikouras et al., 2007). From the above discussions, we posit that larger board can effectively supervise managers, provide better advice, and facilitates high-quality decision making. Therefore, the third hypothesis is:

**Hypothesis 3: Larger board size has positive influence on performance in the UK banks.**

**Board independence and performance**

In relation to agency theory, a higher proportion of independent directors are normally related to better performance (Cornett et al., 2007; Dahya et al., 2008) because independent directors are deemed to better monitor, advise, and discipline managers through their expertise, knowledge and abilities (Harris and Raviv, 2008). Therefore, it is expected that independent directors positively influence performance (Rosenstein and Wyatt, 1990).

On the other hand, in relation to stewardship theory, if monitoring responsibility is centralized in the hands of inside directors, performance can be enhanced since those inside directors can facilitate the succession process (Fama and Jensen, 1983). This theory highlights that inside directors can make better decisions than independent directors, and that they will try to maximize the profit of the company (Adams and Ferreira, 2007; Raheja, 2005). Likewise, a few studies including Chen and Nowland (2010) and Maseda et al. (2014) have further asserted that a board with a predominance of independent directors can suffer from a lack of specific knowledge and information about the firm, therefore hindering performance. From the above discussions, we posit independent directors may suffer from a lack of specific knowledge and information about the firm, and as a result may lead to poor performance. Therefore, the fourth hypothesis is:
Hypothesis 4: Higher proportion of board independence has negative influence on performance in the UK banks.

Board gender and performance

Under agency theory, gender diversity can improve board monitoring because hiring directors from different backgrounds adds multiple diversity facets to the oversight lens, suggesting that female board members offer diverse viewpoints in the boardroom, help better represent all shareholders, and promote lively boardroom discussion (Yi, 2011). Women also tend to take their roles very seriously in boardrooms, which can lead to more civilized behavior and better governance (Singh and Vinnicombe, 2004). The positive effect of women directors on performance has been supported by studies of Erhardt et al. (2003) in U.S. and Liu et al. (2014) in China, which all stress the positive relationship by underlying that women directors have a positive effect on performance.

On the contrary, stewardship theory argues that a gender diverse board may bring potential costs to organizations, such as interpersonal conflicts and communication problems (Cox, JR, 1991). Following this line, some scholars have stated that greater gender diversity may increase the likelihood of conflicts (Joshi et al., 2006), slow down the decision-making process (Meca et al., 2015), and decrease shareholder value (Adams and Ferreira, 2007; Almazan and Suarez, 2003). In the light of the above, we posit female directors are likely to possess managerial skills and public relation skills, which could help banks gain competitive advantage by dealing more effectively with diversity in their decision-making. Therefore, the fifth hypothesis is:

Hypothesis 5: Higher proportion of female directors on the board has positive influence on performance in the UK banks.

3. Methods

Data source

The sample initially consisted of 109 UK banks listed on the Bank of England’s list in 2015. We excluded 30 UK banks with unavailable data or missing values from our sample. As a result, our final sample consisted of 79 banks with 791 observations. The performance indicators and various financial ratios were collected from the Bank-scope database. The board composition and monitoring data were hand-collected and calculated from the annual reports of each bank.
Measurement of variables

Table 1. Definitions of Variables – Board Composition, Monitoring and Performance

The measurements of independent and dependent variables are summarized in Table 1.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measurement</th>
<th>Exp. Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance Variable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROA</td>
<td>Net income scaled by total assets</td>
<td></td>
</tr>
<tr>
<td>Board Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEO duality (DUALITY)</td>
<td>A dummy variable which takes a value of 1 if the CEO and chairman are the same person, 0 = otherwise</td>
<td>-</td>
</tr>
<tr>
<td>CEO_PAY</td>
<td>The natural logarithm of cash-based compensation</td>
<td>+</td>
</tr>
<tr>
<td>Board_SIZE</td>
<td>Total number of members on the board</td>
<td>+</td>
</tr>
<tr>
<td>Board_IND</td>
<td>The percentage of non-executive directors on the board</td>
<td>-</td>
</tr>
<tr>
<td>Board Gender (GENDER)</td>
<td>A dummy variable takes a value of 1 if there is at least one woman on the board, 0 = otherwise</td>
<td>+</td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bank_Size</td>
<td>Log of total assets</td>
<td></td>
</tr>
<tr>
<td>Efficiency</td>
<td>Expenses scaled by revenue</td>
<td></td>
</tr>
<tr>
<td>Financial leverage</td>
<td>Shareholders’ funds scaled by total assets</td>
<td></td>
</tr>
</tbody>
</table>

Econometric model

This section sets out the econometric models employed to estimate the association between board composition, monitoring and bank performance. Our model is:

\[
BP = \beta_1 \text{DUALITY}_i + \beta_2 \text{CEO}_i \text{PAY}_i + \beta_3 \text{Board}_i \text{SIZE}_i + \beta_4 \text{Board}_i \text{IND}_i + \beta_5 \text{GENDER}_i + \delta \text{CONTROLS}_i + \epsilon_i
\]

Where, BP as the dependent variable represents bank performance measure: Return on Asset (ROA). DUALITY represents CEO duality; CEO_PAY is CEO pay; Board_SIZE represents board size; Board_IND represents board independence; GENDER represents board gender. CONTROLS are control variables which include: bank size, efficiency and leverage.

Estimation methods

Using panel data enables us to assess bank performance in the sample over time by analyzing observations from several consecutive years for the same banks. Meanwhile, the temporal dimension of the data, particularly in periods of great change, enriches the study (Meca et al., 2015). To get preliminary results, this study uses pooled OLS model. In line with Luo (2015), the pooled OLS is appropriate for this study because the time variant effect is not significant in regression and some sample UK banks have short-period longitudinal data. When the
unobserved effect is correlated with independent variables, pooled OLS estimations produces estimators that are biased and inconsistent (Andres and Vallelado, 2008). In this case, this study further employs the fixed effects (FE) and random effects (RE) estimators to overcome this challenge. In addition, it is argued that the board is determined endogenously (Hermalin and Weisbach, 2003). If the strict exogeneity condition fails, the fixed effects are inconsistent and have different probability limits (Wooldridge, 2009). Therefore, two-step system generalized method of moments (SGMM) (Arellano and Bover, 1995; Blundell and Bond, 1998) is employed to check the robustness of the results.

4. Results & Discussions

Univariate analysis

Table 2 shows the descriptive statistics of the variables used in this study. The mean value of ROA is 0.42%. CEO duality constitutes 15% of the sample. The mean CEO pay is 0.66 million. This figure is much lower than the average in the US commercial banks (3.43 million) from 2005 to 2010, documented by Tian and Yang (2014). The average board size is 10, which appear relatively smaller compared with 18 and 16 directors in the studies of Adams and Mehran (2008), Andres and Vallelado (2008) in the US and OECD countries. The independent directors constitute about 54% of the board. This suggests that UK banks tend to follow a relatively independent board structure in which the proportion of independent directors is high. Board gender, on average, is 0.12 indicating that female directors account for 12% of total directors in the boardrooms of UK banks. This percentage is almost double the average in the Asian region (6%), reported by Dyckerhoff et al. (2012). The average efficiency of the sample UK banks size is 5.74 million, efficiency ratio is 70.55%, and the average leverage ratio is 7.8%.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA (%)</td>
<td>0.42</td>
<td>0.77</td>
<td>-2.57</td>
<td>3.81</td>
</tr>
<tr>
<td>DUALITY (%)</td>
<td>0.15</td>
<td>0.36</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>CEO_PAY (Million)</td>
<td>0.66</td>
<td>0.85</td>
<td>0.10</td>
<td>3.93</td>
</tr>
<tr>
<td>Board_SIZE (Number)</td>
<td>9.82</td>
<td>2.90</td>
<td>4.00</td>
<td>22.00</td>
</tr>
<tr>
<td>Board_IND (%)</td>
<td>0.54</td>
<td>1.99</td>
<td>2.00</td>
<td>16.00</td>
</tr>
<tr>
<td>GENDER (%)</td>
<td>0.12</td>
<td>0.43</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Bank_Size (Million)</td>
<td>5.74</td>
<td>1.98</td>
<td>3.32</td>
<td>16.03</td>
</tr>
<tr>
<td>Efficiency (%)</td>
<td>70.55</td>
<td>13.98</td>
<td>32.26</td>
<td>99.78</td>
</tr>
<tr>
<td>Leverage (%)</td>
<td>7.80</td>
<td>9.02</td>
<td>1.67</td>
<td>97.89</td>
</tr>
</tbody>
</table>

Table 3 below shows the descriptive statistics of subsample in three different time period, namely, pre-crisis period (before 2007), the crisis period (2007-2009) and post-crisis period (after 2009).
Table 3. Subsample Descriptive Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Before Financial Crisis</th>
<th>During Financial Crisis</th>
<th>After Financial Crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Obs</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td><strong>Dependent</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROA (%)</td>
<td>283</td>
<td>0.61</td>
<td>0.69</td>
</tr>
<tr>
<td><strong>Independent</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DUALITY (%)</td>
<td>283</td>
<td>0.21</td>
<td>0.48</td>
</tr>
<tr>
<td>CEO_PAY (M)</td>
<td>283</td>
<td>0.62</td>
<td>7.51</td>
</tr>
<tr>
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<td>1.93</td>
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<td>Efficiency (%)</td>
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<td>Leverage (%)</td>
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<td>7.51</td>
<td>4.57</td>
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</table>

Table 4 shows that none of the correlation coefficients among independent variables is higher than the value of 0.7 (see Gujarati, 2004). Therefore, multicollinearity appears not be a problem in this study. This is confirmed by the variance inflation factors (VIF) calculated to detect multicollinearity among independent variables in this model. The variance inflation factor scores and they appear to be within the cut-off point of 10 as recommended by Neter et al. (1989)
Table 4. Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>VIF</th>
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</tr>
<tr>
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<td>0.12</td>
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<td>4. Board_SIZE</td>
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<td>5. Board_IND</td>
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<td>6. GENDER</td>
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<tr>
<td>7. Bank_Size</td>
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<td>-0.17</td>
<td>-0.14</td>
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<td>8. Efficiency</td>
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<td>-0.42</td>
<td>0.03</td>
<td>0.09</td>
<td>0.05</td>
<td>0.08</td>
<td>0.13</td>
<td>0.05</td>
<td>1.00</td>
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<tr>
<td>9. Leverage</td>
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<td>-0.14</td>
<td>0.10</td>
<td>-0.12</td>
<td>-0.19</td>
<td>-0.15</td>
<td>-0.04</td>
<td>-0.08</td>
<td>0.08</td>
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<td>1.12</td>
</tr>
</tbody>
</table>

Lu, L., pp. 1-18
Regression results and discussions

This section reports the relationship between board composition, monitoring and bank performance using ROA. In order to test this relationship, we carry out a regression analysis using OLS, FE and RE models. The Hausman specification test is employed to test the fixed effect model and the random effect models. The null hypothesis is as follows: \( H_0 \): The X variables are not correlated with the errors (Random Effects). The alternative hypothesis is as follows: \( H_1 \): The X variables are correlated with the errors (Fixed Effects). The analysis suggests that the random effects model can be rejected in favor of the fixed effects model at a 1% critical level.

Table 5 reports our results across the three approaches, in columns 1-3 (ROA). Overall, our results indicate that CEO duality, CEO pay, and larger board have a positive and significant effect on performance while board independence and female directors exert a negative and significant influence on performance of UK banks.

Regarding the effect of duality, we document a positive and statistically significant relationship between duality and ROA at the 5% level under the FE and RE approaches in columns 2 and 3. Hypothesis 1 is therefore not supported. This result appears surprising as prior evidence is in favor of agency theory, who posit that CEO duality is negatively related to performance (e.g. Chahine and Goergen, 2011; Vepurauskaite and Adams, 2013; Jermias and Gani, 2014). It is argued that CEO duality may reduce board’s ability to monitor management effectively (Cerbioni and Parbonetti, 2007) thereby exerting a negative influence. However, this appears not to be the case. Our results seem to be in line with the stewardship theory as documented by Palmon and Wald (2002), in which they note that CEO duality could provide internal efficiency through unity of command, which leads to strong and unambiguous leadership.

Table 5. Regression Result – UK Banks’ Board Composition, Monitoring and Performance (ROA)

<table>
<thead>
<tr>
<th></th>
<th>OLS (1)</th>
<th>FE (2)</th>
<th>RE (3)</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
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<td>0.17</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>(0.38)</td>
<td>(2.05)**</td>
<td>(2.14)**</td>
</tr>
<tr>
<td>CEO-PAY</td>
<td>0.02</td>
<td>0.11</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>(5.62)**</td>
<td>(2.11)**</td>
<td>(2.33)**</td>
</tr>
<tr>
<td>Board_SIZE</td>
<td>0.01</td>
<td>0.08</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>(0.35)</td>
<td>(3.46)**</td>
<td>(3.39)**</td>
</tr>
<tr>
<td>Board_IND</td>
<td>-0.07</td>
<td>-0.06</td>
<td>-0.07</td>
</tr>
<tr>
<td></td>
<td>(-2.67)**</td>
<td>(-2.35)**</td>
<td>(-2.68)**</td>
</tr>
<tr>
<td>GENDER</td>
<td>-0.22</td>
<td>-0.02</td>
<td>-0.02</td>
</tr>
<tr>
<td></td>
<td>(-2.89)**</td>
<td>(-0.24)</td>
<td>(-0.30)</td>
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<td><strong>Control Variables</strong></td>
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<tr>
<td>Bank_Size</td>
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<td>-0.05</td>
<td>-0.03</td>
</tr>
<tr>
<td></td>
<td>(-2.37)**</td>
<td>(-2.30)**</td>
<td>(-1.85)*</td>
</tr>
<tr>
<td>Efficiency</td>
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<td>-0.01</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>(-4.75)**</td>
<td>(-5.00)**</td>
<td>(-5.26)**</td>
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<tr>
<td>Leverage</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>(1.82)*</td>
<td>(2.10)**</td>
<td>(2.24)**</td>
</tr>
<tr>
<td>Adj R-Square</td>
<td>0.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wald test</td>
<td>10.72</td>
<td>8.48</td>
<td>71.96</td>
</tr>
<tr>
<td></td>
<td>(0.00)***</td>
<td>(0.00)***</td>
<td>(0.00)***</td>
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<tr>
<td>Hausman (p-value)</td>
<td>21.78</td>
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<td>(0.00)***</td>
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<tr>
<td>N</td>
<td>791</td>
<td>791</td>
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</tr>
</tbody>
</table>
CEO pay has a positive and significant relationship with ROA at the 1% and 5% levels under all the three regression models, OLS, FE and RE in columns 1, 2 and 3. The results provide unequivocal support for Hypothesis 2. Our findings are congruent with prior studies (e.g. Cunat and Guadalupe, 2009; and Livne et al., 2011), which present that high rewards of CEO compensation are associated with high performance. The results support the stewardship theory as documented by Crossland and Hambrick (2011) and Hambrick and Quigley (2014), in which they realize that if managerial discretion and CEO pay are aligned well, firm performance is more likely to be higher.

Board size has a positive and significant relationship with ROA at the 1% level under the FE and RE in column 2 and 3 respectively. The results provide support Hypothesis 3, and support the studies of Klein (2002) and Coles et al. (2008), which show that larger board of directors can effectively monitor managers. The underlying explanations appear to be in line with the agency theory as documented by Donaldson and Preston (1995), who found that the board with a large number of members could exercise better control on managers than those with a smaller number. In other words, the effectiveness of board monitoring increase with board committee assignments can be distributed over a larger number of directors (Klein, 2002).

Board independence has a negative and significant relationship with ROA at the 1% level under the OLS and RE in column 1 and 3, and 5% level under FE in column 2. The results provide unequivocal support for Hypothesis 4. Our findings are consistent with prior studies (e.g. Subrahmanyam et al., 1997; Pathan and Faff, 2013), which they indicate that high proportions of independent directors are associated with lower performance. Theoretically, the findings may be explained by the stewardship theory as documented by Bammens et al. (2008), Chen and Nowland (2010), who indicate that independent directors may lack firm-specific knowledge, and thereby lowering the performance.

Board gender has a negative and significant relationship with ROA at the 1% level under the OLS in column 1. Hypothesis 5 is therefore not supported. This result appears interesting and surprising as it is contrary to agency theory, which suggests that board gender is positively related to performance (see Erhardt et al., 2003; Liu et al., 2014). Ait is argued that female directors offer diverse viewpoints to the boardroom to improve board monitoring (Yi, 2011), take their roles very seriously, which can lead to better governance (Singh and Vinnicombe, 2004), and therefore improve performance. However, this appears not to be the case for the UK banking industry. Our results are in line with the spirit of stewardship theory as stated by Adams and Ferreira (2007) and Meca et al. (2015). The argument that greater gender diversity may slow decision making, and increase the likelihood of conflicts, and these accordingly decrease bank performance.

Regarding control variables, bank size has a negative and significant relationship with ROA. This evidence is consistent with the study of Staikouras et al. (2007), who uncover large banks can increase diversification, and accordingly lead to lower required returns. Another finding is that efficiency has a negative and significant relationship with ROA. This evidence is supported by the study of Fries and Taci (2005), who report that the lower the overheads tend to be more efficient and profitable within financial institutions. Furthermore, leverage has a positive and significant relationship with ROA, and this result is congruent with the prior studies (e.g. Demirguc-Kunt and Huizinga, 2010; Berger and Bouwman, 2013), which show that higher leverage tends to be cheaper cost of capital and therefore this variable has a positive impact on performance.

**Robustness test**

To check for robustness, this study employs several additional specifications to rule out alternative explanations. First, this study specifies alternative dependent variable. Return on equity (ROE) is measured as a ratio of the net profit to equity (Hasen et al., 2012). The results remain similar (See Table 6).
Table 6. Robust Test - UK Banks’ Board Composition, Monitoring and Performance with ROE

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<th></th>
<th></th>
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<tbody>
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<td>FE (2)</td>
<td>RE (3)</td>
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</tr>
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<tr>
<td>DUALITY</td>
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<td>0.37</td>
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<tr>
<td>(0.36)</td>
<td></td>
<td>(0.75)***</td>
<td>(0.72)***</td>
<td></td>
</tr>
<tr>
<td>CEO-PAY</td>
<td>0.14</td>
<td>0.06</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>(5.96)***</td>
<td></td>
<td>(1.80)*</td>
<td>(2.83)***</td>
<td></td>
</tr>
<tr>
<td>Board_SIZE</td>
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<td>0.47</td>
<td>0.39</td>
<td></td>
</tr>
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<td></td>
<td>(3.20)***</td>
<td>(3.17)***</td>
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<tr>
<td>Board_IND</td>
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<td>-0.36</td>
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<tr>
<td>(-2.86)***</td>
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<td>(-1.68)***</td>
<td>(-2.27)***</td>
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<tr>
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<tr>
<td>(-1.86)***</td>
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<td>(-3.68)***</td>
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<tr>
<td>Efficiency</td>
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<td>-0.15</td>
<td>-0.15</td>
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<tr>
<td>(-12.99)***</td>
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<td>(-11.01)***</td>
<td>(-12.09)***</td>
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<tr>
<td>Leverage</td>
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<td>0.02</td>
<td>0.04</td>
<td></td>
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<tr>
<td>(3.46)***</td>
<td></td>
<td>(1.27)***</td>
<td>(2.00)***</td>
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<tr>
<td>Adj R-Square</td>
<td>0.09</td>
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<tr>
<td>Wald test</td>
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<td>5.24</td>
<td>66.83</td>
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<td>(0.00)***</td>
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<td>(0.00)***</td>
<td>(0.00)***</td>
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<td>Hausman (p-value)</td>
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<tr>
<td>N</td>
<td>791</td>
<td>791</td>
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</tr>
</tbody>
</table>

Second, this study includes another two additional control variables, namely, non-performing loans ratio (NPLR), which is defined as the amount of non-performing loans scaled by total loans (Shehzad et al., 2010), and loan loss provision ratio (LLPR), which is measured by total loan loss provisions to total gross loans (Nguyen and Boateng, 2015). LLP and NPLs as measuring the quality of the credit portfolio are of vital importance for a bank’s performance (see Kim and Santomero 1993; Musumeci and Sinkey 1990). The results obtained from LLP and NPLs are similar (See Table 7).
Table 7. Robust Test - UK Banks’ Board Composition, Monitoring and Performance with NPLR and LLPR

<table>
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<tr>
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<th>ROA</th>
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<td>DUALITY</td>
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</tr>
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<td></td>
<td>(0.36)</td>
</tr>
<tr>
<td>CEO-PAY</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(5.62)***</td>
</tr>
<tr>
<td>Board_SIZE</td>
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<td>(0.43)</td>
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<tr>
<td>Board_IND</td>
<td>-0.07</td>
</tr>
<tr>
<td></td>
<td>(-2.66)***</td>
</tr>
<tr>
<td>GENDER</td>
<td>-0.20</td>
</tr>
<tr>
<td></td>
<td>(-2.64)***</td>
</tr>
<tr>
<td><strong>Control Variables</strong></td>
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<tr>
<td>Bank_Size</td>
<td>-0.03</td>
</tr>
<tr>
<td></td>
<td>(-2.39)**</td>
</tr>
<tr>
<td>Efficiency</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>(-4.97)***</td>
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<tr>
<td>Leverage</td>
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<td></td>
<td>(1.76)*</td>
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<td>NPLR</td>
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<td></td>
<td>(-0.20)</td>
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<tr>
<td>LLPR</td>
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<tr>
<td></td>
<td>(-1.53)*</td>
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</tbody>
</table>

**SGMM estimation**

The regression of board composition, monitoring on performance that underlies the “board effect” argument is a classic example of a regression that is likely to suffer from all three endogeneity problems such as omitted variables, reverse causality and measurement error (Adams et al., 2010). Therefore, in order to address the problem of endogeneity, we employ two-step system generalized methods of moments (SGMM) to check the robustness of our results (Arellano and Bover, 1995; Blundel and Bond, 1998). System GMM has become popular because using this approach can treat all the explanatory variables as endogenous and orthogonally uses their past values as their respective instruments (Pathan and Faff, 2013). This approach has been widely used in similar studies (e.g. Liang et al., 2013 and Dong et al., 2016). Following Andres and Vallelado (2008), this study employs the two-step system GMM with adjusted standard error for potential heteroscedasticity as proposed by Blundell et al. (1998). We use Sargan test of over-identifying restriction for our model and the GMM instruments. The system estimator regression results are reported in Table 8. The results indicate that the SGMM results appear to be similar to results reported in Table 5.
To assess the impact of the financial crisis in 2008 on our results, we divided the sample into pre-crisis, during crisis and post crisis. Specifically, we examined whether banks adjusted their board composition and monitoring on bank performance during the financial crisis. Consequently, this study put the sample into three groups as follows: the crisis period (2007-2009), pre-crisis period (before 2007), and post-crisis period (after 2009). The results of Table 9 show there are no significant changes in response to changes on bank performance before, during and after the financial crisis.

### Table 8. Board Composition, Monitoring and Performance - System Estimator

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>T-Statistic</th>
<th>Significance</th>
</tr>
</thead>
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<td>(2.13)****</td>
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</tr>
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<td>DUALITY</td>
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<td>(2.80)****</td>
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</tr>
<tr>
<td>CEO_PAY</td>
<td>0.01</td>
<td>(13.04)****</td>
<td></td>
</tr>
<tr>
<td>Board_SIZE</td>
<td>0.11</td>
<td>(23.83)****</td>
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</tr>
<tr>
<td>Board_IND</td>
<td>-0.11</td>
<td>(-20.29)****</td>
<td></td>
</tr>
<tr>
<td>GENDER</td>
<td>-0.01</td>
<td>(-2.00)</td>
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</tr>
<tr>
<td>Control Variables</td>
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</tr>
<tr>
<td>Bank Size</td>
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<td>(-34.75)****</td>
<td></td>
</tr>
<tr>
<td>Efficiency</td>
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<td>(-17.80)****</td>
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</tr>
<tr>
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<td>N</td>
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<td></td>
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</tbody>
</table>
Table 9. Board Composition, Monitoring and Performance in Different Stages of Financial Crisis

<table>
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<tr>
<th>Board Characteristics</th>
<th>Pre-crisis</th>
<th>During Crisis</th>
<th>Post-crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td>DUALITY</td>
<td>0.59</td>
<td>0.19</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>(5.54)***</td>
<td>(4.12)***</td>
<td>(0.63)</td>
</tr>
<tr>
<td>CEO_PAY</td>
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<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>(4.10)***</td>
<td>(9.56)***</td>
<td>(20.21)***</td>
</tr>
<tr>
<td>Board_SIZE</td>
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<td>0.05</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>(4.96)***</td>
<td>(5.10)***</td>
<td>(19.48)***</td>
</tr>
<tr>
<td>Board_IND</td>
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<td>-0.01</td>
<td>-0.11</td>
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<tr>
<td></td>
<td>(-1.48)</td>
<td>(-0.20)</td>
<td>(-16.50)***</td>
</tr>
<tr>
<td>GENDER</td>
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<td>-0.06</td>
<td>-0.07</td>
</tr>
<tr>
<td></td>
<td>(-24.16)***</td>
<td>(-1.46)</td>
<td>(-5.86)***</td>
</tr>
</tbody>
</table>

Control Variables

<table>
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<tr>
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<th>During Crisis</th>
<th>Post-crisis</th>
</tr>
</thead>
<tbody>
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<td>-0.07</td>
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<tr>
<td>Efficiency</td>
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<td>-0.01</td>
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<tr>
<td></td>
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<td>(-3.97)***</td>
<td>(-18.06)***</td>
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<tr>
<td>Leverage</td>
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<tr>
<td></td>
<td>(11.15)***</td>
<td>(5.45)***</td>
<td>(6.03)***</td>
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</table>

N 283 174 334

5. Conclusion

We find that board composition and monitoring mechanisms are related to bank performance. More precisely, we find that CEO duality, CEO pay and board size exert a positive and significant influence on performance of the UK banks, while board independence and female directors have a negative and significant impact on performance of the UK banks. The use of agency theory in this study shows that board composition and monitoring as important governance mechanisms play an essential role to influence bank performance. As a consequence, this study shows agency theory needs to be retained as the primary theory. Meanwhile, our results also support the spirit of stewardship theory. Therefore, this study contributes to deepen our understanding of the effects of within-board governance on bank performance through stewardship theory.

The results and limitations of this study point to a number of areas requiring further research. First and foremost, there is a need to undertake a cross-country study to better understand the influence of cross-national effects of board composition and monitoring on bank performance. The study could be replicated using data from other countries enabling cross-country comparison. As Minichilli et al (2009) suggested, a cross-country study should be undertaken as it can allow researchers to investigate board characteristics and effectiveness both within-country and between-countries and thereby developing a universal framework for corporate governance. Next, the market-based measures in conjunction with accounting based-measure can be also used to measure performance to provide better insights on bank performance. This is important as such triangulation is rare in finance and accounting research.
References


An Application Using Blockchain for Banking Systems

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Abstract
Blockchain is a shared, immutable ledger for recording transactions, tracking assets and building trust. Nowadays, blockchain has become one of the most popular technologies not only in computer science but also in the field of finance. Since blockchain users’ data can be kept private and safe, it became one of the desired technologies. Normally, in the bank sector companies or producers can use checks for payments which can be used in long-term. In that situation, producers may need to apply to banks for loans. On the other hand, when the producers and suppliers deal with a product exchange, they may need a notary for confirmation. To get a loan from a bank, they can be asked to show deal documents and other documents related to their assets and payments. Gathering documents and approving loans take a lot of time. Many people in the World draw loans and the majority of them are producers and suppliers. Blockchain technology can be safer and more trustable than current banking systems. This study was prepared since blockchain can be a favorable solution to deal with large document stacks and thanks to this technology drawing loan process can become faster. In this research, we aim to come up with a new perspective for banking systems by developing a blockchain application. Within the scope of this study, a software named Supplier Finance (Ver_1) is suggested as a useful tool for the banking sector.

Keywords: Blockchain, Banking, Bill, Loan, Notary

Jel Codes: E51, G21, H81

1 Acknowledge: This study was presented as a Senior Design Project at Ihsan Doğramacı Bilkent University, Computer Sciences Department in 2019.
1. Introduction

Blockchain is a decentralized transaction and data management technology developed first for Bitcoin cryptocurrency. The interest in Blockchain technology has been increasing, since the idea was coined in 2008. The reason for the interest in Blockchain is its central attributes that provide security, anonymity and data integrity without any third-party organization in control of the transactions. Therefore, it creates interesting research areas, especially from the perspective of technical challenges and limitations (Yli-Huumo et al., 2016). Although blockchain has become popular thanks to cryptocurrencies, it has other important and astonishing use cases. Especially, blockchain usage in finance and banking systems is an actual and promising topic and Supplier Finance is a banking application and billing system that uses blockchain technology and blockchain ideas in the background which can be used in drawing loans by a supplier.

In production, suppliers and producers are tightly connected to each other. Without suppliers, it would be hard for producers to bulk sell their goods and without producers, suppliers would face difficulties to find adequate amounts of desired ingredients to prepare their own products for the market.

Money plays an important role when producers and suppliers exchange their goods. However, sometimes companies or producers can use checks for payments and these checks can be long-term. In those situations, producers can have financial difficulties which pushes them to apply to banks for getting loans. Besides that, when the producers and suppliers deal for a product exchange, they tend to have notary confirmation deals to guarantee their incomes. Notary confirmation also plays a crucial role in deals. To get a loan from a bank, the producers and companies have to show a deal and some other documents which are related to assets and payments to the banks. Moreover, banks use a system to check how much credit is given to which producers. These are a mandatory regulation by banks to minimize their risks. Conducted statistics show that over 24 million people are using bank loans (TBB, 2020) and %76.1 of them are related to producers and suppliers (Risk analizi, 2019).

The purpose of the system is to decrease the time of gathering documents related to assets and payments to the banks. While using the system, the bank officer can see the history of the company when the company gives access to their information. The history of the company contains the transaction history of assets, payments and loan information.

Also, another goal of the system is eliminating the notaries. The system uses blockchain and mutual verification for deals to eliminate the struggle of using notaries. When the 2 companies deal for material exchange, this information is added to the company's history.

In this research which named Supplier Finance providing a billing system uses blockchain technology is aimed and this technology not only keeps factories ‘and producer’s data in private but also thanks to blockchain banks will see trustable data about their customers. Moreover, thanks to this technology there would be no need for a notary to confirm and verify the suppliers' documents, if a bank wants insurance for credit.
2. Methodology

In this study, a blockchain application is implemented and the architecture of the system is illustrated in Figure 1.

Figure 1. Subsystem decomposition diagram of the study
2.1. Presentation layer

This layer is used to interact between users and the systems, all UI components are stored within this layer. This layer is basically a web interface and by this interface, users can access the Supplier Finance on their mobile phones and computers.

UI Component application GUI is implemented and buttons, frames and lists stored in this service. Mainframes are: home page, transaction page, document page, application page. Also, login and registration frames are implemented here. All frames are created by one frame manager.

2.2. Application layer

This layer decomposes three components which are Hyperledger, Identity Management and Distributed Mechanism to build blockchain projects. In this part of the project coming actions from the presentation layer and communication inside the system are handled.

Hyperledger Fabric is a framework that is used for implementing decentralized systems, which also supports private, public and shared block structures. In addition, Hyperledger supports distributed ledger mechanisms.

Identity Management is a service which is used for managing documents of users, who can be either supplier, company or bank. Managing will be implemented by identifying and verifying the user's document, by checking whether a particular document corresponds to the respective user.

Distributed Ledger Mechanism is used to implement Supplier Finance. Unlike a traditional system, which is a centralized mechanism, the records of the users who are suppliers, companies or banks are kept on distributed nodes, which helps to verify the block (Hancock and Vaizey, 2016).

2.3. Blockchain layer

This layer contains Consensus Algorithm, OffChain Computing, P2P Transaction and Permission, which implement blockchain technology to our system.

A consensus algorithm is used to make our system reliable. This algorithm is used to get agreement on data between several distributed systems. It is a fault-tolerant algorithm that verifies manipulation on data after each distributed node provides an agreement message (Contributor, 2017).

Off-chain computing encapsulates transactions and the agreements between the company and the supplier are kept on off-chain instead of on-chain. Since on-chain limits the capacity of blockchain projects, off-chain computing provides a scalability feature. It also offers more secure transactions since it is not shared publicly (Kenton, 2018).

2.4. Network layer

This layer contains P2P Network, to connect all peers between each other. This layer provides peer to peer communication among devices.

Peer to peer network (P2P) is used in blockchain technology. The peers are the nodes which represent users of our application. Users are connected to each other through the internet, without any centralized server. Every user can act as a client and server at the same time (Person to Person, 2018).

2.5. Data layer

This layer contains Block Data, Chain Structure, Hash Functions and Asymmetric Encryption for keeping the records of users. In this layer users' data and processes related to the ledger are handled.

The records are kept on blocks and each data block has an address of the computed hash address of the previous block, which makes blocks immutable, and cannot be changed by any user. Each block of data has a shared key for setting the permissions. The chains are made of data blocks, each block is critical for the completeness of the data.

The structure of the chain is composed of connected blocks. The chain keeps the data between connected peers and it is secured by hash functions. The completeness of the chain is secured by the current block having a stored computed hash of the next block (Zheng et al., 2017).

Hash functions are the core of blockchain technology. Hash functions take some input and create hashed output data. It is used to store data blocks of the blockchain, and it is impossible to change this data, since every time a user tries to add or change data, new output by hash functions generated and added to the chain. Moreover, users
of the application can see changes in the chain, if they have access to it. Thus, hash functions are very crucial for implementing blockchain systems (Decentralize.today, 2018).

Asymmetric Encryption service used to separate public and private blocks. In Asymmetric Encryption, two keys are used for encryption and decryption, instead of one. One of these keys can be public and shared with everyone. However, others are private and are given to specific users. In such a way, we became able to implement public and private blocks to our system (Brush et al., 2018).

3. Application of the code

Supplier Finance keeps the suppliers ’ product delivery history in the blockchain and it is only visible to a specific group of users who have connections between each other. The information of the supplier is entered by the company who has unique identities. Therefore, the stored data are reliable and that ensures the manufacturer gives these goods to the company. The manufacturer is supposed to take a salary from this company. All this process is verified in the chain.

In order to take credit, suppliers should assure the bank about the reliability of their data. Therefore, in order to do this, normally, people who want to draw a bank loan will get some bills that prove the manufacturer gives some goods to the company. In our application, we store producers’ data reliable and verified so that banks can reach these trustable data.

The only thing that should be done to prove the manufacturer’s capability to draw a bank loan is to show information from the chain. Supplier Finance is a trustable system for banks to decide to give loans, since the loans that are given to manufacturers by fake credits cannot happen. Moreover, this system also protects the manufacturer from drawing risky loans. Therefore, Supplier Finance promises a reliable and secure system for drawing loans from banks.

In Figure 2 a user’s potential actions are illustrated. In this diagram when a user enters the system, the user can either sign up or log in. After this part users can navigate between pages according to their roles in the program.
Users with a bank account have a chance to see the customers who requested to draw credit from that bank and suppliers can see the banks that can give credit to them and share their money flow history to go to the next step of the drawing loan operation. After completion in the online loan system the blockchain is updated according to the loan that has been drown.

If the user will sign in as a company he/she will be able to see the suppliers list and they will be able to choose a specific supplier from who they had got some good and they will pay them in the future. After choosing them they will be able to add a document and this document will be saved in the suppliers’ blockchain as well.

4. Conclusion

The importance of blockchain technology, especially in the field of finance has been a more essential subject day by day. Using the blockchain is one of the most suitable places in many stages of the banking systems since in these systems security and verification of information is critically important. Thanks to hash functions and distributed features, Supplier Finance guarantees that users’ data will be kept safe. Taking these aspects into consideration, blockchain is reliable and secure enough for loans and bills. Moreover, this system reduces time-consuming procedures. It is expected that The Supplier Finance (Ver_1) application can be used as a useful tool in finance.

References


The Impact of Macroprudential Policy Instruments on Financial Stability

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Abstract
After the Great Financial Crisis of 2007, macroprudential policy gained in recognition as a crucial tool for attaining financial stability. The aim of this paper is to investigate whether specific macroprudential policy instruments can influence credit growth rate, house price growth rate, cyclical fluctuations of the economy, and hence financial stability. We use the fixed effects and the random effects panel regression models to test the following three hypotheses for six euro area economies (Belgium, Cyprus, Germany, Spain, Ireland and Netherlands) during time span 2015 Q1 to 2018 Q4: Macroprudential policy instruments (common equity tier 1 ratio; loans to deposits ratio; non-deposit funding as percentage of total funding; leverage ratio; interconnectedness ratio; and coverage ratio) enhance financial stability, as measured by credit growth (H1), house price growth (H2) and cyclical fluctuations of the economy (H3). Our empirical results suggest that, of the investigated macroprudential policy instruments, common equity tier one ratio, coverage ratio, and interconnectedness ratio exhibit the expected impact on credit growth and cyclical fluctuations of the economy. Moreover, common equity tier one ratio, loans to deposits ratio, and leverage ratio exhibit the expected impact on house price growth. The non-deposit funding ratio does not exhibit the expected impact on any of the response variables. As such, we can only partly confirm our three hypotheses.

Keywords: Macroprudential policy, macroprudential instruments, systemic risk, financial stability

Jel Codes: E58, G28, E60, E44

1. Introduction
In this paper we investigate the impact of macroprudential policy instruments on financial stability. Financial stability is defined as a condition in which the financial system, consisting of markets, financial intermediaries and market infrastructures, does not yield to adverse impacts of shocks and financial imbalances. The financial system-wide distress is limited and financial intermediation process is not disrupted to the extent where the real economy could be adversely affected (Borio, 2011; ECB, 2020a). Financial stability requires that the financial system be resilient to external shocks as well as to the shocks originating from within the financial system (Galati and Moessner, 2011). The main costs of financial instability come about as output losses (Crockett, 2012). The formation of possible systemic risks in the financial system is monitored and countered through macroprudential policies. The first and foremost goal of macroprudential policy is achieving and maintaining financial stability by reducing systemic risk stemming from excessive procyclicality in the financial sector, from interconnections and other cross-sectional factors (ECB, 2020a; Claessens, 2014). It strives to ensure that financial system does not magnify a downturn in the real economy — for instance, by financial institutions having to reduce the supply of credit in a stress situation (Aikman et al., 2019). The ultimate target of macroprudential policy is not to eliminate recessions altogether, but rather to prevent the financial system from creating shocks that set off recessions and from magnifying shocks that make recessions worse (Aikman et al., 2019). The key is the preventive, ex-ante reaction to the build-up of systemic risk. Systemic crises come about as a result of the build-up of financial

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effects on the real economy are (partly) risk-taking and interconnections across financial institutions, which lead to systemic risk. First, the causes of systemic risk need to be identified, and therefore they need to be corrected by specific macroprudential tools and instruments. The evidence on the effectiveness of specific macroprudential tools is slowly starting to accumulate in the economics profession; however, there is still much to be done (Claessens, 2014). Our paper is a contribution to this field.

The aim of this paper is to examine the impact of six macroprudential policy instruments (common equity tier 1 ratio (CET); loans to deposits ratio (LDR); non-deposit funding as percentage of total funding (NDF); leverage ratio (LR); interconnectedness ratio (INR); and coverage ratio (CR)) on financial stability (as measured by credit growth rate (CGR) and house price growth rate (HPGR)) and on cyclical fluctuations of the economy (as measured by the amplitude of the deviations of the actual economic growth rate from its long-run trend (DEG)) in six euro area countries (Belgium, Cyprus, Germany, Spain, Ireland and Netherlands) over sixteen quarters (from 2015 Q1 (inclusive) to 2018 Q4 (inclusive)).

2. The theoretical background of empirical analysis

Macroprudential approach to financial stability sees risk as endogenous – that is, contingent on the behavior of all institutions comprising the financial system. Institutions influence the prices of financial assets, the quantities borrowed and lent, and consequently the resilience of the economy and hence the strength of the institutions themselves. From the macroprudential perspective, for the soundness of the financial system as a whole it is not necessary nor sufficient that each individual institution be sound (Borio, 2011). What is important from the macroprudential perspective is the existence of correlated (common) exposures, diversification and pro-cyclicality (in other words, how system-wide risk can be magnified by interactions between the financial system and the real economy as well as by interactions within the financial system). During booms, higher risk appetite and overall favorable market conditions lead to overextension of balance sheets. On the other hand, in contractionary periods financial distress leads to deleveraging, thus magnifying financial stress. The aim of macroprudential policy, tools, instruments and measures is therefore to build up (capital and liquidity) buffers in expansionary periods such that they can be drawn down in periods of financial distress. This dampens pro-cyclicality of the financial system, which in turn improves financial stability (Borio, 2011).
The first time the term “macroprudential” was used in an official report was in 1986 when the Cross Report was published (BIS, 1986; Bini-Smaghi, 2009ab; Maes, 2010). In the Cross Report, the goal of the macro-prudential policy was defined as “the safety and soundness of broad financial system and payments mechanism”. In order to prevent future financial crises, it is indispensable to combine both microprudential and macroprudential approach to financial stability. This is because the causes of the crises are often such that they cannot be prevented or mitigated by relying only on microprudential or only on macroprudential policy instruments. Especially since the Great Financial Crisis of 2007 there has been an increasing focus of policymakers and academics on macroprudential approach to financial stability, as they have recognized that only by “marrying” both approaches do we stand a chance of preventing or at least reducing the likelihood of future crises (Knight, 2006; White, 2006; Borio, 2003). There are still many unknowns involved in using macroprudential policy tools. According to Mérö (2017), macroprudential targets are slightly ambiguous (decreasing systemic risk versus increasing macroprudential shock-absorbing capacity of banks); we do not yet know or have evidence if the new macroprudential rules are suitably calibrated; if the usage of new instruments amplifies possibilities for regulatory arbitrage; what are the interactions between macroprudential and monetary policy; and if the usage of macroprudential tools can create certain risks – for instance those which arise from economic agents increasingly resorting to the use of unregulated shadow banking that is (currently) outside the purview of macroprudential legislation. Our paper is a contribution to investigating the effectiveness of (certain) macroprudential policy instruments, measures, rules and tools, and hence to closing some of the existing gaps in the economic scientific community.

While most of the research centered around macroprudential policy argues for its usage and necessity, and presents its advantages and complementarities to other policies, as well as makes the case for how other available policies (notably monetary policy) are ill-suited for fulfilling the financial stability objective, Malz (2019) puts forward the argument that macroprudential policy cannot rectify the existing regulatory system which increases risks to financial stability. According to Malz (2019), banks are inadequately capitalized and possibly overly leveraged; moreover, the big banks are too opaque and complex for their risks to be properly analyzed and understood. The safety nets and the possibility of a bailout exacerbate the too-big-to-fail (TBTF) and moral hazard problems. The aforementioned problems should be addressed at the root instead of through additional policies and rules. The rationale for macroprudential policy presumes that policymakers have access to unrealistically detailed and broad knowledge about the financial system, and the ability to correct certain systemic weaknesses in a predictable manner. First banks should be stabilized, better capitalized, the implicit and explicit public sector guarantees should be abolished, and only thereafter, if needed, could specific tools be designed to complement monetary policy (Malz 2019). The view of Malz (2019) contradicts most of the existing research on macroprudential policy. This notwithstanding, opposing views must be discussed and considered, as they may also have merit.

Macroprudential policy measures can be split into (ECB, 2020bc; Claessens, Ghosh and Mihet, 2013; Galati and Moessner, 2011; Ebrahimi Kahou and Lehar, 2017):

- capital-based measures (e.g. capital buffers for global systemically important institutions and other systemically important institutions; countercyclical capital buffer to prevent the cyclical build-up of systemic risks; systemic risk buffer; leverage restrictions);
- liquidity-based measures (liquidity coverage ratio and net stable funding ratio; time-varying systemic liquidity surcharges);
- borrower-based measures, instrument-based measures and activity-based measures which restrict lending (e.g. for mortgages at the level of individual borrower; limits on large exposures; countercyclical change in risk weights for real estate exposures and intra-financial sector exposures; time-varying caps on debt-to-income ratio (DTI), loan-to-income ratio (LTI), loan-to-deposit ratio (LTD) and loan-to-value ratio (LTV); through-the-cycle valuation of margins or haircuts for repos; limits on lending to sectors; time-varying limits on credit growth; adjustments to specific loan-loss provisioning such as dynamic provisioning; restrictions on asset composition and activities);
- restrictions on financial sector balance sheet (time-varying limits on foreign exchange and interest rate mismatches; reserve requirements; institution-specific limits on (bilateral) financial exposures);
- taxation and levies (tax on specific assets and/or liabilities; levy on non-core liabilities); and
- additional disclosure requirements.
In this paper we shall investigate whether regulatory changes in macroprudential policy instruments are more procyclical (accentuate cyclical fluctuations in economic growth rate) or more counter-cyclical (dampen cyclical fluctuations in economic growth rate) and thus worsen or improve financial stability.

3. Empirical analysis: Empirical literature overview, data specification, methodology, empirical results and discussion

We investigate the impact of six macroprudential policy instruments (common equity tier 1 ratio (CET); loans to deposits ratio (LDR); non-deposit funding as percentage of total funding (NDF); leverage ratio (LR); interconnectedness ratio (INR); and coverage ratio (CR)) on financial stability (as measured by credit growth rate (CGR) and house price growth rate (HPGR)) and on cyclical fluctuations of the economy (as measured by the amplitude of the deviations of the actual economic growth rate from its long-run trend (DEG)) by using the panel regression method. The purpose of our study is to establish if macroprudential policy instruments can indeed enhance financial stability and dampen cyclical fluctuations of the economy.

The choice of explanatory variables in the model reflects the evidence provided by the large body of empirical literature. Moreover, when selecting explanatory variables, we considered the availability of the data in the databases of ECB SDW, Eurostat, IMF and OECD.

Clancy and Merola (2017) empirically shed light on the effectiveness of countercyclical capital regulation in small open economies that do not have access to traditional stabilization mechanisms such as nominal interest rates and exchange rate (because of a pegged exchange rate regime or because of them being members of a monetary union). The authors use the data for the Irish economy and the recent housing crash episode. The results of the study indicate that a proactive use of the countercyclical capital regulation (as manifested in Basel III regulation) which responds to credit growth can smooth economic fluctuations and mitigate adverse effects of boom-boost cycles. If banks are required to build up capital buffers in times of economic boom, the damage from a subsequent contraction is attenuated.

Morgan et al. (2019) examine the effectiveness of the loan-to-value (LTV) ratio on housing loans by using a sample of 46 countries and 4000 banks from these countries. The findings of the study are that the LTV policy successfully reduces mortgage loans (by 5.9% after one year). The usage of other macroprudential tools may have a complementary effect to LTV, in particular for large banks. The LTV policy is less effective for large banks and for banks with a large portfolio of nonperforming loans. This finding is discouraging, since housing loans should be reduced in precisely these two types of banks. Another macroprudential tool which is found to be statistically significant, are the limits on domestic currency loans – this tool reduces mortgage loans by 11.6% (after one year of the implementation of the measure).

Davis, Liadze and Piggott (2019) make another contribution to evaluating the effectiveness of macroprudential tools by investigating the impact of two macroprudential policies (loan-to-value ratios and bank capital adequacy targets) on the likelihood of occurrence of a banking crisis and net economic benefits with a focus on three countries – UK, Italy and Germany. The loan-to-value simulation predominantly impacts consumption and the housing market, whereas the capital adequacy simulation has a more significant effect on investment and output. Both simulations increase bank capital ratios and curb bank lending. The findings of the study suggest that, overall, the loan-to-value tool has a lower effect than capital adequacy on the probability of a banking crisis occurring and leads to lower net benefits. The introduction of macroprudential policy measures before the onset of the crisis leads to an improvement in key macroeconomic measures and might therefore prevent the crisis from materializing.

Akinci and Olmstead-Rumsey (2018) examine the effectiveness of macroprudential policies in limiting credit growth and house price growth by using a dynamic panel data model for 57 economies and the time period 2000–2013. To this end, the authors develop new indices for seven macroprudential tools (LTV limits, DSTI limits, other housing measures, time-varying capital requirements, provision requirements, consumer loan limits, and credit growth ceilings). The findings of the study suggest that macroprudential tightening dampens bank credit growth, housing credit growth, and house price appreciation. Macroprudential policies targeting the housing sector appear to be more effective at constraining housing credit growth and house price appreciation, in particular in economies where bank finance is of greater importance. Counterfactual simulations indicate that, if the countries had not used any macroprudential policy measures in the period 2011–2013, the bank credit growth, housing credit growth and house price appreciation would have been substantially higher.
Zhang and Zoli (2014) construct several macroprudential policy indices to study the impact of macroprudential policy and capital flow measures on macro financial variables (and, hence, on systemic risk) in 46 economies between 2000 and 2013. Panel regressions demonstrate that the usage of macroprudential instruments (of which the most effective were found to be loan-to-value ratios, housing tax, and foreign currency-related measures) and capital flow measures has indeed reduced housing price growth, equity flows, credit growth, and bank leverage. Only housing-related measures were found to have had a significant effect on curbing credit growth. A surprising finding of the study is that changes in reserve requirements and in capital buffer rates were not found to have had any significant impact on credit growth.

Brzoz-Drezina, Kolasa and Makarski (2015) empirically examine if macroprudential policy (in particular, changes in the loan-to-value (LTV) ratio) in the peripheral euro area countries could enhance macroeconomic stability in the same countries. The findings of the study indicate that macroprudential policy can significantly reduce credit and output volatility in peripheral euro area countries. When maximization of household welfare is taken as the criterion for optimal macroprudential policy, similar conclusions are reached. For macroprudential policy to be efficient as a stabilizing tool and to prevent desynchronization of financial cycles between the core and the peripheral euro area economies, it should be applied in a decentralized manner (instead of in a common manner in both the core and the periphery).

Rubio (2020) considers a two-country DGSE model with housing and credit constraints to study an increase in bank flows to those banks with lower regulatory levels, known as “leakage”. This happens due to a lack of reciprocity of macroprudential instruments between domestic banks in the domestic economy and foreign banks in the domestic economy and leads to less effective macroprudential policies, thereby compromising financial stability. In the study, macroprudential policies are represented by the countercyclical loan-to-value ratio. The findings suggest that financial stability and welfare gains are larger when there exists a reciprocity agreement on macroprudential policy across countries. Reciprocity mechanisms are needed for optimal effectiveness of macroprudential policy, although the severity of macroprudential rules implemented by the foreign lenders in the domestic economy does not need to be as high as the one implemented by domestic lenders, since borrowers prefer domestic lenders.

Aikman et al. (2019) argue that a robust macroprudential policy regime might have prevented the last financial crisis. A macroprudential framework with a stringent mandate and powers to adjust financial system leverage and maturity/liquidity transformation as well as to limit household sector indebtedness could have substantially weakened the negative macroeconomic effects ensuing from the bursting of the real estate bubble in the last financial crisis. Especially three factors made the last financial crisis so calamitous: Excessive indebtedness in the household sector, an increase in short-term funding sources (relative to the amount of stable, long-term funding sources) at financial institutions, and an increase in leverage at financial intermediaries. These vulnerabilities can explain between two thirds and three quarters of the fall in the US GDP which occurred as a result of the financial crisis.

Taylor and Zilberman (2016) shed light on the roles of macroprudential policy and monetary policy in a model with financial frictions, such as credit risk, bank losses and bank capital costs. In the presence of credit shocks, macroprudential countercyclical regulation is found to be more effective than monetary policy in achieving price, financial and macroeconomic stability. In this setting, the unfavorable procyclical spillover consequences of a financial shock are completely eliminated by a countercyclical response to credit risk which restores the equilibrium price of credit. In the face of supply shocks, a combination of macroprudential regulation with monetary (anti-inflationary) policy proves to be most efficient. In this setting, a countercyclical response to credit risk makes it possible for the policymaker to resist to supply shocks, but not to eliminate them altogether. The source of economic shocks thus first needs to be identified for the policymakers to be able to take the right decisions about macroprudential and monetary policy response. The results of the study lead us to believe that the macroprudential provisions of Basel III standards are needed and effective in moderating the output-inflation trade-off.

All the data used in our econometric analysis were extracted from the publicly accessible databases: ECB’s SDW – Statistical Data Warehouse of the European Central Bank (SDW, 2020) and Eurostat (Eurostat, 2020). We are using aggregate data for the whole financial system of a particular economy. The period considered is 2015 Q1 (inclusive) to 2018 Q4 (inclusive). The countries included in our analysis are Belgium, Cyprus, Germany, Spain, Ireland and Netherlands. The selection of the time period and economies included in our analysis was partly motivated by the availability of the data. The following explanatory variables are employed in our paper (all retrieved from the ECB’s SDW database):
- \( CET = \) common equity tier 1 ratio, measured as the amount of CET 1 capital divided by risk-weighted assets;
- \( LDR = \) loans to deposits ratio, measured as total loans, divided by total deposits;
- \( NDF = \) non-deposit funding as percentage of total funding, measured as the non-deposit funding, divided by the total funding;
- \( LR = \) leverage ratio, measured as total assets divided by total equity;
- \( INR = \) interconnectedness ratio, measured as interbank loans divided by total bank assets;
- \( CR = \) coverage ratio for non-performing exposures, measured as loan-loss provisions divided by non-performing exposures.

The response variable in our first econometric model (\( M_1 \)) which tests the first hypothesis (\( H_1: \) “Macroprudential policy instruments enhance financial stability, as measured by credit growth.”) is:

\[
CGR = credit\ growth\ rate,\ measured\ by\ domestic\ credit-to-GDP\ gap
\]

The response variable in our second econometric model (\( M_2 \)) which tests the second hypothesis (\( H_2: \) “Macroprudential policy instruments enhance financial stability, as measured by house price growth.”) is:

\[
HPGR = house\ price\ growth\ rate
\]

The response variable in our third econometric model (\( M_3 \)) which tests the third hypothesis (\( H_3: \) “Macroprudential policy instruments reduce cyclical fluctuations of the economy, as measured by the amplitude of the deviations of the actual economic growth rate from its long-run trend, thereby contributing to financial stability.”) is:

\[
DEG = deviation\ of\ the\ real\ GDP\ growth\ rate\ from\ the\ long-run\ trend\ rate\ of\ growth
\]

CGR data were retrieved from the Statistical Data Warehouse of the ECB, whereas HPGR and GDP data were retrieved from Eurostat.

In order to test the three hypotheses of our paper, we employ the quantitative research method of panel econometrics. Panel regression renders it possible to study variables having both the space dimension (in our case several countries) as well as the time dimension (in our case several quarters). Furthermore, panel regression controls for omitted variables, alleviates the problem of collinearity among explanatory variables, dismisses heterogeneous effects, and may reduce measurement errors and endogeneity bias by including the lags of the regressors. The problem of spurious regression can be circumvented by using the differences of the variables expressed as percentage changes (Festić, 2015; Hahn and Hausman, 2002; Murray, 2006). The stationarity of the times series is verified with Augmented Dickey-Fuller (ADF) test. All of our variables are stationary at first difference, however, most of them are not stationary at level (Table 1). Since the linear combination of the series in a regression analysis should be at the highest order of integration, all our time series are integrated of order one, i.e. I(1). We tried introducing the logarithmic form and lags to our models; however, these models proved to be less statistically significant and less robust than the models we present in this paper. We test both fixed effects models and the random effects models and verify their statistical significance (p-values) with redundant fixed effects test and with Hausman test (Hausman, 1978).
Table 1. Unit root test (Fisher ADF-test).

<table>
<thead>
<tr>
<th>Response and explanatory variables</th>
<th>Level (x)</th>
<th>First difference d(x)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADF-Fisher Chi-square statistic</td>
<td>ADF-Fisher Chi-square statistic</td>
</tr>
<tr>
<td></td>
<td>(ADF-Fisher Chi-square probability)</td>
<td>(ADF-Fisher Chi-square probability)</td>
</tr>
<tr>
<td>CGR</td>
<td>13.2965 (0.3479)</td>
<td>70.8197 (0.0000)</td>
</tr>
<tr>
<td>HPGR</td>
<td>74.8063 (0.0000)</td>
<td>88.6962 (0.0000)</td>
</tr>
<tr>
<td>DEG</td>
<td>15.3016 (0.2254)</td>
<td>71.0383 (0.0000)</td>
</tr>
<tr>
<td>CET</td>
<td>11.9982 (0.4458)</td>
<td>71.0925 (0.0000)</td>
</tr>
<tr>
<td>LDR</td>
<td>11.0842 (0.5217)</td>
<td>47.9746 (0.0000)</td>
</tr>
<tr>
<td>LR</td>
<td>6.74768 (0.8738)</td>
<td>71.2775 (0.0000)</td>
</tr>
<tr>
<td>NDF</td>
<td>10.2671 (0.5925)</td>
<td>35.9455 (0.0003)</td>
</tr>
<tr>
<td>CR</td>
<td>5.87756 (0.9221)</td>
<td>54.8494 (0.0000)</td>
</tr>
<tr>
<td>INR</td>
<td>4.92658 (0.9604)</td>
<td>88.1111 (0.0000)</td>
</tr>
</tbody>
</table>

Notes: P-values for the Fisher-ADF panel unit root test are computed using the asymptotic Chi-square distribution and given in brackets. The maximum number of lags was automatically selected with Schwarz Information Criterion.

We assume that an increase in common equity tier 1 ratio (CET) will have a negative effect on credit growth, on house price growth, and on the amplitude of the deviations of the actual economic growth rate from its long-run trend, thereby enhancing financial stability.

We expect that an increase in the loan-to-deposit ratio (LDR) will have a positive effect on credit growth, on house price growth, and on the amplitude of the deviations of the actual economic growth rate from its long-run trend, thereby undermining financial stability.

Our conjecture is that an increase in the leverage ratio (LR), measured as total assets divided by total equity, will have a positive impact on credit growth, on house price growth, and on the amplitude of the deviations of the actual economic growth rate from its long-run trend, thereby compromising financial stability.

We expect that an increase in non-deposit funding expressed as a percentage of total funding (NDF) will have a positive effect on credit growth, on house price growth, and on the amplitude of the deviations of the actual economic growth rate from its long-run trend, thereby endangering financial stability.

We surmise that an increase in the coverage ratio (CR) will have a negative effect on credit growth, on house price growth, and on the amplitude of the deviations of the actual economic growth rate from its long-run trend, thereby enhancing financial stability.
We suppose that an increase in bank interconnectedness ratio (INR) will have a positive effect on credit growth, on house price growth, and on the amplitude of the deviations of the actual economic growth rate from its long-run trend, thereby undermining financial stability.

The expected impact of an increase in individual explanatory variables on credit growth rate and on financial stability is depicted in Table 2.

Table 2. The expected impact (positive or negative) of a unit increase in individual explanatory variables on credit growth rate, house price growth rate, deviation of actual economic growth rate from its long-run trend rate of growth, and on financial stability and the expected signs of regression coefficients.

<table>
<thead>
<tr>
<th>Explanatory variable experiencing a one-unit increase</th>
<th>Impact on CGR, HPGR and DEG (expected sign of the regression coefficient)</th>
<th>Impact on financial stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>CET</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>LDR</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>LR</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>NDF</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>CR</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>INR</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

Notes: A plus (+) implies a positive impact; whereas a minus (-) stands for a negative effect.

Empirical results, laid down in Table 3, indicate that period fixed effects as well as cross-sections fixed effects and period fixed effects together are present in the first model (with DCGR as regressand), since the F probability is less than 0.1. On the other hand, cross-section fixed effects alone do not seem to be present in the first model, given that the F probability is greater than 0.1. Hence, the results of the cross-section fixed effects model shall not be taken into account in the evaluation of Hypothesis 1. Given the high p-value of the Hausman correlated random effects test for period random effects and the low p-value of the redundant fixed effects test for period fixed effects, both period fixed effects and period random effects models produce consistent estimators. Regarding the first hypothesis (an increase in CET has a negative effect on CGR; an increase in LDR has a positive effect on CGR; an increase in LR has a positive effect on CGR; an increase in NDF has a negative effect on CGR; an increase in CR has a negative effect on CGR; an increase in INR has a positive effect on CGR), we can only partially confirm it, given that the results of the first empirical model indicate that an increase in CET has a negative effect on CGR (thus confirming our first hypothesis); an increase in LDR has a negative effect on CGR (thus rejecting our first hypothesis); an increase in LR has a negative effect on CGR (thus rejecting our first hypothesis); an increase in NDF has a negative effect on CGR (thus rejecting our first hypothesis); an increase in CR has a negative effect on CGR (thus confirming our first hypothesis); an increase in INR has a positive effect on CGR (thus confirming our first hypothesis). Furthermore, CET, LDR and NDF are statistically significant in all models and INR is statistically significant in the cross-section fixed effects model. On the other hand, the constant, LR and CR are not statistically significant in any of the models. All models as a whole are statistically significant with R-squared ranging from 0.19 to 0.44. Since only three regressors (out of six) have the signs predicted by Hypothesis 1, we can only partly confirm Hypothesis 1.

Regarding the second model (with DHPGR as regressand), only period fixed effects are present, since the F probability is less than 0.1. On the other hand, cross-section fixed effects alone and cross-sections fixed effects and period fixed effects together do not seem to be present in the second model, given that the F probability is greater than 0.1. Given the high p-value of the Hausman correlated random effects test for period random effects and the low p-value of the redundant fixed effects test for period fixed effects, both period fixed effects and period random effects models produce consistent estimators. That said, since R-squared (0.34) is sufficiently high only in the period fixed effects model and since redundant fixed effects test confirms the presence of fixed effects in the period fixed effects model, we will in the evaluation of Hypothesis 2 take into account only the results of the period fixed effects model. Regarding the second hypothesis (an increase in CET has a negative effect on HPGR; an increase in LDR has a positive effect on HPGR; an increase in LR has a positive effect on HPGR; an increase in NDF has a positive effect on HPGR; an increase in CR has a negative effect on HPGR; an increase in INR has
a positive effect on HPGR), we can only partially confirm it, given that the results of the second empirical model indicate that an increase in CET has a negative effect on HPGR (thus confirming our second hypothesis); an increase in LDR has a positive effect on HPGR (thus confirming our second hypothesis); an increase in LR has a positive effect on HPGR (thus confirming our second hypothesis); an increase in NDF has a negative effect on HPGR (thus rejecting our second hypothesis); an increase in CR has a positive effect on HPGR (thus rejecting our second hypothesis); an increase in INR has a negative effect on HPGR (thus rejecting our second hypothesis). Furthermore, none of the explanatory variables are statistically significant. Only the period fixed effects model as a whole is statistically significant (with p-value of 0.04). Since only three regressors (out of six) have the signs predicted by Hypothesis 2 (in the period fixed effects model), we can only partly confirm Hypothesis 2.

Regarding the third model (with DDEG as regressand), only the cross-section fixed effects are present, since the F probability is less than 0.1. On the other hand, period fixed effects alone and cross-section fixed effects and period fixed effects together do not seem to be present in the first model, given that the F probability is greater than 0.1. Given the high p-value of the Hausman correlated random effects test for period random effects and the high p-value of the redundant fixed effects test for period fixed effects, only the period random effects model produces consistent estimators. Since only cross-section fixed effects model and period random effects model contain fixed and random effects, respectively, and since they are statistically significant as a whole (with p-values of 0.01 and 0.02, respectively and R-squared of 0.24 and 0.15, respectively), we will in the evaluation of Hypothesis 3 take into account only the results of the cross-section fixed effects model and of the period random effects model. Regarding the third hypothesis (an increase in CET has a negative effect on DEG; an increase in LDR has a positive effect on DEG; an increase in NDF has a positive effect on DEG; an increase in CR has a negative effect on DEG; an increase in INR has a positive effect on DEG), we can only partially confirm it, given that the results of the third empirical model indicate that an increase in CET has a negative effect on DEG (thus confirming our third hypothesis); an increase in LDR has a negative effect on DEG (thus rejecting our third hypothesis); an increase in NDF has a positive effect on DEG (thus rejecting our third hypothesis); an increase in CR has a negative effect on DEG (thus rejecting our third hypothesis); an increase in INR has a positive effect on DEG (thus confirming our third hypothesis). Furthermore, the constant and NDF are statistically significant in all models. The rest of the explanatory variables are not statistically significant. Since only three regressors (out of six) have the signs predicted by Hypothesis 3 (in the cross-section fixed effects model and in the period random effects model), we can only partly confirm Hypothesis 3.

Overall, based on the empirical results, we:

- Partly confirm Hypothesis 1: “Macroprudential policy instruments (common equity tier 1 ratio; loans to deposits ratio; non-deposit funding as percentage of total funding; leverage ratio; interconnectedness ratio; and coverage ratio for non-performing exposures) enhance financial stability, as measured by credit growth.”

- Partly confirm Hypothesis 2: “Macroprudential policy instruments (common equity tier 1 ratio; loans to deposits ratio; non-deposit funding as percentage of total funding; leverage ratio; interconnectedness ratio; and coverage ratio for non-performing exposures) enhance financial stability, as measured by house price growth.”

- Partly confirm Hypothesis 3: “Macroprudential policy instruments (common equity tier 1 ratio; loans to deposits ratio; non-deposit funding as percentage of total funding; leverage ratio; interconnectedness ratio; and coverage ratio for non-performing exposures) reduce cyclical fluctuations of the economy, as measured by the amplitude of the deviations of the actual economic growth rate from its long-run trend, thereby contributing to financial stability.”

It seems that the empirical results vary to some extent in relation to the chosen empirical research method, as demonstrated in Table B with empirical research overview. Moreover, it appears that the empirical results are contingent also on the choice of individual macroprudential policy instruments; time period; and set of economies. Our empirical results indicate that macroprudential policy instruments have a certain impact on financial stability; however, more research is needed into, for instance, why different models are more appropriate (statistically significant) for different response variables. In particular, period fixed effects; cross-section fixed and period fixed effects model; and period random effects model were suitable for the analysis of the impact of explanatory variables on CGR as the response variable; only period fixed effects model was suitable for the analysis of the impact of explanatory variables on HPGR as the response variable; only cross-section fixed effects model and
period random effects model were suitable for the analysis of the impact of explanatory variables on DEG as the response variable. Furthermore, certain macroprudential policy instruments appear to influence credit growth, house price growth, and cyclical fluctuations of the economy differently from our expectations. For instance, we would expect that an increase in the non-deposit funding (as percentage of total funding) increases credit growth, house price growth, and amplifies cyclical fluctuations of the economy, thereby undermining financial stability. However, our empirical results indicate that the opposite is the case. A plausible explanation for this could be that in economic downturns, when credit growth is lower or negative and when more people lose their jobs and when salary increases are hard to come by, the retail depositors do not have excess liquidity to deposit with banks, hence the banks start relying more on non-deposit funding sources. In this case the causal relationship goes from the state of the economy (credit expansion or contraction) to the changes in the calibration of macroprudential instruments (in this case the maximum allowed non-deposit funding as percentage of total funding). This possibility, however, goes beyond the scope of our present research and may be tackled in the future.

Table 3. Empirical Results

<table>
<thead>
<tr>
<th>Model no.</th>
<th>Response variable</th>
<th>Explanatory variable/statistics</th>
<th>Cross-section fixed effects</th>
<th>Period fixed effects</th>
<th>Cross-section random effects and period fixed effects</th>
<th>Cross-section random effects</th>
<th>Period random effects</th>
<th>Cross-section random effects and period random effects</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DCCG</td>
<td>C</td>
<td></td>
<td>-0.677346</td>
<td>-0.991081</td>
<td>-0.833189</td>
<td>Not possible to estimate, since random effects estimation requires number of cross sections &gt; number of coefs for between estimator for estimate of RE innovation variance.</td>
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<td>(0.644290)</td>
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<tr>
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<td>(0.0520)**</td>
<td>(0.0155)**</td>
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<td>Prob. (F-statistic)</td>
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<td>Redundant fixed effects test (F prob.)</td>
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<td>Hausman correlated random effects test (Chi-square prob.)</td>
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<td>DHPGR</td>
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<td>Not possible to estimate, since random effects estimation requires number of cross sections &gt; number of coefs for between estimator for estimate of RE innovation variance.</td>
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<td></td>
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<tr>
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<td>(0.245279)</td>
<td></td>
<td>(0.087651)</td>
<td>(0.477953)</td>
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</table>
coefficients and the p-values are taken at first difference for stationarity. The t-statistics are given in brackets below the coefficients since random effects estimator requires number of cross sections > number of coefficients for between estimator for estimate of RE innovation variance.

**Not possible to estimate, since random effects estimation requires number of cross sections > number of coefficients for between estimator for estimate of RE innovation variance.**

### Notes:
In the table, all regressors and regressands have a >0 in front of their name (e.g. CGR becomes DCGR), since all variables are taken at first difference for stationarity. The t-statistics are given in brackets below the coefficients and the p-values are in brackets below the t-statistics. Significance levels are denoted as:

** *** Significant at 1%.

** ** Significant at 5%.

* Significant at 10%.
4. Conclusion

After the Great Financial Crisis of 2007, macroprudential policy instruments have gained in recognition as a crucial tool for enhancing financial stability. Monetary policy, fiscal policy, and microprudential policy operate with a different toolkit and focus on achieving goals other than stability of the financial system as a whole. In light of this, a fourth policy – namely macroprudential policy – is required to mitigate and prevent shocks that could destabilize the financial system as a whole and compromise financial stability. Since macroprudential policy came to the forefront of the economic profession only recently, the evidence on the effectiveness of specific macroprudential tools is still scarce. Our paper is a contribution to this field.

We tested three hypotheses: H1: Macropuarlential policy instruments (common equity tier 1 ratio; loans to deposits ratio; non-deposit funding as percentage of total funding; leverage ratio; interconnectedness ratio; and coverage ratio for non-performing exposures) enhance financial stability, as measured by credit growth. H2: Macroprudential policy instruments (common equity tier 1 ratio; loans to deposits ratio; non-deposit funding as percentage of total funding; leverage ratio; interconnectedness ratio; and coverage ratio for non-performing exposures) enhance financial stability, as measured by house price growth. H3: Common equity tier 1 ratio; loans to deposits ratio; non-deposit funding as percentage of total funding; leverage ratio; interconnectedness ratio; and coverage ratio for non-performing exposures) reduce cyclical fluctuations of the economy, as measured by the amplitude of the deviations of the actual economic growth rate from its long-run trend, thereby contributing to financial stability.

Our empirical results suggest that, of the investigated macroprudential policy instruments, common equity tier one ratio, coverage ratio, and interconnectedness ratio exhibit the predicted impact on credit growth rate and on the deviation of the actual economic growth rate from its long-run trend. Furthermore, common equity tier one ratio, loans to deposits ratio, and leverage ratio exhibit the predicted impact on house price growth rate. The non-deposit funding ratio does not exhibit the expected impact on any of the response variables. Hence, we can only partly confirm hypotheses 1, 2 and 3.

Avenues for future research are the inclusion of additional macroprudential policy instruments in our models; the usage of different empirical research methods; as well as a consideration of different time periods and different sets of economies.

References


Winners and Losers of the COVID-19: An Empirical Analysis of the NASDAQ-100

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Abstract
The aim of this paper is to present empirical evidence of the impact of the announcement of the COVID-19 pandemic on technology firms. This study focuses on technology companies due to the importance that this sector has acquired in this period, especially due to the digital transformation that many companies and citizens have been forced to implement due to restrictions caused by the pandemic. As a secondary objective, this work analyzes the impact of the announcement of the COVID-19 pandemic on the rest of the Nasdaq-100 sectors. The methodology used is the event study. We also use Ordinary Least Squares (OLS) regression to observe possible significant differences in the reactions of the analysed sectors. Our findings evidence different behaviours in the sectors of the Nasdaq-100. Specifically, only those shares from the technology sector had a positive and significantly reacted to the COVID-19 announcement. These conclusions are significant for agents of the economy in order to better decisions.

Keywords: COVID-19, Financial market, IT sector, Nasdaq-100

Jel Codes: G01, G12, G14, L86

1. Introduction
A novel coronavirus (COVID-19) emerged in Wuhan (China) in December 2019, and quickly spread worldwide. For instance, the first confirmed case in USA was on January 21st, 2020; in Europe was on January 24th, in France; on January, 31th, in UK; and a little later, on February 26th, Brazil confirmed the first case in Latin America, (Georgeou and Hawksley, 2020). The virus caused nearly 2 million deaths in the world and more than 90 million infected in less than one year (as of January 15, 2021), (Center for Systems Science and Engineering at Johns Hopkins University, 2021). Its spread and severity were so relevant, that on March 11th, 2020, the World Health Organization (WHO) announced the COVID-19 global pandemic, being the first pandemic caused by coronavirus.

Worldwide governments undertook policies to reduce the pandemic and avoid the collapse of healthcare systems, such as home confinement or numerous societal constraint policies for both companies and individuals. All this has caused a reduction in production and consumption, including the closure of many businesses and an increase in poverty in the countries (Leduc and Liu, 2020). This led to a combined crisis, a healthcare one, but also a financial-economic one, since the collapse of the world’s economic activity. The negative impact of this healthcare crisis on the economy is much greater than the impact caused by the financial crisis of 2008 (Georgieva, 2020; Shehzad and Others, 2020a), affecting the western economies (Shehzad and Others, 2020b). Thus, the effects of this pandemic are thought to last decades and is considered to be the worst downturn since the end of the World War II (World Bank, 2020).

Nevertheless, society has known how to soften the impact of the coronavirus pandemic through digitisation, especially in sectors such as education, retail, health, or, in general, teleworking, which has come to stay in many companies. In addition, work and personal relationships have been forced to use videoconferencing platforms. And not only that, but, in the workplace, new technologies have evolved with the pandemic due to process automation, cybersecurity, the introduction of artificial intelligence as a management tool, and the growth of the
internet of things. All this fast progress towards digitization have had a positive effect on the technology industry (IT) herein studied.

Accordingly, we can affirm that the main event that have marked both society and the economy in 2020 is the announcement of COVID-19 as a world pandemic.

The primary objective of this paper is to examine the effects that this event has had on technology firms in comparison with other sectors. This is supported by the relevance that the IT sector has gained (Alcaide and Others, 2019), especially in 2020, due to the digital revolution of consumers and companies have had to apply and enhance in order to keep developing their work as a consequence of the limitations occasioned by the pandemic. The second goal of this contribution is to research the impact of the above-mentioned event on the rest of industries by a cross-sectional study.

The research was carried out on the Nasdaq-100, as the index experienced the highest revaluation compared to others in 2020, about 38% (Expansión, 2020). In addition, the Nasdaq-100 is the stock index made up of a greater number of IT technology companies.

2. Literature review

The existing literature is limited on how pandemics impact financial markets (Goodell, 2020), however, and in spite of COVID-19 is a young virus, the literature studying its impact on financial markets is growing rapidly (Qiu and Others, 2021; Heyden and Heyden, 2020; Liu and Others, 2020; Ramelli and Wagner, 2020) as a consequence of the strong impact it has had around the world.

Despite this, there are only three papers that study impact of COVID-19 on the IT sector (Alam and Others, 2020; He and Others, 2020; Sherif, 2020).

The first research investigates the initial volatility and sector performance of eight sectors of the Australian equity market. Study findings show that the pharmaceuticals, food and healthcare indices show exhibit impressive positive returns on the day of the announcement, while the transportation and IT remains steady. He and Others (2020) study the market performance and response trends of Chinese industries to the COVID-19 pandemic. The study found that manufacturing, IT, education and health-care industries have been resilient to the world pandemic. Sherif (2020) examines the spread of COVID-19 and its short-term impact on the Shariah-compliant UK Dow Jones market index to capture the dynamic behaviour of stock returns at economy and industry levels. In addition, through an analysis of sector groupings, it shows that the stock returns of the IT sector performed significantly better than the market, while stock returns of consumer discretionary sector, performed significantly worse than the market during the COVID-19 outbreak.

The technology index has negative AR at a significant level, specifically −3.35% at Day 5,−2.16% at Day −4 and −1.93% at Day 4. The reason for this negative performance may be due to the technology companies having to shut down their business, leading to, instead of shipping of electronic commodities and related goods. The technology index has negative AR at a significant level, specifically −3.35% at Day 5,−2.16% at Day −4 and −1.93% at Day 4. The reason for this negative performance may be due to the technology companies having to shut down their business, leading to, instead of shipping of electronic commodities and related goods. The technology index has negative AR at a significant level, specifically −3.35% at Day 5,−2.16% at Day −4 and −1.93% at Day 4. The reason for this negative performance may be due to the technology companies having to shut down their business, leading to, instead of shipping of electronic commodities and related goods Overall, during Day 0 to Day 10, the industry indices, except for technology index and real estate index, have relatively stable CARs (Figure 4). After the announcement, food, pharmaceuticals, telecommunications and healthcare sectors indicate a clearly increasing trend of CARs, while energy and real estate industry tend to fall, while for transportation and technology it remains relatively steady.

It should be noted that there are no previous works that has studied the effects of COVID-19 on Nasdaq-100 firms, except Sharma and Others (2020), however this paper focuses on providing strategic information on the main problems in the supply chain that companies are facing due to the pandemic and also the strategies they are adopting using text analysis tools. Therefore, they do not focus on studying the stock returns of firms.

We can highlight some recent researches on COVID-19 that follow the event study methodology to observe the reaction of the stock markets, in a similar way to the study in this paper, although each of them analyze different events related to this pandemic.
For example, Broadstock and Others (2020) investigate ESG performance during financial crisis as a consequence of the pandemic; Liu and Others (2020) study the effect of companies’ operating flexibility on the performance on the stock market during the COVID-19 epidemic in China; Schell and Others (2020) examine the divergence in the reactions of the stock market during statements of public threat to health crisis; or Heyden and Heyden (2020) investigate the market responses of western countries stocks during the onset of the COVID-19 pandemic.

All this makes our work fill a gap in literature and contribute to improving knowledge about external shocks.

3. Data and methodology

3.1. Data

The data has been collected from the Finance Yahoo database.

First of all, the daily data of stock prices were collected at the closing price for the 100 companies listed on Nasdaq-100 over the period from May 10, 2019 to April 23, 2020. The final sample is made up of 2,400 observations.

Second, dummy variables were used to analyse the effect of daily abnormalities on stock returns, as other studies have done (Choudry, 2010; Kymaz and Berument, 2003). In this way, we employed the IT dummy variable to find out the impact of our event on the IT sector. This dummy variable took the value of 1 if a Nasdaq-100 company belonged to that sector, and 0 otherwise.

Third, we included the following eight control variables for 2019, also extracted from Finance Yahoo: total assets (ASSET), total value in books (BV), PER ratio, return on equity (ROE), return on assets (ROA), net results (NR), leverage (LV), and stock’s dividend yield (DY).

ASSET indicates the firm size. The PER ratio is the stock price divided by the expected earnings from shares. ROE is NR divided by BV. ROA is the quotient between net income and ASSET. LV is the quotient between ASSET and total liabilities. And stock’s dividend yield (DY) is the shared dividend divided by the mean share price.

Regarding our secondary objective, that is, the impact of the announcement of the COVID-19 pandemic in the rest of the Nasdaq-100 sectors, it should be highlighted that the sectors analysed are three: the Consumer cyclical sector (CC), the Healthcare sector (HC), and Other sectors (OS). Only the sectors with the highest number of Nasdaq-100 companies have been included, after the technology sector. To include these three sectors in the study, it has also been carried out by means of three new dummy variables, being 1 if the company belongs to the corresponding sector, and 0 otherwise. The dummy variable OS is 0 if the company belongs to the IT, HC or CC sector and 1 otherwise. That is, OS is 1 if the company belongs to Industrial, Communication, Consumer non-cyclical, Financial services, or Utilities sectors. These sectors have been grouped into a single dummy variable (OS) because they were poorly represented on the Nasdaq-100 to draw relevant conclusions (Table 1).
Table 1. Descriptive statistics of the control variables by sectors (2019)

<table>
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<tr>
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<th>IT</th>
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<th>NON-IT</th>
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<tbody>
<tr>
<td></td>
<td>MED</td>
<td>SD</td>
<td>MED</td>
<td>SD</td>
</tr>
<tr>
<td>PER</td>
<td>32.41</td>
<td>116.46</td>
<td>29.63</td>
<td>36.42</td>
</tr>
<tr>
<td>DY</td>
<td>0.25%</td>
<td>0.93%</td>
<td>0%</td>
<td>1.49%</td>
</tr>
<tr>
<td>ROA</td>
<td>11.91%</td>
<td>9.93%</td>
<td>13.13%</td>
<td>12.97%</td>
</tr>
<tr>
<td>ROE</td>
<td>17.10%</td>
<td>37.57%</td>
<td>19.07%</td>
<td>59.42%</td>
</tr>
<tr>
<td>LV</td>
<td>50.69%</td>
<td>26.73%</td>
<td>36.94%</td>
<td>22.62%</td>
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<td>ASSE</td>
<td>16.198,5</td>
<td>91.026,6</td>
<td>7.316,0</td>
<td>22.705,8</td>
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<tr>
<td>T</td>
<td>00</td>
<td>18</td>
<td>00</td>
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<tr>
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<td>44,996,3</td>
<td>4,613,0</td>
<td>7,355,77</td>
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<td>0</td>
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</tr>
<tr>
<td>NR</td>
<td>1,168,85</td>
<td>11,797,1</td>
<td>1,002,0</td>
<td>2,435,24</td>
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<tr>
<td></td>
<td>8</td>
<td>25</td>
<td>00</td>
<td>4</td>
</tr>
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N 46   17   19   18

Note: ASSET, BV and NR expressed as USD$. MED: median and SD: standard deviation.

Source: Own processing.

3.2. Methodology

The event study methodology (Sorescu and Others, 2017) is followed in this study to determine how the stock market price reacted to the announcement of the new coronavirus as a global pandemic, and how time affected the financial market responses.

For our purpose, the event date was 11 March 2020. We selected the windows estimation of the last 200 trading days, however we excluded the 14 days preceding the event (MacKinlay, 1997). Hence, the estimated windows went from 10 May 2019 to 25 February 2020. We defined 7 different event windows to determine the period of time in which the event had a stronger influence on each sector. Therefore, if the event day was $t = 0$, the 7 event windows for the study into the COVID-19 pandemic statement would be: $t \in [-1,1]$, $t \in [-1,5]$, $t \in [-1,10]$, $t \in [-1,15]$, $t \in [-1,20]$, $t \in [-1,25]$, $t \in [-1,30]$.

First, we calculated for each company the daily stock returns as $R_{it} = (P_{it} - P_{i,t-1}) / P_{i,t-1}$. Where $R_{it}$ is the daily return of the shares of a company $i$ on day $t$ belonging to the estimation window.

Secondly, the abnormal returns (ARs) were calculated for each company $i$ on day $t$ as $AR_{it} = R_{it} - E(R_{it})$. $E(R_{it})$ was obtained by OLS regression through the expected returns model. Due to it is the most employed market model. The equation for OLS regression is: $E(R_{it}) = \alpha_i + \beta_i R_{mt}$, $R_{mt}$ is the market return of the Nasdaq-100 index on day $t$ belonging to the same period.

Thirdly, the cumulative abnormal returns (CARs) are calculated for each event window as:

$$CAR_{it} = \sum_{t=t_1}^{t_2} AR_{it}; t_1 \text{ and } t_2 \text{ represent the start and end of the event window.}$$

At last, we used OLS regression in order to assess whether there were any significant differences in the reactions of the analysed sectors on the market for each event window. The expression employed was:

$$CAR_{it} = \alpha + \beta_{IT} \times IT_{it} + \beta_{DV} \times DV_{it} + \beta_{PER} \times LN P_{ER_{it}} + \beta_{ASSET} \times LN ASSET_{it} + \beta_{BV} \times LN BV_{it} + \beta_{ROE} \times ROE_{it} + \beta_{ROA} \times ROA_{it} + \beta_{NR} \times LN NR_{it} + \beta_{LV} \times LV_{it}$$

This expression was used to meet the secondary objective. In it the variable $IT$ was replaced by the $HC$, $CC$ and $OS$, dummy variables related to the other above sectors.
4. Results and Discussion

4.1. Empirical evidence

The results of our primary objective are shown in Table 2. This table collects the reactions of the IT companies’ CARs, compared to the rest of the sectors, caused by the WHO’s official statement of the world COVID-19 pandemic.

Table 2. Regression analysis of the CARs to the COVID-19 market model: IT sector versus the rest of sectors

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<tr>
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</thead>
<tbody>
<tr>
<td>IT</td>
<td>4.230***</td>
<td>5.537*</td>
<td>7.490***</td>
<td>5.047**</td>
<td>4.089**</td>
<td>0.720</td>
<td>-1.439</td>
</tr>
<tr>
<td></td>
<td>(0.890)</td>
<td>(2.814)</td>
<td>(1.513)</td>
<td>(2.273)</td>
<td>(1.654)</td>
<td>(2.460)</td>
<td>(2.574)</td>
</tr>
<tr>
<td>DY</td>
<td>-0.736*</td>
<td>2.435*</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td></td>
<td>(0.414)</td>
<td>(1.260)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LN PER</td>
<td>1.008*</td>
<td>2.520**</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(0.545)</td>
<td>(0.888)</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
</tr>
<tr>
<td>LN ASSET</td>
<td>-5.186**</td>
<td>-2.903**</td>
<td>-4.899**</td>
<td>-1.524*</td>
<td>-11.457***</td>
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<td></td>
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<tr>
<td></td>
<td>(2.478)</td>
<td>(1.245)</td>
<td>(1.957)</td>
<td>(0.837)</td>
<td>(3.388)</td>
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<tr>
<td>LN BV</td>
<td>5.205**</td>
<td>2.675**</td>
<td>4.476**</td>
<td>9.377**</td>
<td>-</td>
<td>-</td>
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<tr>
<td></td>
<td>(2.338)</td>
<td>(1.204)</td>
<td>(1.883)</td>
<td>(3.469)</td>
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<td>-</td>
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<tr>
<td>ROA</td>
<td>-0.246*</td>
<td>-0.685***</td>
<td>-</td>
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<td>-</td>
<td>-</td>
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<tr>
<td></td>
<td>(0.128)</td>
<td>(0.183)</td>
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<td>-</td>
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</tr>
<tr>
<td>ROE</td>
<td>0.089*</td>
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<td>-</td>
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<tr>
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<td>87</td>
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<td>83</td>
<td>96</td>
<td>87</td>
<td>100</td>
<td>96</td>
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<tr>
<td>R-squared</td>
<td>0.284</td>
<td>0.131</td>
<td>0.368</td>
<td>0.134</td>
<td>0.119</td>
<td>0.061</td>
<td>0.225</td>
</tr>
</tbody>
</table>

Note: *** = significant at 1%, ** = significant at 5%, * = significant at 10%. Standard errors in brackets

Source: Own processing.

Table 2 shows that IT firms had a positive and significant impact on their CARs in the event windows from t Є {-1,1} to t Є {-1,20}, compared to the rest of the sectors represented by the constant. Conversely, the constant was negative in the first three windows, and was only significant in the first window. The greatest impact of IT, according to the coefficients (7.490), was in t Є {-1,10}; that is, on the 10 trading days of the COVID-19 announcement. Furthermore, in t Є {-1,10}, the highest R-squared value was 0.368, which confirmed the level of explanation of the model obtained in this window. After 20 trading days, the effect of the event was no longer significant on IT firms, and Nasdaq-100 companies recovered considerably as indicated the increased constant in the last two windows (26.292 and 48.024, respectively).

Moreover, the LN ASSET variable was negative in almost all the windows, indicating that the negative impact of this statement was less on small-sized Nasdaq-100 companies than on large-sized ones. The PER represents the...
expected profit of the companies, so its higher value in $t \in \{-1,10\}$, indicated those high expectations helped to reach the highest CARs in that period, but not in $t \in \{-1,20\}$. The $LN\ BV$ variable had a positive coefficient in several windows, this showed that the firms with a higher $BV$ of their shares reached higher ARs.

### 4.2. Cross-sectional analysis

The results of the sectorial analysis are shown in Table 3, which contains the responses of non-IT companies’ CARs, HC, CC or OS, to the WHO’s official publication of the global pandemic.

**Table 3.** Regression analysis of the CARs to the COVID-19 market model of the main non-IT sectors versus the IT sector

<table>
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</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-2.133</td>
<td>-35.129**</td>
<td>0.782</td>
<td>2.059</td>
<td>7.160**</td>
<td>0.616</td>
<td>39.283**</td>
</tr>
<tr>
<td>(2.270)</td>
<td>(14.201)</td>
<td>(10.101)</td>
<td>(1.291)</td>
<td>(3.621)</td>
<td>(1.308)</td>
<td>(14.619)</td>
<td></td>
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<tr>
<td>HC</td>
<td>-4.487***</td>
<td>-7.121***</td>
<td>6.804**</td>
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<tr>
<td>(1.256)</td>
<td>(2.077)</td>
<td>(3.346)</td>
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<tr>
<td>(1.236)</td>
<td>(3.230)</td>
<td>(2.269)</td>
<td>(2.682)</td>
<td>(2.092)</td>
<td>(3.001)</td>
<td>(3.099)</td>
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<tr>
<td>OS</td>
<td>-3.284**</td>
<td>-6.590**</td>
<td>-5.697**</td>
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<tr>
<td>(1.243)</td>
<td>(2.094)</td>
<td>(2.739)</td>
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<tr>
<td>DY</td>
<td>-0.784*</td>
<td></td>
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<td>(0.419)</td>
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<tr>
<td>LN PER</td>
<td>1.092**</td>
<td>2.627**</td>
<td>-1.704*</td>
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<tr>
<td>(0.556)</td>
<td>(0.899)</td>
<td>(0.964)</td>
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<tr>
<td>LN NR</td>
<td>2.289**</td>
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<td></td>
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<tr>
<td>(0.982)</td>
<td></td>
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<tr>
<td>LN ASSETS</td>
<td>-2.507*</td>
<td>-2.101**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(1.354)</td>
<td>(0.846)</td>
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<tr>
<td>LN BV</td>
<td>2.210*</td>
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<td>(1.304)</td>
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<tr>
<td>ROA</td>
<td>-0.388**</td>
<td></td>
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<tr>
<td>(0.125)</td>
<td></td>
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<tr>
<td>Observations</td>
<td>87</td>
<td>90</td>
<td>83</td>
<td>100</td>
<td>87</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.295</td>
<td>0.235</td>
<td>0.377</td>
<td>0.216</td>
<td>0.172</td>
<td>0.095</td>
<td>0.247</td>
</tr>
</tbody>
</table>

**Note:** *** = significant at 1%, ** = significant at 5%, * = significant at 10%. Standard errors in brackets

**Source:** Own processing.

Table 3 shows that the CC sector is the one with the greatest impact (negative and significant) on its CARs when the COVID-19 was announced, and throughout all the event windows, especially on the 5 and 15 trading days after the announcement. The other two sectors studied were also negative and significantly affected by the announcement of the pandemic, but the HC sector only in $t \in \{-1,1\}$ and $t \in \{-1,10\}$, and the OS sector in $t \in \{-1,1\}$, $t \in \{-1,10\}$ and $t \in \{-1,15\}$. In addition, $t \in \{-1,1\}$ and $t \in \{-1,10\}$ were the event windows where the highest R-squared values were obtained, with 0.295 and 0.377, respectively. In this study, the control variables had a more diluted effect than in the previous analysis (table 2). It is also shown through the model’s constant that Nasdaq-
100 companies recovered considerably for the 30 trading days series, although not in the same way in the HC and CC sectors, being positive in the first sector and negative in the second.

5. Conclusion
As a consequence of the current economic and health crisis that we are suffering worldwide, due to the COVID-19 pandemic and the limitations that many countries have imposed to try to slow down its effects; this paper uses an event study to empirically assess the short-term impact of the official announcement of COVID-19 on the stock prices of Nasdaq-100 firms, especially on IT sector.

The results show that the Nasdaq-100 economic sectors have reacted differently. The IT sector has experienced a positive impact on the first days following the pandemic announcement, as opposed to the rest of sectors. Especially, on the 10 trading days after the official announcement made by WHO. The opposite happened in the remaining sectors, where the impact was negative. The CC sector had the greatest negative impact, especially for the 5 and 15 trading days. These results are logical because the CC sector includes the companies most affected by the restrictions (tourism, retail, etc.). The HC and OS sectors were also negatively impacted but to a lesser extent. The findings are consistent with the research on COVID-19 in Shariah-compliant stock market indices by Sherif (2020), and also with He and Others (2020), who studied the Chinese stock market.

This paper shows that companies from different sectors have different abilities to adapt to external shocks, while some have had a strong negative impact, others have created opportunities for development and growth, especially the IT sector thanks to teleworking and quick progress towards the digitization caused by the pandemic.

Furthermore, this article suggests that larger companies had a strongest negative impact than smaller ones, while those companies with higher book value obtained higher CARs.

The results of this article are significant for investors, firms or governments. They will better distinguish those sectors at risk in the event of a similar pandemic, from those that can obtain development opportunities, and they will be able to make better decisions.

References


Corporate Governance and Agency Theory

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Abstract
Agency theory and stewardship theory deal with the relationship between the owner and management in modern corporations. Explaining, describing and concretizing the relationship between the agent and the principal and finding an effective contractual relationship between the agent and the principal is the goal of agency theory. The aim of this paper is to clarify the function of principal as owners and agents as managers, to define the basic goal of principals and agents, to determine the complexity of their relationship and conflicts that may arise between them and to define the core of agency theory, all in the context of corporate governance.

Keywords: Corporation, management, corporate governance, the agent, the principal

JEL Codes: G30, G39, G40.

1. Introduction
Agency theory (along with the stewardship theory) analyzes the relationship between owners and management in corporations with the aim of defining an effective contract between the owner as principal and the agent as manager. The principal is the one who hires an agent to do certain jobs that should benefit him, while agents are usually hired when the owner does not have enough knowledge to do the job or when the owner simply does not have time to do all the activities due to too much work (Goić, 1995). At the time of delegation of work to the agent by the owner, an agency relationship is formed, so the task of the agent is to adequately perform the work in order to achieve the interests of the principal.

2. Corporate governance and agency theory
For the work agent performs for the principal, he expects an appropriate remuneration which is in principle contracted ex ante, and the principal is obliged to pay it to the agent. The principal bears the risk of a possible fiasco, but also assumes the effects of the realization of assigned duties, reduced by the agreed payment to the agent, so that the principal's interest in accomplishing the defined task determines the amount of compensation received by the agent. The agent's reward in the form of profit represents the cost to the principal, while the agent's work represents the cost to the agent, which at the same time brings benefits to the principal (Tipurić, 2008). It is natural for an agent to strive for simple tasks and the easiest and simplest way to perform them, while achieving the highest possible reward. Thus, the principal is interested in maximizing his own utility, with minimizing givings to the agent at the same time, while on the other hand the goal of the agent is to maximize his own utility (Tipurić, 2008).

The basic assumption of agency theory is that the wealth of principals cannot be maximized because agents and principals have opposite goals and desires, different tendency to risk, and different access to information. The principal usually disposes with the financial resources and gives the agent the authority to enrich his financial resources. The main both agent's and principal's goal is maximization of their economic position, taking into account the fact that the agent's actions won't always be in the principal's interest (Tipurić, 2008). Delegating decision-making to the agent results in a divergence of interests between the principal and the agent as each will try to maximize its profitability. The fact is that the principal does not have the information available to the agent and is therefore not able to supervise the agent free of charge (Müller and Turner, 2005). Two things can arise from this, such as the opportunistic behavior of agents which is related to the irrational use of the principal's resources, such as the unnecessary purchase of aircraft and the payment of pilots (Heath and Norman, 2004), because agents are guided solely by self-interest and usually are trying to use every situation for their own benefit, and information asymmetry because the agent is usually in an information advantage according to the fact that the agent performs the task (Tipurić, 2008).
A larger information disproportion increases the possibility of calculated agent's action (Singh and Sirdeshmukh, 2000). Agent's opportunism and information asymmetry can result in two problems of agency relations, and those are: a) hidden information (adverse selection)\(^1\) (Tipurić, 2008) which appears before signing the contract and entering into agency relations, and b) hidden action (moral hazard)\(^2\) (Tipurić, 2008) which is typical behavior after signing the contract, and which appears when the principal cannot determine the accuracy and truthfulness of the agent's actions, and cannot be sure whether the agent has really put in the maximum effort, so agent takes advantage of it (for example, making unjustified investments or acquisitions with the aim of faster growth of the corporation) (Heath and Norman, 2004). In corporate governance, agency relationship is determined by the relation of the principal as the owner and the agent as the manager, where the owner of the company authorizes managers for business enterprise management (Goić, 1995) and therefore the connection between the owner and the manager has properties of stereotypical agency relationship because owners and managers differ in the goals they want to achieve and which are result of different interests and positions in the corporate concept, then because managers have access to information that owners cannot access, and because of the different willingness to bear risks between managers and owners due to the different nature of engaged resources (Tipurić, 2008).

In addition to the above omissions, managers are removed from the role of perfect agents by a lack of expertise and morale, which can adversely reflect on the value of corporate assets (Tipurić, D., 2008). As protection against such omissions, owners use ratification and authorization mechanisms, oversight mechanisms, and sanctioning mechanisms where the key role in the implementation of these mechanisms is played by the board of directors or the supervisory board as the holder of fiduciary responsibility, the right to monitor, ratify and sanction the manager's decisions (Fama and Jensen, 1983). The interesting thing about the agency relationship in corporate governance is the existence of significant uncertainty in the way the agent's actions are transformed into an outcome (which can be influenced by external factors that neither the principal nor the agent can influence) (Tipurić, 2008) and the existence of asymmetric information. The principal cannot determine the accuracy of the information presented to him by the agent or the business moves he undertakes and carries out, and therefore cannot be sure that the agent is working in his favor (Tipurić, 2008).

Agency problems are closely related to the occurrence of agency costs, which represent the sum of the costs of implementation and conception of the contract between the principal and the agent, monitoring costs by the principal, bonding costs by the agent and the residual loss (Jensen and Meckling, 1976). Monitoring costs, such as the cost of auditing, drafting managerial contracts, the cost of dismissing managers, etc., are the costs that owners have so that they could control the behavior of managers (Fama and Jensen, 1983). Although these costs are initially covered by the principal, they will eventually be borne by the agents as their fees will be adjusted to cover the costs. The audit tasks include checking the work of the management by reviewing the accounts of companies and organisations to ensure the validity and legality of their financial records and they can also act in an advisory role to recommend possible risk aversion measures and cost savings that could be made, so the main role of the auditor is to protect the owner-principal. The analysis of audit costs (which are included in control costs and are part of agency costs) and the success of the company conducted based on the analysis of net cash flow led to the conclusion that strengthening the audit had a positive impact on cash flow but only when there is minority internal ownership. In the case of majority insider ownership where mostly ownership and management are not separated, the relationship between the variables is negative. Therefore, the consideration of corporate governance from the aspect of agency theory only makes sense if ownership and management are clearly separated (Nikkinen and Sahlström, 2004).

Bonding costs are the costs of establishing and maintaining such a system by an agent, which will guarantee the course of action in line with the shareholders' interests, while the remaining loss is the opportunity loss remaining

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1 In the context of hidden information, the principal must be very careful because choosing a bad agent carries additional costs (for example, severance costs, court costs, etc.). The principal's problem is to choose the right agent and then motivate him to increase their dedication to work well. The selection can be made either by researching the agents' market or by offering agents several contracts. Namely, the principal creates several contracts so that the agent, by choosing one of the offered contracts, reveals information about himself and how much effort he is willing to invest. For good agents, contracts are created that require more effort, but they must be such that it is not worth cheating for a good agent to be bad in order to choose a contract for a bad agent. Mathematically, it turns out that a good agent gets an extra allowance to reveal his abilities (information rent). Another way to solve the problem of hidden information is signaling (agents will try to signal information through some action, decision, etc. when it works in their favor). It is considered that in the case of the problem of hidden information, the monitoring of the agent has no purpose, since the principal does not have the information that the agent has, so he cannot even know whether the agent's action is correct. According to: Tipurić, D. (2008) op. cit., pp 119.

2 Moral hazard is a situation in which an agent cheats principal without delivering the quality specified by their contractual relationship. The principal cannot assess the effectiveness of the agent's actions due to the high cost of monitoring the agent's significant influence of environmental factors on the agent's performance. The solution to the problem of hidden action is the optimal risk allocation that can be achieved with cash premiums for the agent. According to: Tipurić, D. (2008) op. cit., pp 121.
after the economic fulfillment of the contract (Tipurić, 2008). For example, in the continental corporate governance system that operates on the principle of two-tier corporate governance structure, which means that management and leadership functions are strictly separated and contained in the supervisory board (consists of members who do not have executive positions but they take over the role of supervision and monitoring) and management (which consists of top managers in the corporation who take on the role of management and leadership of the company) (Galetić, 2011), the divergence of interests of members of the supervisory board and shareholders leads to an agency problem which can eventually lead to maximizing personal power and authority by establishing subcommittees that fragment the decision-making rights of the supervisory board, then maximizing bargaining power and authority by using its own relational capital to influence contractual relations in the corporation, and minimizing its own inconveniences by uncritically accepting top management directives, initiatives and suggestions, by filtering informations that are detrimental to their credibility and by avoiding decision-making on relatively difficult topics (Moldoveanu & Martin, 2001).

The core of agency theory is in forming a contract that will maximize the agent’s welfare and minimize the principal’s costs (Tipurić, 2008). Furthermore, since the agent cannot be adequately motivated by the fixed compensation for his resettlement, his compensation must be linked to the achievement of the principal's main goal. If the cost of supervising the manager as an agent is small, it is better to arrange agent's behavior-based contract, and if the supervision is unprofitable, it is better to arrange outcome-based contract because it allows each other approaching goals, and all the risk of switching to an agent (Eisenhardt, 1989). We can summarize that the stewardship theory dominates in the initial phase of business and emphasizes the need for cooperation between owners and managers (there is mutual trust and identification with goals), while agency theory emphasizes the greater need for control and dominates in the phase of business maturity, wherein the introduction of control mechanisms results in a reduction of the stewardship relationship with the simultaneous dominance of the agency relationship (Wasserman, 2006). The key difference between these two theories is that the stewardship theory assumes that managers will constantly do actions in the company’s interest regardless of the existence of control mechanisms while agency theory emphasizes direct and indirect control over management. The advantage of agency theory over stewardship theory is that the stewardship theory is still in its infancy with many unknowns, while agency theory has a clearly constructed model (Tipurić, 2007).

3. Conclusion

Corporate governance looks at possible conflicts of interest that may arise between the most important interest groups, ie owners and managers. The basic problem arises when the owner-investor wants to act differently from the manager who runs the company. From agency theory, which is based on realistic behavioral settings in the form of risk tendency and opportunism, emerges advantages that are significant in formation of relationship between principals and agents. Agency theory, as a clearly constructed model of owner’s control over management, actually considers ways in which capital’s owners can protect their investment and ensure an increase in value and allows finding answers to achieve the selfish managers to behave in accordance with the interests of the owners instead of in accordance of their own interests.

References


The Role of University Faculties in Regional Development

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Abstract

Universities play an important role in economic development. This role is often called as the third mission that was investigated in the scientific literature through studies examining this role on the level of universities. The present article approaches this research at the level of individual faculties. Our database includes annual reports of selected faculties of Slovak universities for the years 2008 and 2016. The aim of the article is to find out, what activities aimed at fulfilling the third role of universities - participation in the development of the region - they perform. We investigated individual activities in regional development from a territorial and thematical point of view. Our findings confirm differences in development activities when comparing faculties located in Bratislava and located outside the capital city of Slovakia. Based on the performed analysis, it can be stated that non-technical departments show better activity in the field of regional development than technical faculties. The most frequently used activities were measures promoting additional education and cooperation with internships based on student fellowships. Hence, Slovakian statistics are still very low when compared to other European countries. Slovakian universities should place greater emphasis in this regard and introduce better measures to support regional development.

Keywords: Regional development, third role of universities, universities, education, research and development  
JEL Codes: I2, I25, R58, O3.

1. Introduction

Universities are very important for economic development and perform several functions. In addition to education and research, which we refer to as the so-called traditional roles of universities, in recent years they have been joined by a new, third task, which is focused on regional development (Boucher et al., 2003; Uyarra 2010). Universities, as one of the important actors in regional development, need to develop cooperation with other stakeholders, such as both private and public sector institutions. The cooperation includes various types of activities and specific measures by which universities can influence the development of regions. For example, the transfer of knowledge between the academic, public and private spheres is important, as well as the help and involvement of citizens living in the places and regions of operation of individual institutions. Quality and regular cooperation helps to create more developed and competitive regions.

Several studies have addressed the issue of the third role of universities. In our work, we therefore decided to examine these activities not at the level of universities, but at the lower level of individual faculties. We divided the individual activities into three areas - education, research and community development according to Caniëls and Bosch (2011). Based on this, we examine individual faculties of Slovak public universities on first area – education. The support of these activities is important especially in the case of less developed regions and therefore we have chosen as one of the criteria for the division of faculties their location. Two groups of faculties were created - faculties from Bratislava and faculties outside the capital city of Slovakia. Regarding the focus, technically oriented faculties non-technical faculties will be distinguished.

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1
2. Literature Review

The third task "extends the understanding of universities to broader aspects of regional development - developing the quality of life of the region's population or increasing the efficiency of public services" (Hanová et al., 2016, p. 17). Most of the studies are related to research part of third role (Gunasekara, 2006). Bramwell and Wolfe (2008) argue that the contribution of universities to local and regional economic dynamics is much richer than suggested. In addition to creating commercialized knowledge and qualified researchers, universities create other knowledge transfer mechanisms and work with local industry through the provision of formal and informal technological assistance. According to Ručinská (2009, p. 169), this task is connected with the transfer of knowledge and "related to the fact that no university can be a closed collector of knowledge." The transfer of knowledge mainly concerns the transfer of knowledge to companies.

Also the education part of third role is important. As part of the new role they cover, universities should also take into account the current needs of employers - for example, through needs surveys in order to reconcile university activities with regional needs. Universities are under pressure to be expected to play a role in developing the region in which they operate, not only by providing education but also by providing social, cultural and economic development. We can therefore say that this role is also focused on services for the public and community development.

In the processes of globalization, availability of knowledge and skills and the transfer of knowledge and innovation to industry especially to small and medium-sized enterprises is becoming increasingly important. Puukka and Marmolejo (2008) base this view on an OECD study examining the contribution of higher education institutions to countries and regions. They discuss why regions are becoming more and more important in the process of globalization and refer to the new mission of these institutions as a third task or a social obligation. This third mission of universities may have a long-term character, especially when considering companies and their cooperation with universities. Their joint activities can have various special forms which cause positive impact on the development of the region (Rehák et al., 2019).

On the other hand, there is a study in which the authors examine the influence of universities on the regional economy in the provision of university education at three former universities in different parts of Sweden. They did the research using a synthetic control method and their results show little or no effect on the regional economy. Their findings therefore call into question the effectiveness of research universities in supporting regional growth and development (Bonander, et al, 2016).

3. Methodology

Our database includes annual reports of individual faculties of Slovak universities for the years 2008 and 2016. These two years were chosen to better compare how universities in our country are improving or stagnating or even deteriorating. By processing the annual reports, we obtained quantitative data but also qualitative data, on which we performed an in-depth analysis.

There are 38 universities in the Slovak Republic, of which 20 are public universities, 3 state universities and 15 private universities. In our work we deal only with public universities (Ministry of Education, Science, Research and Sports of the Slovak Republic, 2020).
All 20 public universities have a total of 102 faculties. After collecting the annual reports, we have 27 faculties left for our analysis.

We divided the role of universities in regional development on the basis of a study of Rehák et al., 2019). Generally, three main areas of third mission were identified:

- education (matching with the needs of the regional labour market, surveys of employers’ needs, student placements, sponsoring students by individual companies, retaining graduates in the region, etc.),

- research (such as the existence of science or technology parks, technical incubators, the existence of contracted research or the commercial use of facilities, etc.),

- community development (finding out civic participation in the region, the existence of libraries, sports grounds, theaters, galleries or museums, etc.).

In this work, we decided to analyse more deeply only the field of education. We examine all activities mainly from the point of view of performing the third task of universities. In the first aspect, we divided the faculties into those faculties that operate in the Bratislava region and faculties that operate in other regions of Slovakia. Based on this division, we have 12 faculties operating in the Bratislava region and 15 faculties operating outside it. In the second step were the faculties into two groups divided based on their focus. The first group consists of faculties with a technical focus and the second group consists of all the others, which we called general. In the category of technical specialisation, we have 5 faculties and there are up to 22 general ones. Our assumption is that general faculties will be more involved in activities related to education. As we deal with in-depth analysis, there were examined only those faculties where we have annual reports for both years. However, we did not find all the necessary information in these annual reports, which we consider to be a significant limitation of this research.
4. Results – The role of university faculties in the field of education

After an in-depth analysis of the annual reports, we divided the individual activities in education. In the table below we see a summary of how many faculties from the given category perform the surveyed activities. In almost all activities, faculties that perform them in 2016 increased compared to 2008.

In the category of harmonization with the needs of the regional labor market, we see that in the case of faculties outside Bratislava, there was a decrease in 2016 compared to 2008. In 2008, five faculties out of the total number of 15 in the given category performed this activity. The Faculty of Wood Science evaluates that the profile of the graduate was created to meet the requirements of the internship, but at the same time they state that students of the first degree do not know about the internship. The Faculty of Central European Studies at UKF is gradually being transformed into a faculty that takes into account the actual needs of the present labour market and thus responds to changes by adapting its profile. In 2016, only 3 faculties out of 15 surveyed performed this activity.

In the case of faculties located in Bratislava, the number remained the same. In 2008, this activity was performed by the Faculty of Chemical and Food Technology of the Slovak University of Technology, which paradoxically did not carry out this activity directly in Bratislava, but in eastern Slovakia. Within the needs of the Bratislava region, this faculty introduced a new subject, which was offered by Slovnaft. In the second division, we divided the faculties into technical and non-technical (general). From this point of view, we see that in 2008, 3 out of 5 technical faculties deal with this activity. In 2016, however, none of them will address this. In the case of faculties with a non-technical focus, their number was 3 (2008) out of a total of 22 and 4 in 2016. In year 2008 we have three faculties from both categories, but in the case of technical faculties it is 60% and in the case of non-technical only 13.64%.

Only two faculties from the category outside Bratislava dealt with the survey of the needs of future employers, and only in 2016. From the point of faculties, the surveys of the needs were carried out by 1 technical and 1 general faculty. In absolute terms, they seem to be in the same situation, but in terms of the share in the total number of researched faculties, the technical faculties are better off, of which 20% were devoted to research, in the case of non-technical ones it is only 4.55%.
According to the analysis of the annual reports in our research, we can state that cooperation with practice in the region through student internships in companies is more developed in the case of faculties located in other parts of Slovakia than in Bratislava. While in Bratislava there are 3 faculties (2008) and 2 faculties (2016) outside Bratislava, there were seven in 2008 and six in 2016. Students from two of the five technically oriented faculties have the opportunity for internships, in the case of otherwise focused faculties, there are 10 of these faculties in 2008 and in 2016 there are one less. Here, however, we must emphasize that in the case of general faculties, we also took into account pedagogical internships at schools training in the region of the faculty. In the case of medical faculties we also included internships in teaching hospitals or other medical devices. Another specific feature is theological faculties, whose students practice in parishes, for example, the Roman Catholic Cyril and Methodius Faculty in Bratislava provides pastoral theological practice and also practice in hospitals, charities and social care institutions, primary and secondary schools in catecho-pedagogical practice, or help in special groups of the population, such as the pastoral care of the Roma or the mentally handicapped.

Only 3 faculties and all of them in 2016 were involved in the transformation of educational programs. All these faculties are located in Bratislava and are non-technical. This is the Faculty of Business Management (EUBA), which is trying to be more practice-oriented and therefore revised its study plans and introduced the subject "Skills for Success" not only in Slovak but also in English language. As part of this curriculum transformation, this institution began working with the American Chamber of Commerce and the Business Service Center Forum. Companies such as IBM, Dell, Johnson Controls International, Siemens will also take part in the training.

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**Table 1. Evaluation of the field of education in absolute numbers**

<table>
<thead>
<tr>
<th></th>
<th>BA (12)</th>
<th>Outside BA (15)</th>
<th>Technical (5)</th>
<th>Non-technical (22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment with labour market</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>needs</td>
<td></td>
<td></td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Surveys of (future) employer</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>needs</td>
<td></td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Student internships in companies</td>
<td>3</td>
<td>2</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Transformation of educational</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>programs</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sponsorship of students by</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>companies</td>
<td></td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Increasing the participation</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>of the local population in</td>
<td></td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>education</td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Specialized educational</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>programs for local residents</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Additional education</td>
<td>6</td>
<td>9</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Educational programs for</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>vulnerable groups</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Retention of graduates in the</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>region</td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Support for business</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>activity in the region</td>
<td></td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**Source:** Own elaboration according to the annual reports.
In 2008, companies sponsored students only in the case of three faculties, specifically in the case of the Faculty of Economics in Bratislava, the Faculty of Industrial Technologies in Púchov and the Faculty of Medicine in Bratislava. In 2016, there were already 5 of these faculties. The increase occurred in the case of faculties located in Bratislava and in the case of non-technical faculties. For the most part, it was just a matter of sponsorship in rewarding students' final theses or in helping to organize competitions and sponsoring various prizes for students. Several faculties try to engage in activities that involve residents in the place or region of the faculty in the educational process. In 2008, two faculties were involved in this activity, both were located in Bratislava and were of general focus.

The majority of faculties are engaged in activities in the field of further education. In the case of Bratislava, their number increased from 6 faculties in 2008 to 9 in 2016. We also record an increase outside Bratislava faculties, where 9 of them originally performed this activity in 2016. In terms of focus, in 2016, more education was provided by more than half of the faculties. In any case, we can see an increase in each of the categories. Some of the faculties implement the programs of the University of the Third Age, others are dedicated to increasing qualifications in the field of health care, coaching. Many faculties offer the possibility of additional pedagogical study.

In 2008, the Faculty of Pharmacy in Bratislava, focused on vulnerable groups by providing a database of lectures for handicapped students, which was available to them via Internet. In addition, they plan to implement a project through which it will be possible to broadcast streaming videos from the lectures, which will then be stored in a digital database.

The Faculty of Electrical Engineering and Informatics in Bratislava strives to retain graduates in the region, trying to present professional activities, focusing on social projects and knowledge transfer. They try to present these activities mainly to companies that already have an existing form of cooperation in the education of graduates. The Faculty of Chemical and Food Technology helps to retain graduates through cooperation with the Association of the Chemical and Food Industry. They are also promoting companies among students, so that graduates can be obtained mainly for the Slovak market. In 2008, these faculties are the only ones that have actively addressed this issue. Both also belong to the category of Bratislava and technically oriented faculties. In 2016, we record a decrease in these two categories to zero, but on the other hand, this activity is performed by one non-Bratislava non-technical faculty, namely Jessenius Faculty in Martin, which provides various contacts to its graduates, cooperates with the Institute of Information Technologies. Entrepreneurial activity in the region was supported only in 2016 by the Faculty of Electrical Engineering and Informatics of STU through projects in the form of business activities with the private sector and the Faculty of Law of Comenius University, which supports companies in the region through seminars for corporate lawyers.

5. Discussion

Since we divided the faculties to two divisions and there is a different number of faculties in each category, we decided to conclude by stating the performance of the researched activities in percentages so that we could better compare.
In the implementation of the third role of universities in the field of education, faculties from Bratislava were better in 2008. On the other hand, in 2016, were faculties from other parts of Slovakia more active. In terms of focus, non-technical faculties have been more involved in these activities in both years, which also confirms our first assumption. However, we still see that only a very small percentage of faculties are involved in some activities, or

Table 2. Evaluation of the field of education in %

<table>
<thead>
<tr>
<th>%</th>
<th>BA (12)</th>
<th>Outside BA (15)</th>
<th>Technical (5)</th>
<th>Non-technical (22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment with labour market needs</td>
<td>8.33</td>
<td>8.33</td>
<td>33.33</td>
<td>20</td>
</tr>
<tr>
<td>Surveys of (future) employer needs</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>13.33</td>
</tr>
<tr>
<td>Student internships in companies</td>
<td>25</td>
<td>16.67</td>
<td>46.67</td>
<td>40</td>
</tr>
<tr>
<td>Transformation of educational programs</td>
<td>0</td>
<td>25</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sponsorship of students by companies</td>
<td>8.33</td>
<td>25</td>
<td>13.33</td>
<td>6.67</td>
</tr>
<tr>
<td>Increasing the participation of the local population in education</td>
<td>16.67</td>
<td>16.67</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Specialized educational programs for local residents</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6.67</td>
</tr>
<tr>
<td>Additional education</td>
<td>50</td>
<td>75</td>
<td>33.33</td>
<td>60</td>
</tr>
<tr>
<td>Educational programs for vulnerable groups</td>
<td>8.33</td>
<td>8.33</td>
<td>6.67</td>
<td>20</td>
</tr>
<tr>
<td>Retention of graduates in the region</td>
<td>16.67</td>
<td>0</td>
<td>0</td>
<td>6.67</td>
</tr>
<tr>
<td>Support for business activity in the region</td>
<td>0</td>
<td>16.67</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Own elaboration according to the annual reports.
even no one is involved in it in any year. We also looked at how faculties in each category improved or deteriorated over the years. The results are shown in Table 3. We wanted to find out whether in 2016 the faculties started to pay more attention to their third role. In the case of categories where there was a decrease in 2016 compared to 2008, the corresponding cell is highlighted. Thus, we see that the decrease occurred only in 4 activities out of 11. The largest decline is observed in the case of technical faculties in the area of compliance with the needs of the regional labour market and in the issue of retaining graduates in the region as well as in the case of technical faculties. The decrease in each category of occurred in cooperation with practice through student internships, and the largest up to 40% occurred again at technical faculties. Faculties should make more efforts to cooperate with local companies. It is no secret that companies are willing, if satisfied, to offer such a student a permanent job after school. This could ultimately also have a positive effect on the retention of university graduates in the regions. On the contrary, we see the biggest increase in the implementation of further education at technical faculties, which we evaluate as a great positive, because in today's modern age full of innovations and technical progress, continuous education in this issue is very important.
Table 3. Percentual changes in the implementation of activities in the field of education

<table>
<thead>
<tr>
<th>%</th>
<th>BA (12)</th>
<th>Outside (15)</th>
<th>BA Technical (5)</th>
<th>Non-technical (22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment with labor market needs</td>
<td>0.00</td>
<td>-13.33</td>
<td>-60.00</td>
<td>4.55</td>
</tr>
<tr>
<td>Surveys of (future) employer needs</td>
<td>0.00</td>
<td>13.33</td>
<td>20.00</td>
<td>4.55</td>
</tr>
<tr>
<td>Student internships in companies</td>
<td>-8.33</td>
<td>-6.67</td>
<td>-40.00</td>
<td>-4.55</td>
</tr>
<tr>
<td>Transformation of educational programs</td>
<td>25.00</td>
<td>0.00</td>
<td>0.00</td>
<td>13.64</td>
</tr>
<tr>
<td>Sponsorship of students by companies</td>
<td>16.67</td>
<td>-6.67</td>
<td>0.00</td>
<td>4.55</td>
</tr>
<tr>
<td>Increasing the participation of the local population in education</td>
<td>0.00</td>
<td>20.00</td>
<td>20.00</td>
<td>9.1</td>
</tr>
<tr>
<td>Specialized educational programs for local residents</td>
<td>0.00</td>
<td>6.67</td>
<td>0.00</td>
<td>4.55</td>
</tr>
<tr>
<td>Additional education</td>
<td>25.00</td>
<td>26.67</td>
<td>40.00</td>
<td>22.73</td>
</tr>
<tr>
<td>Educational programs for vulnerable groups</td>
<td>0.00</td>
<td>13.33</td>
<td>0.00</td>
<td>9.1</td>
</tr>
<tr>
<td>Retention of graduates in the region</td>
<td>-16.67</td>
<td>6.67</td>
<td>-40.00</td>
<td>4.55</td>
</tr>
<tr>
<td>Support for business activity in the region</td>
<td>16.67</td>
<td>0.00</td>
<td>20.00</td>
<td>4.55</td>
</tr>
</tbody>
</table>

Source: Own elaboration according to the annual reports.

We are also aware that the quality and content of the annual reports varied, especially if the faculties came from different universities. Each author of a report considers something different to be important and therefore it is possible that information on some activities was not provided only in the annual reports. The difference in terms of content was also noticeable if there was a change in the management of the faculties between these years. We also consider the unavailability of all documents to be a shortcoming, due to which we examined only 27 faculties.
in our work. However, we think that a small number of faculties are involved in these activities. We must state that almost all of them focus more on cooperation with foreign countries than on cooperation with regional institutions. In their annual reports, they write about efforts to expand international cooperation, either through the conclusion of bilateral agreements or through the Erasmus + program. They place great emphasis on the foreign mobility of students as well as teachers and take it as a huge opportunity to improve, make new contacts and gain new experiences. Of course, we cannot deny or deprive these positives. Nevertheless, we think that in addition to international cooperation, our faculties should start to pay more attention to cooperation in area of their location. Through such cooperation, they can significantly help the development of cities or regions, but also the whole country. Educating the population is an important field but knowing how to keep students in the country better is what we should strive for in Slovakia. It is generally known that a major group of educated people are leaving Slovakia. By developing activities in the regions, it is ultimately possible to increase the competitiveness of companies and regions thus gradually prepare the conditions to become a stronger competitor for other countries.

6. Conclusion

In this article, we dealt with the so-called third mission of universities, that is the support of economic development of regions. Our study was based on an in-depth analysis of the annual reports of the investigated faculties. The third role of universities can be seen in terms of education, research and community development. In this article, we have focused on education.

The main goal of the research was to analyse the fulfilment of the activities of the third role of universities in the field of education. In the field of education, we found out that in 2008 the faculties located in Bratislava paid more attention to these activities, but in 2016 faculties outside of Bratislava have been activated. Most faculties are dedicated to further education. This is 75% in Bratislava, 60% outside Bratislava, as well as 60% technically oriented and 68.18% general faculties in 2016. Each category recorded an increase in this activity compared to 2008. In summary, this activity was performed in 11 out of 27 faculties (2008) and 18 of 27 faculties (2016). The second most performed activity is cooperation with internships based on student internships, in 2008 a total of 10 faculties and in 2016 only 8 faculties. The number of faculties outside Bratislava predominates. However, these numbers are still very low. Faculties should be more active in carrying out their third role to foster economic development in Slovakian regions.

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Univerzita Komenského v Bratislave Fakulta telesnej výchovy a športu. Výročná správa za rok 2008. Bratislava. 58 s. Dostupné na:

- Univerzita Komenského v Bratislave Fakulta telesnej výchovy a športu. Výročná správa za rok 2016. Bratislava. 72 s. Dostupné na:


Zákon č. 131/2002 Z. z. o vysokých školách a o zmene a doplnení niektorých zákonov.
Can Internet Use and Cellular Subscriptions Explain the ICT Trade between Turkey and Its Trade Partners within the Gravity Model?

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Abstract

It is recognized that innovation enhances the economic performance of countries. Exports of information and communication technologies (ICT) is one of the innovation indicators. The number of internet users and cellular subscriptions in a country can be considered as the variables that enable both the creation of information that will provide ICT production and, in terms of the product range, the generation of demand for ICT imports. The gravity model, which relies on Newton’s law of gravity, has been a workhorse in the investigation of trade flows among the countries. Therefore, the current paper uses the gravity model to estimate the ICT trade between Turkey and its trade partners. Two datasets and four models that take into consideration internet users and cellular subscriptions are constructed for the analyses. The empirical findings show that internet users and cellular subscriptions have positive effects on both ICT exports and imports, with cellular subscriptions having the highest impact.

**Keywords:** ICT trade, internet use, cellular subscriptions, gravity model

**JEL Codes:** C21, F14, O30

1. Introduction

The export of information and communication technologies (ICT) is one of the science and technology indicators which captures the information about the technology level of countries. According to OECD’s (2003:3-4) definition, ICT goods are the products that provide information processing and communication electronically. In this sense, computers and smartphones can be examples of ICT goods.

The technology (or information) in a product can be obtained through patents, licenses, or know-how. Apart from these, technology can be learned through importing as well. Because the technology in the imported product becomes available to the importer who owns that product. For instance, the importer may use reverse engineering techniques on the product and discover that technology. Whether the technology in the product can be learned depends on the absorptive capacity of that country. Absorptive capacity refers to the country’s learning ability. The countries that absorb the technology in a product may be the producer and/or exporter of that product or its improved versions. The absorbed technology may also be used in different products. There is also a chance for the importer to apply the absorbed technology to different products. Then, the ICT imports can be thought of as a critical determinant of the ICT exports. These implications are supported by Posner’s (1961) technological gap, and Vernon’s (1966) product life-cycle theories.

When it comes to ICT, computer technologies are generally considered from the demand side. In recent years, smartphone technologies have progressed significantly. These technologies cannot be used effectively with no active internet connection. In this context, the number of internet users and mobile cellular subscribers are noteworthy indicators for the ICT demand. On the supply side, these indicators can represent production inputs. Because these variables provide the creation and exchange of information that will enable ICT production. In line with these inferences, the current study aims to investigate the potential of the aforementioned indicators to explain the ICT trade.

Due to its superiority in explaining trade between countries and its frequent use, the gravity model is preferred in the analysis of ICT trade. The seminal work on the gravity model is done by Tinbergen (1962). Taking inspiration from Newton’s law of gravity, the author explains the trade between countries. As Ruiz & Vilarrubia (2007:9) indicate, the gravity equation is a construction of economic mass that positively affects, and the distance that
decreases the total trade between the two countries. Over time, the model is evolved and augmented to numerous variations thanks to the contributions of many authors.

For analysis, two sets of cross-sectional data are created, and four different gravity equations are estimated using ordinary least squares (OLS). Turkey’s all ICT destinations for the first dataset and its top 10 ICT trade partners in terms of ICT trade volume for the second dataset are considered. Empirical results suggest all these variables are positive and significant predictors of ICT trade with a higher effect of mobile cellular subscriptions.

2. Review of the Literature

The vast majority of the studies making use of the gravity model considers the total trade among countries. For example, Antonucci & Manzocchi (2006) apply the gravity model for the trade between Turkey and the European Union (EU) and find that trade agreements do not increase the trade between them. Batra (2007) finds that India’s trade is positively affected by historical and cultural similarities. Ruiz & Vilarrubia (2007) estimate the export potential of the Euromed region. By using various dummy variables, they show the avoiding misleading results. Tourist flows from 11 countries to Turkey are investigated by Eryiğit, Kotil, & Eryiğit (2010). The main variables explaining the tourist flows to Turkey are found to be distance and tourism climate index. Dikkaya (2016) analyses the trade between ECO countries and finds that the GDPs of the exporter and the importer are positive, and the distance is negative determinants of the exports, imports, and the total trade among these countries. Singh & Padhi (2020) examine the trade between India and some trade blocks. Their results indicate that the distance decreases the trade to the European Union and North American Free Trade Agreement countries, and GDP decreases the trade to the EU countries. Zhongxiu & Shahzad (2020) reveal that trade facilitation improves the imports of Pakistan. Sarıca, Hubbard, & Dawson (2020) focus on Turkey’s agricultural exports to 30 Mediterranean countries and find that the distance and GDP are respectively negative and positive predictors of Turkey’s agricultural exports.

A part of the literature also concentrates on the impact of ICT products or their use on the total trade. These studies treat ICT as an explanatory variable. Some of them are summarized as follows. Özcan (2018) investigates the impact of ICT (ICT use, access, skill, and index) on the trade between Turkey and its trade partners for the period 2000-2014. The author finds that the exports and imports of Turkey are increasing functions of ICT. Also, ICT has a higher impact on exports than imports. Xing (2018) study the effect of ICT variables (on the internet and phone) on e-commerce among 30 OECD and 21 developing and least developed countries. Findings reveal that better ICT levels lead to higher e-commerce. Donaubauer et al. (2018) consider 150 countries and examine the impact of the infrastructure on the trade among them. Accordingly, the countries with higher quality infrastructure are found to trade more and have lower trade costs. By segmenting 120 countries by product complexity and income, Crespo & Zarsoso (2019) employ the gravity model to explain the trade among them for the period 2000-2014. They find that internet use enhances trade. The coefficient of internet use is greater when the countries are segmented by product complexity. Turkey’s trade with 200 countries is examined by Aykuteli & Töngür (2020) in respect to ICT (ICT use, access, skill, and index). Accordingly, ICT increases the exports of Turkey, and its magnitude depends on the presence of trade agreements.

The minority of the studies use high-technology or ICT product exports as a dependent variable. For example, Greene (2013) examines advanced technology goods exports of the USA to its top 76 trade partners and India. As expected, the distance has a reducing impact on the trade. For India, its low level of economic development and poor infrastructure results in lower advanced technology good imports from the USA.

Among the papers that employ ICT as a dependent variable, some of them include ICT-related variables as an explanatory variable. For 40 countries (OECD, Brazil, China, Indonesia, Russia, and South Africa), Yushkova (2014) emphasizes the role of internet use by the business world on the trade of technology goods. Within the gravity model, the results indicate that the internet has a positive relation with exports of technological goods. The trade of technology products for emerging and developing Asian countries is examined by Nasir & Kalirajan (2016). The results indicate that the export potential of these countries is lower than the of developed countries, and internet use is an important and positive predictor of technology trade.
3. Two Analyses Based on Gravity Model

The variables used in the analyses are summarized with their definitions and sources in Table 1. Unlike in the original source, the variable on the ICT exports is expressed as the entire value instead of million dollars. Also, the variable on internet users is transformed to headcount using population data obtained from World Bank (2021).

Table 1. Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X$</td>
<td>ICT exports (current US$)</td>
<td>UNCTAD (2021)</td>
</tr>
<tr>
<td>$dist$</td>
<td>The distance between exporter and importer (km)</td>
<td>distancefromto.net (2021)</td>
</tr>
<tr>
<td>$cont$</td>
<td>Dummy indicating if the countries are contiguous (0-1)</td>
<td>CIA (2021)</td>
</tr>
<tr>
<td>$area$</td>
<td>The total land area of the country (km$^2$)</td>
<td>CIA (2021)</td>
</tr>
<tr>
<td>$lang$</td>
<td>Dummy indicating if the countries share an official language (0-1)</td>
<td>CIA (2021)</td>
</tr>
<tr>
<td>$locked$</td>
<td>Dummy indicating if the country is landlocked (0-1)</td>
<td>CIA (2021)</td>
</tr>
<tr>
<td>$island$</td>
<td>Dummy indicating if the country is an island (0-1)</td>
<td>CIA (2021)</td>
</tr>
<tr>
<td>$net$</td>
<td>The number of individuals using the internet (headcount)</td>
<td>World Bank (2021)</td>
</tr>
<tr>
<td>$cel$</td>
<td>The mobile cellular subscriptions (headcount)</td>
<td>World Bank (2021)</td>
</tr>
</tbody>
</table>

Variables on distance, contiguity, landlocked, and island are used as proxies for shipping costs. The shipping costs are higher for distant, non-contiguous, landlocked, and island countries. Therefore, such factors are likely to decrease the trade between these countries (Bacchetta et al., 2012:106).

Countries with larger areas can have higher imports than the smaller ones. However, the large land area may end up with domestic markets to be more prominent. Therefore, the land area may have two opposite effects on trade (Greene, 2013:10).

Countries that use the same official language are likely to have more trade mutually because of the ease of communication.

For income, GDP per capita ($Y$) is employed since it includes the population. Its coefficient is expected to be positive.

The number of internet users and cellular subscriptions are utilized to capture the ICT demand of the importer, and the ICT production inputs of the exporter. Countries with higher numbers of ICT users are expected to have higher ICT imports and exports.

3.1. One-way analysis: Turkey’s ICT exports

3.1.1. Model

The following equations are estimated using ordinary least squares (OLS) to examine Turkey’s ICT exports:

$$\ln X_{ei} = a_0 + a_1 \ln dist_{ei} + a_2 cont_{ei} + a_3 locked_{ei} + a_4 island_{ei} + a_5 \ln Y_i + a_6 \ln net_i + \epsilon_{ei}$$  (1)

$$\ln X_{ei} = \beta_0 + \beta_1 \ln dist_{ei} + \beta_2 cont_{ei} + \beta_3 locked_{ei} + \beta_4 island_{ei} + \beta_5 \ln Y_i + \beta_6 \ln cel_i + \epsilon_{ei}$$  (2)

Here, subscripts $e$ and $i$ stand for exporter and importer, respectively. $\epsilon$ and $\epsilon$ are the error terms. Alphas ($\alpha$) and betas ($\beta$) are the coefficients to be estimated. Prefix ln is for the natural log. The coefficients are estimated using OLS.

The cross-sectional dataset constructed using Turkey’s ICT export destinations (see Table A1 in Appendix). For most observations, the year is 2019. However, due to the lack of data, the year varies between 2019 and 2016 for some observations.
3.1.2. Empirical results

Table 2 presents the estimated coefficients of equations (1) and (2). As expected, the farther the exporter is, the lower the ICT exports. Both coefficients are found to be statistically significant at the 1% level. Even they have desired signs, the remaining variables on shipping costs (namely contiguity, area, landlocked, and island) are statistically insignificant.

<table>
<thead>
<tr>
<th>Variables</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \ln \text{dist} )</td>
<td>-2.049***</td>
<td>-2.144***</td>
</tr>
<tr>
<td></td>
<td>(0.237)</td>
<td>(0.230)</td>
</tr>
<tr>
<td>cont</td>
<td>0.0794</td>
<td>0.140</td>
</tr>
<tr>
<td></td>
<td>(0.952)</td>
<td>(0.934)</td>
</tr>
<tr>
<td>( \ln \text{area} )</td>
<td>0.0783</td>
<td>0.0466</td>
</tr>
<tr>
<td></td>
<td>(0.115)</td>
<td>(0.112)</td>
</tr>
<tr>
<td>locked</td>
<td>-0.635</td>
<td>-0.581</td>
</tr>
<tr>
<td></td>
<td>(0.417)</td>
<td>(0.410)</td>
</tr>
<tr>
<td>island</td>
<td>-0.455</td>
<td>-0.437</td>
</tr>
<tr>
<td></td>
<td>(0.574)</td>
<td>(0.563)</td>
</tr>
<tr>
<td>( \ln \text{y} )</td>
<td>0.562***</td>
<td>0.808***</td>
</tr>
<tr>
<td></td>
<td>(0.128)</td>
<td>(0.118)</td>
</tr>
<tr>
<td>( \ln \text{net} )</td>
<td>0.865***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.132)</td>
<td></td>
</tr>
<tr>
<td>( \ln \text{cel} )</td>
<td></td>
<td>0.955***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.134)</td>
</tr>
<tr>
<td>Constant</td>
<td>10.96***</td>
<td>7.787***</td>
</tr>
<tr>
<td></td>
<td>(2.729)</td>
<td>(2.848)</td>
</tr>
</tbody>
</table>

Observations 153 153
\( R \)-squared 0.691 0.703
Adj. \( R \)-squared 0.676 0.688

Standard errors in parentheses
*** p<0.01

GDP per capita of the importer also exhibits the expected positive effect on the ICT exports of Turkey. The coefficients for both equations are statistically significant at the 1% level.
The coefficients of the variables representing the ICT demand of the importer are positive and significant at the 1% level. A 1% increase in the internet users in the importer country brings a 0.865% increase in the ICT exports of Turkey. The elasticity for mobile cellular subscriptions is higher. Each 1% increase in mobile cellular subscriptions ends up with a 0.955% rise in the ICT exports of Turkey.

Finally, \( R^2 \) values show that approximately 70% of the changes in Turkey’s ICT exports are explained by the independent variables.

As seen in Table 3, equations (1) and (2) pass all the diagnostic tests except for normality. The null hypotheses that indicate the normality of the residuals are rejected at the 1% level of significance.

### 3.2. Two-way analysis: ICT trade among Turkey and its top ICT trade partners

#### 3.2.1 Model

The following equations focus on the ICT trade among Turkey and its top ten trade partners in ICT:

\[
\ln X_{ei} = \gamma_0 + \gamma_1 \ln \text{dist}_{ei} + \gamma_2 \ln \text{area}_e + \gamma_3 \ln \text{area}_i + \gamma_4 \ln \text{locked}_e + \gamma_5 \ln \text{locked}_i \\
+ \gamma_6 \ln \text{net}_e + \gamma_7 \ln \text{net}_i + \gamma_8 \ln \eta_e + \gamma_9 \ln \eta_i + \gamma_{10} \ln \text{con}_{ei} + \gamma_{11} \ln \text{con}_{en} + \gamma_{12} \ln \text{con}_{en} + \gamma_{13} \ln \text{con}_{en} + \gamma_{14} \ln \text{con}_{en} + \gamma_{15} \ln \text{con}_{en} + \gamma_{16} \ln \text{con}_{en} + \gamma_{17} \ln \text{con}_{en} + \gamma_{18} \ln \text{con}_{en} \quad (3)
\]

\[
\ln X_{ei} = \delta_0 + \delta_1 \ln \text{dist}_{ei} + \delta_2 \ln \text{area}_e + \delta_3 \ln \text{area}_i + \delta_4 \ln \text{locked}_e + \delta_5 \ln \text{locked}_i \\
+ \delta_6 \ln \text{net}_e + \delta_7 \ln \text{net}_i + \delta_8 \ln \eta_e + \delta_9 \ln \eta_i + \delta_{10} \ln \text{con}_{ei} + \delta_{11} \ln \text{con}_{en} + \eta_{ei} \quad (4)
\]

Here, subscripts \( e \) and \( i \) stand for exporter and importer, respectively. Gammas (\( \gamma \)) and deltas (\( \delta \)) are the coefficients to be estimated. Prefix \( \ln \) stands for the natural log. The coefficients are estimated using OLS. The coefficients are estimated using OLS.

Since there is no island country in the sample, no dummy is included for it. The cross-sectional dataset constructed using Turkey and its top 10 ICT trade partners (China, Czechia, France, Germany, Hong Kong, Hungary, Netherlands, United Kingdom, United States of America, and Viet Nam). The year is 2019 for each observation.

#### 3.2.2 Empirical results

Variables on the area of importer and exporter are removed from Eq. (3) because of the multicollinearity. However, these variables can be employed in Eq. (4) since there is no such obstacle. Even so, the residuals of Eq. (4) were heteroskedastic (\( \chi^2=10.13*** \)). To tackle this, the model is re-estimated with robust standard errors, which are also known as Huber, White, or sandwich standard errors (Long & Freese, 2001: 69).

The coefficient estimates of equations (3) and (4) are given in Table 4. The distance has no significant impact on the trade among the countries for equation (3) while a negative effect and significant effect (at the 1% level) is obtained for equation (4). The coefficients of the contiguity dummies are positive and significant at the 1% level. Of the variables on area, only the exporter’s is a significant predictor of the ICT trade among the countries.

Being a landlocked importer/exporter or speaking the same language with the trade partner does not make any significant changes in the ICT trade for Eq. (3). Among these variables, only the coefficient of being a landlocked exporter is significant (at the 1% level). This positive and rather high coefficient is not compatible with the

### Table 3. Diagnostics for equations (1) and (2)

<table>
<thead>
<tr>
<th>Test</th>
<th>Eq.</th>
<th>Test statistic</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variance inflation factors (maximum)</td>
<td>(1)</td>
<td>2.88</td>
<td>No multicollinearity</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
<td>2.88</td>
<td>No multicollinearity</td>
</tr>
<tr>
<td>Breusch-Pagan/Cook-Weisberg heteroskedasticity test (( \chi^2 ))</td>
<td>(1)</td>
<td>2.30</td>
<td>Homoskedasticity</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
<td>1.70</td>
<td>Homoskedasticity</td>
</tr>
<tr>
<td>The link test (t-statistics of ( \hat{y}^2 ))</td>
<td>(1)</td>
<td>-1.28</td>
<td>No omitted variables</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
<td>-1.58</td>
<td>No omitted variables</td>
</tr>
<tr>
<td>Jaque-Bera test (joint adjusted ( \chi^2 ))</td>
<td>(1)</td>
<td>23.18***</td>
<td>Non-normality</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
<td>24.68***</td>
<td>Non-normality</td>
</tr>
</tbody>
</table>

*** \( p<0.01 \)
literature and implies that the landlocked countries export ICT about 2.647% more than the coastal or island countries.

Table 4. Regression results for equations (3) and (4)

<table>
<thead>
<tr>
<th>Variables</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>lndist</td>
<td>-0.133</td>
<td>-0.656***</td>
</tr>
<tr>
<td></td>
<td>(0.166)</td>
<td>(0.124)</td>
</tr>
<tr>
<td>cont</td>
<td>2.342***</td>
<td>1.007***</td>
</tr>
<tr>
<td></td>
<td>(0.630)</td>
<td>(0.379)</td>
</tr>
<tr>
<td>lnarea_i</td>
<td>-0.0999</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0976)</td>
<td></td>
</tr>
<tr>
<td>lnare_a_e</td>
<td>-0.925***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0781)</td>
<td></td>
</tr>
<tr>
<td>locked_i</td>
<td>0.240</td>
<td>0.408</td>
</tr>
<tr>
<td></td>
<td>(0.513)</td>
<td>(0.463)</td>
</tr>
<tr>
<td>locked_e</td>
<td>-0.234</td>
<td>2.647***</td>
</tr>
<tr>
<td></td>
<td>(0.513)</td>
<td>(0.452)</td>
</tr>
<tr>
<td>lang</td>
<td>1.089</td>
<td>0.270</td>
</tr>
<tr>
<td></td>
<td>(0.888)</td>
<td>(0.404)</td>
</tr>
<tr>
<td>ln y_i</td>
<td>1.060***</td>
<td>1.052***</td>
</tr>
<tr>
<td></td>
<td>(0.178)</td>
<td>(0.146)</td>
</tr>
<tr>
<td>ln y_e</td>
<td>0.286</td>
<td>0.476***</td>
</tr>
<tr>
<td></td>
<td>(0.178)</td>
<td>(0.154)</td>
</tr>
<tr>
<td>ln net_i</td>
<td>0.332**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.141)</td>
<td></td>
</tr>
<tr>
<td>ln net_e</td>
<td>0.361**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.141)</td>
<td></td>
</tr>
<tr>
<td>ln cel_i</td>
<td></td>
<td>0.645***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.244)</td>
</tr>
<tr>
<td>ln cel_e</td>
<td></td>
<td>2.363***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.182)</td>
</tr>
<tr>
<td>Constant</td>
<td>-18.02***</td>
<td>-45.51***</td>
</tr>
<tr>
<td></td>
<td>(5.293)</td>
<td>(5.124)</td>
</tr>
<tr>
<td>Observations</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.464</td>
<td>0.743</td>
</tr>
<tr>
<td>Adj. R-squared</td>
<td>0.416</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Standard errors in parentheses for Eq. (3)
Robust standard errors in parentheses for Eq. (4)

*** p<0.01 ** p<0.05

GDP per capita of the importer is a significant (at the 1% level) predictor of the ICT trade. However, the coefficient of the exporter’s GDP per capita is significant (at the 1% level) just in Eq. (4).

Both the coefficients of the number of internet users in the exporter and importer countries are significant at the 5% level. A 1% increase in the number of internet users in the importer (exporter) country brings a 0.332% (0.361%) rise in the ICT trade among the countries.
Table 5. Diagnostics for equations (3) and (4)

<table>
<thead>
<tr>
<th>Test</th>
<th>Eq.</th>
<th>Test statistic</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variance inflation factors (maximum)</td>
<td>(3)</td>
<td>1.65</td>
<td>No multicollinearity</td>
</tr>
<tr>
<td></td>
<td>(4)</td>
<td>8.32</td>
<td>No multicollinearity</td>
</tr>
<tr>
<td>Breusch-Pagan/Cook-Weisberg heteroskedasticity test (χ²)</td>
<td>(3)</td>
<td>1.64</td>
<td>Homoskedasticity</td>
</tr>
<tr>
<td></td>
<td>(4)</td>
<td>N/A</td>
<td>Robust standard errors</td>
</tr>
<tr>
<td>The link test (t-statistics of ( \hat{y}^2 ))</td>
<td>(3)</td>
<td>-1.71*</td>
<td>No omitted variables</td>
</tr>
<tr>
<td></td>
<td>(4)</td>
<td>-1.64</td>
<td>No omitted variables</td>
</tr>
<tr>
<td>Jarque-Bera test (joint adjusted χ²)</td>
<td>(3)</td>
<td>2.76</td>
<td>Normality</td>
</tr>
<tr>
<td></td>
<td>(4)</td>
<td>7.70**</td>
<td>Non-normality</td>
</tr>
</tbody>
</table>

*** p<0.01 ** p<0.05

Both the coefficients of the mobile cellular subscriptions in the exporter and importer countries are significant at the 1% level. Each 1% upswing in the mobile cellular subscriptions in the importer (exporter) country promotes the ICT trade among the countries by 0.645% (2.363%).

\( R^2 \) of Eq. (3) is low, which may due to the lack of variables on the area. However, Eq. (4) has a \( R^2 \) value implying that about 74% of the variations in the ICT trade among the countries is explained by the independent variables considered.

Results from diagnostic tests are summarized in Table 5. The equations do not suffer from multicollinearity, heteroskedasticity, and omitted variables (no omitted variable is acceptable for Eq. (3) at the %5 and 1% percent levels of significance). The residuals of Eq. (3) exhibit a normal distribution. But the null of non-normality of the residuals is rejected at the 5% and 10% levels of significance for Eq. (4).

4. Conclusion

This study investigates Turkey’s ICT trade with its top trade partners with an emphasis on the factors of ICT demand and production. These are represented by the numbers of internet users and mobile cellular subscriptions. According to the results, each coefficient has an expected influence on the ICT trade, except the one for the landlocked dummy. Accordingly, the landlocked countries trade way more than non-landlocked countries. The landlocked countries may be specialized in the production of these products due to their geographic positions and demand more ICT products from the other countries due to product range. Also, the results possibly vary depending on the product group considered.

The number of internet users and mobile cellular subscribers have a trade-enhancing effect on the ICT. Countries with higher internet users and cellular subscribers import more ICT products from Turkey. For Turkey and its top trade partners, the internet users both in the importer and the exporter countries have a close magnitude of impact on the ICT trade. Mobile cellular subscriptions in the importer country increase the ICT trade more than the internet users. However, the impact of mobile subscriptions in the exporter on ICT is much higher. This result may indicate that the mobile cellular subscriptions in the exporting country considerably accelerate the production and sharing of information required for ICT production, increasing the production of the ICT products, and releasing them to the foreign markets.

Limitations of the study and future research

Current work does not include varying time dimension. A panel time-series analysis can be applied to have better implications. Also, it is assumed that the indicator of the ICT demand of the importer and the factor of the ICT production for the exporter are the same. But it does not have to. Especially in terms of ICT production, variables on R&D expenditures, the number of researchers, and the number of patent applications can be utilized as well.
References


Appendix

Table A1. Model 1 countries

<table>
<thead>
<tr>
<th>Afghanistan</th>
<th>Cyprus</th>
<th>Lao PDR</th>
<th>Romania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>Czechia</td>
<td>Latvia</td>
<td>Russian Federation</td>
</tr>
<tr>
<td>Algeria</td>
<td>Denmark</td>
<td>Lebanon</td>
<td>Rwanda</td>
</tr>
<tr>
<td>Andorra</td>
<td>Dominican Rep.</td>
<td>Libya</td>
<td>St. Vincent and the Grenadines</td>
</tr>
<tr>
<td>Angola</td>
<td>Ecuador</td>
<td>Lithuania</td>
<td>Sao Tome and Principe</td>
</tr>
<tr>
<td>Argentina</td>
<td>Egypt</td>
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<td>Zimbabwe</td>
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<td>Korea</td>
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<td>Côte d'Ivoire</td>
<td>Kuwait</td>
<td>Portugal</td>
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<td>Croatia</td>
<td>Kyrgyzstan</td>
<td>Qatar</td>
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</table>
Impact of Insurance Tax on Decision Making of Households in the Slovak Republic with Focus on Digital Era Challenges

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Abstract

The era of digitalization brings many new challenges. Some of the new technologies, can cause partial extinction of some insurance products. On the other hand, digitalization can create many new insurance products, as far as digitalization is changing what insurers cover (cyber-attack, loss of the virtual data). In addition to these changes, in Slovakia we face also changes in taxes paid by insurers. According to the European Union law, financial services, including insurance and reinsurance transactions supplied by insurance brokers and insurance agents, are exempted from the VAT. However, across the EU Member States, we have been witnessing a growing trend of introduction of other taxes to substitute VAT in the field of insurance and reinsurance services.

Our research is motivated by the effort to estimate the possible impacts of insurance tax from the perspective of households. The effect, that tax can have on household’s demand depends on a slope of the demand curve which in turn heavily depends on the price elasticity of demand. Furthermore, elasticity of demand curve can be affected by degree of necessity of product. We presume that the slope of demand curve might be changed by the effects of digitalization. If digitalization cause, that some of insurance products would no longer have high degree of necessity (car insurance may be no longer necessary if autonomy cars of the future, would have very low number of car accidents), then coefficient of elasticity in case of that insurance products would be higher number. Higher absolute value of elasticity coefficient means, that demand would react more aggressively to the same price changes. This leads us to raise a research question whether substitution of VAT exemptions by insurance tax or its alternatives does lead into the shifts of tax burden from insurance companies to insured households, which can be further reflected to a reduction in amount of policyholders. To explore this question, we measure a slope of the demand curve, while for estimation purposes a regression analysis method is employed.

The results of our work provide evidence of shifting of the insurance tax burden on demand side. However, by reason of steep slope of demand curves (inelastic demand), increase in prices, caused by the shifts of insurance tax burden on insured households is likely not to affect the amount of policyholders in a wide range. Our results also provide summarization of possible scenarios, how these insurance products can be affected by the digitalization in the future.

Keywords: Insurance tax, elasticity of demand, regression analysis, tax incidence

JEL Codes: D10, G22, H22, K34, Q11

1. Introduction

Financial services, including insurance and reinsurance transactions, including related services provided by insurance brokers and insurance agents, are exempt from value added tax under the Article 135 of Council Directive 2006/112 / EC on the common system of value added tax. (EP, 2006).

Acknowledgement: VEGA No 1/0779/19 Challenges of digitization of the economy in the field of taxation, possible solutions and their assumptions. This research paper is an outcome of the research project VEGA No 1/0779/19 Challenges of digitization of the economy in the field of taxation, possible solutions and their assumptions.
The said provision of the said Council Directive is also transposed into the legal order of the Slovak Republic so that in the provision of §37 of Act No. 222/2004 Coll. on value added tax, it is stated that insurance and reinsurance activities, including insurance intermediation and reinsurance intermediation, are exempt from value added tax (National Council of the Slovak Republic, 2004).

The economic justification for exempting insurance services from VAT is that these services do not serve to create new value, but only contribute to the restoration of values that already existed but were damaged by the insured event (SLASPO - Slovak Insurance Association, 2018).

Another reason for which financial services are selected, including insurance services exempt from VAT in the EU, may be lower value added in financial corporations compared to non-financial corporations.

However, it should be emphasized that Council Directive 2006/112 / EC on the common system of value added tax, Chapter 4, Other taxes, duties and charges, states in Article 401, without prejudice to other Community provisions, they can not prevent a Member State from maintaining or introducing taxes on insurance contracts which cannot be described as turnover taxes, provided that the levying of such taxes does not give rise to formal cross-border transactions in trade between Member States (The Council of the European Union, 2006) This provision is the legal basis for EU Member States, which entitles them to introduce other taxes that can substitute and offset the VAT exemption for insurance services. Thus, in addition to the exemption of selected financial services from VAT, the Council Directive also provides a legal basis for the introduction of an insurance tax which compensates and substitutes for the exemption of insurance services from VAT.

Several EU Member States have introduced part of the premiums received. The legal basis for the introduction of the payment of part of the premiums received in the EU Member States is the fact that insurance and reinsurance transactions, including related services provided by insurance brokers and insurance agents, are exempted under Article 135 of Council Directive 2006/112 / EC on the common system of value added tax from value added tax. (EP, 2006)

However, it is for this reason that in the last 25 years, in accordance with Council Directive 2006/112 / EC on the common system of value added tax, most Member States of the European Union have introduced either a premium or an insurance tax. Generally speaking, a common feature of the payment of part of the premium introduced by some EU Member States is that it is an alternative to VAT, as insurance services are not subject to VAT in the EU. (Bearman, et al., 2015)

The economic reason for introducing a levy on part of the premium received, which is imposed on insurers in addition to corporation tax, is that insurance services are not subject to VAT in the European Union. As Council Directive 2006/112 / EC on the common system of VAT exempts insurance services from VAT and, as a result, creates favorable conditions for higher profit margins in the insurance sector, governments of the European Union in first introduced a special levy, or immediately proceeded with the introduction of insurance tax, or introduced the payment of part of the premium.

In connection with the introduction of a new insurance tax, it is necessary to take into account the tax incidence. The tax incidence, or otherwise referred to as a tax shift, significantly influences the decision-making of market participants. There are various reasons why the tax is shifted. It is possible to assume three types of transfer of insurance tax. The first option is to transfer the tax, or part of it, to consumers. Another possibility is to leave the entire tax burden on the supply side, and thus on the insurance side. A third option would be to share the tax burden between both market participants, supply and demand. However, a distinction needs to be made between the legal impact of the tax (who actually pays and pays the tax) and the economic, real impact of the tax (who will benefit from the consumption after the tax is introduced).

The aim of this paper is to estimate which of the non-life insurance products could be affected more and which of them less by the tax incidence, induced by new insurance tax. This may be helpful in understanding of, which types of insurance products are more suitable for introduce of new insurance tax from the perspective of public budget income increase and at the same time the tax should affect the demand for insurance as little as possible.

The rest of our paper is organized as follows. Next section provides brief insight into the theory of tax incidence. Third section develops research question and hypothesis. Section four speaks about data and methodology. Section five then provides research results and discussion. Finally, in the conclusion we summarize our research and its results.
2. A Brief Inside into the Theory of Tax Incidence

We divide the effects of tax into microeconomic (they affect the individual and his behavior), which can then lead to macroeconomic impacts (based on several individuals who adjust their rights, a situation arises that affects the entire economy). Since consumers do not perceive different forms of non-life insurance identically, we assume that the slopes of the demand curves will be different. After the introduction of the tax, it may happen that one and the same consumer will react differently to the change in price for 2 types of insurance products. In the first case, consumer can keep the insurance despite the price increase, if the insurance is significant for him and he perceives it as necessary. We observe such behavior if the consumer is in a situation that carries a risk to which he is averse. However, if the same consumer has a contract to cover another risk for which he does not have such a significant degree of aversion, an increase in the tax price may cause the consumer to tend to enter into a contractual relationship with the insurance company, as his demand has low absolute value of the demand curve slope. This means that even a small increase in price leads to a significant reduction in the required quantity, in our case the number of concluded contracts.

If the demand for the insurance product has steeper slope, it will respond to price changes by a more aggressive change in demanded quantity. If the demand is steeper, consumer is not able to adequately adapt to a unit change in price and therefore the decrease in the required quantity is not very noticeable, the demand does not respond to price changes by the demanded quantity for a given insurance product. (Hussels , Ward, & Zurbruegg, 2005)

Previous research has shown that different insurance products have different slope/elasticity (elasticity-relative value of the change and slope-absolute value of the change of demand curve have not the same meaning, but they are highly related, for the purposes of the short literature review we can consider them as very closely related concepts) of demand curve, that could be affected by many factors. For example, in the study, where motor vehicle and liability insurance has been examined, income elasticity has been found greater for motor vehicle insurance. Even if both of the insurance products have been compulsory, the fact that motor vehicle insurance may have elasticity coefficient affected by the level of income of household. (Browne & Hoyt , 2000) Another study show, that demand for the insurance services can be also affected by the necessity of that special type of insurance. For example, the empirical study of hypothetical determinants, that may affect purchase of flood insurance show, that purchases are highly correlated with the level of flood loses according to prior year in the observed state of US. (Browne & Hoyt , 2000). Even in the field of life insurance, study of a real price index for whole life insurance in selected years in US has shown, that purchases of life insurance, that are considered as new, are negatively related to changes, that has changed the price index. Study has also found the strong price elasticity of demand in this case of insurance products. (Babbel, 1985) Studies also show that price elasticity (slope of the demand curve) can evolve over time. (Simon, 1979), (Parker & Neelamegham, 1997). Study of price elasticity of e-books has shown that price elasticity in this case as time goes by, elasticity coefficient gets lower, that means, customers after period of time do not reflect so much in quantity of books purchased, when price changes. (Lee & Lee, 2013)

These research show, that demand elasticity can be different in different cases of insurance products and can be affected as in case of insurance or non-insurance products by the several factors and it is able to change over time.

3. Research Questions and Hypothesis

Q1: Introduction of new insurance tax in Slovak Republic may cause tax burden on demand side of the market. Which types of non-life insurance products are more likely to absorb tax burden on demand side?

Q2: Are there any situations in future, which can change the slope of demand curve in case of digitalization affecting insurance products?

First question is going to be answered by the estimated coefficient of the slope of demand curve. According to the estimated coefficients, insurance products will be sorted according to the steepness of the slope of demand. By this sorted list of insurance products, we can predict, that in case that product has steeper slope of demand curve the tax burden can be easily shifted to the demand side (to the consumers), or tax burden is more likely to be shifted do the supply, in case of products that have low absolute value of slope. It is necessary to keep in mind that also the slope of supply curve can change the result of tax burden. However, this paper is not dedicated to estimate supply curve slope.
The second question is going to be discussed in the results of this paper, based on evidence from literature (in the field of insurance or in the different areas of businesses) that can indicate, the possible effect of digitalization on insurance demand in the future. (Eling & Lehmann, 2017) According to these presumptions we can predict whether slope of demand curve of specific insurance product of these days may change in the future, and what these changes can cause in the context of insurance tax burden (possibility of shifting tax burden on different side of market).

4. Methodology & Data

Research on insurance demand elasticity has shown, that insurance is luxurious good. (Nakata & Sawada, 2007) However, researches have focused on income elasticity of insurance products demand. That implies, usage of variables as income, or initial wealth, price, that is function of premium and quantity of insurance (measured in different units). (Browne & Hoyt, 2000) (Nakata & Sawada, 2007) In our study we focus on price elasticity of demand, or rather slope of demand curve that is as we have mentioned very close to price elasticity of demand. According to this our variables are price “P”, represented by the data of gross premiums written. Gross premiums written describes gross written premiums, which was reduced by the change in premium reserves created for future periods. It therefore represents a premium regulation that applies only to the current period (current observed year). We consider gross earned premiums as a proxy which represents the price of an insurance unit. The number of contracts represents the quantity that was concluded in the given period at the given prices (for the gross written premium). Quantity denoted as “Q” is the second variable of the regression

Variable price is represented by the data gross premiums written and has been obtained from the website of Slovak National Bank also the variable representing quantity has the same source of the data (National bank of Slovakia, 2020). Variables for the price and also for the quantity has been as it was mentioned obtained from the website of National Bank of Slovakia, and the data represent years 2006-2015 (except for year 2007, where has been made reporting errors). All over our dataset is created of 72 observations, in 9 types of non-life insurance and 8 years.

We have collected all of the accessible data for nine types of non-life insurance products namely: Accident and illness insurance; Property insurance; General liability insurance; Liability insurance for damage caused by the operation of a motor vehicle; Insurance of damage to land vehicles; Insurance of credit, deposit and various financial losses; Accident and illness insurance, individual health insurance; Carrier's liability insurance; Damage insurance on vehicles other than land vehicles. (National bank of Slovakia, 2020) To estimate the relationship between price and quantity (demand curve) we used regression analysis.

Estimated equation of demand:

\[ P = kQ + q \]

Legend:

\( P \) – price
\( k \) – directive (estimated sign (-))
\( Q \) – quantity of insurance contracts
\( q \) – level constant

We expect the slope of demand curve to be negative, according to the law of decreasing demand. When the price gets higher, the demanded quantity of insurance is going to be lowered. Level constant “q” is estimated to be positive. In microeconomics this number represents the price when demand disappears, that means the price is so high that not a single consumer is interested in buying that product.

For our research the most interesting outcome of the regression analyses is going to be “k”, the directive, that represents the slope of demand curve. The higher absolute value of the slope coefficient “k” is going to be, demand is going to look more like inelastic demand curve. According to this, when the absolute value of this coefficient is going to be lower, demand is going to look like more as elastic demand curve.
5. Results & Discussions

Estimated coefficients “k” (directive/slope of the demand curves) have all negative sign according to our presumption. Also, all of the estimated coefficients “q” (level constant) is with positive sign, that is also according to our initial presumption. All of the coefficients are displayed in the Table 1), and they are sorted ascending from the lowest to the highest coefficient “k” representing the slope of demand curve. According to this order, we can see that “Accident and illness” non-life insurance has the lowest absolute value of the demand curve slope, that means, it is harder to move tax burden on the demand than in case of insurance products “Damage insurance on vehicles other than land vehicles”, where absolute value of demand curve slope is greater number.

Significance of model as whole is extremely low (no more than 50% of changes in dependent variable can be explained by the changes in the independent variable) only in case of insurance products: Accident and illness insurance, General liability insurance, Carrier's liability insurance.

Table 1. Estimated demand curve equations coefficients

<table>
<thead>
<tr>
<th>Insurance product type</th>
<th>Estimated coefficient of parameter “k”</th>
<th>Estimated coefficient of parameter “q”</th>
<th>Estimated R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident and illness insurance</td>
<td>-9E-09</td>
<td>+0,0468</td>
<td>0,049</td>
</tr>
<tr>
<td>Property insurance</td>
<td>-2E-08</td>
<td>+0,1505</td>
<td>0,5335</td>
</tr>
<tr>
<td>General liability insurance</td>
<td>-3E-08</td>
<td>+0,0878</td>
<td>0,0279</td>
</tr>
<tr>
<td>Liability insurance for damage caused by the operation of a motor vehicle</td>
<td>-8E-08</td>
<td>+ 0,2956</td>
<td>0,8973</td>
</tr>
<tr>
<td>Insurance of damage to land vehicles</td>
<td>-7E-07</td>
<td>+0,8794</td>
<td>0,6642</td>
</tr>
<tr>
<td>Insurance of credit, deposit and various financial losses</td>
<td>-1E-06</td>
<td>+0,3634</td>
<td>0,8943</td>
</tr>
<tr>
<td>Accident and illness insurance, individual health insurance</td>
<td>-5E-06</td>
<td>+0,2475</td>
<td>0,8221</td>
</tr>
<tr>
<td>Carrier's liability insurance</td>
<td>-6E-05</td>
<td>+1,468</td>
<td>0,158</td>
</tr>
<tr>
<td>Damage insurance on vehicles other than land vehicles</td>
<td>-0,0002</td>
<td>+2,7997</td>
<td>0,909</td>
</tr>
</tbody>
</table>

Source: own processing

According to the results of demand slope value in the Table 1), we can easier predict, which insurance products may be affected by introduction of new insurance tax. Higher absolute value of demand curve slope means that demand of insurance product is going to react not so aggressively on price changes than it could be in case of products on the top of the chart, which have not so steep demand curve. These findings could be helpful in the case other countries, introducing new insurance tax. In case of Slovakia insurance tax has been introduced on all of the non-life insurance products. But as we can see, every product has different slope of demand curve, so that means, every insurance product can react to price changes in premiums caused by the insurance tax, differently.

If the government is looking for new sources of financing for the public budget, it is more efficient to impose a new insurance tax for such insurance products that have a steeper slope of the demand curve. As far as changes in demand are minimal in contrast to price changes. If the slope of demand is not so steep, introduction of new insurance tax may reflect in overall insufficient insurance policy, that means underinsurance. This may be caused by the fact, that when the demand slope is not so steep, demand would react on unit change in price more aggressively in change of demanded quantity.
To answer Question 2) of our work, we will focus on enumeration of possible aspects of digitalization that can shift the demand curve (factors that can change the slope of curve). Some factors that affect consumers’ price elasticity could include family size, education level, size and price of homes, and race. (Hoch, Kim, & Montgomery, 1995) We can add to these factors some more general factors, that can affect the slope of the demand curve: nature of goods, existence of substitutes, income level, necessity of goods, how many times it is possible to use the product, share of expenditure on total expenditure of individual and time period. What we can expect, in the field of insurance, is that in case of some insurance products the necessity of product can evolve over time. For example, in case of cyber risks now and in the future. For example, in case of products like car insurance, insurance for autonomy cars, the need or necessity for this kind of insurance product could be lower in the future than now. These changes can be mainly driven by the new industry I04, in other words also by rapid digitalization, that can change product, that we use. In case of intelligent houses (when sensors detect incoming storm, they close all windows, shade the blinds or open the blinds, smart house can send you notification, if the doors are open longer than some period of time, also new cameras can detect exactly the type of animal moving around your house, or they can send you picture of suspicious person, that is too close to house and many more gadgets are common even now), so it is even impossible now to think what technology we can use in future. These intelligent/smart houses can reduce possibility of plethora accidents. This leads to lack of risk perception of house owners in case of some house insurance event. (Schmidt, 2018) On the other hand, digitalization in insurance industry can also bring the new challenges and possibilities, like more personalized insurance products, insurance products that can be purchased at home and many other advantages that results from digitalization for customers. Benefits of digitalization also can be on supply side of the market, when big data about customer’s needs can be used by the insurance to sell the products. (Albrecher, et al., 2019), (Eling & Lehmann , 2017), (Mustafina, Kaigorodova, Alyakina, Velichko, & Zaïnullina, 2020) These changes, especially by affecting necessity of insurance products, may in the future shift the demand curve of some non-life insurance products. (Schmidt, 2018) In case of insurance, where the risk of accident has been driven by the possibility of man failure, could be more sensitive to demand curve counterclockwise swifter. This type of swift, results in situation, where demand is more sensitive to price changes. In case of ceteris paribus on supply side of market, these changes of demand could shift the tax burden on supply side. Situations, where possibility of insurance event is caused by the natural disaster, we consider as more resistant to demand shifts, that could be affected by digitalization. It is possible that in the future weather forecasts would be more accurate, technical gadgets may warn us further before the accident may happen. (Eling & Lehmann, 2017) However, it is not so probably, that digitalization could stop the hurricane or earthquake. This led us to the idea, that non-life insurance products with nature of reducing disaster damages, may not be affected by the evolution of digitalization. As far we have generally mentioned, non-life insurance products with possibility of demand curve swift affected by digitalization, also the one that may not be affected by these changes, there is one more group of non-life insurance products that would be extremely affected by the digital era. Some of these insurances even does not exist now. Some of them are relatively young, and they are all tightly related to the digitalization. (Eling & Lehmann, 2017) As example we can mention cyber-attack insurance, insurance against loss of data (personal, corporate, sensitive, government, secret). Cyber insurance is rising on awareness as the globalization is affecting wider and wider areas of life. (Schmidt, 2018) For example, only in year 2016 cyber-attacks in US reached average 7 million USD of loss on one attack. (Catlin, Lorenz, Nandan, Sharma, & Waschto, 2018) As the globalization affect daily life more and more, we can expect that in future demand for this kind of insurance products would have rather steep than slight demand curve, according to factor necessity that may affect the demand curve steepness. To answer the Question 2, we can say that digitalization brings many challenges to the field of insurance, and demand curves can be shifted in some cases described above, but also may remain without change, or there could be created completely new demand curve for cyber insurance products.

6. Conclusion

Introduction of new tax is accompanied by the tax burden and tax incidence. Whether is demand side of the market going to bear a bigger piece of tax burden depends on its curve slope. If the slope of demand curve is steep, demand would react less to price changes triggered by the new insurance tax. If the demand slope of the insurance product is not so steep, reaction to price change is going to be grater.

In case of Slovakia, we estimated the demand curve equations for nine insurance products. Out of these nine models, six of them could explain more than 50% of changes between the price and demanded quantity of insurance product. Then we have sorted these insurance products from the one with the lowest steepness of demand curve to the one with the highest steepness of the demand curve slope.
These results may help in decision making of governments of other countries or also in Slovakia, when deciding which insurance product is better for introducing the new insurance tax or which one is more suitable in case of changing the tax rate to higher or to lower one. Generally, insurance products with steeper slope of demand would react to increase in price only little. These products are more suitable for implementation of new tax in case, that government’s goal is to raise revenues in public budget.

To estimate the possible ways, by which digitalization could lead us in the future is very hard. In our work, we tried to describe the three possible scenarios, in which insurance products of today and also of the future may find itself. In some cases, the necessity of products could change (liability insurance for damage caused by driving a motor vehicle, in the case of autonomous vehicles), so they will be no longer needed in the way we know them today, some of nonlife insurance products may even disappear due to digitalization affecting their necessity. In the other group of insurances, necessity of them may not be affected by the digital era (natural disaster insurance), even if we agree that digitalization may help us to prepare further for this kind of insurance events. And the last group of insurance products, that may even now does not exist, but the digital era is definitely going to change that in the future, is cyber-insurance. Data about cyber-attacks losses can foreshadow the necessity of this new means of insurance.

References


Results and Trends of the Prosecutor's Office of the Republic of Bulgaria in Combating Crime

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Abstract

The purpose of this Report is to present the operations of the Prosecutor’s Office of the Republic of Bulgaria for the first six months of 2020, based on indicators characterising the performance of its main statutory functions. One of the essential factors in the first six months of 2020 was the unprecedented COVID – 19 pandemic which required the adoption of measures and decisions of the competence of the PORB (the Prosecutor's Office of the Republic of Bulgaria) which directly reflect the effective exercise of the indictment function and the protection of the rule of law and of the public interest.

Keywords: Prosecutor's Office of the Republic of Bulgaria (PORB), results, combating crime, trends

JEL Codes: K00, K13, K14

1. Introduction

The adopted Act on the Measures and Actions Applicable During the State of Emergency, and in this regard the overall mobilisation of the Prosecutor’s Office human resource potential, are unprecedented in current history, both in terms of the organisation of the Prosecutor’s Office activities in general, and for supervising prosecutors, investigating bodies and security and protection services. The main objective is to ensure compliance with the anti-epidemic measures and to provide for health and safety at work for all participants in criminal proceedings (Terziev, Georgiev and Bankov, 2020). The data on the activities of the Prosecutor’s Office in the first six months of 2020, based on key indicators and compared to the data from the previous two years, reflects an increase in the monitored and newly initiated files.

2. Files monitored

In the first six months of 2020 the number of files monitored by the PORB has increased compared to 2019 by 0.8% and by 0.5% compared to 2018. An increase was also recorded in the number of newly initiated files; compared to 2019 it was 1.5%, and compared to 2018 – 0.2% (Table 1) (Terziev, Georgiev and Bankov, 2020a; 2020b; 2020c).
Table 1. Files Monitored (Ist six months of 2018—2020)

<table>
<thead>
<tr>
<th>Indicators</th>
<th>1st six months 2018</th>
<th>1st six months 2019</th>
<th>1st six months 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Files monitored</td>
<td>125105</td>
<td>124784</td>
<td>125729</td>
</tr>
<tr>
<td>Newly initiated files</td>
<td>104753</td>
<td>103435</td>
<td>104967</td>
</tr>
</tbody>
</table>

Source: Authors

3. Files resolved

The first six months of 2020 continued the trend for a decrease in the relative share of the resolved files compared to the monitored ones, and the decrease compared to the same period of 2019 was by 0.4 percentage points, and compared to 2018 – by 0.8 percentage points. The share of the resolved court instance files compared to the total number of resolved files has also decreased (Table 2) (2020c).

Table 2. Resolved Files (Ist six months of 2018—2020)

<table>
<thead>
<tr>
<th>Indicators</th>
<th>1st six months 2018</th>
<th>1st six months 2019</th>
<th>1st six months 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolved files</td>
<td>113304</td>
<td>112565</td>
<td>112867</td>
</tr>
<tr>
<td>Resolved files within 1 month</td>
<td>111805</td>
<td>111855</td>
<td>111852</td>
</tr>
<tr>
<td>Resolved court instance files</td>
<td>8180</td>
<td>7755</td>
<td>6975</td>
</tr>
<tr>
<td>Unresolved files at the end of the reporting period</td>
<td>11801</td>
<td>12219</td>
<td>12862</td>
</tr>
<tr>
<td>Files unresolved within 1 month</td>
<td>11626</td>
<td>12029</td>
<td>12673</td>
</tr>
</tbody>
</table>

Source: Authors

In 14 district prosecutor’s offices there were files resolved after more than 1 month, and compared to all resolved files for the reporting period their share was the highest in the Slivnitsa DPO – by 4% (25 out of the 625 total files), which reported a minimal decrease compared to the previous reporting period when this share was 4.1% or 20 files resolved after more than 1 month out of 483 total resolved files. It was followed by: the Pleven DPO – by 1.9% (63 out of the 3344 total resolved files, with 2.3% (48 out of 2104 resolved files) in 2019; the Veliko Tarnovo DPO – by 1.5% (18 out of 1176 resolved files) with 2.8% (30 out of 1089 resolved files) in 2019; the Lukovit DPO – by 1.1% (3 out of 273 resolved files) with 5.4% (14 out of 257 total resolved files) in 2019. In the remaining prosecutor’s offices the share of the files resolved after more than 1 month, compared to the total files resolved, was below 1%.

At the end of the reporting period in 6 district prosecutor’s offices (a total of 52 files) there were remaining unresolved files after 1 month, and their share compared to the total number of unresolved files for the district prosecutor’s offices was 2.2%.

9 provincial prosecutor’s offices reported files that were resolved after more than 1 month. The highest share compared to the total resolved files was registered in: the Specialised Prosecutor’s Office – by 10.3% (572 out of 5575 total files resolved) with 14.5% (236 out of 1630 total files resolved) in 2019; the Silistra Provincial Prosecutor’s Office – by 9.7% (15 out of 155 resolved files) with 6.5% (13 out of 201 resolved files) in 2019; the Pleven Provincial Prosecutor’s Office – by 3.5% (13 out of 372 resolved files) with 12.1 (41 out of 338 resolved files) in 2019; the Varna Provincial Prosecutor’s Office – by 2.4% (18 out of 744 resolved files) with 5.2% (46 out of 888 resolved files) in 2019; the Blagoevgrad Provincial Prosecutor’s Office – by 2.2% (11 out of 502 resolved files) with 0.7 (3 out of 442 resolved files) in 2019; the Sofia City Prosecutor’s Office – by 2.1% (44 out of 2073 resolved files) with 1.7% (41 out of 2407 resolved files) in 2019; the Kardzhali Provincial Prosecutor’s Office –
by 2% (5 out of 250 resolved files). In the previous reporting period the prosecutor’s office didn’t have any files resolved after more than 1 month (2020c).

In the remaining two provincial prosecutor’s offices the share of the files resolved after more than 1 month, compared to the total resolved ones, was below 2% - the Plovdiv Provincial Prosecutor’s Office – by 1.2%, and the Shumen Provincial Prosecutor’s Office – by 0.5%.

At the end of the reporting period in 6 provincial prosecutor’s offices there were remaining unresolved files after 1 month, and their share compared to the total number of unresolved files for the provincial prosecutor’s offices was 2.2%. This share has decreased substantially compared to the previous reporting period, when it was 5.2% (2020c).

4. Monitored preliminary investigations (PIs)

In the first six months of 2020 there was a decrease in the number of monitored preliminary investigations, compared to the same period in the previous two years, and it was by 9.4% compared to 2019 and by 3% compared to 2018 (2020c). The number of newly initiated preliminary investigations continued to decrease, by 7.4% compared to 2019 and by 14.2% compared to 2018, as a result of the sustainable trend in recent years for a decrease in the registered crime (Table 3).

| Table 3. Monitored Preliminary Investigations (1st six months of 2018—2020) |
|-----------------------------------------------|-----------------|-----------------|-----------------|
| Indicators                                | 1st six months 2018 | 1st six months 2019 | 1st six months 2020 |
| Monitored PIs                            | 128015           | 137057          | 124165          |
| Newly initiated PIs                      | 52955            | 49072           | 45447           |
| Monitored expedited procedures           | 10248            | 9294            | 7541            |
| Monitored PIs related to public order    | 104837           | 103597          | 101377          |

Source: Authors

A decrease during the current reporting period was also established in the number of monitored expedited procedures (following the substantial growth in the first six months of 2018, resulting from the elimination of the expedited procedure – Act Amending and Supplementing the Code of Criminal Procedure, State Gazette, issue 63/2017), by 18.9% compared to the first six months of 2019.

5. Investigation completion

There is a decrease in the share of the preliminary investigations where the investigative part has been completed, compared to the monitored PIs (except the ones terminated by prescription), as well as during the current reporting period, compared to the same reporting periods of the previous two years, by 3.8% compared to 2019, and by 5.6% compared to 2018 (Table 4) (2020c). Out of the preliminary investigations completed in the first six months of 2020, 99.7% were completed within the legal deadline, which is a slight improvement over the same period of 2019 and 2018 when it was 99.6%.

We are witnessing a continuation of the sustainable trend for a decrease in the PIs completed beyond the legal deadline. The decrease was by 22.6% compared to 2019 and by 33.6% compared to 2018.

An increase compared to the previous two years was recorded in the number of pending PIs, with 0.9% of them beyond the legal deadline.

Completion of investigations beyond the legal deadline was reported in 3 provincial prosecutor’s offices, where during the current reporting period their share compared to the total completed preliminary investigations has decreased. The highest share was recorded in the Specialised Prosecutor’s Office – by 20.3%, compared to 20.5%
in 2019, and the remaining two prosecutor’s offices have a relatively lower share, respectively 2.3% for the Sofia City Prosecutor’s Office, compared to 2.6% in 2019, and 2.2% for the Varna Provincial Prosecutor’s Office, compared to 4.5% in 2019. With regard to district prosecutor’s offices – 5 DPOs reported preliminary investigations that were completed beyond the legal deadline, with the highest share being in the Berkovitsa District Prosecutor’s Office – by 1.5%, compared to the 0.5% share in 2019, the Varna District Prosecutor’s Office – by 1.3%, compared to 2.4% in 2019, and the remaining 3 district prosecutor’s offices had a relative share below 1% (the Sofia District Prosecutor’s Office and the Harmalni District Prosecutor’s Office – by 0.4%, and the Veliko Tarnovo District Prosecutor’s Office – by 0.3%) (2020c).

Table 4. Investigation Completion (1st six months of 2018—2020)

<table>
<thead>
<tr>
<th>Indicators</th>
<th>1st six months 2018</th>
<th>1st six months 2019</th>
<th>1st six months 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed IPs</td>
<td>59980</td>
<td>57073</td>
<td>50990</td>
</tr>
<tr>
<td>Completed within the legal deadline</td>
<td>59733</td>
<td>56861</td>
<td>50826</td>
</tr>
<tr>
<td>Completed outside the legal deadline (1)</td>
<td>247</td>
<td>212</td>
<td>164</td>
</tr>
<tr>
<td>Pending IPs</td>
<td>46987</td>
<td>47884</td>
<td>50442</td>
</tr>
<tr>
<td>Pending within the legal deadline</td>
<td>46652</td>
<td>47562</td>
<td>49963</td>
</tr>
<tr>
<td>Pending outside the legal deadline</td>
<td>335</td>
<td>322</td>
<td>479</td>
</tr>
</tbody>
</table>

(1) These are closed cases where the investigation deadline has expired and was not extended by the end of the reporting period by the supervising prosecutor, the administrative lead or a prosecutor authorised by them, pursuant to Article 234(3) et seq of the Code of Criminal Procedure.

Source: Authors

In the remaining provincial and district prosecutor’s offices there were no preliminary investigations that extended beyond the legal deadline.

Investigations that were not completed within the legal deadline were recorded in 3 provincial prosecutor’s offices, with the highest share compared to the total pending PIs for the respective period were reported by the Specialised Prosecutor’s Office – by 21.3% (207 out of 974 pending investigations), the Sofia City Prosecutor’s Office – by 1.3% (34 out of 2525 pending investigations), and the Varna Provincial Prosecutor’s Office – by 1% (5 out of 502 pending investigations). 2 district prosecutor’s offices reported cases where the investigations were not completed beyond the legal deadline – the Varna District Prosecutor’s Office, with a share of 5% (211 out of 4217 pending PIs) and the Sofia District Prosecutor’s Office, with a share of 0.2% (22 out of 11104 pending PIs) (2020c).

In the remaining district and provincial prosecutor’s offices there were no recorded preliminary investigations that by the end of the current reporting period were beyond the legal deadline and the investigation had not been completed.

6. Resolved preliminary investigations

In the first six months of 2020 the number of the resolved preliminary investigations has decreased as absolute values, respectively by 18.9% compared to the same period of 2019 when an increase was reported in the resolved PIs, resulting from the increased number of terminated PIs due to the expiry of the legal limitation period (Table 5). The decrease compared to 2018 was by 10.7%. With regard to the remaining types of prosecutor’s pronouncements, in absolute values the downward trend from the previous three years has continued (2020c).

A decrease was registered in the relative share of the resolved PIs compared to the total monitored PIs during the reporting period, by 6.4% compared to 2019, and by 4.7% compared to 2018.
The prosecutor’s acts brought to court represent 19.5% of the total preliminary investigations resolved during the first six months of 2020, 54.5% of them via bills of indictment. Compared to the same period of the previous two years, there was an increase compared to 2019 in the cases with prosecutor’s acts brought to court compared to the total resolved PIs, which was 17.4%, with the bills of indictment representing 52.5%, as well as a minimal decrease compared to 2018 – with a share of 20.2%, out of which 51.3% with bills of indictment (2020c).

**Table 5. Resolved Preliminary Investigations (1st six months of 2018—2020)**

<table>
<thead>
<tr>
<th>Indicators</th>
<th>1st six months 2018</th>
<th>1st six months 2019</th>
<th>1st six months 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolved PIs</td>
<td>75679</td>
<td>83322</td>
<td>67548</td>
</tr>
<tr>
<td>Terminated PIs</td>
<td>33069</td>
<td>43445</td>
<td>33510</td>
</tr>
<tr>
<td>Suspended PIs</td>
<td>25476</td>
<td>23731</td>
<td>19609</td>
</tr>
<tr>
<td>Suspended PIs due to failure to identify the perpetrator (Article 244(1)(2) of the Code of Criminal Procedure)</td>
<td>22666</td>
<td>20021</td>
<td>15772</td>
</tr>
<tr>
<td>PIs brought to court</td>
<td>15131</td>
<td>14388</td>
<td>13048</td>
</tr>
<tr>
<td>Prosecutor’s acts brought to court</td>
<td>15288</td>
<td>14508</td>
<td>13150</td>
</tr>
<tr>
<td>Persons involved in the prosecutor’s acts brought to court</td>
<td>16813</td>
<td>15901</td>
<td>14518</td>
</tr>
<tr>
<td>Bills of indictment</td>
<td>7839</td>
<td>7612</td>
<td>7162</td>
</tr>
<tr>
<td>Persons under the bills of indictment</td>
<td>8998</td>
<td>8687</td>
<td>8257</td>
</tr>
<tr>
<td>Agreements</td>
<td>5291</td>
<td>4943</td>
<td>4074</td>
</tr>
<tr>
<td>Persons under the agreements</td>
<td>5584</td>
<td>5197</td>
<td>4276</td>
</tr>
<tr>
<td>Offers under Article 78a of the Criminal Code</td>
<td>2158</td>
<td>1953</td>
<td>1914</td>
</tr>
<tr>
<td>Persons involved in the offers under Article 78a of the Criminal Code</td>
<td>2231</td>
<td>2017</td>
<td>1985</td>
</tr>
</tbody>
</table>

**Source:** Authors

The average number of the preliminary investigations resolved in substance by a single prosecutor in the district prosecutor’s offices was 54.2 PIs. In the first six months of 2020 in 31 district prosecutor’s offices this number was above the average for PIs, with the highest values recorded by the Kozloduy District Prosecutor’s Office (180.7), the Karnobat District Prosecutor’s Office (136.0), the Byala Slatina District Prosecutor’s Office (127.2) and the Dimitrovgrad District Prosecutor’s Office (111.5), and in the remaining prosecutor’s offices the value of this indicator was below 100 (2020c).

In provincial prosecutor’s offices the average number of the PIs resolved in substance by a single prosecutor was 7.8 cases, with 19 prosecutor’s offices recording above the average value for provincial prosecutor’s offices.

**7. Duration of the investigative phase**

The duration of the investigative phase is determined from the date of the initiation/launch of the PI till the resolution by a prosecutor via termination or submission of a prosecutor’s act to the court (this also accounts for the duration of any further investigation after the return of the case from the court).

In the first six months of 2020 the preliminary investigations resolved in substance were 28558, whereas for the same period of 2019 there were 30880 PIs resolved in substance, and in 2018 they were 32061. Out of them the highest share is that of preliminary investigations that were completed within 8 months – 65.4% or 18687 resolved
PIs. This is followed by the ones resolved within 1 year – 15.2% or 4336 PIs, then the ones resolved beyond the 1-year mark – 12.4% or 3546, and the ones resolved beyond the 2-year mark, representing 7% of the PIs resolved in substance, or 1989 preliminary investigations (2020c).

8. Cases returned by the court by the prosecutor’s office

The current reporting period continued the sustainable trend for a decrease in the number of cases returned by the court to the prosecutor’s office, by 26.8% compared to 2019, and by 30.6% compared to 2018 (Table 6) (2020c). A decrease was also recorded in the number of cases returned by the court compared to the total prosecutor’s acts brought to court. Compared to the reporting periods of the previous two years, the decrease was by 0.6 percentage points.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>I\textsuperscript{st} six months 2018</th>
<th>I\textsuperscript{st} six months 2019</th>
<th>I\textsuperscript{st} six months 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases returned by the court to the prosecutor’s office</td>
<td>504</td>
<td>478</td>
<td>350</td>
</tr>
<tr>
<td>Objections filed against the return</td>
<td>274</td>
<td>226</td>
<td>148</td>
</tr>
<tr>
<td>Out of those – objections upheld</td>
<td>74</td>
<td>57</td>
<td>25</td>
</tr>
</tbody>
</table>

Source: Authors

A decrease was also registered in the number of objections filed against the return of cases by the court, with 148 objections filed during the current reporting period (226 objections in 2019 and 274 objections in 2018), with 81 of them upheld by the court, representing 54.7% of the objections filed.

9. Convicted and acquitted persons with an effective judicial act

In the first six months of 2020 there was a significant decrease in the number of convicted and sanctioned persons with an effective sentence, maintaining the trend observed over the recent reporting periods for a decrease in the number of convicted persons (Table 7) (2020c).

<table>
<thead>
<tr>
<th>Indicators</th>
<th>I\textsuperscript{st} six months 2018</th>
<th>I\textsuperscript{st} six months 2019</th>
<th>I\textsuperscript{st} six months 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convicted and sanctioned persons with an effective judicial act</td>
<td>15467</td>
<td>14717</td>
<td>11175</td>
</tr>
<tr>
<td>Acquitted persons with an effective judicial act</td>
<td>431</td>
<td>317</td>
<td>224</td>
</tr>
</tbody>
</table>

Source: Authors

We are also witnessing a decrease in the number of acquitted persons with an effective judicial act and, as evident by the graph, there was a decrease in the share of the acquitted persons with an effective judicial act in the first six months of 2020.
10. Conclusion

The information presented above warrants the following conclusions and trends (Terziev, Georgiev and Bankov, 2020d; 2020e):

- A sustainable trend for a decrease in registered crime;
- Continuing growth in crime detection within the three-year period;
- Sustainability in the structure of registered crime – the highest share held by the crime against property, followed by general crime, economic crime and crime against individuals;
- The primary criminogenic factors affecting the level of crime continue to be the migration processes to the large regional centres, the aging population and the lack of well-developed infrastructure in small settlements. The determining factor for juvenile delinquency is the low education level, resulting from the early leaving of school or the non-inclusion in the educational system;
- The criminogenic situation will also be significantly affected by the consequences of the restrictive measures implemented against the spread of the COVID–19 pandemic, due to their global impact on economic growth, unemployment levels and migration processes, which will inevitably affect global crime levels as well. This new unforeseen reality requires significantly greater commitment by the competent authorities in order to ensure safe and healthy working conditions for their own personnel, as well as of all participants in criminal proceedings, with a view to both increasing the effectiveness of the interaction and their primary role in effective combat against crime.

References


The Bulgarian Public Prosecution Office as a Leading Institution in Bulgaria

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Abstract
The article aims to present the activities of Bulgaria’s Public Prosecution Office in terms of the initiation, movement and completion of inquiry files and cases in the first half of 2020, for key indicators describing the performance of its statutory functions. The productivity of their efforts is directly proportionate to the pro-active stance of citizens, including that of victims, in seizing the Public Prosecution Office, and it is also a function of the exercise of functional competencies by other government authorities as regards crime detection, investigation and proving by investigation authorities, the administrative law enforcement and referral activities of control bodies, the operations of the penitentiary authorities, etc.

Keywords: Bulgaria’s Public Prosecution Office, leading institution, prosecutor general, achievements, results

JEL Codes: K00, K13, K14

1. Introduction
The COVID-19 pandemic was a major, unprecedented factor driving developments in the first half of 2020 which caused the adoption of certain measures and decisions within the remit of Bulgaria’s Public Prosecution Office that had an immediate effect on the effectiveness of exercising the prosecutorial function and the defence of legality and the public interest. The newly adopted Law on Measures and Actions in the Conditions of the Emergency Situation and the ensuing overall mobilization of the human resource potential of the Public Prosecution Office are a first-ever factor, both as regards the organisational arrangements for the operation of the Public Prosecution Office as a whole, and for the lead prosecutors, investigative authorities and the security and protection services, the principal goal being to ensure observance of the anti-epidemic measures and make provisions for health and safety for all parties involved in the criminal justice process (Terziev, Georgiev and Bankov, 2020, 2020a).

Data on the activities of the Public Prosecution Office in the first half of 2020, by key indicators, when compared to data for the previous two years, show an increase in pre-trial proceedings lead and in newly initiated inquiry files.
2. The Bulgarian Public Prosecution Office as a leading institution in Bulgaria

According to the data on the work of the Public Prosecution Office on cases of particular public interest in the first half of 2020, there is an increase in the number of pre-trial proceedings lead, up by 1.2% compared to the same period in 2019, and by 6.8% compared to 2018, respectively, and a decrease in the number of the newly initiated pre-trial proceedings, down by 7% and by 14.6%, respectively (Table 1).

<table>
<thead>
<tr>
<th>Indicators</th>
<th>First half of 2018</th>
<th>First half of 2019</th>
<th>First half of 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-trial proceedings lead</td>
<td>16332</td>
<td>17229</td>
<td>17439</td>
</tr>
<tr>
<td>Newly initiated pre-trial proceedings</td>
<td>6936</td>
<td>6371</td>
<td>5925</td>
</tr>
<tr>
<td>Pre-trial proceedings completed with a decision</td>
<td>7563</td>
<td>7726</td>
<td>7140</td>
</tr>
<tr>
<td>Suspended pre-trial proceedings</td>
<td>1427</td>
<td>1390</td>
<td>1172</td>
</tr>
<tr>
<td>Terminated pre-trial proceedings</td>
<td>3306</td>
<td>3569</td>
<td>3292</td>
</tr>
<tr>
<td>Prosecutorial acts submitted to court</td>
<td>2460</td>
<td>2421</td>
<td>2304</td>
</tr>
<tr>
<td>Persons brought to trial</td>
<td>2858</td>
<td>2834</td>
<td>2746</td>
</tr>
<tr>
<td>Cases sent back to the prosecution by the court</td>
<td>79</td>
<td>102</td>
<td>74</td>
</tr>
<tr>
<td>Persons convicted with an enforceable judgement</td>
<td>2361</td>
<td>2294</td>
<td>1918</td>
</tr>
<tr>
<td>Persons acquitted with an enforceable judgement</td>
<td>88</td>
<td>51</td>
<td>42</td>
</tr>
</tbody>
</table>

Source: Authors

There is also a decrease in the number of criminal proceedings suspended and in those terminated in the first half of 2020 where, compared to the same period in the previous two years, suspended pre-trial proceedings are down by 15.7% from 2019 and by 17.9% from 2018, and the decrease in terminated pre-trial proceedings compared to 2019 is 7.8%, and 0.4% compared to 2018. There is also a significant drop in the number of cases sent back to the prosecution by the court. Compared to the first half of 2019, they show a decrease of 27.5%. A decrease is registered also in the number of persons acquitted with an enforceable judgement: by 17.7% compared to 2019 and 52.3% compared to 2018, respectively (2020b).

The downward trend in the percentage of pre-trial proceedings completed with a decision compared to the pre-trial proceedings lead continues in the current reporting period as well. Compared to the first half of 2019, there is a decrease of 3.9 percentage points, and compared to 2018, it is down by 5.4 percentage points. Considering the registered slide in the number of pre-trial proceedings completed with a decision (in absolute terms), i.e. down by 7.6% compared to 2019 and by 5.6% compared to 2018, respectively, the percentage of cases of particular public interest submitted to court compared to pre-trial proceedings completed with a decision has grown comparatively from the previous reporting period, reaching its level from the first half of 2018 (2020b).

Given the decrease in the number of cases sent back to the prosecution by the court and in the number of persons acquitted with an enforceable judgement, registered in the first half of 2020, there is also a decrease in the relative share of cases sent back by the court, compared to the total number of prosecutorial acts submitted to court, and in the percentage of acquittals compared to the number of all persons, with an enforceable judgement issued on cases of particular public interest (Terziev, Georgiev and Bankov, 2020, 2020a).
2.1. Organised crime

In the first half of 2020, the number of the pre-trial proceedings lead by prosecutors that were initiated on grounds of suspected organised crime went up by 19% compared to the same period in 2019, and by 5.2% compared to 2018 (Table 2). The pre-trial proceedings completed with a decision in the current reporting period are 20.7% more, when compared to 2019, and 12.6% less, when compared to 2018. Submissions to court accounted for 56.8% of the total number of pre-trial proceedings completed with a decision, with 230 persons brought to trial. There is a considerable decrease in the number of cases sent back to the prosecution by the court. Compared to the first half of 2019, their number was 62.5% fewer, while compared to the same period in 2018, they were 25% fewer (2020b).

<table>
<thead>
<tr>
<th>Indicators</th>
<th>First half of 2018</th>
<th>First half of 2019</th>
<th>First half of 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-trial proceedings lead</td>
<td>619</td>
<td>547</td>
<td>651</td>
</tr>
<tr>
<td>Newly initiated pre-trial proceedings</td>
<td>100</td>
<td>106</td>
<td>85</td>
</tr>
<tr>
<td>Pre-trial proceedings completed with a decision</td>
<td>127</td>
<td>92</td>
<td>111</td>
</tr>
<tr>
<td>Suspended pre-trial proceedings</td>
<td>14</td>
<td>16</td>
<td>31</td>
</tr>
<tr>
<td>Terminated pre-trial proceedings</td>
<td>23</td>
<td>3</td>
<td>28</td>
</tr>
<tr>
<td>Prosecutorial acts submitted to court</td>
<td>93</td>
<td>78</td>
<td>63</td>
</tr>
<tr>
<td>Persons brought to trial</td>
<td>223</td>
<td>259</td>
<td>230</td>
</tr>
<tr>
<td>Cases sent back to the prosecution by the court</td>
<td>8</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>Persons convicted with an enforceable judgement</td>
<td>104</td>
<td>65</td>
<td>55</td>
</tr>
<tr>
<td>Persons acquitted with an enforceable judgement</td>
<td>12</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: Authors

The ratio of pre-trial proceedings completed with a decision compared to those lead by prosecutors over the three-year period grew by 0.3 percentage points compared to the year before, but declined by 3.4 percentage points compared to 2018. The percentage of cases submitted to court, compared to the total number of pre-trial proceedings completed with a decision on suspected organised crime, is on the decrease.

The registered decrease in the number of cases sent back to the prosecution by the court in the first half of 2020 is objectively reflected on the percentage of cases sent back by the court compared to the total number of submitted prosecutorial acts with charges of organised crime, and in the current reporting period the decrease from 2019 stands at 11 percentage points.

An increase, compared to the first half of 2019, is reported in the percentage of acquittals compared to all persons, with an enforceable judgement on charges of organised crime, and that percentage remains more than 2 times less, compared to the same period in 2018.

2.2. Corruption

The first half of 2020 exhibits a slight decrease both of the number of newly initiated and in the number of pre-trial proceedings lead on suspected corruption, compared to the previous two reporting periods (Table 3).
Table 3. Corruption: Cases of particular public interest

<table>
<thead>
<tr>
<th>Indicators</th>
<th>First half of 2018</th>
<th>First half of 2019</th>
<th>First half of 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-trial proceedings lead</td>
<td>2147</td>
<td>2147</td>
<td>2126</td>
</tr>
<tr>
<td>Newly initiated pre-trial proceedings</td>
<td>475</td>
<td>447</td>
<td>399</td>
</tr>
<tr>
<td>Pre-trial proceedings completed with a decision</td>
<td>721</td>
<td>647</td>
<td>617</td>
</tr>
<tr>
<td>Suspended pre-trial proceedings</td>
<td>110</td>
<td>93</td>
<td>71</td>
</tr>
<tr>
<td>Terminated pre-trial proceedings</td>
<td>318</td>
<td>289</td>
<td>309</td>
</tr>
<tr>
<td>Prosecutorial acts submitted to court</td>
<td>225</td>
<td>206</td>
<td>184</td>
</tr>
<tr>
<td>Persons brought to trial</td>
<td>284</td>
<td>238</td>
<td>231</td>
</tr>
<tr>
<td>Cases sent back to the prosecution by the court</td>
<td>30</td>
<td>30</td>
<td>17</td>
</tr>
<tr>
<td>Persons convicted with an enforceable judgement</td>
<td>183</td>
<td>163</td>
<td>118</td>
</tr>
<tr>
<td>Persons acquitted with an enforceable judgement</td>
<td>31</td>
<td>17</td>
<td>18</td>
</tr>
</tbody>
</table>

Source: Authors

The number of suspended pre-trial proceedings is down, with a decrease of 23.7% compared to the first half of 2019, and 35.5% compared to 2018. The number of terminated pre-trial proceedings shows a slight increase compared to the same period in 2019, but remains lower than in 2018.

The number of the cases sent back by the court that were initiated on grounds of suspected corruption offences shows a considerable decline, with a 43.3% decrease compared to the previous two years (2020b).

The three-year period exhibits a trend of declining pre-trial proceedings completed with a decision as a percentage of pre-trial proceedings lead on grounds of suspected corruption. There is a dynamic development in the relative share of prosecutorial acts submitted to court compared to pre-trial proceedings completed with a decision. Following the slight increase in the first half of 2019, the current reporting period again marks a drop both from 2019 and from 2018 levels, by 1.4 percentage points and by 2 percentage points, respectively.

The percentage of the cases sent back by the court compared to prosecutorial acts submitted to court decreased considerably, both compared to the same period in 2019, and compared to 2018. Compared to the previous reporting period, the percentage of acquittals from the number all persons with an enforceable judgement in the cases of corruption went up but when compared to the first half of 2018, it remained at a lower level.

2.3. Money-laundering

Data on the pre-trial proceedings lead that were initiated on grounds of suspected money-laundering in the first half of 2020 in comparison to the same period in the previous two years registered an increase of 19.9% from 2019 and 25.4% from 2018, respectively (Table 4). The number of the newly initiated pre-trial proceedings on suspected money-laundering is also up, with an increase of 21.6% compared to the previous reporting period. An increase was also reported in the number of pre-trial proceedings completed with a decision, while the number of prosecutorial acts submitted to court measure 2.5 times higher than in the previous reporting period. One case initiated on money-laundering charges was sent back by the court. The persons brought to trial are almost 5 times more than the persons brought to trial in the first half of 2019. There were no persons acquitted with an enforceable judgement (2020b).
Table 4. Money-laundering: Cases of particular public interest

<table>
<thead>
<tr>
<th>Indicators</th>
<th>First half of 2018</th>
<th>First half of 2019</th>
<th>First half of 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-trial proceedings lead</td>
<td>307</td>
<td>321</td>
<td>385</td>
</tr>
<tr>
<td>Newly initiated pre-trial proceedings</td>
<td>67</td>
<td>51</td>
<td>62</td>
</tr>
<tr>
<td>Pre-trial proceedings completed with a decision</td>
<td>81</td>
<td>74</td>
<td>83</td>
</tr>
<tr>
<td>Suspended pre-trial proceedings</td>
<td>44</td>
<td>33</td>
<td>42</td>
</tr>
<tr>
<td>Terminated pre-trial proceedings</td>
<td>21</td>
<td>28</td>
<td>23</td>
</tr>
<tr>
<td>Prosecutorial acts submitted to court</td>
<td>10</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Persons brought to trial</td>
<td>26</td>
<td>7</td>
<td>32</td>
</tr>
<tr>
<td>Cases sent back to the prosecution by the court</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Persons convicted with an enforceable judgement</td>
<td>11</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Persons acquitted with an enforceable judgement</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Authors

A comparison over the three-year period shows a decrease of 15 percentage points in the percentage of the cases sent back by the court compared to prosecutorial acts submitted to court on money-laundering charges. Following a sharp fall in acquittals as the relative share of all persons with an enforceable judgement in the first half of 2019, down to 0%, that percentage remains at zero in the current reporting period as well.

2.4. Misappropriation of EU funds

An examination of the data on the key indicators measuring activities in the pre-trial proceedings initiated on grounds of suspected misappropriation in the absorption and management of funds and property from the European Union funds or provided from them to the Bulgarian government, in absolute terms, for the first half of 2020 compared to data for the same periods in the previous two years showed an increase in the number of pre-trial proceedings lead of 24.7% and 16.2%, respectively; an increase was also observed in the number of newly initiated pre-trial proceedings, up by 83.3% compared to 2019 and over 2 times compared to 2018 (Table 5). The number of terminated pre-trial proceedings registered similar values in the reporting periods in the past three years. The number of prosecutorial acts submitted to court compared to the previous two years decreased, and so did the number of persons brought to trial (2020b).
Table 5. Misappropriation of EU funds: Cases of particular public interest

<table>
<thead>
<tr>
<th>Indicators</th>
<th>First half of 2018</th>
<th>First half of 2019</th>
<th>First half of 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-trial proceedings lead</td>
<td>308</td>
<td>287</td>
<td>358</td>
</tr>
<tr>
<td>Newly initiated pre-trial proceedings</td>
<td>49</td>
<td>54</td>
<td>99</td>
</tr>
<tr>
<td>Pre-trial proceedings completed with a decision</td>
<td>102</td>
<td>88</td>
<td>77</td>
</tr>
<tr>
<td>Suspended pre-trial proceedings</td>
<td>9</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Terminated pre-trial proceedings</td>
<td>43</td>
<td>49</td>
<td>45</td>
</tr>
<tr>
<td>Prosecutorial acts submitted to court</td>
<td>39</td>
<td>25</td>
<td>19</td>
</tr>
<tr>
<td>Persons brought to trial</td>
<td>41</td>
<td>26</td>
<td>20</td>
</tr>
<tr>
<td>Cases sent back to the prosecution by the court</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Persons convicted with an enforceable judgement</td>
<td>28</td>
<td>13</td>
<td>21</td>
</tr>
<tr>
<td>Persons acquitted with an enforceable judgement</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Source:** Authors

In the first half of 2020, the court sent back to the Public Prosecution Office 4 cases, vs. 1 returned case in the same period in the previous two years, which resulted in an increase in the relative share of cases sent back by the court compared to prosecutorial acts submitted to court, respectively.

*2.5. Tax crimes*

First half of 2020 showed an upward trend in the number of pre-trial proceedings lead which were initiated on grounds of suspected tax crimes, where, compared to the same period in 2019, the increase was by 2.9%, and by 5.4% compared to 2018 (Table 6) (2020b).

Over the three-year period, a downward trend is reported in the numbers of newly initiated pre-trial proceedings, in criminal proceedings completed with a decision, in prosecutorial acts submitted to court, in the persons brought to trial, and in the number of enforceable convictions for tax crimes, but there is a decreasing number of persons acquitted with an enforceable judgement.

The trend of decreasing numbers registered over the past three years in most of the key indicators monitored for cases initiated on grounds of suspected tax crimes influences the respective percentage of the total number of pre-trial proceedings completed with a decision as a relative share of pre-trial proceedings lead, and the percentage of all prosecutorial acts submitted to court, which also showed a decline.
Table 6. Tax crimes: Cases of particular public interest

<table>
<thead>
<tr>
<th>Indicators</th>
<th>First half of 2018</th>
<th>First half of 2019</th>
<th>First half of 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-trial proceedings lead</td>
<td>3418</td>
<td>3502</td>
<td>3603</td>
</tr>
<tr>
<td>Newly initiated pre-trial proceedings</td>
<td>1178</td>
<td>902</td>
<td>785</td>
</tr>
<tr>
<td>Pre-trial proceedings completed with a decision</td>
<td>1159</td>
<td>1081</td>
<td>898</td>
</tr>
<tr>
<td>Suspended pre-trial proceedings</td>
<td>199</td>
<td>201</td>
<td>200</td>
</tr>
<tr>
<td>Terminated pre-trial proceedings</td>
<td>443</td>
<td>483</td>
<td>387</td>
</tr>
<tr>
<td>Prosecutorial acts submitted to court</td>
<td>467</td>
<td>325</td>
<td>261</td>
</tr>
<tr>
<td>Persons brought to trial</td>
<td>503</td>
<td>354</td>
<td>329</td>
</tr>
<tr>
<td>Cases sent back to the prosecution by the court</td>
<td>14</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Persons convicted with an enforceable judgement</td>
<td>449</td>
<td>305</td>
<td>209</td>
</tr>
<tr>
<td>Persons acquitted with an enforceable judgement</td>
<td>13</td>
<td>12</td>
<td>9</td>
</tr>
</tbody>
</table>

Source: Authors

The number of cases sent back to the prosecution by the court in the reporting periods in the past three years remained relatively stable, but when seen in a relationship to the number of cases submitted to court in the period under analysis, it reveals a trend of increasing relative share of cases sent back as compared to cases submitted to court.

Despite the smaller number of persons acquitted with an enforceable judgement in the current reporting period, a comparison to the previous periods under examination shows that acquittals as a percentage of all persons with an enforceable judgement are on the increase, which, in terms of relative share, is a function of the decreasing number of persons convicted for tax crimes with an enforceable judgement.

2.6. Forgery of payment instruments and currency

In the first half of 2020, a slight drop is reported in the numbers for pre-trial proceedings lead and for those completed with a decision when compared to the same period in 2019, but there is an increase of 6.3% in the number of pre-trial proceedings lead and 8.7% in the number of pre-trial proceedings completed with a decision when compared to 2018 (Table 7) (2020b).
Table 7. Forgery of payment instruments and currency: Cases of particular public interest

<table>
<thead>
<tr>
<th>Indicators</th>
<th>First half of 2018</th>
<th>First half of 2019</th>
<th>First half of 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-trial proceedings lead</td>
<td>2014</td>
<td>2155</td>
<td>2141</td>
</tr>
<tr>
<td>Newly initiated pre-trial proceedings</td>
<td>780</td>
<td>734</td>
<td>688</td>
</tr>
<tr>
<td>Pre-trial proceedings completed with a decision</td>
<td>1079</td>
<td>1221</td>
<td>1173</td>
</tr>
<tr>
<td>Suspended pre-trial proceedings</td>
<td>680</td>
<td>673</td>
<td>558</td>
</tr>
<tr>
<td>Terminated pre-trial proceedings</td>
<td>223</td>
<td>396</td>
<td>450</td>
</tr>
<tr>
<td>Prosecutorial acts submitted to court</td>
<td>140</td>
<td>126</td>
<td>124</td>
</tr>
<tr>
<td>Persons brought to trial</td>
<td>168</td>
<td>142</td>
<td>138</td>
</tr>
<tr>
<td>Cases sent back to the prosecution by the court</td>
<td>1</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Persons convicted with an enforceable judgement</td>
<td>140</td>
<td>127</td>
<td>125</td>
</tr>
<tr>
<td>Persons acquitted with an enforceable judgement</td>
<td>4</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

**Source:** Authors

A decrease is reported also in the number of prosecutorial acts submitted to court which, when compared to the previous reporting period, is only slight, with 2 acts fewer compared to 2019, and 16 acts fewer compared to 2018; hence, there is also a decrease in the number of persons brought to trial, and in the number of persons convicted with an enforceable judgement.

In the current reporting period, there have been no persons acquitted with an enforceable judgement on charges of forgery of payment instruments or currency.

The percentage of pre-trial proceedings completed with a decision as a relative share of the pre-trial proceedings lead decreased, but an increase is reported in the percentage of prosecutorial acts submitted to court compared to pre-trial proceedings completed with a decision, in comparison to data from the first half of 2019.

In the latest reporting period, i.e. the first half of 2020, the relative share of cases sent back by the court as a percentage of prosecutorial acts submitted to court also decreased, in comparison to the previous reporting period.

### 2.7. Illegal drug trafficking

In the current reporting period, there is a decrease in the number of newly initiated pre-trial proceedings on suspected illegal drug trafficking, and in pre-trial proceedings completed with a decision, when compared to the previous reporting periods. The number of prosecutorial acts submitted to court remained relatively close to the values reported in the first half of 2019, and an increase of 11.1% is observed when compared to 2018. These observations are also applicable to the number of persons brought to trial, where their number went up by 10.3% compared to 2018 (Table 8) (2020b). The number of terminated pre-trial proceedings dropped. There is also a decrease in the number of persons acquitted with an enforceable judgement.
Table 8. Illegal drug trafficking: Cases of particular public interest

<table>
<thead>
<tr>
<th>Indicators</th>
<th>First half of 2018</th>
<th>First half of 2019</th>
<th>First half of 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-trial proceedings lead</td>
<td>7289</td>
<td>8067</td>
<td>7973</td>
</tr>
<tr>
<td>Newly initiated pre-trial proceedings</td>
<td>4251</td>
<td>4048</td>
<td>3763</td>
</tr>
<tr>
<td>Pre-trial proceedings completed with a decision</td>
<td>4185</td>
<td>4423</td>
<td>4092</td>
</tr>
<tr>
<td>Suspended pre-trial proceedings</td>
<td>327</td>
<td>321</td>
<td>223</td>
</tr>
<tr>
<td>Terminated pre-trial proceedings</td>
<td>2206</td>
<td>2291</td>
<td>2025</td>
</tr>
<tr>
<td>Prosecutorial acts submitted to court</td>
<td>1462</td>
<td>1636</td>
<td>1625</td>
</tr>
<tr>
<td>Persons brought to trial</td>
<td>1579</td>
<td>1772</td>
<td>1742</td>
</tr>
<tr>
<td>Cases sent back to the prosecution by the court</td>
<td>25</td>
<td>34</td>
<td>27</td>
</tr>
<tr>
<td>Persons convicted with an enforceable judgement</td>
<td>1421</td>
<td>1584</td>
<td>1368</td>
</tr>
<tr>
<td>Persons acquitted with an enforceable judgement</td>
<td>22</td>
<td>15</td>
<td>12</td>
</tr>
</tbody>
</table>

Source: Authors

A decrease compared to the previous two reporting periods is reported in pre-trial proceedings completed with a decision as a relative share of pre-trial proceedings lead which were initiated on grounds of suspected drug trafficking. However, the percentage of prosecutorial acts submitted to court compared to pre-trial proceedings completed with a decision registered an increase, where, compared to the first half of 2019, it grew by 2.7 percentage points and, compared to 2018, by 4.8 percentage points.

A decrease from the first half of 2019 is reported in the percentage of the cases sent back by the court compared to prosecutorial acts submitted to court, and the figures for the current reporting period are identical to those for 2018.

The decrease reported in the percentage of acquittals compared to the number of all persons with an enforceable judgement in the first half of 2019 persisted in the first half of 2020 as well.

2.8. Illegal trafficking in human beings

In the first half of 2020, the number of pre-trial proceedings lead on suspected illegal trafficking in human beings decreased from the same period in the previous two years, yet an increase is reported in the number of newly initiated pre-trial proceedings, which points to a reasonable conclusion that there is a decrease in the backlog of pre-trial proceedings undecided in previous periods. However, a decrease over the three-year period was observed also in the number of prosecutorial acts submitted to court, where the decrease was 14.3% from 2019, and 25% from its 2018 level (Table 9) (2020b). Decreases are also reported in the number of criminal proceedings suspended and in those terminated.

Pre-trial proceedings completed with a decision decreased as a percentage of pre-trial proceedings lead, as did prosecutorial acts submitted to court the percentage of the total number of pre-trial proceedings completed with a decision, in the category of trafficking in human beings.

In the current reporting period, the lasting trend persists again: there was not a single case initiated on grounds of suspected trafficking in human beings that has been returned to the Public Prosecution Office.
Table 9. Illegal trafficking in human beings: Cases of particular public interest

<table>
<thead>
<tr>
<th>Indicators</th>
<th>First half of 2018</th>
<th>First half of 2019</th>
<th>First half of 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-trial proceedings lead</td>
<td>230</td>
<td>203</td>
<td>202</td>
</tr>
<tr>
<td>Newly initiated pre-trial proceedings</td>
<td>36</td>
<td>29</td>
<td>44</td>
</tr>
<tr>
<td>Pre-trial proceedings completed with a decision</td>
<td>109</td>
<td>100</td>
<td>89</td>
</tr>
<tr>
<td>Suspended pre-trial proceedings</td>
<td>44</td>
<td>47</td>
<td>38</td>
</tr>
<tr>
<td>Terminated pre-trial proceedings</td>
<td>29</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>Prosecutorial acts submitted to court</td>
<td>24</td>
<td>21</td>
<td>18</td>
</tr>
<tr>
<td>Persons brought to trial</td>
<td>34</td>
<td>36</td>
<td>24</td>
</tr>
<tr>
<td>Cases sent back to the prosecution by the court</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Persons convicted with an enforceable judgement</td>
<td>25</td>
<td>30</td>
<td>14</td>
</tr>
<tr>
<td>Persons acquitted with an enforceable judgement</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

**Source:** Authors

There are no persons acquitted with an enforceable judgement, either. In the first half of 2020, there were 302 (vs. 341; 339) victims of illegal trafficking in human beings in total, including 20 minors aged between 16 and 18 (vs. 28; 51) and 1 aged under 16 (vs.0; 2). There were a total of 273 women (vs. 289; 291), of which 19 minors aged between 16 and 18 (vs. 26; 48) and 1 girl aged under 16. There were a total of 29 men (vs. 52; 48), including 1 minor aged between 16 and 18 (vs. 2; 3) (2020b).

3. Conclusion

The positive findings in the October 2019 Report of the European Commission and the draft decision to lift the monitoring of the judiciary system under the Cooperation and Verification Mechanism proposed to be voted at the European Parliament and the Council came as a kind of reaffirmation for the fact that Bulgaria’s Public Prosecution Office has gained the status of a leading institution in Bulgaria.

Achievement of the priorities set by Bulgaria’s Public Prosecution Office (Terziev, Georgiev and Bankov, 2020c; 2020d; 2020e):

- Full mobilization of the human resource potential of the Public Prosecution Office to prevent the risk of infection, and ensuring the legality of activities included in the functional competence, by expanding the existing arrangements and putting in place new appropriate arrangements for the performance of the duties of magistrates, investigation authorities and judicial staff, including in emergency conditions, and mitigation of the negative consequences of judicial restrictions in terms of public access, as a result of the preventive actions against the spread of COVID-19. Active supervision for legality to protect the life and health, and the rights of citizens;

- Continuous monitoring and support in the expanding process of concentration (consolidation) of regional prosecution offices;

- Retaining the high level of timeliness of checks performed in working on the inquiry files and investigation of cases, including by means of updating and efficient use of the mechanisms for active cooperation with competent control bodies and law-enforcement authorities;
Establishing a stable trend of improving the quality of prosecutorial acts, ensuring timely, well-reasoned and legally compliant decisioning of inquiry files and cases, in compliance with the standards for effective investigation set out by the Convention on Human Rights and Fundamental Freedoms;

Organisational arrangements and methodological support for the cooperation with the European Public Prosecutor’s Office, in view of the upcoming launch into operation of that international authority this year;

Ensuring full cooperation with European and other international partners by making effective use of the current and new forms of international cooperation on legal matters in the activities of the authorities involved in pre-trial proceedings;

Organisational arrangements and methodological support for the process of a possible step-by-step transition from paper-based to electronic exchange in the practice of the Public Prosecution Office, in implementation of the e-justice strategy which applies also to the movement of documents generated in the course of law enforcement activities of authorities involved in pre-trial proceedings within Bulgaria’s Public Prosecution Office;

Constantly maintaining a high level of professional competency of prosecutors, investigators and judicial staff in the Public Prosecution Office by an efficient use of the system of further training within Bulgaria’s Public Prosecution Office and the capabilities of the National Institute for Justice.

References


COVID-19 Pandemic Uncertainty Shock Impact on Macroeconomic Stability in Ethiopia¹

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Abstract

This study investigated the impact of COVID-19 pandemic uncertainty shock on the macroeconomic stability in Ethiopia in the short run period. The World Pandemic Uncertainty Index (WPUI) was used a proxy variable to measure COVID-19 Uncertainty shock effect. The pandemic effect on core macroeconomic variables like investment, employment, prices (both food & non-food prices), import, export and fiscal policy indicators was estimated and forecasted using Dynamic Stochastic General Equilibrium (DSGE) Model. The role of fiscal policy in mitigating the shock effect of coronavirus pandemic on macroeconomic stability is also investigated. The finding of the study reveals that the COVID-19 impact lasts at least three years to shake the economy of Ethiopia. Given that the Ethiopian economy heavily relies on import to supply the bulk of its consumption and investment goods, COVID-19 uncertainty effect starts as supply chain shock, whose effect transmitted into the domestic economy via international trade channel. The pandemic uncertainty shock effect is also expected to quickly transcend to destabilize the economy via aggregate demand, food & non-food prices, investment, employment and export shocks. The overall impact of COVID-19 pandemic uncertainty shock is interpreted into the economy by resulting under consumption at least in the next three years since 2020. Therefore, the government is expected to enact incentives/policy directions which can boost business confidence. A managed expansionary fiscal policy is found key to promote investment, employment and to stabilize food & non-food prices. A particular role of fiscal policy was identified to stabilizing food, transport and communication prices. The potency of fiscal policies in stabilizing food, transport and communication prices go in line with the prevailing reality in Ethiopia where government has strong hands to control those markets directly and/or indirectly.

This suggests market failure featuring COVID-19 time, calling for managed interventions of governments to promote market stabilities. More importantly, price stabilization policies of the government can have spillover effects in boosting aggregate demand by spurring investments (and widening employment opportunities) in transport/logistics, hotel & restaurant, culture & tourism and export sectors in particular.

Keywords: Covid-19; macroeconomic instability; Ethiopia; economic uncertainty; fiscal policy.

JEL Codes: B22, E62, E6

1. Introduction

Quiet unprecedented in the world history in memory, all corners of the globe is living at a standstill following the outbreak of coronavirus pandemic. A highly contagious viral disease, Covid-19 (the scientific name of the disease) has stopped virtually every human activity at global scale, as people’s movement curbed; by way of controlling the spread of the pandemic (Fetzer et al. 2020, Politico 19/2020).

Expertise commentaries on Covid-19 dub the disease an economic pandemic, to signify counting the cost of the cure is getting dear than the problem itself. The size of the shock will be determined mostly by the measures taken to avoid large scale contagion and to limit the area of spread. Thus, the containment measures – the disruption to work processes, the limitations on travel and travel – will be a larger negative supply shock than the number of

¹ Acknowledgments: The author would like to extend his sincere regard to Jigjiga University Vice President Office for Research and Community Service (JJU-VPRCS) for financing this study. A special gratitude goes to my colleagues at JJU-VPRCS: Dr. Tesfu Mengistu, Dr. Elyas Abdulahi, Mr. Mayhedin Mohammed, Dr. Solomon Yared and Dr. Binyam Bogale for their amenable managerial services from the very start of the study. I also owe my friend Mr. Miler Teshome, whose encouragement was a positive energy in the process of undertaking the research.
deaths, even if the latter could still turn out to be large. Full or partial lockdown, like in China, is one of the most extreme measures and can bring production and consumption almost to a standstill. Such extreme measures are likely to remain restricted to certain areas and will be difficult to maintain for a long time (Baldwin and Weder di Mauro 2020).

Ethiopia announced the first case of coronavirus on March 13 2020. This was sad news for the economy of the country, which has been struggling from economic and non-economic shocks already which has stilled the economic growth and/or resulted in macroeconomic instability. Since a couple of years preceding the COVID-19 outbreak, the Ethiopian economy has been facing immense macroeconomic instability and precarious balance of payment problems (IMF 2018, Alemayehu Geda 2020). A report by IMF indicates that macroeconomic distortions were characterized by rising sovereign debt, estimated to hold 58% of GDP; government budget deficit of 3.7% of GDP; trade deficit of 12.4% of GDP and a current account deficit of 4.5% of GDP in 2018.

Though the country has been undertaken major economic and political reforms to heal the fractures of the economy, still the macroeconomic instability persisted even on the wake of the COVID-19 pandemic outbreak. According to Alemayehu (2020), on the month Ethiopia announced the first case of COVID-19 i.e. March 2020, the general inflation was 23%, with food inflation hit 26%; In the period under consideration, the Birr was devalued by the government significantly from about 32% a couple of weeks ago to about 34.34% (more than 7%); the government debt (without including recent pledges by the donors, which is significant) as percentage of GDP was above 55%; the export-import gap remained significant as Ethiopia has been importing more than 5 times its exports which is just below $3 billion per annum.

The Ethiopian economy is too small to withstand such global shocks the likes of COVID-19. The prevailing global economic slump as result of COVID-19 pandemic shock inevitably have a pass-through negative effect on Ethiopian economy, given the country is largely depending on imports to supply its consumption and investment goods. In the immediate aftermath when COVID-19 outbreak waged a global pandemic, its effects were quickly felt where supply chains affected and manufacturing operations disrupted around the world. Economic activity has fallen in the past few months since the onset of the pandemic outbreak, especially in China, and is expected to remain depressed in the coming months even. The outbreak is taking place at a time when global economic activity is facing uncertainty and governments have limited policy space to act (FDRE Ministry of Finance 2020).

It is amidst all those domestic and global macroeconomic problems already that COVID-19 pandemic uncertainty shock is added to exacerbate the problem on the world economy at large and the Ethiopian economy in particular.

Since March 2020, when Ethiopia announced the first case of the pandemic, COVID-19 has taken the single most uncertainty topic grabbing the dialogue among the Ethiopian society. The government of Ethiopia has also considered the issue a number one national agenda, where a number of measures and actions taken to fight the spread of the disease. In a bid to curb the spread of the disease thereby limiting the movement of people, the government announced for schools & universities to shut-down; also large portion of personnel in the public service were set to stay home.

While much of public and private businesses are almost in their shutdown, counting the cost of the pandemic has been undertaken by think thank groups and professional institutions working in Ethiopia. In this regard, the policy researches by Ethiopian Economics Association (EEA) and FDRE Policy Institute has produced two policy papers on COVID-19 economic wide impact on Ethiopia.

A study by EEA, (Ferede, Diriba and Beyene 2020) titled ‘the economy wide impact of the COVID-19 in Ethiopia: Policy and Recovery options’, investigated the short, medium and long term impacts of COVID-19 on the Ethiopian economy. Using a dynamic Computable Equilibrium (CGE) model, the study captured the impact of the pandemic on productivity growth of labor and capital the impacts on Foreign Direct Investments and Remittances, export demand, import supply, transaction costs and the anticipated government interventions. The study reported the pandemic effect under mild and severe case scenario. Accordingly, under amplified (or severe) pandemic scenario, the total loss on the economy as a result of COVID-19 shock is estimated at 310 billion birr in FY 2020/21, whose effect downgraded the forecast estimate on economic growth in 2020/21 to 0.6%.

A study by FDRE Policy Institute (PI) aimed at identifying key policy alternatives to tackle the social and economic impacts of COVID-19 on Ethiopia. An exploratory study investigated determinant factors on effectiveness and implications of public health measures aimed at mitigating the effect of COVID-19. Accordingly,

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2 The pre-pandemic growth projection for Ethiopian economy was 9% in the year 2020/21.
factors related to demographic, economic and social settings are important in determining the economic damages associated with the public health measures to contain or suppress the virus. The study recommended targeted and combined social and economic policy measures to overcome COVID – 19 effects on the economy (Weldesilassie and Woldehanna 2020).

Another policy research, which was authored by Geda (2020), investigated the dynamic impact of the pandemic on the Ethiopian economy. Using auto-regressive distribution lag model (ADL) model, the study focused on the COVID-19 effect on the service sector of Ethiopia. Finding from this study reveal that 10% increase in confirmed weekly cases in Ethiopia is found to lead to a 1.1% and 6.8% reduction in demand for hotels in the long and short run, respectively. This reduction becomes 8.5% and 3.7% for restaurants and air travel services in the short run.

The study further estimated that demand for services in the tourism sector to decline by about 15% to 17% for a 10% increase in confirmed weekly cases in the short run. In the other hand, the estimation from the study indicated COVID-19 shock results in an increase in the demand for communication services, where a 10% increase in weekly cases estimated to increase the demand for Zoom software demand (a proxy variable to communication service) by 5.6% both in the short run and the long run.

However, empirical evidences so far on the effect of COVID-19 on Ethiopian economy did not address the dynamic impact through the channel of uncertainty impact of the pandemic on macroeconomic stability. The impact of COVID-19 via uncertainty channels is well depicted in the literature. According to a report by International Labor Organization (ILO), the restrictive health measures countries pursued like travel bans, border closures and quarantine measures has knock-on effects on the economy by creating uncertainties in consumption and investment decision makings of economic agents. Those health measures interpreted into economic uncertainties as consumers expectedly unable or reluctant to purchase goods and services. Given the current environment of uncertainty and fear, enterprises are likely to delay investments, purchases of goods and the hiring of workers (ILO 2020).

Therefore, this study tries to fill the aforementioned knowledge gap. As such, analysis and inferences were made on COVID-19 uncertainty shock effect on the pillars of macroeconomic stability: Investment, Employment, Export expenditure, Import demand, Price Indices (both food and Non-Food prices) and Government Expenditures. Moreover, the role of fiscal policy to mitigate the effect of the pandemic in the short run period is also investigated.

2. COVID-19 Pandemic: Health and Economic Impacts

As we note from history, deadly pandemics have always been inherent to human civilizations. In the past two centuries alone, the world has seen a total of eight major pandemics. In the 20th century three outbreaks recorded as global pandemic: the historic ‘Spanish Influenza’ of 1918, (killed over 100 Million people): the ‘Asian flu’ of 1957 (killed 1.1 million people) and the ‘Hong Kong flu’ of 1968 (killed 1 million people worldwide)

The 21st century has seen five pandemic outbreaks: N1H1 in 2009 (~575,400 killed), Severe Acute Respiratory Syndrome – SARS (with 7 to 17% fatality rate) in 2002, Middle East Respiratory Syndrome – MERS (with 35% fatality rate) in 2012, and Ebola which peaked in 2013-14 (with 25% to 90% fatality rate).

Currently the world is struggling with the fifth pandemic in 21st century, the coronavirus pandemic COVID-19.
Table 1. Record on World’s Major Pandemics in History (14th - 21st Century)

<table>
<thead>
<tr>
<th>Event</th>
<th>Start Year</th>
<th>End Year</th>
<th>Total Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Death</td>
<td>1347</td>
<td>1352</td>
<td>75,000,000</td>
</tr>
<tr>
<td>Italian Plague</td>
<td>1623</td>
<td>1632</td>
<td>280,000</td>
</tr>
<tr>
<td>Great Plague of Sevilla</td>
<td>1647</td>
<td>1652</td>
<td>2,000,000</td>
</tr>
<tr>
<td>Great Plague of London</td>
<td>1665</td>
<td>1666</td>
<td>100,000</td>
</tr>
<tr>
<td>Great Plague of Marseille</td>
<td>1720</td>
<td>1722</td>
<td>100,000</td>
</tr>
<tr>
<td>First Asia Europe Cholera Pandemic</td>
<td>1816</td>
<td>1826</td>
<td>100,000</td>
</tr>
<tr>
<td>Second Asia Europe Cholera Pandemic</td>
<td>1829</td>
<td>1851</td>
<td>100,000</td>
</tr>
<tr>
<td>Russia Cholera Pandemic</td>
<td>1852</td>
<td>1860</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Global Flu Pandemic</td>
<td>1889</td>
<td>1890</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Sixth Cholera Pandemic</td>
<td>1899</td>
<td>1923</td>
<td>800,000</td>
</tr>
<tr>
<td>Encephalitis Lethargica Pandemic</td>
<td>1915</td>
<td>1926</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Spanish Flu</td>
<td>1918</td>
<td>1920</td>
<td>100,000,000</td>
</tr>
<tr>
<td>Asian Flu</td>
<td>1957</td>
<td>1958</td>
<td>2,000,000</td>
</tr>
<tr>
<td>Hong Kong Flu</td>
<td>1968</td>
<td>1969</td>
<td>1,000,000</td>
</tr>
<tr>
<td>SARS Pandemic</td>
<td>2002</td>
<td>2003</td>
<td>800,000</td>
</tr>
<tr>
<td>COVID-19</td>
<td>2019</td>
<td>2020</td>
<td>2,000,000</td>
</tr>
<tr>
<td>MERS Pandemic</td>
<td>2012</td>
<td>2015</td>
<td>2,400,000</td>
</tr>
<tr>
<td>Deadly Ebola</td>
<td>2014</td>
<td>2015</td>
<td>11,000</td>
</tr>
<tr>
<td>Novel Coronavirus</td>
<td>2019</td>
<td>2020</td>
<td>2,346,000</td>
</tr>
</tbody>
</table>

Source: Alfani and Murphy (2017), Taleb and Cirillo (2020); https://en.wikipedia.org/wiki/List_of_epidemics and references

2.1. COVID-19 – Epidemiological Timeline

In late December 2019, a new pneumonia of unknown cause was identified in Wuhan pro, People’s Republic of China (PRC). In subsequent days and weeks, massive laboratory studies undertaken on the cause of the newer pneumonia. On 11 February 2020, World Health Organization officiate the disease outbreak in China as caused by coronavirus, naming the disease COVID-19.

Earlier medical investigations about COVID-19 reported the disease ‘an extremely contagious but not especially fatal, and that in the majority of cases, it is no worse than the seasonal flu’. As medical studies goes on, however, the diseases can causes serious respiratory infections that would lead to death. Subsequent medical studies then reported the risk of death from COVID-19 between 1% and 4%.

As of early March 2020, the COVID-19 epidemic was very much centered in China, with over 90% of reported cases located there. In late January, the disease had begun spread out of China. In the mentioned period, the two hardest hit nations outside China were Japan and Korea. The World Health Organization declared the outbreak a Public Health Emergency of International Concern on 30 January, 2020. As of 31 January, 2020, COVID-19 had spread to 19 countries with 106 confirmed cases.

By Mid February 2020, the WHO has reported 68,584 COVID-19 cases and 1666 confirmed death in China. The spread of the disease went up to 26 countries in the world, where WHO report on February 16 recorded 355 COVID-19 cases outside China with no death report. By 28 February, 2020, COVID-19 affected countries mount to 50; with global COVID-19 cases were 83,631, with 2858 deaths recorded.

The spread of the disease even mounting day on day, and on March 11, 2020 WHO declared the disease a global pandemic. By March 31, 2020 WHO reported 693,224 confirmed COVID-19 cases and 33,106 deaths across the world. On the turn of April, on April 2, 2020 global COVID-19 cases top one million, with death tolls surge
51,000. As of April 5, 2020 COVID-19 cases tally 1.22 million and 65,711 death tolls reported worldwide. By August 26 2020, the global COVID-19 cases reached 24,242,981, and the total death 827,060.

Ethiopia announced the first case of coronavirus on March 13, 2020. By April 5, 2020, Ethiopia has recorded the first COVID-19 deaths (two deaths in a day), and the total cases in the country reached 43. With the tally of COVID-19 cases incessantly increasing, the COVID-19 cases start surging since month of July. By August 26, 2020, the total COVID-19 cases in Ethiopia were 45,221 and the death toll counts 725.

Figure 1. Trend of COVID-19 New Cases in Ethiopia (March 13 - August 26, 2020)

Source: https://www.worldometers.info

2.2. COVID-19 Pandemic - an Economic Pandemic?

As a matter of fact, the contagiousness of COVID-19 disease is extremely detrimental on human life, with its toll on the economic and psycho-social lives of people is severe (Dennis et al. 2020). This is because containment measures required the disruption to work processes, the limitations on meetings and travel. Bloomberg economics, in its March issue, dubbed COVID-19 an economic pandemic, to signify counting the cost of the cure is getting dear than the problem itself. A glimpse into the world economic order in the past six months has been telling that COVID-19 is a global economic pandemic.

The crisis caused by the coronavirus pandemic is plunging the world economy to depths unknown since the Second World War, adding to the woes of an economy that was already struggling to recover from the pre-2008 crisis. Beyond its impact on human health (materialized by morbidity and mortality), COVID-19 is disrupting an interconnected world economy through global value chains, which account for nearly half of global trade, abrupt falls in commodity prices, fiscal revenues, foreign exchange receipts, foreign financial flows, travel restrictions, declining of tourism and hotels, frozen labor market, etc. (AU 2020).

The COVID-19 pandemic crisis has already transformed into an economic and labour market shock, impacting not only supply (production of goods and services) but also demand (consumption and investment). Disruptions to production, initially in Asia, have now spread to supply chains across the world. All businesses, regardless of size, are facing serious challenges, especially those in the aviation, tourism and hospitality industries, with a real threat of significant declines in revenue, insolvencies and job losses in specific sectors. Sustaining business operations will be particularly difficult for Small and Medium Enterprises (SMEs, ILO 2020)

The United Nations African Union Economic Commission for Africa (UN-ECA) has identified the major economic challenges attributed to COVID-19 in Africa as endogenous and exogenous. The exogenous effects come from direct trade links between affected partner continents such as Asia, Europe and the United States; tourism; the decline in remittances from African Diaspora; Foreign Direct Investment and Official Development Assistance; illicit financing flows and domestic financial market tightening, etc. The endogenous effects occur as a result of the rapid spread of the virus in many African countries (AU 2020).

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Ethiopia announced the first case of coronavirus on March 13, 2020. Since then Coronavirus has taken the single most topic grabbing the dialogue among the Ethiopian society. The possible impact of COVID-19 has been the topic of discussions, researchers and print and digital media reportages. The government of Ethiopia has also considered the issue a number one national agenda, where a number of measures and actions taken to fight the spread of the disease. In a bid to curb the spread of the disease thereby limiting the movement of people, the Ethiopian government ordered for schools and universities to shut-down; also large portion of personnel in the public service were instructed to stay at home.

As discussed in the next sub-section, those restrictive measures inevitably have huge tolls on the economy, and for some economic analysts, Ethiopians are yet to count the damage cost of the pandemic. This is pertaining the fact that the country’s economy has already been struggling from political, economic and socio-economic problems in the past couple of years, leaving the economy extremely vulnerable to COVID-19 pandemic uncertainty shock.

2.3. Ethiopia’s Preparedness to Withstand COVID-19 Pandemic Uncertainty Shock

This part of the study tries to depict the current political, macroeconomic, socioeconomic and demographic contexts of Ethiopia. The intent is to evoke readers imagine the breadth and depth of COVID-19 impacts on Ethiopians across the board, from the life of an average citizen to private businesses and the government sector in general.

(I) Political Context

For the past more than 15 years, Ethiopia has been on growth trajectory, where the annual economic growth rate averaged at 10%. This fast economic growth enabled a reduction in poverty level from 305 in 2010/11 to 24% in the year 2015/16. Pertaining to its achievements in those regards, the country has been praised a growth model in the realm of developing world. Despite the step forward in the economic arena, the case in the political development has been otherwise. The government of Ethiopia has been widely condemned for its suppressions of opposition voices, the media and civil society groups.

A dominant feature of Ethiopian political system is polarized interests on the stream, giving political shocks key variables determining the performance of the economy. In the decade preceding the outbreak of COVID-19, the EPRDF lead government has been trying to contain those political shocks not to ‘disrupt’ the economic progress. The containment, however, faded away starting the year 2015, when political unrest began raging Ethiopia. Consequent public rallies gave EPRDF lead government undertake massive political reforms, where Abiy Ahmed (PhD) came to the apex of state leadership. As package of reforms, the political spectrum is redefined where alternative/competing political views have got to reverberate.

Given polarized interests featuring the political spectrum of the country, the newer development has given political shocks to reappear again to twist and turn the whole fabrics of Ethiopian society, including the economy.

The economic outlook in the pre-COVID-19 years is a showcase how political shocks downplayed the economic performance of the country. Since the political upheaval began in 2015, investment massively affected; youth unemployment in its spike; foreign debt made the economy a headache; staggering decline of remittance flows; decline in export. According to International Monetary Fund (IMF) report in 2018, political factors coupled with external shocks explains the slowdown of the economy from the normal trend of double digit growth for years to slow down to 7.7% in 2017/18. It is amidst those political contexts and consequent shocks posing economic uncertainty that COVID-19 shock appeared to affect the economy in the years ahead.

(II) Macroeconomic Context

Though the past decade featured by a fast ride in the economic growth in Ethiopia, the economy has been poorly managed. Consequently, the country remained in difficulties to interpreting the its fast growing economy a blessing to majority of its people. The showcases in this regard involves the followings: rising national debt; mounting current account deficit; poor performance of export sector; rising prices, youth unemployment; unfair income distribution; geographic imbalances in terms of distribution of economic infrastructures/investments, among others.

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* Ethiopian People’s Revolutionary Democratic Front (EPRDF) is the political party that has been ruling Ethiopia since 1995. Following a major political reforms in Ethiopia since 2018, the party has under went a number of changes, including changing its ideological line - Revolutionary Democracy, which was built on Marxist-Leninist-Maoist thoughts. In November 2019, EPRDF replaced revolutionary democracy with MEDEMER/Synergy as its newer line of governance. The party also changed its name as Prosperity Party.

* Decline in commodity prices in international markets for which Ethiopian economy is highly dependent in export earnings.
Structural Problem: The Ethiopian economy is often dubbed a subsistence economy, for it is highly dependent on agriculture which depends on vagaries of nature. Agriculture accounts an average of 35% of the share of the country’s GDP in the years from 2015/16 to 2018/19. The sector is a mainstay for about 85% of Ethiopians. A bulk of foreign exchange Ethiopia earns from international trade comes from agriculture. For instance, the top five foreign exchange earnings of the country are from agriculture.

Though the share of agriculture is declining steadily in the past decade, since the last four years onwards, its place is grabbed by the incompetent and inefficient service sector. That even added to the structural problem the economy has been suffering from as the service sector is weakly interlinked with the industry and the agriculture sectors. The value addition of service sector to Ethiopian economy in terms of employment, foreign exchange earnings and technology transfer is subjected to quests by many economic analysts. As a matter of fact, the service sector rather has a huge connection with the foreign sector, dominated by importable merchandise trade, having negative impact on the current account balance of Ethiopia.

The industry sector on the other hand, though its share is rising, is still bottlenecked with a lot of hurdles. Frequent Power outages, limiting industrial and trade policy of Ethiopia coupled with lack of trained & disciplined labour forces is often raised as the limitations of the industrial sector.

Figure 2. Sectorial Share of GDP (2015/16-2018/19)

As of recent years in particular, the Ethiopia economy experienced volatilities. That was pertaining to a number of shocks, which can be categorized as natural and human made. Natural shocks, which appeals to the agriculture sector, were drought and locust infestations, with their damaging impacts on agriculture yields since the past three years or so.

As agriculture in Ethiopia is highly a rain fed, the sector is already exposed to natural shocks, where seasons of droughts almost comes and go roughly every five years. Those challenges were added up by a locust swarm affecting large tract of cultivations on the field as of last years and continuing this year too.

Recent Developments in Macroeconomic Management: Home Grown Economic Reform Plan

The growth episode of Ethiopia is largely explained by massive public investment in infrastructural development. The state-led development model of the country though cannot be totally discredited, had a number of flaws. For one, servicing public investments was entirely on foreign debt. While the stock of the external debt growing fast, poor project execution along with disappointing export performance prompted the IMF and World Bank to rate Ethiopia’s external debt burden as a high risk of distress. That greatly undermined the country’s credit standing and borrowing ability.

Though the economy has been on a rise in the last decade, it was far less inclusive in a sense that the role of domestic private sector where crowd-out effect of public investment on the scene. The public sector failure is characterized by growing caps on the scope of economic growth where the public sector, the major driver of the economy, faced up with required financial and institutional/bureaucratic fallbacks.

As a reflection of the aforementioned macroeconomic distortions, sovereign debt rose to an estimated 58% of GDP; government budget deficit of 3.7% of GDP; trade deficit of 12.4% of GDP and a current account deficit of 4.5% of GDP in 2018.

In light of addressing those macroeconomic problems, a new leadership installed in 2018, which is led by Abiy Ahmed Ali (PhD) enacted stringent fiscal and/or financial measures, where the monetary policy tightened and public sector credit policies were introduced. According to IMF (2018), those tight macroeconomic policy directions and reforms being made to open up the economy by Ethiopian government may have slowing down effect on the growth of the economy, but enables to control inflation, enhance the optimal usage of foreign currency. Those policy reforms of the newer government in Ethiopia were complemented by Home-grown Economic Reform Agenda: A Pathway to Prosperity, which was introduced in September 2019. The home grown
economic reform plan is set to tackle the cumulated problems of Ethiopian economy in the past plus decade years. A three years plan commencing 2019, this reform plan costs the country 10 billion USD.

Those policy reforms of the newer government in Ethiopia were complemented by *Home-grown Economic Reform Agenda: A Pathway to Prosperity*, which was introduced in September 2019. The home grown economic reform plan is set to tackle the cumulated problems of Ethiopian economy in the past plus decade years. A three years plan commencing 2019, this reform plan costs the country 10 billion USD.

Those recent policy developments in Ethiopian economy sustains the economy by helping fix key structural bottlenecks that hamper the economic growth in the medium to long term period, by spurring private investment and productivity gains and reduce external and domestic vulnerabilities. In addition, the proposed policies would substantially reduce the risk of sudden financial and real economic disruptions - hence fostering domestic private sector development and FDI (IMF 2018).

However, the COVID-19 appeared at this critical time where Ethiopia has started implementing those hosts of policy reforms aimed at healing the cumulated fractures of the economy in the past decade or so. Indeed, the COVID-19 pandemic inevitably poses bleak future, even adding to the woes of Ethiopian economy, let alone realizing the reform plan

### (III) Socio-Economic Context

The immediate requirements to endure in times of COVID-19 are worryingly low in Ethiopia. The larger segment of the population lives on a daily starving income level. A sizable portion of the population struggles with limited access to food, water and housing provisions. 58% of the population lack access to clean water, 89% live without safe toilets, and 55.7% survive without electricity and 48 million people live further than 2 Km from all-weather road.

#### Table 2. Major indicators on socio-economic status of Ethiopians

<table>
<thead>
<tr>
<th>Socio-economic Indicator</th>
<th>2011 E.C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Indicators</td>
<td></td>
</tr>
<tr>
<td>People: Hospital Beds</td>
<td>3150:1</td>
</tr>
<tr>
<td>People: Nurse 1</td>
<td>1624:1</td>
</tr>
<tr>
<td>Access to Safe Drinking Water</td>
<td></td>
</tr>
<tr>
<td>Country level (in %)</td>
<td>76</td>
</tr>
<tr>
<td>Urban population</td>
<td>66</td>
</tr>
<tr>
<td>Rural Population</td>
<td>79</td>
</tr>
<tr>
<td>Access to Housing</td>
<td></td>
</tr>
<tr>
<td>Number of Rooms Per National Average Households size⁶</td>
<td>0.88</td>
</tr>
<tr>
<td>Based on NBE (2019) and CSA (2016)</td>
<td></td>
</tr>
</tbody>
</table>

Moreover, the country’s health care system is too primitive and fragile to cope up the preventive methods prescribed by the World Health Organization (WHO). The per capita hospital bed is 3150. The nurse to population ratio is 1 to 1624. Worse of all, the major segment of the population to the pandemic, the urbanites, are very ill prepared to fight the virus. In urban areas, provisions on basic amenities to prevent the disease like water are even below the national average. With the existing poor socio-economic status of the people, it would be far-fetched for Ethiopia to withstand tremendous shocks posed by COVID-19.

### (IV) Demographic Context

Ethiopia is the second largest country in Africa, with population size estimated 120 million in the year 2020. Ethiopia can be regarded as a country of youths. The fertility rate in the country is about 3.45 children per woman

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⁶ Average National Household Size in Ethiopia
(mother). And the natural rate of population increase\(^7\) in 2018/19 was 2.07\%. The age structure shows that nearly 60\% of Ethiopians are within the working age bracket, necessitating the country to look for absorbing this large section of society into productive means like provision of access to education and/or provide job. Though Ethiopian society is much rural (with percentage of rural population to urban population is 79: 21), the urban population is fast growing pertaining to pushing and pulling factors which speed up the rural-urban migration. The influx of people into the urban centres are largely driven by pushing factors in the rural areas.

In this regard, the major pushing factor is limited scope of rural economies to diversified livelihoods beyond farming/animal husbandry, leaving the ever rising youth without farm land. As a result, the rural youth is forced to destine to towns and cities in search of employment opportunities. Worse for rural migrants in cities is a dire working conditions is not just far below their expectations but also below the standards. Industrial employments are with a starving wage, and the working condition is too unsafe and undignified. That in turn pushes the rural-urban migrants to look for crossing borders of Ethiopia, often eying their destinations to be Arab states in the Gulf and the European countries.

The pain and stress of Ethiopian migrants to Arab countries has been reported by international and local agencies. Many youths remained sunken in seas and oceans. For those who crossed dangerous sea/ desert voyages and reached the host countries, life is far below their expectations. The tragic reality is that the working condition and payments for those crossed borders is next to slavery. This particularly appeals to Ethiopian economic migrants destined to Middle Eastern Arab countries.

A recent showcase on that is the grief of Ethiopians in Yemen, Saudi Arabia, Qatar, United Arab Emirates (UAE) and Lebanon. In connection to COVID-19 pandemic, Ethiopian migrants in those countries, many of them dubbed ‘illegal’, have been left helpless on streets in bad days, while they have been exploited in good days (pre-corona days). Too many of them were set to live and get deported in this pandemic days, where too many of them were forced to survive in dangerous conditions that would exposed to COVID-19. This is a recent memory grabbing the international media to the disgrace of the country, Ethiopia.

Those tragic showcases of massive unemployment and youth migration are the tragedy of mismanaged socio-economic and political governance in Ethiopia in the past decades or so. Circumstantial evidences from the profile of the country in the past five years are boldly telling the price of those mismanagements. The youth movement that forced the incumbent EPRDF to undertake reforms, but it seems too little too late. At this juncture at least, unresolved youth quests cannot be underestimated as socio-economic or political problems, but goes beyond risking the national security of the Ethiopia. For a country which is already trapped in economic and political woes, COVID-19 pandemic is only added on those complexities.

### Table 3. Major demographic indicators on Ethiopia

<table>
<thead>
<tr>
<th>Demographic Indicator</th>
<th>2011 E.C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (In Millions)</td>
<td>97.6</td>
</tr>
<tr>
<td>Working age Population</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>10.1</td>
</tr>
<tr>
<td>Rural</td>
<td>49.8</td>
</tr>
<tr>
<td>Total</td>
<td>59.9</td>
</tr>
<tr>
<td>Age Dependency Ratio</td>
<td>69</td>
</tr>
<tr>
<td>Natural Rate of Population Increase (in %)</td>
<td>2.07</td>
</tr>
<tr>
<td>Total Fertility Rate</td>
<td>3.45 Chil: W</td>
</tr>
<tr>
<td>Average Household Size</td>
<td>6.07</td>
</tr>
<tr>
<td>Based on NBE (2019) Chil: W refers an average children a mother gives birth</td>
<td></td>
</tr>
</tbody>
</table>

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\(^7\) Natural Rate of Population Increase is computed as crude death rate less crude birth rate.
The intent of such analysis is not motivated by a blind judgment or pessimistic mind-set of the author, but triggered by a pragmatic concern to investigate the breadth and width of the problem sparked by COVID-19 pandemic in Ethiopia.

3. Methodology

3.1. The Data

The information used to draw inferences in this study largely relied on secondary sources. A bulk of time series dataset on macroeconomic indicators used for regression was secured from quarterly bulletins of National Bank of Ethiopia (NBE). The data on World Pandemic Uncertainty Index (WPUI) is gathered from www.worlduncertaintyindex.com. The dataset on each macroeconomic variable and WPUI accounts 46 quarters, starting from 2008/09 Q1 to 2019/20 Q2 E.F.Y. Supplementary data/information is also accessed from Ethiopian Development Research Institute (EDRI), Ethiopian Economics Association (EEA), Ministry of Finance and Economic Cooperation of Ethiopia (MoFEC) and Planning Commission of Ethiopia, among others.

3.1.1. Harmonizing the Time Series Data

All quarterly dataset but World Pandemic Uncertainty Index (WPUI) was secured from the local sources, measured in Ethiopian Fiscal Year (E.F.Y). Quarterly data on WPUI is secured from foreign sources. In Ethiopian context, there is difference between fiscal year and calendar year. The fiscal year starts on July 8 (HAMLE) while the calendar year begins September 11 (MESKEREM). This is unlike the Gregorian calendar where the starting of calendar year (in the month of January) is the start of a fiscal year. Moreover, the Ethiopian calendar lags seven years (eight years) compared with the Gregorian calendar.

Therefore, it takes to harmonize the data gathered from domestic sources, which are based on Ethiopian Fiscal Year and the data from foreign sources, which is based on Gregorian calendar. In lieu of adjusting those differences between data sets from local (Ethiopian) sources and abroad, the study made harmonization on the time series data before making regression. Given the theme of this study, the time series dataset gathered from local (Ethiopian) sources were based on fiscal calendar. In this regard, the first and last quarters of all data sets on WPUI were customized to Ethiopian fiscal year.

After the harmonization made, in the data for WPUI variable, observation in the 3rd quarter of 2008 in the Gregorian calendar was taken to hold the first quarter (first observation) of start year for time series data i.e. 2008/09. In addition, the last observation on WPUI from the source, which is 2020 Q1, was taken to assume the last observation in the time series data used for regression i.e. 2019/20 Q2 as in Ethiopian fiscal year.

Moreover, all observations on model variables except World Pandemic Uncertainty Index (WPUI) were transformed into logarithmic value before regression was made.

3.2. Conceptual Framework of Analysis and Inference

The whole set of analysis and inference made in the study relies on circular flow of economy. For this study, linkage in economic sectors/factors of productions/agents is based on framework of World Bank Group that was used to construct the latest Input-output Matrix or SAM matrix for Ethiopia (Andualem et al. 2020).

Discussion of results is framed based on UNCTAD (2020) and UN-ECA (2020) (UNCTD, 2020), which dictates narratives on economic impact of COVID-19 supposed to be on three dimensions: the domestic Sector, the foreign Sector and the policy environment.

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8 The four quarters of the Ethiopian fiscal year are (with a word in the parenthesis represent corresponding name of the month in Amharic language): 1st Quarter: July (HAMLE), August (NEHASE) and September (MESKEREM); 2nd Quarter: October (TIKIMT), November (HIDAR) and December (TAHISAS); 3rd Quarter: January (TIR), February (YEKATIT) and March (MEGABIT); 4th Quarter: April (MIAZIA), May (GINBOT) and June (SENE).

9 The months/quarters of the fiscal year as in Gregorian calendar are as follows: 1st Quarter: January, February and March; 2nd Quarter: April, May and June; 3rd Quarter: July, August and September; and 4th Quarter: October, November, December.

10 For months of the year between September and January, the lag accounts seven years in the calendar. For the rest eight months of the year (January-August), the year difference between Ethiopian calendar and Gregorian calendars is eight.
3.3. Tools of Data Analysis: Dynamic Stochastic General Equilibrium Model (DSGE)

The study employs econometric technique to analyze the data. By way of making inferences, the essential principles of macroeconomic policy research were consulted. As such, narratives integrate positive and normative approaches of economic analysis. Positive approach of making analysis involves making a diagnostic look on the scale of damage of COVID-19 uncertainty shock on Ethiopian economy. The normative aspect of analysis is meant to propose a viable policy options to mitigate the macroeconomic instabilities as result of the pandemic shock effect. To estimate on the seize and dimensions of effect of COVID-19 shock on macroeconomic stability, the study relied on Dynamic stochastic general equilibrium models (DSGE) or Bayesian Vector Auto-regressions (BVAR). Bayesian Vector Auto-regressions (VARs) are linear multivariate time-series models able to capture the joint dynamics of multiple time series (Miranda-Agrippin and Ricco 2018). The earliest studies employing Bayesian VARs (BVARs) to macroeconomic forecasting are found in Letterman (1979) and Doan et al. (1984). Since then, VARs and BVARs have been a standard macro-econometric tool routinely used by scholars and policy makers for structural analysis, forecasting and scenario analysis in an ever growing number of applications.

Empirical evidences on the uncertainty shock effect of COVID-19 on macroeconomic stability increasingly suggest Dynamic stochastic general equilibrium models (DSGE) or BVAR produces produce sound results (For instance see Leduc and Liu 2020, Watanabe 2020, Ozili 2020 and Pinshi 2020, Alemayehu 2020, Kiku, Oscar 2020. The BVAR model to be estimated in this study is defined as follows:

$$X_t = \sum_{\tau=1}^{44} (B_{\tau}X_{t-\tau} + \varepsilon)$$

where: $X_t =$ Vector of Macroeconomic & Fiscal Policy Indicators and World Pandemic Uncertainty Index (WPUI); $\varepsilon =$ Vector of residuals of reduced form at time $t$.

3.4. Definition of Model Variables

The COVID-19 first time shock and uncertainty shock is estimated and forecasted using data on core macroeconomic variables defined in the preceding section. Time series data set consists 46 quarters (Qs), where data on macroeconomic variables gathered spanning in the period between 2008/09 Q1 and 2019/20 Q2 was considered. In time series regressions, high frequency data set is preferred over low frequency data set is preferred because to remove seasonality of variables and to reduce the impact of high frequency measurement errors (Baker, Scott et al. 2020)

The BVAR model is structured by variables indicating all aspects of the economy: the aggregate demand, aggregate supply, Genera Price Level, current account balance, policy and economic uncertainty indicators.

- **Aggregate Demand Indicators**: Aggregate Investment Expenditure (domestic and foreign direct investments);
- **Aggregate Supply Indicators**: Employment;
- **General Price Level Indicators**: Food Price Index (CPIF), Non-food Price indices (Transport Prices; Education Prices, Hotel & Restaurant Prices, Health Prices, Communication Price Indices);
- **Current Account Indicators**: Export earnings and Import demand (import expenditure);
- **Fiscal Policy Indicator**: Government Expenditure (sum total of recurrent & capital expenditures);
- **COVID-19 Uncertainty Shock Indicator**: the uncertainty impact of COVID-19 is tapped by the World Pandemic Uncertainty Index on Ethiopia (WPUI) as a proxy variable. The data on WPUI is accessed from [www.worlduncertaintyindex.com](http://www.worlduncertaintyindex.com).

### Table 4. Definition of model variables

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Definition</th>
<th>Measurement</th>
<th>Time Period</th>
<th>No of observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>World Pandemic Uncertainty Index (WPUI)</td>
<td>A Proxy Measure of COVID-19 Uncertainty Shock Impact</td>
<td>The index is constructed by counting the number of times a word related to pandemics is mentioned in the Economist Intelligence Unit country reports. Specifically, the index is the % of the words related to pandemic episodes in EIU country reports, multiplied by 1,000. A higher number means higher discussion about pandemics and vice versa.</td>
<td>Q1 2008/09 Q1 - 2019/20 Q2</td>
<td>Uncertainty is associated to total count of five pandemics namely: SARS, Avian Flu, Swine Flu, MERS, Bird Flu, Ebola and Coronavirus between 1996Q1 to 2020Q2</td>
</tr>
<tr>
<td>2</td>
<td>Import</td>
<td>Quarterly Value of Imports, by Major Commodity Groups</td>
<td>In Million Birr</td>
<td>2008/09-2019/20</td>
<td>In Ethiopian context, non-food price index is computed on average price index for the following list of products: Communication, Transport, Education, Health, Hotel &amp; Restaurant, recreation &amp; culture; Alcoholic Beverages and Tobacco; Clothing &amp; Footwear; Housing, Water, Electricity/ Gas and Other Fuels; Furnishings, Household Equipment and Routine Maintenance of House; Miscellaneous Goods</td>
</tr>
<tr>
<td>3</td>
<td>Non-Food Price Indices: Communication; Transport; Education; Health, Hotel &amp; restaurant</td>
<td>Quarterly National data on selected Non-Food price indices (selected non-food prices in this study are: Transport, Communication, Education, Health, Hotel &amp; Restaurant price indices</td>
<td>Indexed</td>
<td>Q1 2008/09 - 2019/20</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Food Price Index (CPIF)</td>
<td>Quarterly National Food Consumer Price Index</td>
<td>Indexed</td>
<td>Q1 2008/09 - 2019/20</td>
<td>In Ethiopian context, food price index is computed on average price index for the following list of products: Bread and Cereals; Meat; Fish, Sea Food; Milk, Cheese &amp; Egg; Oils &amp; Fats; Fruits; Vegetables; Sugar, Jam, Honey, Chocolate, Confectionery; Food Products; Non-Alcoholic Beverages</td>
</tr>
</tbody>
</table>
3.5. **BVAR Statistical Tests**

Before undertaking VAR estimation and prediction, each model variables were subjected to seasonality and Unit Root Tests.

**Seasonality Test**

When a time series data is measured for high frequency series, like monthly or quarterly, they may contain pronounced seasonal variations. The seasonal component in time series refers to patterns that are repeated over a period and that average out in the long run. The patterns that do not average out are included in the constant and the trend components of the model; whereas the trend is of importance in the long term forecasting, the seasonal component is very important in short term forecasting as it is the main source of short run fluctuations. In this study, all model variables are seasonally adjusted before estimation in VAR was made.

**Unit Root Test**

Spurious regression problem is common in time series regressions. Hence, setting the right order of integration of each time series data has to be made before VAR regression. The unit root test helps to set the order of selection, hence to detect and avoid spurious regression problem. To that end, the order of integration of each time series variable was made.

There are different Unit Root Test criteria. The most widely used selection criteria is Augmented Dickey-Fuller (ADF) test. Summary of Unit Root Test for model variables is depicted under table below:
3. Ordering of Model Variables

Cholesky decomposition requires the variables to be ordered in a particular fashion, where variables placed higher in the ordering have contemporaneous impact on the variables which are lower in the ordering, but the variables lower in the ordering do not have contemporaneous impact on the variables those are higher in the ordering. In essence, ordering of variables in VAR model estimation dictated by theoretical and/or empirical evidences on the subject of analysis. Contextual factors are also key aspect of ordering of model variables. In this study, both theoretical/empirical and contextual factors pertaining the COVID-19 shock and particular feature of Ethiopian economy were integrated to conceptualize the ordering of model variables.

As a matter of fact, COVID-19 uncertainty shock is an exogenous variable, and its effect on the economy, at least in the short run, is interpreted in its effect on macroeconomic stability. In essence, COVID-19 shock direct and immediate effect on the economy is via distorting the supply chain. Supply chain distortion effect in return spills over in to the domestic economy by distorting import sector. Distortions in import quickly transmitted into the economy by affecting transport/logistics sectors. As Ethiopian domestic supply chain is largely dependent on importable for consumption and investment goods, COVID-19 impact on macroeconomic stability of Ethiopia is felt at the earliest via import and transport/logistics shocks.

The effect of the pandemic via supply chain shocks is quickly transmitted into disturbing the aggregate demand. As such, both aspects of aggregate demand i.e. consumption and investment demands (expenditures) affected by supply chain distortions. In this regard, while prices on basic consumption items (like food and medical/pharmaceuticals) are expected to sky rocketed as people rush to hold for uncertain future. On the other hand, demand for investment goods is expected to decline, whose effect would be in dwindling down prices on

Table 5. Summary of Unit Root Test for model variables

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Variable (Seasonally Adjusted and Log Transformed)</th>
<th>ADF, I(1)</th>
<th>1% (Critical Values)</th>
<th>5% (Critical Values)</th>
<th>10% (Critical Values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Import</td>
<td>LNIMPORT*</td>
<td>-7.973821</td>
<td>-3.5889</td>
<td>-2.9303</td>
<td>-2.6030</td>
</tr>
<tr>
<td>2</td>
<td>Export</td>
<td>LNEXPORT**</td>
<td>-7.530118</td>
<td>-3.5930</td>
<td>-2.9320</td>
<td>-2.6039</td>
</tr>
<tr>
<td>3</td>
<td>Food Price Index</td>
<td>LCPIF*</td>
<td>-3.634257</td>
<td>-3.5889</td>
<td>-2.9303</td>
<td>-2.6030</td>
</tr>
<tr>
<td>4</td>
<td>Communication Price Index</td>
<td>LNCOMUNICAITION</td>
<td>-6.224109</td>
<td>-3.5889</td>
<td>-2.9303</td>
<td>-2.6030</td>
</tr>
<tr>
<td>5</td>
<td>Education Price Index</td>
<td>LNEducation*</td>
<td>-3.617568</td>
<td>-3.5889</td>
<td>-2.9303</td>
<td>-2.6030</td>
</tr>
<tr>
<td>6</td>
<td>Employment</td>
<td>LNEMPLOYG*</td>
<td>-6.375550</td>
<td>-3.5889</td>
<td>-2.9303</td>
<td>-2.6030</td>
</tr>
<tr>
<td>7</td>
<td>Government Expenditure</td>
<td>LNGOVTEXPEND*</td>
<td>-4.967246</td>
<td>-3.5889</td>
<td>-2.9303</td>
<td>-2.6030</td>
</tr>
<tr>
<td>8</td>
<td>Health Price Index</td>
<td>LNHEALTH*</td>
<td>-5.328321</td>
<td>-3.5889</td>
<td>-2.9303</td>
<td>-2.6030</td>
</tr>
<tr>
<td>9</td>
<td>Transport Price Index</td>
<td>LTRANSPORT*</td>
<td>-4.741770</td>
<td>-3.5889</td>
<td>-2.9303</td>
<td>-2.6030</td>
</tr>
<tr>
<td>10</td>
<td>Hotel &amp; Restaurant Price Index</td>
<td>LHOTELREST**</td>
<td>-5.839783</td>
<td>-3.5930</td>
<td>-2.9320</td>
<td>-2.6039</td>
</tr>
<tr>
<td>11</td>
<td>Investment</td>
<td>LNINVEST*</td>
<td>-5.396353</td>
<td>-3.5889</td>
<td>-2.9303</td>
<td>-2.6030</td>
</tr>
<tr>
<td>12</td>
<td>World Pandemic Uncertainty Index</td>
<td>WPUI***</td>
<td>-2.701929</td>
<td>-3.5850</td>
<td>-2.9286</td>
<td>-2.6021</td>
</tr>
</tbody>
</table>

Note: *Variable Qualify for Regression with 1st Order of Integration, I(1) with 1% level of significance; **Variable Qualify for Regression with 2nd Order of Integration, I(1) with 1% level of significance; ***Variable Qualify for Regression at Level Order, I(0) with 10% level of significance

The ADF test shows that the order of integration for all model variables except World Pandemic Uncertainty Index (WPUI) is one i.e. I(1). The result on ADF Test shows that all variables qualifies for regression at order one I(1); and the WPUI qualifies at level i.e. I(0).
Investment goods. Supply chain distortions also have upward pressures on the cost of doing businesses by soaring key inputs (soft and hard inputs) in investment undertakings. While supply chain shock effect is translated into demand side shocks via consumption and investment expenditures price volatilities is expected in the process. As Ethiopian investment sector is growing to be export oriented, the effect of the pandemic on investment is expectedly translated into affecting export earnings (performance of export sector).

The sum effects of supply chain and demand side distortions as a result of the pandemic uncertainty shocks take their toll by evoking price volatilities (of both food and non-food items), also by damaging employment creation capacity of the economy.

To mitigate the COVID-19 pandemic shock effect on the pillars of the economy, government interventions in the economy is expected to grow. Indeed, one of the legacies of COVID-19, as depicted in many studies so far, is reminding for the crucial role of government sector. In Ethiopian context too, as depicted in COVID-19 recovery package, the government is set to intervene to mitigate the effect of virus by indulging in massive fiscal stimulus plan. In lieu of the illustrations made in the previous paragraphs, the order of variables in the VAR estimation in this study assumes the following:

**VAR Model**

- **GOVERNMENT EXPENDITURE (FISCAL POLICY)**
- **IMPORT**
- **TRANSPORT**
- **FOOD & NON-FOOD PRICES**
- **INVESTMENT**
- **EXPORT EMPLOYMENT**
- **GOVERNMENT EXPENDITURE (FISCAL POLICY)**

**Predicting COVID-19 Shock Impact Using BVAR Model: Impulse Response Function (IRF)**

Impulse response functions can be used to produce the time path of the dependent variables in the VAR, to shocks from all the explanatory variables. If the system of equations is stable any shock should decline to zero, an unstable system would produce an explosive time path.

In this study, COVID-19 uncertainty shock impact is estimated instrumenting World Pandemic Uncertainty Index on Ethiopia (WPUI) over macroeconomic indicators integrated in BVAR model. Hence, the Impulse Response Function (IRF) is generated from BVAR estimation. The result on Impulse Response Function (IRF) of each endogenous variables of the model in response to one standard deviations of WPUI is presented in graphs. The span of prediction period is set to be 14 quarters or Three years and two months since January 2020 (or TIR, 2012 E.C).

The COVID-19 Shock Transmission Mechanism into the Economy Using BVAR

To depict on the transmission mechanism of the pandemic uncertainty shock, the BVAR Variance Decomposition was estimated. Variance Decomposition is an alternative method to the impulse response functions for examining the effects of shocks to the dependent variables. This technique determines how much of the forecast error variance for any variable in a system, is explained by innovations to each explanatory variable, over a series of time horizons. Usually own series shocks explain most of the error variance, although the shock will also affect other variables in the system. In this study, the result of Variance Decomposition on each endogenous variables of the model in response to one standard deviations of WPUI is made is presented in tables.

Investigating the Role of Fiscal Policy for Macroeconomic Stability

In this study, the role of fiscal policy to mitigate COVID-19 driven macroeconomic instability on Ethiopian economy is examined by instrumenting fiscal policy shocks against key macroeconomic variables integrated in VAR model used. Expansionary fiscal policy instruments examined in this study are increasing government expenditure and reducing import tariffs. By way of illustration, impulse response of key macroeconomic stability indicators to COVID-19 shock (the disturbance factor) and the expansionary fiscal policy shocks (counter disturbance factors) is presented.

4. Findings and Discussion

This chapter summarizes the key findings from VAR model estimations. Narratives further discuss the finding results in line with prevailing contexts of the Ethiopian macroeconomic & socio-economic landscape, and empirical findings from the broader literature.

(a) COVID-19 Uncertainty Shock Effect on Import Demand in Ethiopia (2013-2015 E.C)

The VAR estimate indicates that COVID-19 uncertainty shock results a massive rise in import in the second half of 2019/20 Ethiopian Fiscal Year (E.F.Y) or (2019/20 Q3 and Q4). In the period between months of January-June 2020 (TIR-SENE 2012 E.C), import demand is expected to grow by 4.17 billion birr. The finding in this regard is
expected, as the pandemic triggers massive demand in food and pharmaceuticals, for which Ethiopia is import dependent on both items.

The magnitude & direction of COVID-19 shock effect on import demand in the last two quarters of 2019/20 E.F.Y is not the same. In the months from TIR-MEGABIT 2012 E.C. (i.e. the third quarter of 2019/20 E.F.Y) import demand will decline by 1.71 billion birr. This reduction is expectedly due to immediate restrictive measures taken by countries worldwide (including countries where Ethiopia depends for its imports) after World Health Organization declared COVID-19 outbreak a Public Health Emergency of International Concern on 30 January 2020. However, the decline in import in the period TIR-MEGABIT 2012 E.C is expected to be off-setted by a massive increase in the next quarter i.e. MIAZIA-SENE 2020 E.C, where forecast estimate puts an increase of import demand by 5.89 billion birr in this period.

This overwhelming in import demand between the months of MIAZIA-SENE/ 2012 E.C may be attributed to two interrelated factors: the momentum effect and the inelasticity nature of Ethiopian import items.

**Figure 4. Dynamic Response of Import to COVID-Uncertainty Shock**

The momentum effect captures the pressure of a reduction of import in the 1st quarter puts on import in the second quarter. COVID-19 triggered major import partner countries of Ethiopia to remain in shut down for over three months so. And a halt in import in the first quarter is expected to have momentum effect on the second quarter. On top of that, Ethiopia is net importer on two basic commodities required to deal with coronavirus pandemic days: pharmaceuticals and food items. That explains why import shows a rise in the second quarter of forecast period.

**Figure 5. Estimated Effect of COVID-19 Uncertainty Shock on Import (Millions of Birr)**

In the year 2013 E.C, as a result of COVID-19 uncertainty effect, import declines by 2.68 billion birr. Decline in import continues in 2014 E.C too, with an estimated decline in import values by 2.06 billion birr. A decline in
imports in the successive years (2013-2014 E.C) is explained by expected decline in consumption and investment expenditures, which are highly import dependent in the Ethiopian context, as result of the virus effect.

However, the decline in import ceases in 2015, where the pandemic uncertainty effect results an increase in import by 133 million. That perhaps signals recovery of Ethiopian economy from COVID-19 tolls in the mentioned time.


In the first four quarters ahead, the impact of COVID-19 uncertainty shock on import is transmitted to the economy via food prices. A rise in food prices in the immediate aftermaths of the pandemic is expected as Ethiopia is net importer of food and food supplements.

Since the 5th quarter of forecast period, COVID-19 triggered import volatility is much explained by volatilities in non-food prices. In this regard, education, hotel & restaurant and transport sectors would be the major channels through which the uncertainty shock transmitted into the economy.


The uncertainty impact of COVID-19 on export is another focus of inquiry of this study. The dynamic time path of forecast effect of COVID-19 on export earnings of Ethiopia is depicted in Impulse Response Graph below.

Figure 6. Dynamic Response of Export Earnings to COVID-19-Uncertainty Shock

As we learn from IRF graph, export thoroughly declines in all forecast periods. The loss in export earning is massive three months starting TIR- MEGABIT 2012 E.C, where export earnings declines by 5.85 Billion birr.

Figure 7. Forecast Effect of COVID-19 on Export Earning (Millions of Birr)

Source: Author’s Computation based on VAR Forecast via Impulse Response Function)

In the first six months since January 2020 (TIR/2012), an estimated 6.5 billion birr will be lost as a result of COVID-19 uncertainty shock effect. The study forecasts export to decline by 597.7 million birr April-June 2020 (MIAZIA-SENE 2012 E.C). This finding fits (only with forecast error of 3.5%) the forecast estimate made by Ministry of Finance of Ethiopia in April, 2020. According to Ministry of Finance of Ethiopia, export earnings are expected to fall by 30% (576 million birr) between March and June 2020 compared to earnings from exports in the same period in 2019 (which was 19.2 billion birr) (FDRE Ministry of Finance, 2020). The decline in export keeps between July and September 2020 (HAMLE 2012-MESKEREM 2013 E.C).

In the year 2013, export loss due to COVID-19 shock is estimated to reach 4.8 billion birrs. The total loss in export in the first six months of 2013 E.C will be 3.5 billion birr. In next half year following, the predicted loss in export
earnings in estimated at 1.34 billion birr. The impact of the pandemic on export earnings of Ethiopia shows a progressive decline in 2014 E.C. The total loss as a result of pandemic shock effect in 2014 E.C. is forecasted to reach 709.71 million birr. In the year 2015, the damage cost of COVID-19 on export earnings of Ethiopia is estimated at 557 million birr. The pandemic uncertainty effect on export, though shows a steep decline, remains to be felt up until 2017 E.C.


The pandemic effect on export earnings of Ethiopia, at least in the coming three years, is largely explained by the duration of the pandemic period itself. As such, pandemic shock explains an average of 65.66% of variation (decline) in export earnings. A result from variance decomposition result also reveals that transport and investment shocks another mechanisms COVID-19 uncertainty effect transmitted into the export sector between the years 2012-2015 E.C.

e) Forecasting COVID-19 Uncertainty Shock Effect on Investment Expenditure

One of the impacts of COVID-19 is its toll in downsizing key components of aggregate demand, consumption and investment expenditures. In uncertain times like our days, both households and firms prefer to withhold their cash. Households would set aside cash in their hands for food and basic amenities. Firms too, refrain from spending to build-up their capital stock. Overall, both consumption and investment demands are expected to slump in the pandemic period.

In this study, the impacts of COVID-19 on the aggregate demand in Ethiopian economy is investigated through the pandemic’s effect on investment expenditure, one component of The study found out that COVID-19 driven investment volatility lasts three years. To examine on investment expenditure dynamics between TIR/2012 and SENE 2015, changes to Investment expenditure to one standard deviation of World Pandemic Uncertainty Index is generated using VAR Impulse Response Function (IRF).

Figure 8: Dynamic Response of Employment to COVID-Uncertainty Shock

According to forecast estimate made, the total damage on investment expenditures from TIR 2012- SENE 2015 will be 1.9 billion birr (63.95 Million USD). This finding complies findings from a study by EEA (2020) which concluded the pandemic is expected to reduce the foreign direct investment to the country ranging from 24% to 70% compared to the pre pandemic period.

The finding from our study further reveals that, in the coming three years at least, investment performance is largely determined by the length of the pandemic period (pandemic uncertainty effect), explaining on average 56% of loss in investment expenditure. The result is in compatible with investment theories and empirics, where uncertainty what so ever is the major shock variable affecting investment. Next to pandemic uncertainty factor, transport and export sectors are also the major shock variables in 2012-2014 E.C. In 2015, investment is largely affected by hotel & restaurant prices and government expenditure shocks.

The size of investment expenditure losses and the dynamic impacts of major determinants of investment performances vary across different quarters/years in the prediction period (in the next three years). Investment expenditure steeply declines in the upcoming two years since TIR 2013. The biggest loss forecasted to hold
between months of January (TIR) and (MEGABIT) 2012 E.C., where an estimated 443.82 million birr worth of investment expenditure decline is expected.

Overall, in the six months of 2012 E.C, COIVID-19 pandemic uncertainty shock results half a billion birr (512 Million birr). In this period, investment decline is largely attributed to Pandemic uncertainty shock (82.83%). Other than pandemic uncertainty, transport and export shocks takes a respective share of 9.9% and 6.49% for a decline in investment in the period between TIR and NEHASE 2012.

**Figure 9.** Forecast Estimate of Effect of COVID-19 Pandemic Uncertainty on Investment Expenditure in the Three years

Source: Author’s Computation based on VAR Forecast via Impulse Response Function

In 2013 E.C too, the effect of the virus keeps on its damage on investment climate in Ethiopia. In this regard, the total cost of pandemic uncertainty is estimated to be 391.77 million birr. Though the pandemic uncertainty shock effect shows a progressive decline, it still remains the major factor determining the performance of investment sector in 2013, contributing on average for 62.32% of investment volatility. In the mentioned period, transport and export shocks remain on top spot of affecting investment performance, with respective the average shares in explaining investment expenditure is predicted to be 8.39% and 4.87%.

The effect of the pandemic on investment shows a relative decline in 2014 E.C, whose estimated effect on loss in the investment expenditure predicted at 68.7 Million birr. This is largely attributed to a decline in pandemic uncertainty shock, whose effect declines to 49.12%. Transport prices and export shocks remain major variables in 2014 where COVID-19 uncertainty shock effect takes its toll on investment performance in Ethiopia. The finding from VAR estimation shows transport price shocks are forecasted to explain 8.63% of volatilities in investment expenditure. In 2013 E.C the role of export performance in explaining investment volatilities is averaged at 4.12%.

In the year 2015 E.C, the damage of the pandemic on investment expenditure will be and 84.2 Million birr respectively. In this period, the relative importance of pandemic uncertainty, transport and export shocks progressively declines in affecting investment expenditures. In this regard, the share of each shock in affecting investment stability is predicted to be 43.1%, 7.96% and 3.79% respectively. On the other hand, the importance of hotel & restaurant and government expenditure shocks appeared on the scene to shake investment sector. The Impulse Response results from VAR estimation predicts that hotel & restaurant prices & government spending explain on average 7.14% and 6.01% of changes in investment expenditures respectively.


The impact of COVID-19 on macroeconomic stability can be gauged by its effect on price volatility. Theoretical and empirical evidences tell price stability a signal about the health of the economy. For one, it can be rough gauge on the gap between the aggregate demand and supply. Moreover, price volatilities also implicate the shock level in the economy. Indeed, looking the impact of COVID-19 from the two broader aspects of linkages between macroeconomic stability and price volatility is important, as discussed below.
g. **Forecasting the Effect of COVID-19 on Food Prices**

The VAR model result predicts that COVID-19 pandemic shock to have an upward pressure on food price index\(^\text{11}\). As shown from IRF graph below, food prices are predicted to show a rise in most of the forecast. Two explanation can be given why food prices surge in the pandemic period. One, health preventive measures would give food market disruptions mainly creating transport & logistics service barriers, among other factors. Two, the pandemic uncertainty effect would raise households’ precautionary demand for food, whose effects interpreted in pushing food prices up.

**Figure 10. Dynamic Response of Food Prices to COVID-Uncertainty Shock**

To infer on the channels through which food price volatility to be transmitted into the economy, variance decomposition of food prices shock was made. Accordingly, transport shock is forecasted to be the main channel through which COVID-19 uncertainty effect is impact is transmitted into food prices. On average 16.3% of variances in price of food-price is explained by transport prices in the whole periods of forecast. As food inputs are highly reliant on transport & logistics services, it is natural that food prices to vary with transport prices.

Education price is another channel where COVID-19 uncertainty shock impact is transmitted to food price volatility in Ethiopia in the upcoming three years, whose shock effect on food price volatility is averaged at 14.9% in the prediction period. In a country like Ethiopia, where there are 26 million students attending classes as of 2020 or 2012 E.C\(^\text{12}\), it is highly likely that education sector to affect food prices via effects on hotel & restaurant businesses. Indeed, a stay at home health measures affect hotels and restaurants drawing substantial customer base from getting services. That inevitably put downward pressure on food prices through the line of demand shortfalls. That may explain why the impact of education prices is expected to spill over into food prices.

Apart from education, the impact of COVID-19 on food prices are expected to pass through communication prices, particularly since the first four quarters of prediction period.

h. **Forecasting the Effect of COVID-19 on Non-Food Prices\(^\text{13}\)**

To see the dynamic response of non-food prices to COVID-19 uncertainty shock, the study considers major items in non-food price indexing in Ethiopia. Hence, the dynamic response of indicators of non-food price index to one standard deviation of COVID-19 uncertainty shock on transport, communication, education, health and hotel & restaurant prices is forecasted for the next fourteen quarters since 2019/20 Q3.

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\(^{11}\) The basket of goods/services in the estimation on food price index in Ethiopia involves the following items: bread and Cereals; Meat; Fish & Sea Food; Milk, Cheese & Egg; Oils & Fats; Fruits; Vegetables; Sugar, Jam, Honey, Chocolate & Confectionery; Food Products; Non-Alcoholic Beverages.

\(^{12}\) Report by Planning Commission of Ethiopia, July 2020

\(^{13}\) In Ethiopian context, non-food price index is computed on average price index for the following list of products: Transport, Communication, Education, Health, Hotel & Restaurant, recreation & culture; Alcoholic Beverages and Tobacco; Clothing & Foot-wear; Housing, Water, Electricity/Gas and Other Fuels; Furnishings, Household Equipment and Routine Maintenance of the House; Miscellaneous Goods.
As depicted in subsequent paragraphs, the forecast result reveals that the pandemic uncertainty impact is not the same across non-food goods/services indicators.

**Transport Prices**

In the immediate aftermath of the pandemic outbreak, transport prices show upsurge, but only with a momentous effect as it lasts for few time. This can be explained by pressure on public mobility on the eve of stay at home measures likely be implemented on the wake of the coronavirus pandemic. People would rush at once to take themselves at home, raising transport demand and hence surge in the price index. Moreover, the future is uncertain with more restrictive measures (including lockdowns) may hold. Therefore, precautionary demands for food/non-food items, which raise demand for transport services, leaving an upward pressure on transport prices.

Except for a momentous increase in prices of transport, the VAR model forecast transport prices fall in almost all quarters of forecast period. Given the pandemic triggered stay away measures, that would amount significant limitations on mobility of people and freight, all with dwindling down effect on transport prices. The impact of COVID-19 uncertainty shock on transport prices seemingly fades beginning 12\textsuperscript{th} quarter of forecast.

**Figure 11.** Dynamic Response of Transport Prices to COVID-Uncertainty Shock

Moreover, the pandemic uncertainty shock is transmitted to transport price volatility via education and food prices, hotel & tourism, also with investment. The result in this regard is expected as education, food supply chain and investment activities are highly reliant on transport services. Other studies also concluded similar. For instance, Geda (2020) found out that a 10\% increase in confirmed weekly cases in Ethiopia is found to lead to 8.5\% and 3.7\% reductions in the demand for restaurants and air travel services in the short run.

**Communication Prices**

Communication prices show a rise in the upcoming six quarters at least. The rise in price is also observed in the seventh and eighth quarters too before falling in the last two quarters of forecast.

The upward effect of COVID-19 pandemic on communication price index is understandable. For obvious reasons, the pandemic preventive measures required limited physical contact. and the only feasible way managing one’s business, whether economic or social, would be via telecommunications. That in turn results into surge in demand for communication devices/services, hence a rise in their prices too. This finding complies what is concluded by similar studies. For instance, Geda (2020) found out that a 10\% increase in weekly cases of COVID-19 in Ethiopia would increase the demand for Zoom software demand (a proxy variable to communication service) by 5.6\%, both in the short run and the long run.
Volatilities in communication prices are predicted to be explained via volatilities in prices in the health and food prices. Export sector is another channel where COVID-19 uncertainty shock evokes volatilities in the communication prices. The finding is consistent with the fact that all those sectors are largely dependent on communication devices to deliver/function their services.

**Education Prices**

Education prices show a fall in the next three forecast periods, but begins a steady rise that lasts for the next five quarters. The finding is in compatible with the stringent measures to be taken in the aftermath of the pandemic, one of which is closure of education centers. As education remains in closure for months, demand for education services and education materials would be low. And the impact is interpreted with a fall in education prices. That explains why education price index shows a decline in the months following COVID-19 pandemic.

**Figure 13. Dynamic Response of Education Prices to COVID-Uncertainty Shock**

As forecasted in the VAR variance decomposition, the transmission channel of the pandemic effect on education sector is most felt through transport and food price shocks. The duration of pandemic uncertainty time is also another factor affecting the stability of education prices in the next couple of years in Ethiopia. Since the beginning of the fourth quarter of forecast, communication price shocks will affect stability of education prices.

**Health Price Index**

Health prices show a rise in the first two quarters of forecast. Given the pandemic result a public health measures to step up, the prediction is as expected. However, for the next three quarters, health prices show a decline. The impact of COVID-19 uncertainty shock on health prices culminates beginning the seventh quarter.
Figure 14. Dynamic Response of Health Prices to COVID-Uncertainty Shock

The transmission channel of uncertainty effect on health price stability is most explained by communication, transport & food price shocks. Import and hotel & restaurant prices are also found to be another transmission mechanism of COVID-19 uncertainty shock on variations in health price in the forecast period.

Hotel & Restaurant Prices

Hotel & restaurant prices increase roughly in all periods of forecast except the fourth and fifth quarters. Given that public health measures required hotels & restaurant business to put in place changes in their service delivery to complying customer safety that inevitably interpreted in making cost of production costlier. The in part explains the upward pressures on hotel & restaurant prices expected in the first four quarters at least.

Figure 15. Dynamic Response of Hotel & Restaurant Prices to COVID-Uncertainty Shock

The impact of COVID-19 pandemic takes its biggest toll in the hotel & restaurant business via education and food price volatilities. As food items are major inputs/outputs of hoteling business, and students are the major customers of hotel & restaurant services, the finding is expected. Non-food prices like communication and transport are also important lines of uncertainty shock transmission lines resulting volatilities in the hotel & restaurant prices.


The pandemic shock effect has a negative impact on government expenditure in the next four quarters of pandemic period. As the forecast estimation considers policy factors intact, one reason why reduction of public spending is because a reduction in government earnings due to tax and tariff falls as result of the pandemic.

An increase in government expenditure is forecasted in the first quarter of prediction period. Government spending shows a decline in the last quarter of 2019/20 fiscal year and the first quarter of 2020/21 fiscal year. In the remaining three quarters of the 2020/21 fiscal year, however, a slight increase in government expenditure is expected. The pattern of government expenditure change appears to be cyclical in the next quarters of forecast.
To see the effect COVID-19 uncertainty shock on macroeconomic stability in Ethiopia, the study examined the transmission mechanism of Government Expenditure volatility. To that end, variance decomposition on government expenditure variable is estimated in the VAR model.

The result of estimation shows that volatilities in government expenditure transmitted into the economy by affecting prices, both food and non-food prices. In this regard, food and communication prices appear to be main channels through which COVID-19 shock transmitted into government expenditure volatility.

As variance decomposition result shows, communication prices shocks are the main transmission channel of COVID-19 uncertainty shock on government expenditure, explaining 15.74% of public expenditure volatilities in the forecast period (the coming three years). The explanation goes to structural/contextual factor pertaining to the public sector in Ethiopia. The role of communication sector in determining the pattern of government expenditure is apparent as direct and indirect source of government revenues.

In Ethiopian context, communication sector is entirely owned by the government sector, with the state monopolizes the telecom business to fetch ransom to service its expenditure. For instance, in the years 2017/18 and 2018/19, the annual revenue of ethio-telecom was 37.7 and 36.3 billion birr respectively. In the pandemic period (2019/20), the revenue even showed an escalation, where ethio-telecom reported annual revenue 47.7 billion birr, a rise by 32% compared to previous year.

Moreover, the effect of communication sector shock on government expenditure may be through its potential impact on the tax revenue.

The study further identified that COVID-19 uncertainty effect is transmitted into government expenditure via hotel & restaurant shock. This can be explained by two. For one, hotel & restaurant business is key source of tax revenue for the government. Moreover, as a result of the pandemic takes its biggest toll on hotel &restaurant businesses, tax revenue from the sector is expected to face a decline in the next couple of years. On top of that, given that the hotel & restaurant sector is receiving major tax concessions from the government, the downward effect on tax revenue that could have been received from the sector.


Empirical finding from VAR estimation shows that uncertainty shock sparked by coronavirus pandemic affect aggregate employment (temporary & permanent employment) negatively in the first two quarters of forecast period at least, i.e. January-June 2020 (between TIR and SENE 2012 E.C).

As we learn from the dynamic response graph below, the decline in employment in the first quarter of forecast is 65% compared to the previous quarter where no-COVD1-19 (i.e. 2019/20 Q2). Indeed, similar studies conclude the same. A study by Ethiopian Economic Association (EEA 2020) reveals that employment is likely to be hit hardest by COVID-19 pandemic shock. According to this study, the decline in employment level is between 8.6%
and 16.5% lower than the Pre-COVID-19 period (baseline period). The dynamics of COVID-19 uncertainty shock effect on employment in the forecast period is depicted using the Impulse Response Function graph below.

**Figure 17. Dynamic Response of Employment to COVID-Uncertainty Shock**

The effect of the pandemic on employment is expected to come through investment, the length of the pandemic period (uncertainty effect) and export shocks. The finding is real as the employment data used in the study is investment induced employment; and investment and export sector are largely affected by the length of pandemic period (see sections 4.2 and 4.3). Studies on COVID-19 economic impact also concluded the same. For instance, ILO (2020) identified the employment channel one of the major lines COVID-19 uncertainty shock takes its toll on the economy.

Indeed, as VAR forecast estimate show, the impact of COVID-19 uncertainty effect is much felt through investment channels in the whole period of prediction period (three years). In the first six months of 2012 E.C for instance, changes in investment expenditures explain 37.89% of volatilities in employment. In the first four quarters of forecast period, though permanent employees are not totally immune from the pandemic shocks, temporary employment will bear the cost of the pandemic more than permanent employment. There are solid reason why so.

For one, COVID-19 triggers stringent public health measures to prevent the spread of the disease restrict the growth of ongoing investments, whose effect interpreted in downsizing additional. Moreover, pandemic uncertainty erodes the confidence of investors as the prospect for businesses expectedly gloomy curbing new investments from holding. In both cases, COVID-19 effect is interpreted in its massive effect on temporary employment. A study by ILO (2020) also concluded that stringent health measures taken by countries would make many workers unable to move to their places of work or carry out their jobs, which has knock-on effects on incomes, particularly for informal and casually employed workers.

**Figure 18. Forecast Effect of COVID-19 on Employment (%)**

The effect of COVID-19 uncertainty on employment is however almost nil in the year 2014. This, in part, is explained by a rise in public spending to investment undertakings and existing businesses targeting employees (permanent/contract) from layoffs. As forecast prediction shows, the effect of the pandemic on employment culminates beginning the second half of 2013 E.C
The findings in this study that COVID-19 uncertainty shock affect employment through investment and export sector channels complies findings from similar other studies. For instance, a study by EEA (2020) concludes that job losses would be severe in all the export-oriented sectors.


In this study, the role of fiscal policy to mitigate COVID-19 driven macroeconomic instability on Ethiopian economy is examined by instrumenting fiscal policy shocks against key macroeconomic variables integrated in VAR model used. Expansionary fiscal policy instruments examined in this study are increasing government expenditure and reducing import tariffs. By way of illustration, impulse response of key macroeconomic stability indicators to COVID-19 shock (the disturbance factor) and the expansionary fiscal policy shocks (counter disturbance factors) is presented.

m. The Role of Managed Rise in Public Expenditure to Stabilize the Economy

To examine the effect of expanding public expenditure in stabilizing the macroeconomic order, The Impulse Response Function (IRF) to one standard deviation of shock from Government Expenditure on investment, employment, food & non-food prices, import, export sector was investigated. It is evident from IRF graphs below, the particular role of an increase in government expenditure goes to stabilize general prices (both in the food and non-food prices).

**Figure 19. The Role of Expansionary Government Expenditure to Price Stability**

Moreover, increasing government expenditures can heal the fractures of the economy due to pandemic uncertainty shock effect by stimulating investment, export and employment (see IRF graphs below).

**Figure 20. The Role of Expansionary Government Expenditure to Promote Investment, export and employment**

n. The Role of Reducing Import Tariffs (Import Policy) on Macroeconomic Stability

To enhance the potency expansionary fiscal policy intervention to stabilize the economy, increased public expenditure has to be complemented by import policies/regulations/procedures. An important instrument of expansionary fiscal policy in this regard is reducing import tariffs. Reduction of tariff should be directed toward key ventures in the supply chain in the import supply of consumption and investment goods.

The role of import policies to complement fiscal policy measures can be explained in to two. For one, by reducing the transaction cost in import sector, complementary import policies would have positive spillover effect in final prices thereby mitigating inflation. On the other hand, complementary import policies would help facilitate...
importing consumption and investment goods, hence mitigate the inflationary effects of expansionary fiscal policy by keeping the balance of aggregate demand and supply. The role of import policy to stabilize prices is depicted in the IRF graphs below.

**Figure 21.** The Role of Import Policies to stabilize prices (both food and non-food Prices)

Beyond its price stabilization outcomes, a managed and viable import policy can also have positive outcome in spurring investment and export, hence widening employment opportunities in the economy (see IRF graphs below).

**Figure 22.** The Role of Import Policies to Promote Investment, export and employment

4. Conclusion

This study investigated the impact of COVID-19 pandemic uncertainty shock on the macroeconomic stability of Ethiopia. The World Pandemic Uncertainty Index (WPUI) was used a proxy variable to measure COVID-19 Uncertainty shock effect. The pandemic effect on core macroeconomic variables like investment, employment, prices (both food & non-food prices), import, export and fiscal policy indicators was estimated and forecasted. The role of fiscal policy in mitigating the shock effect of coronavirus pandemic on macroeconomic stability is also investigated.

The finding of the study reveals that the COVID-19 impact lasts at least three years to shake the economy of Ethiopia. Essentially the COVID-19 immediate impact was on international transactions. and in the Ethiopian context, where the country relies heavily on import for the service of consumption and investment demands. Hence, the impact is expected to take its toll via import channel in the immediate aftermath of the outbreak of the pandemic.

The VAR estimate indicates that COVID-19 uncertainty shock results a massive rise in import in the six months following the outbreak of the pandemic. The finding in this regard is expected, as the pandemic triggers massive demand in food and pharmaceuticals, for which Ethiopia is import dependent on both items. In the next two years, however, the import bill of Ethiopia shows a decline. Reduction in aggregate demand (both consumption & investment expenditures) is one explanation for decline in import size in 2013 and 2014 E.C.

The price dynamics as forecasted in the upcoming three years in Ethiopia tells the direction of impacts of COVID-19 uncertainty shock to shake the macroeconomic order. The findings in this regard revealed the structural breakdowns of Ethiopian economy, characterized by its inability to withstand shocks. As signaled in forecasted price dynamics on both food and non-food price indices, COVID-19 was a supply shock in its first time impact, but quickly trans-passes to demand shock. And in the next few years the demand shock outweighs the supply shock.
The results of estimations indicate that food prices to skyrocket at least until the end of 2014 E.C (2021/22). On the other hand, except communication & hotel & restaurant prices, other components of non-food price indices show a slump. The decline in non-food price level is a clear showcase of under-consumption characterizes the economic order in Ethiopia in the coming three years.

COVID-19 uncertainty shock puts huge loss in the investment sector in Ethiopia at least in the coming two years 2013 and 2014 E.C (2020/21-2021/22). In this regard, the pandemic effect transmitted to shake investment expenditure via the length of the pandemic period itself and export performances, both of which are exogenous shocks.

Employment declines up until the sixth quarter, but shows a slight increase between the sixth and eighth quarter of forecast. The uncertainty impact of COVID-19 on employment dies-off after the tenth quarter.

Findings from VAR estimation suggest that fiscal policy can help stabilize both food and non-food prices in the next three years at least. A particular role of government spending in stabilizing prices goes to food market, transport and communication sectors. The potency of fiscal policies in stabilizing food, transport and communication prices go in line with the prevailing reality in Ethiopia where government has strong hands to control those markets directly and/or indirectly. This suggests market failure featuring COVID-19 time, calling for managed interventions of governments to promote market stabilities.

Moreover, the study found out that price stabilization policies have spillover effects in boosting investment, promote export and enhancing the scope of the economy in terms of creating employment opportunities.

**Policy Implications**

The study identified that general under consumption features the Ethiopian economy in the next couple of years. Therefore, the government is expected to enact incentives/policy directions which can boost business confidence. In this regard, government expenditures on consumption and capital goods would heal the damage cost of COVID-19 uncertainty shocks on aggregate demand thereby promoting investment & consumption expenditures. The finding of the study suggests for a managed expansionary fiscal policy to promote investment induced employment and stabilize food & non-food prices.

Policies that aim to stabilize food price should focus in providing economic incentives to those agents in food supply chain thereby increasing their production capacity. Price stabilization interventions in the food market can also be achieved through strategies that identify key agents in the supply chain most affected by the pandemic shock, and channel subsidies in those lines.

Moreover, the government has to encourage merchandise imports to avoid inflationary effects of expansionary fiscal policy in basic consumption and investment goods as a result of supply shortfalls. In this regard, incentivizing the transport and logistics sector can help fix major fallouts of the economy as result of COVID-19 uncertainty shock effect on supply chain. Policy interventions can manage on that through combined legal, bureaucratic and financial policies/strategies/directives that helps facilitate for an efficient export-import trade, which is key to mitigate macroeconomic instability thereby narrowing the gap in aggregate demand and supplies on consumption and investment goods.

Finally, while servicing its rising expenditures, the government has to see viable options of financings. As such, financing public expenditures should be in a way that would not pressurize the prospect of the economy in medium and long run. As part of the broader interventions in the economy through divergent policy instruments, fiscal optimization should also be considered in a way retargeting or reprogramming possible on already running public projects/programs when the need arises.

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Factors for the Successful Implementation of Self-Dependant Training During the Educative Process

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Abstract

An important task of the military education system is the quality professional training of officers for the formations of the country's Armed Forces, building psychological readiness and abilities for professional and competent performance of official duties. According to the law on higher education, training is carried out in specialized higher education institutions, whose role is to prepare personnel necessary for the country's defense and national security for the various levels of government (tactical, operational and strategic). The education acquired in the military educational establishments of the Republic of Bulgaria corresponds to the requirements of the European legislation and the normative regulation of the country. It provides graduates with the necessary qualifications, including vocational education, professional knowledge, skills and experience, competence to practice skills and their application in practice, as well as competencies representing a set of interrelated knowledge, skills and attitudes necessary to perform the military profession. The provision of interaction between the military educational establishments and the users of personnel from the system of the Armed Forces of the Republic of Bulgaria is of key importance for the connection of the military education with the practice. In this way, students will learn what they need to know and can about their future realization in the field.

Keywords: Education, training, cadets.

JEL Codes: I20, O10, P00

1. Introduction

The unity between the education and the upbringing under the contemporary conditions and the dynamic development of the innovative processes represents one of the major guidelines of the Strategy for Development of the Higher Education.

The formation process of the future Officer is determined by numerous factors, which are connected with the educative process of the Cadets. The complex formation of the Cadets’ individuality can be only achieved with the implementation of the unity between the education and the upbringing during the training process.

With the concept of the unity of education and upbringing it’s meant the unbreakable bond between the flow of the presented to the Cadets scientific information, i.e. their enrichment with real knowledge of the nature, of the scientific and social development, the acquiring of skills and habits, the development of their cognitive abilities, the forming of particular and abstract thinking, of conceptions, convictions, will, character, stability and high sense of duty (Mitkov, 1980).

Hence, the educative process represents the necessary condition and means for the complex shaping of the personality.

The conducted particular researches in Bulgaria until the present moment in the sphere of the training of the Cadets from “Vasil Levski” National Military University are not helping to draw a definite conclusion and to take specific decisions, corresponding to the contemporary requirements of the training process. Most of the researches are
seeking after and are revealing the quantitative and the quality alterations of a given pedagogical system. If the connections and the relations of the components of a particular structure are being disclosed, this either happens within the empirical frames of the given pedagogical, psychological or further region, or the bounds and relations to the components of the other spheres of social life, which play major role in the forming of the personality, are being looked for.

The subject of research are the factors, which contribute for the developing of solid, profound knowledge, skills and habits in the cadets and for their practical implementation, also the factors, related to the conditions for individual training, for the conduct of the lessons and the independent work. The object of research is the conducted autonomous preparation of the Cadets at “Vasil Levski” National Military University.

2. The autonomous preparation as one of the elements of the educational process

The educational process at “Vasil Levski” National Military University becomes increasingly based on the creative activity and on the bigger autonomy in the work of the Cadets. Already under the contemporary conditions it is hard to digest successfully the difficult and capacious training material. That’s why it’s necessary to improve continuous the structure and the organization of the educational process. For this reason the individual striving for knowledge acquires a special importance and becomes a specific characteristic of the training of the Cadets.

The independent work is a major method of a profound and comprehensive learning of the training material. In the Regulation for the Admission and Educational Activity at “Vasil Levski” National Military University it’s stated, that the independent training of the students is a constituent part of the learning process and one of the main methods and forms of the training at the University (2009). The systematical independent training develops in the Cadets activity, independent thinking, organization and stronger focus and is regulated by the study plans, by the curriculum and by the time schedule during the 24-hours period.

The expression “independent training” means each activity of the Cadet not only according to advance assignment, but also of their own volition, aimed on reassertion, expanding and deepening of the obtained knowledge, skills and habits, also on the individual learning of a new training material.

3. Factors of the successful implementation of the independent training

The implementation of a highly effective independent training depends on the influence of a number of objective and subjective factors. The objective factors create the conditions needed for the running of the independent training. Here belong: material foundation, information base, organization and implementation of the learning process. In order to provide information to the academic Board of the University regarding the perfection of the independent training it’s necessary to analyze the objective factors and to evaluate according to established criteria the status, the parameters, the activities and the ability for independent training (2004).

3.1. Evaluation according to the factor “Material foundation”

The factor comprises evaluation of the material resources and of the material foundation and the conditions of training, they create.

For the evaluation of the sub-factor “material resources and consumables and the created conditions” the following rations can be assumed: $K_{MR}$ and $K_{CON}$ (Terziev and Nichev, 2017, 2017a; 2017b, 2017c; 2017d; 2017e; 2017f):

\[
K_{MR} = \frac{X_{MR}}{X_K}, \text{ and } \quad K_{CON} = \frac{X_{CON}}{X_K},
\]

Where: $X_{MR}$ is the number of departments, secured with material resources; $X_{CON}$ is the number of departments, assured with consumables;
[Xx] is total number of departments.

The evaluation of the sub-factor “Conformity of the material foundation with the foreseen academic standards and practical knowledge and skills” is performed using the rations $K_{\text{KNOW}}$ and $K_{\text{SKILL}}$ of the material assurance of the required according to the academic standards knowledge and practical skills:

$$K_{\text{KNOW}} = \frac{X_{\text{KNOW}}}{X_{\text{KNOW}}}, \text{ and}$$

$$K_{\text{SKILL}} = \frac{X_{\text{SKILL}}}{X_{\text{SKILL}}},$$

Where: $X_{\text{KNOW}}$ and $X_{\text{SKILL}}$ are the quantities of the required according to the academic standards respectively knowledge and skills under the curricula, ensured by means of the needed material foundation;

$[X_{\text{KNOW}}]$ is the total quantity of the required according to the academic standards knowledge under the curricula;

$[X_{\text{SKILL}}]$ is the total quantity of the required according to the academic standards practical skills under the curricula.

The sub-factor “Evaluation of the financial resources, needed for the normal running of the training according to the academic standards” is estimated using the rations $K_{\text{FR1}}$ and $K_{\text{FR2}}$ of the financial assurance with the needed according to the requirements of the academic standards knowledge and practical skills

$$K_{\text{FR1}} = \frac{X_{\text{FR1}}}{X_{\text{FR1}}}, \text{ and}$$

$$K_{\text{FR2}} = \frac{X_{\text{FR2}}}{X_{\text{FR2}}},$$

Where: $X_{\text{FR1}}$ and $X_{\text{FR2}}$ are the available financial resources for the assurance of the required by the academic standards knowledge and practical skills, according to the curricula modules;

$[X_{\text{FR1}}]$ and $[X_{\text{FR2}}]$ are the financial resources, needed for the assurance of the required by the academic standards knowledge and practical skills.

The evaluation of the sub-factor “Dynamics of the material foundation renewal, according to the speciality, and the conformity of the material foundation with the curriculum alterations” is performed using the ratio $K_{\text{DYN}}$ for the assurance of the required curriculum alterations with an additional material basis

$$K_{\text{DYN}} = \frac{X_{\text{DYN}}}{X_{\text{DYN}}},$$

Where: $X_{\text{DYN}}$ is the quantity of the required alterations of the educational content according to the curriculum, secured by means of an additional material foundation;

$[X_{\text{DYN}}]$ is the total quantity of the required alterations of the educational content.

The total evaluation of the factor “Material foundation” is:

$$K_{\text{MB}} = K_{\text{MR}} + K_{\text{con}} + K_{\text{KNOW}} + K_{\text{SKILL}} + K_{\text{FR1}} + K_{\text{FR2}} + K_{\text{DYN}}$$

3.2. Evaluation of the factor “Information basis”

The factor comprises evaluation of the information resources, which insure the running of the autonomous work.

The evaluation of the sub-factor “Textbooks and learning literature” is accomplished using the ration $K_{\text{textbooks}}$ of the secured learning literature
\[ K_{textbooks} = \frac{X_{course}}{Y_{course}}, \]

Where: \( X_{course} \) is the number of subjects according to the curriculum, for which the needed quantity of modern learning literature is provided;

\( Y_{course} \) is the total number of subject according to the curriculum.

The sub-criterion “Professional and scientific periodical issues and supporting literature according to the speciality” is evaluated using the ratios \( K_{periodicals} \) and \( K_{aids} \) for the provided professional periodical issues and supporting literature according to the speciality

\[ K_{periodicals} = \frac{X_{periodicals}}{Y_{course}}, \text{ and} \]

\[ K_{aids} = \frac{X_{aids}}{Y_{course}}, \]

Where: \( X_{periodicals} \) and \( X_{aids} \) are the number of subjects from the curriculum, which are secured respectively with professional periodical issues and supporting specialized literature;

\( Y_{course} \) is the total number of subjects according to the curriculum.

The sub-factor “Publishing activity” is evaluated using the ratio \( K_{publishing} \) for the using of education literature, published by the university

\[ K_{publishing} = \frac{X_{publishing}}{Y_{course}}, \]

Where: \( X_{publishing} \) is the number of subjects, for which education literature, published by the university is being used;

\( Y_{course} \) is the total number of subjects according to the speciality.

The evaluation of the sub-factor “Sufficiency and current enrichment of the library stocks and access of the students to the library stocks” is performed using the ratios of enrichment of the library stocks \( K_{library1} \) and its’ usage by the cadets \( K_{library2} \)

\[ K_{library1} = \frac{X_{library1}}{Y_{library1}}, \text{ and} \]

\[ K_{library2} = \frac{X_{library2}}{Y_{library2}}, \]

Where: \( X_{library1} \) is the quantity of the purchased scientific literature and periodicals and of the University publications during one calendar year;

\( Y_{library1} \) is the total quantity of the books stocks at the library and the received in it literature;

\( X_{library2} \) is the number of the students, who use the reading rooms of the library;

\( Y_{library2} \) is the total number of the teachers and of the cadets from the speciality.
The sub-factor “Internet – networks and access to it” is evaluated using the ratios $K_{\text{Internet1}}$ and $K_{\text{Internet2}}$ respectively of the information from the Internet, recommended by the teachers and of the implementation of the Internet-network by the students for their autonomous training.

$$K_{\text{Internet1}} = \frac{X_{\text{Internet1}}}{Y_{\text{lecturer}}}$$

and

$$K_{\text{Internet2}} = \frac{X_{\text{Internet2}}}{Y_{\text{learner}}}$$

Where: $X_{\text{Internet1}}$ is the number of teachers, who recommend to the cadets suitable information from the Internet; $[Y_{\text{lecturer}}]$ is the total number of the teachers; $X_{\text{Internet2}}$ is the number of the students, using the Internet-network for obtaining of new information; $[Y_{\text{learner}}]$ is the total number of the students.

The general assessment of the factor “Information foundation” is formed:

$$K_{\text{IB}} = K_{\text{textbooks}} + K_{\text{periodicals}} + K_{\text{aids}} + K_{\text{publishing}} + K_{\text{library1}} + K_{\text{library2}} + K_{\text{Internet1}} + K_{\text{Internet2}}$$

3.3 Evaluation according to the factor “Learning process”

The sub-factor „Workload of the teachers“: $K_{\text{NP}}$ gives information about the time, provided to the teachers for individual work with the students.

$$K_{\text{NP}} = \frac{X_{\text{DZ}}}{Y_{\text{D}}}$$

Where: $X_{\text{DZ}}$ is the arithmetic average quantity of the foreseen days of classes with up to 2 learning hours daily for one teacher; $[Y_{\text{D}}]$ is the number of the schooldays of the Semester Schedule.

The sub-factor “Insured implementation”$-K_{\text{OU}}$ measures the time insurance for the implementation of the lectures’ content and of additional knowledge before conducting exercises.

$$K_{\text{OU}} = \frac{X_{\text{L2}}}{Y_{\text{L}}}$$

Where: $X_{\text{L2}}$ is the number of the 2-hours lecture exercises with insured time for the learning of the educational information during a period of not less than 3 hours; $Y_{\text{L}}$ is the total number of the 2-hours lecture exercises in the Semester Schedule.

The evaluation of the sub-factor “Attendance of lectures” is performed using the ratio $K_{\text{PZ}}$ for attendance of classes.

$$K_{\text{PZ}} = \frac{X_{\text{AK}}}{Y_{\text{K}}}$$

Where: $X_{\text{AK}}$ is the number of the attending cadets; $[Y_{\text{K}}]$ is the total number of cadets, who must attend the classes (excluding those, who are ill, at service or at home leave).
The sub-factor “Activity of the Cadets during the training process” is evaluated by means of the ratio \( K_{AC} \) of the cadets’ activity during their training process.

\[
K_{AC} = \frac{X_{KD}}{X_{AK}}
\]

Where: \( X_{KD} \) is the number of the cadets, who had expressed at least once on their own initiative their opinion regarding the educational content or had asked questions in the course of the classes or of the consultations;

\( [X_{AK}] \) is the total number of the attending the classes cadets.

The sub-factor “Methods of teaching” is evaluated using the ratio \( K_{methods} \) for the implementation of various teaching methods.

\[
K_{methods} = \frac{X_{lecturer}}{Y_{lecturer}}
\]

Where: \( X_{lecturer} \) is the number of the lecturers, who implement diversified teaching methods in the course of their pedagogical activity;

\( [Y_{lecturer}] \) is the total number of the lecturers;

The sub-factor “Implementation of electronic devices for the training process (e'Learning)” is evaluated using the ratio \( K_{e'Learning} \) for the implementation of electronic devices for training (e'Learning) and for examination of the cadets.

\[
K_{e'Learning} = \frac{X_{e'Learning}}{Y_{lecturer}}
\]

Where: \( X_{e'Learning} \) is the number of the lecturers, who are using electronic devices for training and examination of the cadets.

\( [Y_{lecturer}] \) is the total number of the lecturers.

The sub-factor “Intensity of control over the classes and over the competences at the educational modules” is evaluated by means of the ratio \( K_{control} \).

\[
K_{control} = \frac{X_{control}}{Y_{learner}}
\]

Where: \( X_{control} \) is the number of the cadets, who had been controlled for each subject of their classes;

\( [Y_{learner}] \) is the total number of the students.

The general assessment of the factor “Training process” \( (K_{LP}) \) is calculated:

\[
K_{LP} = (K_{NP} + K_{OU} + K_{PZ} + K_{AC} + K_{methods} + K_{e'Learning} + K_{control})
\]

The influence of the objective factors puts in the center of the focus the cadet as an object of the training and in order to stimulate his self-education it’s necessary to provide for him the needed material and information foundation, to provide him with an effective training process and assistance on behalf of the teachers. He must be interested himself to study and there is no need to exercise a special control over his achievements (Glushkov, Simeonov, and Georgiev, 2018; Terziev and Kanev, 2019; Terziev, 2019a; Terziev and Solovev, 2020; 2020a).
4. Conclusion

The learning process, as a relatively independent system, succumbs to management and the components of this system represent such sub-systems, during the functioning and development of which some elements drop off, others evolve, third appear as innovations, determined by socio-economical processes in the society. The formation of the future officers is determined by numerous factors, connected with the educational process and the upbringing of the cadets (Kyriakopoulos et al. 2020b; Solovev et al. 2020c).

The complete training of the cadets is directly bound up with the process of the independent training. Hence, independent training is a necessary condition for the shaping of the personality and for the formation of the military professional training of the future officers.

The analysis of the objective factors, affecting the independent training of the cadets shows, that the material and the informational foundation, and also the implementation of the educational process affect substantially the separate parts of the learning process – enhance the assimilation quality, increase the creative and research abilities of the students and raise the degree of knowledge.

References


Independent Training of the Cadets

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Abstract

Priorities in the development of military education are the continuous improvement of military training, the establishment of a leadership model of education aimed at building military leaders for all command levels, and foreign language training. An important aspect of the military education system is the training of cadets, including the study of the laws, nature, content and principles of organizing communication and information support of the command and control system in the preparation and conduct of hostilities, non-war operations and implementation of tasks related to liquidation of the consequences of disasters and accidents. It is organized to provide the necessary knowledge, to develop abilities and create the necessary work habits, to create conditions for further realization of the officers by increasing their language training and to provide initial theoretical knowledge for work in a military environment.

Keywords: Military education, training, cadets.

JEL Codes: P00, I20, O10

1. Introduction

Today the social development rates depend, to large extent, on the level of the educational training not only of the management staff, but also of the executive employees. The education must not only secure knowledge, but also an information and professional culture, which should allow the person to react in time to all changes and requirements during the process of his/her active employability. Within the system of the Higher Schools in Bulgaria, the Military Universities occupy a special place. The cadets, who study there, prepare to perform a specific activity, connected with the defense of the fatherland (Dimitrov et al. 1980). The combination between the Commander will and the high requirements to themselves and to the subordinates, the organization skills, with general knowledge, with the developed operational-tactical thinking and with the military and technical training represents a necessary condition for the successful work of each Officer. Bearing the influence of these factors, the knowledge volume, needed for the Commander training, increases continuously. In order to assimilate qualitatively a considerable volume of learning information, the cadet must be able to plan and to utilize rationally his time, using effective means and methods of the mental work.

The observations of the Cadets’ work from “Vasil Levski” National Military University demonstrate that they must be trained also how to study. It is necessary also for those cadets, who had achieved results higher than the average level in the secondary schools for knowledge assimilation. It is so, because the Cadets, entering the National Military University, find themselves in absolutely unknown for them conditions – the increasing number of the subjects, the volume and the profoundness of the supplied information. The exactness of the granted study material, which they had been used to in the secondary schools, has been replaced by a relative freedom of choice of the volume, content and speed of work. The elaborated in the secondary schools skills and habits now are becoming irrational. Also in the National Military University, as everywhere, it is necessary to improve the organization of labor, in order to achieve effectiveness and quality of education and of upbringing, using the most rational way the available conditions and resources.
The problematic of the scientific organization of labour of the Cadets, foremost presupposes the determination of the optimal time budget for independent training, the drawing up of scientifically grounded norms for its distribution, the elaboration of a scientifically reasoned methodology for supervision of the assimilation and for calculating the results, for perfection of the ways and means of the educational activity including the independent training and for planning of the self-work and of the scientific and research activity of the Cadets.

The acquisition of skills and habits for a successful independent training is necessary to the Cadets not only for the successful learning of the study material, but also for their professional activity in the military units. Hence, they are not just means, but also purpose of the training. They result in one of the main tasks, facing the National Military University – not only to provide a definite volume of knowledge for the Cadets, but also to teach them to work autonomous, to learn during their whole life, what is far more difficult. Therefore, according to the content of knowledge, necessary for a modern officer, the choice is practically unlimited, although the military specialization is predetermined. That’s why the formation of the contemporary officers is based on the acquisition of a specific stock of theoretical knowledge, practical skills and habits, on the continuous improvement of the military professional qualification, on a high labor activity and ability to work independently.

2. The independent training as one of the elements of the educational process

The autonomous work is a basic method for a profound and comprehensive learning of the study material. In the Regulation for the Admission and Educational Activity at “Vasil Levski” National Military University it’s stated, that the independent training of the Students is a component of the educational process and is one of the main methods and forms of training at the University (2004; 2009). The systematic independent training develops in the Cadets activity, independent thinking, organization and purposefulness and is regulated by the curricula, Classes schedule and the time distribution during the 24-hours period.

By the term “independent training” it’s meant each activity of the Cadet, not only according to a preliminary task, but also on his own desire, directed towards reassertion, expanding and deepening of the acquired knowledge, skills and habits, also towards an autonomous learning of a new study material.

During the training process, the Cadets apprehend a certain volume of knowledge, and together with it, they learn autonomously how to acquire new knowledge, skills and habits. It’s a well known fact, that the self-dependence of the students is unimaginable without activating their work through the whole process of the training. That’s why the method of the independent training is combined with the methods of activation of the Cadets.

The autonomous work contributes foremost to the following (Terziev and Nichev, 2017; 2017a; 2017b; 2017c; 2017d; 2017e; 2017f):

- Formation of a broad culture of the mental labor of the Cadets, also of skills and habits, and finally is a determining factor for the achievement of high results in the training;
- To the developing such properties of the Cadets, as: organization, discipline, initiative, strong will and persistence to achieve the set goal;
- To create an ability to analyze the facts and the situations, to think independently, what leads to a creative manifestation of the Cadets;
- To transform the acquired knowledge into convictions and ways of behavior (Dimitrov et al. 1980).

The importance of the independent work is determined also by a number of other factors.

In order to work autonomously and effectively, it’s necessary, that the Cadets acquire also further defined at the Military University virtues, such as: ability to focus, persistence and strong will for overcoming the difficulties, well developed memory, ability to work with literature sources, ability to listen carefully and to take down notes, self-control habits, to rule over rational means of mental activity and habits for the successful implementation of the acquired knowledge in a specific sphere of life.

The organization and the implementation of the educational process are subordinated to the performance of this task. All kinds of classes are conducted in such way, as to teach the Cadets to have a creative approach to every question, to have the abilities and habits for an autonomous training.

In order to understand and to learn the taught material already, when the lecture is presented, the Cadets must exercise a certain self-preparation: to revise the presented by the lecturer material, to write down the lecture in his
own words, etc. At the practical and seminar classes, the range of the autonomous work expands significantly. Here they must solve tasks alone, to analyze the situation, to take decisions, to set tasks, etc. At the laboratory classes, the autonomous work expands even more and in number of cases, it bears a research character. The autonomous work of Cadets figures to the greatest extent at the classes for self-preparation. There the Cadets perform different kinds of compulsory tasks, summarize sources of information, prepare themselves for seminars, for laboratory and practical classes, for examinations, elaborate course projects and tasks, etc.

It can be asserted also, that the independent work represents a combination between creative and non-creative activity. The training purpose, of course, is to develop a creative mental independency. In order to achieve this goal we must not neglect also the executive independency, which can be exercise or recreating self-preparation. It allows the formation of the needed skills and habits in the Cadets, which shall be used further for the development of a creative way of thinking. An expression of the Cadets creative work could be achieved only by means of improvement of their theoretical training and of developing habits for research work. This requires to raise the role of the Cadet as a subject of the educational cognition and the role of the teacher as an organizer of the autonomous training of the students.

In the scientific literature, there exist different classifications of the autonomous work (Tsekov, 1992). The differences are based on the criteria for classification.

The independent work in the educational process at “Vasil Levski” National Military University goes through the following basic levels:

- Autonomous work, aimed on remembering, comprehension and reproducing of a specific educational content. With its’ help the needed basic knowledge of the respective study subject is secured. It serves as a first step towards the higher levels of the cognitive activity and autonomy. Here belongs the work with textbooks, with lecture notes and with the educational literature, solving of problems, connected with the systematic of knowledge, comparison of different opinions and concepts, determination of their ideological attitude, seeking of the general and of the different between them, etc. This level of autonomous work is linked with the use of ready patterns and algorithms;

- Autonomous work, connected with the use and operating with knowledge aimed on solving a range of cognitive problems. By this kind of autonomous work, the student performs analysis and synthesis, abstraction and summarizing, classifies, compares, chooses optimal variants for solving the problems, etc. Here belong the following activities: writing of paper, elaboration of reviews, tables or diagrams, analysis and summarizing of empiric data, etc. For the performance of the listed above activities, it is required not only to think reproductively, but also to possess a "personal presence", to use diverse knowledge and skills, to take a specific position, to combine the theory with the practice and to acquire new knowledge;

- Autonomous work with clearly expressed creative character. The students formulate on their own the problems, elaborate a plan for their solution, ground a hypothesis, examine it and choose a suitable variant of solution, also the corresponding methods and means. The self-dependence of the students is on its highest degree at this third level.

Between these three levels of the autonomous work, and especially between the second and the third level, there is no clearly outlined boundary. The structural analysis of the cognitive activity shows, that the elements of each higher level of autonomous work originate from the lower level also the components of each previous level are inevitably present also in the next levels of autonomous work. As lower the kind of independent work is, as more frequently it is used and must be used during the educational process.

According to the didactic goal, the independent work can be divided into following groups:

- Aiming to acquire new knowledge;
- Aiming to implement the knowledge;
- Aiming to repeat the knowledge;
- For the examination and evaluation of the knowledge;
According to the way of organization the autonomous work is performed:

- By the whole seminar group;
- By part of the group;
- Individually;

Depending on the subject, implementing the organization, we can specify two kinds of autonomous work: organized mainly with the help of the teachers and students’ activity. The organization stage of the independent work can be: high, average, low.

The autonomous work is performed over a particular study material. It can be:

- Scientific literature, normative documents, works of outstanding scientists, archive material, etc.;
- Processes and phenomena from the reality;
- Didactic material /tests, problems, flowcharts, tables, etc.

The autonomous work can be compulsory or free. In the first case, it comprises specific activities, assigned as tasks by the teacher, who will also check the results. In the second case, the Student is freer and according to his interests and capabilities can express more initiative and creativity. A similar character possesses the autonomous work, connected with the study literature beyond the compulsory one, the participation in study circles, etc.

The independent work can cover different stages of consciousness and self-dependence. It can be implemented using a high, average or low degree of consciousness and self-dependence.

3. Planning and organization of the independent training

One of the main conditions for an effective independent training beyond the study material is the correct solution of the problems, connected with the planning and the organization of the autonomous training of the Cadets. It’s imposed by the fact, that about 1/3 of the distribution of the studying time belongs to the autonomous training. Independent of that, the autonomous training still represents the most poorly managed sphere of the study process. That is why at first place comes the task of improving the planning, the organization and management of such kind of educational activity. For the planning, we must pay attention to the specificity of the study discipline and the educational content and to the capabilities of the Students. The autonomous training under the conditions of the National Military University must be reasonably planned, covering the university term or the month and, if needed, to be elaborated in details for every week and day. By means of such planning, the problem of the reverse connection between the Cadets and the departments, and between the departments and the Commanders, is better solved. The presence of a reverse connection between the departments and the commanders allows distributing correctly the general budget of time for autonomous training in such way, as to provide equal conditions for the study of every subject from the curriculum. It’s necessary on one side, that the commanders and the departments participate in the planning and organization of the independent work, and on the other side – the Cadets. The correct planning of the autonomous training is possible only based on particular norms, which are considering the difficulty of all kinds of autonomous activities, performed by the Cadets. The availability of such norms allows to control the distribution of the time limit for autonomous training of the studied subjects and to ensure the uniform load of the cadets during the study year.

The methodology for the planning of the autonomous work can comprise the following basic stages:

- Determination of the total time budget of the Cadets and of the time, needed for the autonomous training;
- Determination of the needed time for the execution of all sorts of learning activities according to the studied subjects;
- Comparison of the average needed time with the available time for autonomous training;
- Determination of the needed time for autonomous training for every studied subject, taking into consideration its difficulty and the relative share in the training system of the military specialist;
- Distribution of the time budget for autonomous training between the learnt subjects;
• Elaboration of documents, needed for the planning of the autonomous training of the Cadets;
• Investigation of the opinion of the Cadets, of the teachers and of the commanders, aiming to improve further the planning of the autonomous training;

The needed time for autonomous training for any study subject has been embedded in the curriculum of each particular military specialization and can be defined with the help of the following formula (2004; 2009):

$$ST = IW + WT$$

Where:
- \(ST\) – hours for self-training;
- \(IW\) – hours for independent work;
- \(IW = 0.67 \times AT\);
- \(WT\) – hours for work with teachers (consultations);
- \(WT = 0.1 \times AT\)
- \(AT\) – hours for training in the auditorium
- \(AT = L + E\)
- \(L\) – Lectures;
- \(E\) – Exercises

With such formulation of the problem, it’s absolutely reasonable to put the question about the position and the role of the departments and of the teachers in the planning, organization and management of the autonomous training of the Cadets. Taking into consideration the time for autonomous training and the curriculum, the teachers from the departments elaborate basic source data for each month of the semester. They are needed for the elaboration of the monthly curricula of the classes and for autonomous training. The teachers from the departments are obliged to supervise the correct spending of time on autonomous training and the compliance between planning and the actually spent time. Information about this comes in the Department and in the University Management, and based on it timely measures are implemented for the improvement of the organization of the autonomous training.

The organization of the autonomous training consists in the securing of a duly beginning and end of the autonomous training, of its effective planning and ceaseless management, in other words the work with teachers and conduct of consultations. One of the major tasks is the summarizing of data about the disturbance of the Cadets autonomous training and engaging them in other activities and the taking of measures for the maximal restriction of malpractices. Here are being solved also the problems of providing literature, illustrative tools and equipment to the Cadets.

It’s reasonable to keep the reporting of the autonomous training in a system of Management of the Education Quality.

3.1. Consultations with the teachers

As an organization form of education at “Vasil Levski” National Military University, the consultations perform foremost cognitive, organization-methodology and controlling functions (Mitkov, 1980; Tsekov, 1992).

The consultations are conducted by the teachers during the hours for autonomous training and are aimed at clearing the questions, emerged while studying the educational material, at deepening and assimilating the knowledge about the specific questions, at rendering of a methodological assistance to the Cadets for their autonomous training and checking the assimilation of the studied material.

According to their form, the consultations can be: consultations of the whole student’s flow, of the seminar group and individual, while according to their contents – introductory, topical and pre-examination.

The introductory consultation is reasonable to be conducted with the whole flow at the beginning of the lecture course. It performs a methodology function. General instruction for the organization of the educational process, of its forms, of the used ways, also some more particular requirements are given, also some problems and difficulties, encountered by the students during the previous years are being stated. During similar consultations the education and the scientific literature is listed. The introductory consultation mobilizes the students they receive
a clear idea of the forthcoming tasks and the means of their solution, entering the study process of the particular subject.

The topical consultations are conducted with the whole flow, with a separate seminar group, with a number of students or individually. They perform organization-methodological or controlling functions. The controlling function is implemented only individually or with a small group. The aim of such kind of consultations is to conduct successfully the training for a specific topic or group of topics. A number of instructions for the conduct of the autonomous training and the seminar are given during them.

The pre-examination consultations implement foremost a cognitive function. They perform also an organization-methodology function, when a new form of examination lies ahead to be used. In this case, specific instructions ought to be given. The pre-examination consultations are performed mainly with the whole flow or with the semester group at the end of the semester. Its basic goals are (Terziev and Kanev, 2019; Terziev, 2019a; Terziev and Solovev, 2020; 2020a):

- To eliminate the cognitive difficulties, encountered by the students during their self-preparation for the examination. The experience shows, that, for the correct implementation of this goal it’s necessary to assign personal tasks for studying the literature covering one or several questions from the synopsis. The distributing is done such way, as to leave no one from the students unengaged and no question from the synopsis unexamined;
- To provide the Students the methodology instructions, connected with the conduct and preparation for the examination and their autonomous work;
- To make the students familiar with the questions of organization and technical character – general instructions about attending the examination by the Cadets, needed aids, examination procedure, etc.

The introductory, topical and pre-examination consultations must be obligatory conducted by every teacher. They secure the complete educational process.

The individual consultations are conducted on specified by the teacher days and hours at a specified by him/her place. They have cognitive, methodology and controlling functions. Often, during the conversation with the teacher, an atmosphere of trust emerges and educative functions are being implemented. The teacher has the opportunity to exercise educative influence on the Cadets, meanwhile getting to know their individuality: interests, desires, relation to the elements of the study process, their temperament, etc. The individual consultations are important means of becoming acquainted with the students, what is necessary to every teacher. The educative influence of such kind of consultations can be exercised not only during the discussion of particular problems, but also during a freer conversation. Such conversations often create a strong bond between the teachers and the Cadet and leave durable traces in the Student’s consciousness.

The individual consultations can possess a voluntary or obligatory character. In the first case, the Students attend them on their own desire and put the corresponding questions. The practice shows, that similar consultations are hold with the most active students and represent a relatively rare situation. That’s why most teachers invite to their consultations the less active students and those, who prepare themselves unsatisfying. In this case, also the controlling function of the consultation is being implemented. It can be by means of a talk, verification of the synopses and of the individually assigned tasks. If such consultations were conducted already at the beginning of the study process, then a careless attitude of part of the Cadets could be eliminated to a big extent. The individual consultations are an effective form of rendering assistance by writing of paper or report, solving a situational task, preparation to oppose, reviewing, discussion, etc.

In order to achieve their goals, the individual consultations must be conducted in a relaxed and predisposing environment and using an experienced pedagogical tact on the part of the teacher. If these conditions are not present, the voluntary character of the consultations will be reduced to zero, on the contrary to the forced consultations. The sarcastic remarks, the condescending or ironic tone of the voice, the nervousness, the behaviour of the kind: “Don’t bother me with stupidities, I have important thing ahead of me!”; the phone-calls and other similar activities are impermissible.

The practice shows, that the consultations are attended mainly by systematically studying students. The rest, who are using only their notes, written down at the lectures and rely on their preparation on the eve of the examination, don’t have question, regarding the theoretical material. Usually the students request consultations during the elaboration of coursework or projects and only at the end of the semester concerning theoretical questions. The
poor cadets, evaluated by the results of the flowing control, avoid requesting consultations from the teacher. For that reasons, also compulsory consultation are being stipulated, which are conducted at a fixed by the teacher time during the self-preparation.

It’s perceived, that the cadets ask questions during the consultations and the teachers give them their answers. In most cases it’s accepted, that the answer should be complete and detailed. Although it’s necessary to state, that there is a bigger advantage, when instructions are given, regarding finding the answers in the literature, because the knowledge, obtained unaided, is more profound and long-lasting. That’s why the teachers quote the pages and paragraphs from the textbook, which ought to be studied, and then they give the necessary explanations (Kyriakopoulos et al. 2020b; Solovev et al. 2020c).

The experience shows that the time needed for consultations usually amounts 2-5% of the time, foreseen for the study of the particular subject.

4. Conclusion

The learning process, as a relatively independent system, succumbs to management and the The training in the military specialization “Organization and management of the tactical military units” is not limited within the transmitting of knowledge, but also in the development of capabilities to implement creatively this knowledge on a practical level. That’s why at “Vasil Levski” National Military University a big part of the educational time is earmarked for practical forms of study, i.e. attention is focused mainly on the creative work of the Cadets (Glushkov, Simeonov, and Georgiev, 2018).

Under the conditions of the dynamic security environment and the connected with it new methods of warfare and new defensive products, there is no Department, which is able to secure the Students such an amount of knowledge, which would be sufficient for the entire period of his service in the Army. Each officer, after his/her graduation from the National Military University is obliged to enrich and to restore his/her knowledge by means of a continuous self-education. For this reason, the assimilation of capabilities and habits for autonomous training represents a necessary precondition for the high quality mastering of the educational program and for the successful implementation of his/her official duties in the military units.

References


The Crisis Unit Created in Premiere in the Institute of Mother and Child of Moldova

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Abstract
The COVID-19 pandemic is considered a major global problem, which is also affecting the national level. Thus, this article substantiates the need for efficient management as well as the undertaking of prompt response measures to the COVID-19 outbreak within the IMSP Mother and Child Institute. The aim of the paper is to highlight the strengths and weaknesses, but also the threats and opportunities of creating a crisis cell in republican medical institutions. So, the basic objective is the activity of the crisis cell within the IMSP Mother and Child Institute. The main results obtained from the investigations are to provide a comprehensive diagnosis of the management of the activity in the epidemiological situation and to provide useful practical recommendations for republican medical institutions in the Republic of Moldova.

Keywords: Crisis management, crisis, pandemic, crisis unit, internal audit, emerging risks.

1. Introduction
The topicality of the study derives from the pandemic situation that the whole world is facing, but also the Republic of Moldova. The crises caused by COVID-19 have required strict measures to manage the pandemic in the country and in medical institutions. Therefore, being in such situations for the first time, it was necessary to make considerable physical and intellectual efforts in order to manage the pandemic correctly and quickly. The COVID-19 pandemic has virtually disrupted the normal operation of all systems, processes and activities. Therefore, the research problem is represented by the body that ensures the collaboration between all the structures involved in the crisis management At the same time, the measures taken by the IMSP Institute of Mother and Child in order to manage the pandemic situation also require increased attention. Currently, the issue addressed is at the early stage of research, given that humanity has never faced such a pandemic. Which motivated the author to do such a research for the first time, in order to highlight the positive but also negative aspects in the management of the response measures to the COVID-19 outbreak at the level of the republican medical institution Mother and Child Institute.

2. Data sources and methods used
As sources of information, the author used the statistical data of the World Health Organization, the Ministry of Health, Labor and Social Protection, the National Agency for Public Health, etc. In the paper the author used the classical methods of analysis and synthesis, induction and deduction, history and logic, as well as comparative and systemic analysis, as well as a contemporary approach to the trends of the COVID-19 pandemic.

3. Analysis and interpretation of results.
According to Romanian language dictionaries, the crisis unit is a working group organized at ministries in case of crisis caused by wars, strikes, etc. [1].
According to the French crisis management system, its basic element is the crisis unit, with the following responsibilities [2]:
   a) defining the crisis management strategy that may occur in the area of responsibility;
   b) strategic level decisions making;
   c) coordinating actions in all phases of a crisis;
d) ensuring the exchange of information and communication between all "actors" involved.

The crisis unit is an official body, a state authority and is responsible for achieving the following goals [2]:

- limiting the effects generated by crises in the area of responsibility;
- efficient use of available forces and means;
- ensuring a working climate characterized by trust and transparency.

In the Republic of Moldova, the crisis unit in the health care system is an innovative element, which for the first time was implemented within the IMSP Mother and Child Institute. The need to create a crisis unit is based on several criteria, and namely:

1) the epidemiological situation and the spread of the infection globally and nationally;
2) the need to implement measures to prevent and control COVID-19 infection;
3) implementation of the provisions of the International Sanitary Regulations (2005);
4) the recommendations of the World Health Organization;
5) the recommendations of the Ministry of Health, Labor and Social Protection;
6) effective response measures to the COVID-19 outbreak within the IMSP Mother and Child Institute.

It should be mentioned that managing the activity of the medical institution during a pandemic is an extremely big challenge for both decision makers and its employees. The crisis unit within the Mother and Child Institute was created to manage the COVID-19 pandemic within the institution. The existence of this organism, which is meant to react quickly to the prevention and control of infection, is due to the efforts of the management to ensure the management of the crisis in optimal, efficient and timely conditions. The creation of the unit was formed by order of the head of the institution and coordinated with the board of directors of the Mother and Child Institute. We draw attention to the fact that at present, the crisis unit has a poorly defined structure and composition, which entails the updating of the order approving the composition.

The crisis unit must have a flexible structure and composition and adaptable to different scenarios/situations complex or particularly complex and with a high level of risk. Once the unit body is activated by order of the head of the medical institution, it becomes functional 24/7, until the crisis situation diminishes. In our opinion, the good practices within the IMSP Mother and Child Institute must be extended and implemented at the level of all republican medical institutions, in order to ensure the institutions but also the leaders with decisional support in crisis situations.

In the context of those reflected, we further present the most optimal variant of the crisis unit structure of republican tertiary level medical institutions, which will respect the interests of different categories of society, and can be represented as follows (Table 1).
Table 1. Comparison of the existing and proposed structure of the IMSP crisis unit of the Mother and Child Institute

<table>
<thead>
<tr>
<th>Crisis unit structure of the MCI (according to the director's order)</th>
<th>Crisis unit structure of the MCI (proposed project)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit President</strong> (Director of the Institution)</td>
<td><strong>Unit President</strong> (Director of the Institution)</td>
</tr>
<tr>
<td>Coordinator, vice-president of the unit (deputy director of the institution)</td>
<td><strong>Vice President of the unit</strong> (Deputy Director of Research, Technology Transfer, Innovation)</td>
</tr>
<tr>
<td><strong>Member</strong> (deputy director of the clinic)</td>
<td><strong>Unit coordinator</strong> (deputy director of the institution)</td>
</tr>
<tr>
<td><strong>Member</strong> (Head of Anesthesia and Intensive Care)</td>
<td><strong>Member</strong> (heads of departments)</td>
</tr>
<tr>
<td><strong>Member</strong> (head of the control service, infections and nosocomial diseases)</td>
<td><strong>Member</strong> (head of the control service, infections and nosocomial diseases)</td>
</tr>
<tr>
<td><strong>Member</strong> (head of pharmacy)</td>
<td><strong>Member</strong> (head of pharmacy)</td>
</tr>
<tr>
<td><strong>Member</strong> (Head of Heritage Development, Infrastructure and Management)</td>
<td><strong>Member</strong> (Heads of Administrative/Support Services: Economy, Finance and Investment, Public Procurement, Internal Audit, Human Resources, Information Technology)</td>
</tr>
<tr>
<td><strong>Member</strong> (head of household)</td>
<td><strong>The secretary of the crisis unit</strong></td>
</tr>
</tbody>
</table>

**Source:** elaborated by the author

The implementation of the changes in the structure of the crisis unit, proposed by us, within the republican medical institutions will allow the significant improvement of the process of managing the measures to respond to pandemics or other exceptional situations. If necessary, other specialists from inside / outside of the institution can be trained in the activity of the unit, necessary for the management of the exceptional situation (crisis / potential crisis). It is very important that in these situations the internal audit is involved as a support in the proper functioning of the crisis unit. The internal audit has a significant role, because it is the one that knows best the specifics, objectives and activities of the institution.

If we refer to the basic attributions of the crisis unit established by the order of the head of the Mother and Child Institute, then we mention [3]:

- elaboration of the action plan for the management of the response measures to the COVID-19 outbreak within the IMSP Mother and Child Institute;
- ensuring increased vigilance of medical staff for the early detection of potential patients based on clinical data and epidemiological history (visits in the last 14 days to countries with extensive local community transmission and areas affected by COVID-19);
- identification of the resources (human resources, logistics, information, etc.) necessary to ensure the continuity of the activity of these hospital services;
- informing the IMSP staff of the Mother and Child Institute with the functional obligations and responsibilities for the management of COVID-19 patients, in accordance with the work plan in crisis situations;
- ensuring the communication of appropriate staff and stakeholders of all decisions on patient care priorities, i.e. clinical triage (e.g. adjusted hospitalization and discharge criteria), infection prevention and infection control measures, and disease management strategies and measures epidemic;
- drawing up an updated list of essential equipment, materials and medicines, creating mechanisms for the timely detection of a foreseeable deficit and ordering another batch;
calculating the needs for basic equipment, materials and medicines (daily, weekly, monthly needs) in the most likely outbreak scenario.

In the context of what is reported, we propose to replace the attributions of the crisis unit within the republican medical institution according to the French model, namely:

a) determining the crisis management strategy that may occur;
b) decision making at the strategic level;
c) coordinating actions / measures at all stages of a crisis;
d) identification, assessment, response and monitoring / reporting of all types of risks and factors that may arise;
e) ensuring the exchange of information and communication between all "actors" involved.

Therefore, the creation of the crisis unit is seen as a strong moment in the process of pandemic management within the institution. Next, the author will perform the SWOT analysis of the crisis unit, in order to reflect the strengths and weaknesses, as well as the opportunities and risks in the implementation of the respective body within the IMSP Mother and Child Institute.

**Figure 1. Crisis unit SWOT analysis**

<table>
<thead>
<tr>
<th>S (strengths)</th>
<th>W (weaknesses)</th>
<th>O (opportunities)</th>
<th>T (threats)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Decision support body</td>
<td>• Lack of normative regulations</td>
<td>• Regulation of crisis cell activity</td>
<td>• Insufficient managerial skills and abilities at the cell level</td>
</tr>
<tr>
<td>• Formed by the specialists of the institution</td>
<td>• Duplication of some functions and omission of others in the composition of the cell</td>
<td>• Strengthening the link of the institutional crisis cell with the national cell</td>
<td>• Lack of documentation on the activity of the crisis unit</td>
</tr>
<tr>
<td>• Technical support for crisis management</td>
<td>• The employees of the institution do not know about the existence of the crisis cell</td>
<td>• Training of crisis management experts</td>
<td>• Insufficient and poor quality reporting of crisis unit activity</td>
</tr>
<tr>
<td>• Exchange of information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Pandemic management</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** elaborated by the author

Because, this is the first time that the republican medical institutional level has created the crisis unit some information is required.

The created crisis unit within the Institute of Mother and Child carried out its activity based on an IMSP response plan for outbreak conditions with the new type of coronavirus COVID-19, which includes seven chapters with planned measures, terms of achievement, responsible persons and responsible for enforcement control. According to the business plan, the crisis unit focused on the following basic directions, namely:
We consider it appropriate that after each activity of the crisis unit a retrospective analysis of the measures / actions taken to be performed, and the decisions taken to be part of the general / operational procedures of the institution, which will allow the formation of institutional memory, indispensable for future work of the medical institution. It is also important to activate risk management in exceptional periods, which will ensure the elimination or estimation of possible unpleasant events for the institution.

Another important aspect approached by the author, is related to the stimulation of the personnel trained in the functioning of the crisis unit. Although, it is an extremely sensitive subject, financial stimulation can take place, but in exceptional situations and based on good practices, we consider that it is not the case that the people who form the crisis unit not to be remunerated.

4. Conclusions and recommendations

In conclusion, we mention that the creation of the crisis unit was a correct and efficient management decision, because during the state of emergency it was possible to properly manage the institutional activity, as well as pandemic response measures.

In the context of what is reported, the author proposes:

1. Creating the crisis unit in the health system, both at national level and at the level of republican medical institutions, in order to ensure inter-institutional communication.

2. The regulation of the crisis cell organism, so that it is possible to legislate it as well as to offer several attributions during the exceptional states.

3. Description of the procedures regarding: functioning, organization, reporting but also the stimulation of the factors involved in the crisis cell.

4. Creating adequate and efficient mechanisms for the functioning of the crisis unit.

5. The composition of the crisis unit should be lucrative and ensure coverage with specialists from all fields.

6. Involvement of internal audit in order to provide the support and knowledge necessary for the proper functioning of the crisis unit.

7. Estimation of emerging risks by crisis unit members.

8. Strengthening risk management within medical institutions.

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Ordinul directorului IMSP Institutul Mamei și Copilului nr.29 din 20.03.2020 cu privire la crearea celulei de criză pentru gestionarea măsurilor de răspuns la focarul COVID-19 în cadrul IMSP IMC.

https://dexonline.ro/definitie/Celula%20de%20criza%20
Modelling the Forms of International Scientific and Educational Cooperation

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Abstract
Higher education today is associated with new topics, unthinkable for discussion even a decade ago, related to a new reality in social development that has emerged in the last few years. If so far we have been looking for options on how education can respond to the rapidly evolving high technologies, today we are already looking for opportunities to integrate education into cloud technologies and the creation of artificial intelligence and supercomputers. At first glance, this is a challenge, but seen from the standpoint of the process of consistency and upgrading of knowledge, skills and competencies in recent years, it can be defined as a systematic logical and consistent development. The modernization of higher (and not only higher) education requires a serious rethinking of the models, methods and content of the educational process. The agenda of higher education is related to its technology - digital, remote and information. Universities have well-established procedures and platforms that offer these opportunities and in which it is possible to apply interactive methods of teaching, distance learning and e-learning, with continuous improvement of quality, improvement and adaptation of content and this opportunity existed before our hit the current pandemic by COVID-19. On a limited scale, only where innovations in teaching were at the appropriate level and the motivation to adapt to the new technology was high enough, their implementation took place. These innovations, despite the support of national institutions responsible for the quality of education, were not widespread. The challenges of these organizational models are serious and range between technical, technological equipment, infrastructure and training of teachers and students - some to teach, others to learn by these methods.

Keywords: Education, development, change.

JEL Codes: O10, I20, P00

1. Introduction
The current challenges which education system is facing are inextricably connected to the difficulties of engaging its participants in research and innovation, expanding professional and competence tools, developing forms of partnership cooperation at the interregional and international levels. Universities are the main generator of innovative ideas. One of the biggest issues in the process of creating innovations is the low level of their commercialization. The issues that have arisen in the education system related to the digital transformation of the economy and the labour market, the development of remote working, teachers’ resistance to using digital technologies, limited state funding and the impossibility of implementing global mobility require the initiation of new and further development of existing partnerships. This will be beneficial to all parties to such cooperation, ensuring the pooling of intellectual, investment, material and technical resources.

2. Change in the education system
Pooling the resources of educational organizations results in new opportunities targeted at generating joint innovative ideas, obtaining additional sources of funding, developing new and strengthening existing project teams, sharing elements of the material and technical infrastructure and other ways of interaction. However, in this
case pooling the resources of only educational organizations themselves is not enough, since the final product must be delivered to the recipient. This, in its turn, requires attracting investors in order to raise the necessary financial resources for carrying out procurement operations, real economy organizations and business to create actual product requests and authorities to assess the priority and the need of specific market segmentation for the region (country) (Klimuk, & Lazdins, 2019a; Pecherskaya, Klimuk, & Tarasova, 2019b).

Therefore, the main challenge for most national economies, including the Republic of Belarus, is the need to harmonize the interactions between participants of scientific and innovation systems, economic entities and businesses, government bodies in regions and countries (Fig. 1).

Figure 1: Model of the effectiveness of scientific and innovation infrastructure

Source: Authors

In the current crisis situation caused by the coronavirus pandemic, the pooling of the resources of organizations on an international level of cooperation contributes to the current direction of development of educational organizations and increase in the innovation potential of regions and countries. The step-by-step process of transforming an idea into a finished product sold on the market (Fig. 2) requires the involvement of interested partners.
International (including interregional) cooperation between universities and organizations is a mean for:

- scaling the research, innovation and educational activity results with their further commercialization;
- participating in international scientific and educational projects;
- introducing a university on new foreign educational markets;
- creating an international scientific and educational alliances (theme-based).

Higher education institution ‘Baranovichi state university’ is implementing an efficient model of interaction in the form of interregional scientific and education ecosystem, tested together with Russian educational partner organization (Fig. 3).

Such an ecosystem combines in itself:

- Organizations that:
  - perform educating functions (managers);
  - carry out research and innovation (generators);
  - ensure investment incentives for research projects (investors);
  - contribute to the validation and implementation of the obtained results into practice (experts);
  - contribute to the promotion of well-developed and well-founded initiatives in the regional (national) socio-economic system (coordinators).
- Consumers (beneficiaries, buyers);
- Communication channels between organizations and consumers;
- Mechanisms of effective interaction between organizations and consumers in order to assess the socio-economic impact.
The Baranovichi state university has agreements in the field of education and science with more than 140 scientific and academic institutions from all over the world, 55 of which are with the Russian federation and 4 – with the Republic of Bulgaria.

Long-term effective cooperation with partners made it possible to create a foundation for joint research, innovation developments in certain fields, joint educational and cultural projects. Based on the experience of such cooperation, in 2020 Baranovichi state university initiated the process of validation of the model of an international independent scientific and education ecosystem.

The ecosystem functioning concept is represented by the following algorithm:

- Analysis of research, innovation, intellectual, material and technical potential of your organization. Identification of strengths and weaknesses (SWOT analysis matrix);
- Development of a base of potential and selection of real participants (based on the experience of successful cooperation, prioritization of activities, uniqueness of available resources);
- Development of a “roadmap” for ecosystem partners interaction with a description of the mechanisms of such collaboration (detailed description of requests, description of intermediate and final results);
- Presentation and promotion of the obtained results of partners’ cooperation to the market or other practical fields.

**Figure 3:** Interregional scientific and education ecosystem (basic model)
In 2020 the Baranovichi state university began functioning within the ecosystem (Belarus-Russia vector) that includes:

- 9 active partners in the field of research;
- 3 partners of credit and financial sector;
- more than 20 potential investors from small, medium and large business (Table1).

Table 1. Matrix of interaction of Baranovichi state university with the main partners of the ecosystem (results of 2020): Belarus-Russia vector

<table>
<thead>
<tr>
<th>Scientific and research partners</th>
<th>Scientific and research partners</th>
<th>Development (implementation) of joint scientific projects (0.25 point)</th>
<th>Development (implementation) of joint academic programmes (projects) (0.15 point)</th>
<th>Internships, invitations of leading foreign experts (0.15 point)</th>
<th>Joint scientific centres (laboratories) (0.25 point)</th>
<th>Points total</th>
</tr>
</thead>
<tbody>
<tr>
<td>University No.1</td>
<td></td>
<td>2 projects</td>
<td>academic programmes (short-term)</td>
<td>1 internship, 1 foreign visit</td>
<td>-</td>
<td>1.9</td>
</tr>
<tr>
<td>University No.2</td>
<td></td>
<td>2 projects</td>
<td>academic programmes (short-term)</td>
<td>1 foreign visit</td>
<td>Joint centre for youth initiatives</td>
<td>2.2</td>
</tr>
<tr>
<td>University No.3</td>
<td></td>
<td>2 projects</td>
<td>academic programme (short-term)</td>
<td>1 internship</td>
<td>-</td>
<td>1.4</td>
</tr>
<tr>
<td>University No.4</td>
<td></td>
<td>1 project</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.05</td>
</tr>
<tr>
<td>University No.5</td>
<td></td>
<td>3 projects</td>
<td>academic programmes (short-term)</td>
<td>1 internship</td>
<td>Joint start-up design centre</td>
<td>2.45</td>
</tr>
<tr>
<td>University No.6</td>
<td></td>
<td>1 project</td>
<td>-</td>
<td>1 internship</td>
<td>-</td>
<td>1.2</td>
</tr>
<tr>
<td>University No.7</td>
<td></td>
<td>1 project</td>
<td>academic programme (short-term)</td>
<td>2 internships, 1 visit</td>
<td>-</td>
<td>1.5</td>
</tr>
<tr>
<td>University No.8</td>
<td></td>
<td>2 projects</td>
<td>academic programmes (short-term)</td>
<td>2 internships, 2 visits</td>
<td>-</td>
<td>2.2</td>
</tr>
<tr>
<td>University No.9</td>
<td></td>
<td>1 project</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.85</td>
</tr>
<tr>
<td>University No.10</td>
<td></td>
<td>1 project</td>
<td>academic programmes (short-term)</td>
<td>1 visit</td>
<td>Joint laboratory for pedagogical and psychological research</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Source: Authors
3. Conclusion

This matrix helps quickly identify “problematic” partners and develop a set of measures in the form of a corrective “roadmap” to enhance cooperation. In the given example, the partners of Baranovichi state university (Vologda State University and Vladivostok State University of Economics and Service) were in a risk zone because the contractual relations were concluded only in 2020.

In 2020 Baranovichi state university entered into cooperation agreements with Bulgarian organizations, which laid the foundation for the development of a concept of the scientific and educational Belarus-Bulgaria ecosystem, which includes the following partners:

Education institution ‘Baranovichi State University’; Prof. Asen Diamandiev Academy of Music, Dance and Fine Arts; Lyuben Karavelov Regional Library; Kaneff University Hospital (Terziev, Andreeva, Georgiev & Klimuk, 2020a; 2020b; Terziev, Georgiev & Klimuk, 2020c; Ivanov, 2020d).

Thus, the development of a model of the scientific and education ecosystem makes it possible to engage as efficiently as possible the research, innovation and infrastructural potential of educational and scientific organizations, to involve external partners (potential investors, associates), including government authorities and public organizations at the planning stage of intermediate and final goals. At the same time, the process of interaction should be represented by an expanded range of forms and means of relationships between partners and beneficiaries, which will contribute to the development of innovations in regions (countries), initiating a new stage in the development of society.

References


Directions for Modernization of Innovative Youth Startup Design in Belarus

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Abstract
Technology and change have a great impact on every aspect of life, including education. Educational institutions are undoubtedly an important part of this whole process. Educational institutions are facing major cultural, demographic and, above all, technological changes. Today, teachers are facing new ways of teaching in the digital age that effectively incorporate technology into the educational environment. The authors of this article discuss the issue of change management, learning in the digital age and its impact on educational practices and experiences. In this context, the method of content analysis of relevant documents is applied, as well as the results of previous theoretical and empirical research of many scientists and researchers in this field. The conclusions reached are an appropriate starting point for future action in the framework of educational activities, policies and perspectives.

Higher education in its system has always developed in different areas of science and has made changes that are aimed at training professionals in relevant areas of our economy. With different structures, but subject to foundations that provide sustainability and conditions for innovations that update it to be useful to society. Education has always required a lot - to provide specialists for various positions in industry and all economic fields, to be a good basis for research and research, to provide personal development mainly to young people, but also without age restrictions, especially in the last years of his career. To a greater or lesser degree, the correspondence between supply and needs is ensured both by the quality of the process itself and by the quantity of the offered educational service.

Keywords: Modernization, innovative, education.

JEL Codes: I20, P00, O10

1. Introduction
The growing demands of buyers, the changing processes of globalization of certain industries, the search for effective mechanisms for the development and growth of competitiveness make it necessary to build a new, improved model of the socioeconomic system. The government of the Republic of Belarus has focused on the development of scientific and innovative potential and the creation of an effective infrastructure that contributes to this process.

2. Development of innovative youth entrepreneurship: the experience of Belarus
The process of regulating innovation depends on an appropriate legislative framework that creates the institutional basis for the development of state innovation policy. At the same time, regional support of this policy is of particular importance. The legal base that regulates the activity of the participants of innovative entrepreneurship is represented by legislative acts; Government decrees in the Republic of Belarus; normative legal acts of the State Committee for Science and Technology of the Republic of Belarus, other state bodies and organizations subordinated to the Government of the Republic of Belarus and the National Academy of Sciences of Belarus.
Here are the main ones:

- **Law of the Republic of Belarus No. 425-3 dated July 10, 2012 (as amended on May 11, 2016 No. 364-3)** “On the state innovation policy and innovation activities in the Republic of Belarus”, aimed at determining the legal and organizational foundations of the state innovation policy and innovation activities in the Republic of Belarus. The law provided a legal basis to stimulate innovation and laid the foundations for the development of public-private partnerships in the field of research and innovation;

- **Decree of the President of the Republic of Belarus No. 1 dated January 3, 2007** “On approval of the Regulation about the procedure for creating subjects of innovation infra-structure”. The decree defines the procedure for registration (extension of the registration period) of legal entities as subjects of innovation infrastructure, acquisition by legal entities and individual entrepreneurs of the status of a science and technology park resident (hereinafter – a “technopark”) and deprivation (loss) of such statuses (Klimuk & Lazdins, 2019а).

- **Decree of the President of the Republic of Belarus No. 229 dated May 20, 2013** “On some measures to stimulate the implementation of innovation projects.” The decree defines the mechanism of state support for the implementation of innovation projects by small businesses;

- **Decree of the President of the Republic of Belarus No. 31 dated January 31, 2017 (revised on 25/07/2017 No. 258; dated 30/11/2017 No. 428; dated 13/06/2018 No. 236)** “On the State Programme for Innovation Development of the Republic of Belarus for 2016-2020”. The state programme is aimed at achieving the priorities of the socio-economic development of the Republic of Belarus for 2016-2020 in the field of effective investments and accelerated development of innovation sectors of the economy and is the basic document ensuring the implementation of the most important directions of the state innovation policy.

The analysis of the legal base allowed us to conclude that there are institutional prerequisites for the implementation of regional innovation strategies of the Republic of Belarus, aimed at stimulating the innovative entrepreneurs.


The annual growth dynamics of the presented indicators reflects the gradual transition of the Republic of Belarus to the digital economy model (Fig. 1-2) (Terziev & Klimuk, 2021).

**Figure 1.** Dynamics of specific indicators of digital economy development in the Republic of Belarus for 2011-2017, %

![Graph](image)

**Source:** Authors
In order to determine a strategy for development of the country's socio-economic system, it is necessary to determine the trends that have been established during this period and will be relevant in the near future. Amongst these trends we shall outline the current tendencies, already established in time, together with their innovations (Fig. 3) (Terziev & Klimuk, 2021).

**Figure 3.** Trends in socio-economic systems of states

**Source:** Authors
With a limited amount of financial, intellectual and technological resources at their disposal, educational and scientific organizations at the current stage of socio-economic development have to independently implement projects, primarily practical ones, in order to make profit. Achieving this goal is possible through scientific and technological cooperation with the real sector of the economy.

We have conducted monitoring of the subjects of innovation infrastructure in the Republic of Belarus to identify priority areas of the business sector in the direction of the youth entrepreneurship development. In 2018, a network of innovation infrastructure subjects covered all regional centres and included 24 organizations: 14 science and technology parks (hereinafter referred to as “technoparks”) and 9 technology transfer centres (hereinafter referred to as TTC). The activities of innovation infrastructure entities are governed by the provisions of the Decree of the President of the Republic of Belarus No. 1 dated January 3, 2007 “On approval of the Regulation about the procedure for creating subjects of innovation infrastructure” and the Law of the Republic of Belarus dated July 10, 2012 “On state innovation policy and innovation in the Republic of Belarus”. In 2020, the Republic of Belarus ensured the functioning of 24 subjects of innovation infrastructure, including:

- 14 science and technology parks;
- 9 technology transfer centres;
- Belarusian innovation fund.

The last TTC was created in March 2020 on the basis of the educational institution ‘Baranovichi State University’ as a subject of innovation infrastructure.

Among the main activities of TTC, that are located on the sites of higher education institutions, in the direction of developing entrepreneurial competencies the following ones should be noted:

- Assistance in the transfer of technology, knowledge, skills and methods to the manufacturing and service sectors between universities, enterprises and other organizations;
- Consultancy on innovation projects funding. Consultancy on finding financial sources for innovation activities: innovation projects within the framework of state and regional programmes, innovation funds and others;
- Preparation of project documentation necessary for the implementation of scientific research;
- Assistance in organizing scientific research and others.

Based on the application developed by Klimuk V.V. methods of assessing innovative development (Klimuk, 2015), based on the calculation of dynamic, equity, integrated indices, calculations were performed on the basis of reported data on the results of the work of technology parks and technology transfer centers in Belarus.

According to the formed system of selected for the assessment of socio-economic indicators of economic activity of technology parks and technology transfer centers for 2016-2019 on the basis of the method of Klimuk V.V. the matrix of efficiency of subjects of innovation infrastructure “Dynamics-Excellence” for definition of the most effective period of development of subjects of innovation infrastructure is constructed. The construction of the matrix is based on dynamic and equity indices, which allow interpreting the level of innovative development by the analysed periods. There are 4 quadrants in the presented matrix. According to the results of the research, it should be noted the positive dynamics in 2018 and 2019 of technology parks and technology transfer centers in terms of efficiency of their development (approaching the transition to the 4th quadrant, upper right “Leadership”) (Fig. 4) (Terziev & Klimuk, 2021).
Figure 4. Matrix of innovation activity of Science and technology parks and TTC “Dynamics – Superiority” for 2014-2019

Source: Authors

One of the most important and promising areas for the development of the country's socio-economic potential is innovative youth entrepreneurship with the opportunity to interact with partners, the implementation of tools for innovation activity, the development of the intellectual potential of partners, including on an international scale (Fig. 5).

Figure 5. Innovative youth entrepreneurship development scheme

Source: Authors
3. Conclusion

To conclude, the development of scientific and innovation infrastructure makes it possible to expand technology transfer in the field of innovative youth entrepreneurship in the following areas (Terziev et al. 2020a; Terziev, Georgiev, & Klimuk, 2020b; Terziev & Klimuk, 2020c; Ivanov, 2020d):

Research projects: analysis of innovation development of regions, development of proposals for improving the innovation policy of the region and attracting investments in innovation based on international experience; analysis of the technological needs of organizations in the real sector of the regional economy, development of proposals for expanding the implementation of high technology products in the region; analytical study of the problems and prospects of innovation development of the regions’ peripheral settlements; development of methodological support for forecasting sustainable development of regions (peripheral settlements); development of promising areas of innovation development according to the list of production and technological needs of regional organizations; Scientific and technological projects; Scientific and practical events, development of information and communication platform and other projects.

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Issues of Foreign Investments in Mongolian Economy

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Abstract
The article considers the concept of foreign investment as an important source for overcoming the constraints of Mongolia’s socio-economic development. This is due to the fact that foreign investment is not only a source of finance for the improvement of the economic structure and diversification of the country's exports, but also the source of high technology, best management methods, know-how, and experience. It’s proven that by following foreign investment new technical, technological, and innovative achievements in the industry bring novel technologies and knowledge, best management and marketing methods in production, which help to increase income, consumption of high-quality goods and products, and a positive impact on economic development while also sharply improving knowledge, productivity, and labor skills of the work force. The results of our studies showed that the dominant part of foreign investment is directed to the mining industry, and it has become an important factor in Mongolian economic growth.

Keywords: Mongolia, economic growth, foreign investment, mining development, labor skills etc.

JEL Codes: M21, O11, O15

1. Introduction
Investment in the market economy is determined as profit, income, or stocks, monetary and other properties invested in order to reach a satisfactory outcome made by the owners of the businesses and companies. In other words, it is entrepreneurs’ activities expressed by actual cash value and substantive laws (Laws of Russian Federation, 1999, p.88). In terms of the impact and importance of investment on the economy and social development, Dr. Prof. Tserenpil D. (2006) noted indicators of the investment dynamics is an important macroeconomic measurement that determines the development of the economic and social capacity of any country. For a country with a transitional economy and economic crisis, it is necessary to make the socio-economy stable by recovering and renewing the industrial power and increasing the investment in order to provide it with further growth.

In 2003, Batsaikhan N. stated, foreign direct investment (FDI) is the acquisition of a company's shares by expanding his or her business in another country. Researchers assume that when investors take the management control of an entity, FDI is considered to be made (Batsaikhan, 2003).

An American economist, Joseph Cortright developed “the theory of new growth” in 2001. According to this theory, he explained that it’s possible to increase the efficiency of the country’s economic activities and influence its growth by introducing and acquiring new knowledge, skills, and methods of production management to the labor force. By following foreign investment, new knowledge, and technology foster the ability to compete in the country (Thomas, 2004). A British economist John Dunning proposed a theory about factors that affect making decisions to attract foreign investment. As the researcher has defined, it can’t be an attractive environment for foreign investment if the cost is possible to grow, if there is a lack of guarantee on the transactions of the income profit, if buyers and sellers don’t have any information about a product, if there is non-available information regarding the foreign markets, if there are a lot of commerce difficulties and transportation cost is high in an imperfect market.

The term “The capability to absorb investments” was created by Wesley M.Cohen, Daniel A. Levinthal in 1990. In their joint work “Absorptive Capacity: A New Perspective on Learning and Innovation”, they suggested the theory absorption of investment. Since then, they have been devoting themselves and writing many theoretical and practical papers for the research on the absorption of investments. In their work, they have stated that absorption
of investment is a concept that can be used at the individual, organizational, and national levels. The country’s national absorptive capacity is based on the company’s and organizational absorptive capacities while organizational absorptive capacity depends on individual ability to absorb. The absorptive capacity of foreign direct investment is defined as what it retains from the investment, as well as how it is efficient and sufficient.

Since our research focuses on the Mongolian national economy, including the mining sector regarding foreign investment issues, it does not require much in-depth consideration of the organizational absorptive capacity. In terms of influences of absorptive capacity of foreign investment, they are classified as follows:

1. Technical and technological impact
2. Influence of laborer’s education level
4. The impact of the financial system
5. The system of state institutions

We will examine the workforce in more detail. The labor force is defined as the mental and physical capacity that a person uses in the process of creating an added value. Good skills indicate a high quality of work. In other words, the demand for the labor market will be provided by the supply of good quality labor. Borensztine et al. in their work “How does a foreign direct investment affect economic growth?” reached a more specific conclusion in 1998. They studied the impact of developing countries’ foreign direct investment inflows on growth and found that FDI contributed more to economic growth than other forms of capital, and the level of human capital development in the host country had a greater impact. They believe that the greater the number of professionals with higher education in foreign countries, the greater the positive impact of foreign direct investment.

The government has set up a “Human Development Fund” to distribute the income that was gained from mineral resources equally to its citizens, providing 21000 tugriks per person per month, which has been shown that it increased not only the population’s income and purchasing power, but also resulted in a positive growth of the trade sector. See Figure 1 which demonstrates the growth of the Mongolian economy.

![Figure 1. Trend of annual economic growth of Mongolia (in percent) (2000-2018 years)](source)

Source: Based on researchers’ annual data of National Statistics Office

Figure 1 shows that due to the prices of raw materials in the mining sector falling sharply in the world market since 2012, there was a sharp drop to 1 percent in a short period of time until 2016. However, there has been a slight economic recovery since 2017 due to the increased demand for coal and iron ore in China. Moreover, it’s clear that prices of mining commodities such as gold and copper have risen slightly in the international market. Although our country’s nominal GDP seems to be growing in 2017 and 2018, economic growth is very unstable, and real per capita income is unsteady because of high inflation and the constant depreciation of tugriks.

Following the development of the global mining and manufacturing sector, there was continuous progress in Mongolian foreign direct investment from 2005 to 2011 and reached a peak of $4.5 billion whereas it has been declining sharply since 2013. However, foreign direct investment in the Mongolian economy recovered after 2016 due to a slight recovery in the prices of the international mining market products and the increased demand for imported coal and iron ore from China’s metal industry.
Table 1. Rate of foreign investment in mining and explorations sectors (in million USD)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total rate of foreign direct investment</th>
<th>Geology, exploration, crude oil industry</th>
<th>Total rate of investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>366.5</td>
<td>195.4</td>
<td>53.3</td>
</tr>
<tr>
<td>2007</td>
<td>499.9</td>
<td>336.9</td>
<td>67.4</td>
</tr>
<tr>
<td>2008</td>
<td>708.9</td>
<td>485.1</td>
<td>68.4</td>
</tr>
<tr>
<td>2009</td>
<td>801.1</td>
<td>643.4</td>
<td>80.3</td>
</tr>
<tr>
<td>2010</td>
<td>1025.9</td>
<td>819.7</td>
<td>79.9</td>
</tr>
<tr>
<td>2011</td>
<td>4986.0</td>
<td>4083.2</td>
<td>81.9</td>
</tr>
<tr>
<td>2012</td>
<td>3198.7</td>
<td>2217.9</td>
<td>69.3</td>
</tr>
<tr>
<td>2013</td>
<td>122.5</td>
<td>62.0</td>
<td>50.7</td>
</tr>
<tr>
<td>2014</td>
<td>184.7</td>
<td>76.2</td>
<td>41.2</td>
</tr>
<tr>
<td>2015</td>
<td>197.0</td>
<td>86.8</td>
<td>44.1</td>
</tr>
<tr>
<td>2016</td>
<td>1489.4</td>
<td>905.8</td>
<td>60.8</td>
</tr>
<tr>
<td>2017</td>
<td>2086.5</td>
<td>1442.3</td>
<td>73.2</td>
</tr>
<tr>
<td>2018</td>
<td>2728.6</td>
<td>2130.3</td>
<td>72.0</td>
</tr>
<tr>
<td>2019</td>
<td>2899.7</td>
<td>2197.0</td>
<td>72.5</td>
</tr>
</tbody>
</table>

Source: Foreign Investment Report of the Foreign Investment Division of the National Development Agency of Mongolia, 2018

Table 1 shows that the mining and exploration sector occupies 60-80 percent of the total foreign direct investment in the Mongolian economy from 2006-2019 which indicates the mining and exploration dominate the foreign direct investment. At the same time, there aren’t processing plants other than the ‘Erdenet’ Mining Corporation and ‘Oyu Tolgoi’ LLC. The manufacturing companies export raw materials and minerals to the refineries of the Chinese Republic to be processed at the final stage.

Therefore, it’s necessary to create policy and regulatory mechanisms to influence foreign investment in order to increase the number of processing raw material plants further in the exploration sector and create as much added value in Mongolia as possible. In other words, it’s time to arrange management and regulation in order to increase the return on investment in our country and improve its absorption capacity.

2. Technic and technological impact

When the technological differences were identified according to Lu and Liu’s methods, there were 12 countries that occupy 1 and more percent of the total investment and there were technological differences in Mongolia between 1990 and 2016.
Table 2. The estimations of the technological differences among some investor countries in Mongolia

<table>
<thead>
<tr>
<th>Year</th>
<th>The People’s Republic of China</th>
<th>Canada</th>
<th>Netherlands</th>
<th>South Korea</th>
<th>Japan</th>
<th>Hong Kong</th>
<th>Bermuda</th>
<th>Russian Federation</th>
<th>USA</th>
<th>Singapore</th>
<th>United Kingdom of Great Britain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>0.21</td>
<td>34.73</td>
<td>45.52</td>
<td>20.16</td>
<td>62.76</td>
<td>41.66</td>
<td>74.35</td>
<td>3.58</td>
<td>48.69</td>
<td>43.78</td>
<td>35.21</td>
</tr>
<tr>
<td>1999</td>
<td>0.54</td>
<td>41.27</td>
<td>48.24</td>
<td>21.34</td>
<td>66.2</td>
<td>53.02</td>
<td>93.24</td>
<td>4.47</td>
<td>59.2</td>
<td>51</td>
<td>45.33</td>
</tr>
<tr>
<td>2000</td>
<td>0.73</td>
<td>41.93</td>
<td>53</td>
<td>14.71</td>
<td>63.24</td>
<td>52.7</td>
<td>105.38</td>
<td>2.88</td>
<td>65.71</td>
<td>44.57</td>
<td>51.41</td>
</tr>
<tr>
<td>2001</td>
<td>0.95</td>
<td>47.94</td>
<td>57.77</td>
<td>20.57</td>
<td>76.87</td>
<td>54.79</td>
<td>119.95</td>
<td>2.02</td>
<td>74.24</td>
<td>47.4</td>
<td>56.8</td>
</tr>
<tr>
<td>2002</td>
<td>1.01</td>
<td>49.02</td>
<td>50.34</td>
<td>23.09</td>
<td>77.13</td>
<td>52.87</td>
<td>118.87</td>
<td>2.77</td>
<td>73.48</td>
<td>48.71</td>
<td>52.27</td>
</tr>
<tr>
<td>2003</td>
<td>1</td>
<td>43.18</td>
<td>46.93</td>
<td>19.45</td>
<td>60.82</td>
<td>46.62</td>
<td>111.5</td>
<td>3.03</td>
<td>67.9</td>
<td>39.68</td>
<td>46.76</td>
</tr>
<tr>
<td>2004</td>
<td>1</td>
<td>40.24</td>
<td>46.73</td>
<td>20.29</td>
<td>53.13</td>
<td>41.76</td>
<td>108.98</td>
<td>3.18</td>
<td>63.78</td>
<td>37.21</td>
<td>46.84</td>
</tr>
<tr>
<td>2005</td>
<td>0.98</td>
<td>41.58</td>
<td>50.68</td>
<td>19.95</td>
<td>50.58</td>
<td>35.7</td>
<td>102.01</td>
<td>3.64</td>
<td>58.5</td>
<td>35.32</td>
<td>47.66</td>
</tr>
<tr>
<td>2006</td>
<td>0.88</td>
<td>38.16</td>
<td>46.3</td>
<td>17.98</td>
<td>44.52</td>
<td>29.88</td>
<td>88.03</td>
<td>4.19</td>
<td>49.9</td>
<td>33.15</td>
<td>45.45</td>
</tr>
<tr>
<td>2007</td>
<td>0.75</td>
<td>34.41</td>
<td>38.48</td>
<td>16.71</td>
<td>34.95</td>
<td>25.33</td>
<td>75.93</td>
<td>4.39</td>
<td>41.92</td>
<td>28.67</td>
<td>37.2</td>
</tr>
<tr>
<td>2008</td>
<td>0.57</td>
<td>28.8</td>
<td>30.55</td>
<td>14</td>
<td>24.99</td>
<td>20.08</td>
<td>63.26</td>
<td>4.29</td>
<td>32.99</td>
<td>24.13</td>
<td>29.7</td>
</tr>
<tr>
<td>2009</td>
<td>0.64</td>
<td>25.76</td>
<td>28.6</td>
<td>12.42</td>
<td>20.23</td>
<td>17.53</td>
<td>55.74</td>
<td>4.67</td>
<td>27.75</td>
<td>22.94</td>
<td>27.56</td>
</tr>
<tr>
<td>2010</td>
<td>0.62</td>
<td>20.35</td>
<td>24.19</td>
<td>8.09</td>
<td>17.13</td>
<td>13.64</td>
<td>43.84</td>
<td>4.55</td>
<td>21.28</td>
<td>17.57</td>
<td>19.53</td>
</tr>
<tr>
<td>2011</td>
<td>0.22</td>
<td>22.43</td>
<td>27.44</td>
<td>9.12</td>
<td>22.35</td>
<td>16.68</td>
<td>51.51</td>
<td>4.1</td>
<td>26.07</td>
<td>20.75</td>
<td>19.81</td>
</tr>
<tr>
<td>2013</td>
<td>0.87</td>
<td>17.86</td>
<td>20.25</td>
<td>8.27</td>
<td>18.27</td>
<td>12.45</td>
<td>57.42</td>
<td>3.64</td>
<td>21.54</td>
<td>17.56</td>
<td>15.18</td>
</tr>
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<td>21.56</td>
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<td>12.06</td>
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<td>3.53</td>
<td>21.35</td>
<td>17.34</td>
<td>14.52</td>
</tr>
<tr>
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<td>21.48</td>
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<td>3.68</td>
<td>21.24</td>
<td>18.26</td>
<td>15.18</td>
</tr>
<tr>
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<td>20.57</td>
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<td>19.26</td>
<td>13.25</td>
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<td>3.65</td>
<td>21.35</td>
<td>18.44</td>
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</tr>
<tr>
<td>2018</td>
<td>0.99</td>
<td>17.78</td>
<td>20.21</td>
<td>7.12</td>
<td>19.14</td>
<td>12.35</td>
<td>55.32</td>
<td>3.46</td>
<td>20.54</td>
<td>17.46</td>
<td>14.05</td>
</tr>
</tbody>
</table>

Source: Researchers’ estimated data since 2011

From Table 2, you can see that the Mongolian index of the technological gap is not stable for 20 years. For example, at the beginning of the period, the technological backwardness of the major investor countries was not much greater than China. In the mid of the period, this situation was changing, and it is observed that there was significant technological backwardness in other countries exceptional from China and Russia.

However, since 2008, the technology gap index has been steadily declining. If we see the technological backwardness that was estimated in the table, Louis and Lee’s threshold is above 12.6 which means Mongolia didn’t gain profits completely from foreign direct investment in terms of technological level during the period of 1998-2018. Therefore, it’s required to make some technological advancements in our country in order to gain profit from the inflow.
From the estimation above, it is interesting that the technology gap index mean has been lower than 12.6 comparing to the Republic of Korea since 2009. Technological backwardness is relative understanding and technological advancement is not the same for each sector. For example, new technologies are emerging every six months in IT, but this rate is not so high in some other sectors.

Therefore, it is necessary to study in detail the impact of technology on the investment absorption capacity of Mongolia in some areas.

Depending on the type of mineral resources, the operations of studies, exploring, and applying have been intensified. Due to this, it's possible to increase the ability to absorb the investment by getting the investment from countries that have lower technological gap indices.

The essence of innovative operations is to maximize the economic benefits in social and economic development as a result of the full use of human intellectual resources. The following trends are being revealed from innovative operations.

- The quantity of production and the lifecycle of goods depend on a wide range of scientific and technological knowledge;
- Innovation is growing due to cooperation between manufacturers and scientific organizations;
- The delivery of new technologies, especially the training on organizational management is learned more than the purchase of new equipment.

3. Influence of laborer’s education level

The influence of the laborer’s education level is important for the issues to impact on the absorption capacity of the foreign investment.

**Figure 2.** Employment of foreigners working under contracts with foreign-invested companies in Mongolia by sectors, 2017-2018

![Figure 2: Employment of foreigners working under contracts with foreign-invested companies in Mongolia by sectors, 2017-2018](chart.png)

Source: National Statistics Office

**Figure 2** shows that 4.4 percent of Mongolia's total workforce is employed in the mining sector. This shows that the employment of foreigners in Mongolia is largely in the mining and construction sectors. For example, Oyu Tolgoi LLC has a total of 17,000 employees, of which 10 percent are foreign workers and the remaining 90 percent are locals.

During the research done within the framework of this article, we have conducted some research based on minerals and petroleum information of 120 mining and foreign investment companies for 2012-2018 years. According to the survey, let's look at the information about the employees of the companies included in the sample (Human Resources Database of Minerals and Crude Oil, 2018).
As shown in Figure 3, geologists, mining engineers, finance and economists, and legal professionals are relatively few in number. In addition, the number of legal professionals decreased by 47 in 2017 and 2018 compared to 2016, to 11. This suggests that the mining sector employs more contracted foreign specialists than other sectors, but that there is a shortage of skilled professionals, with fewer Mongolian workers working in jobs that require major skills. Therefore, it is necessary to pay attention to intellectual investment, as it is necessary to train skilled personnel in the field of mining and employ our own Mongolian employees.

4. The impact of the financial system

The instability of Mongolia's financial sector is influenced by external market conditions, macroeconomic, monetary and financial, asset price, private and household financial capacity, banking sector borrowing and solvency risks, and liquidity risks.

<table>
<thead>
<tr>
<th>Table 3. Financial market structure in Mongolia (by percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Nonbanking financial institutions</td>
</tr>
<tr>
<td>Insurance</td>
</tr>
<tr>
<td>Savings and credit cooperatives</td>
</tr>
<tr>
<td>Stock market</td>
</tr>
<tr>
<td>Interbank market</td>
</tr>
</tbody>
</table>


According to Table 3, while 95-96 percent of Mongolia's financial market capitalization is traded in the interbank market, only 0.3 percent of total financial assets are invested in the stock exchange. Since 2005, a number of nonbank financial institutions have emerged and emerged as new competitors in the microfinance market. Nonbank financial institutions account for 2.5-3.0 percent of financial market assets. The insurance sector and savings and credit cooperatives together account for 1.2-1.4 percent. Thus, the banking-dominated financial system makes our country's financial sector vulnerable and makes it impossible to attract the necessary foreign investment to the economy. On the other hand, the relatively small capital of our banks is a condition for large foreign investors to transfer their financial transactions through foreign banks, and foreign investment does not take advantage of the positive impact on Mongolia's macroeconomic balance. On the other hand, there are some inconsistencies in the financial sector, in some cases there occurs conflicts with one another. For example, during the economic crisis, the Ministry of Finance pursued a policy of expanding the economy by increasing public spending, while the central bank pursued a tight monetary policy to reduce the money supply by raising interest rates out of fear of...
rising inflation. This situation surprises foreign investors and makes them doubt the macroeconomic policy of our country.

4. The system of state institutions

The quality of politics and governance has a significant impact on Mongolia’s ability to attract foreign investment. According to our research, the institutional system of our country that manages foreign investment has been developed based on the laws of the Government and its agencies, and their changes in 2016 and 2018.

**Figure 4.** Institutional framework for managing foreign investment in Mongolia
Notes:

1. The subjects of management are shown in black font, and their main function is highlighted in blue.
2. The following lines illustrate the differences in the management functions that interact between subjects and the entity (investors). Here:

   - Management line communication
   - Functional management relationships
   - Action (horizontal cooperation)

As can be seen from this figure, there is no institutional framework for investment management, i.e., the Prime Minister has a strategic investment management function, but there is no specific ministry to implement it. Currently, the Ministry of Finance is responsible for developing macroeconomic policies and investment budgets, while the Ministry of Mining is responsible for implementing mineral and mining, heavy industry, and industrial park policies. Local governments are responsible for attracting, monitoring and supporting investment in the region.

The current National Development Agency, which is seen as playing a key role in investment management and regulation, has no more than an agency-level role in conducting sectoral and cross-sectoral coordination, conducting research and conducting tenders. In other words, there is no government structure to guide investment as a whole. Therefore, the management of foreign investment from a single center, the definition and implementation of government policies as a whole, and the continuity of management are insufficient.

In order to confirm the point of this section, we conducted a survey of 50 experts at the expert level, combining quantitative and qualitative analysis in order to determine the factors and causes that affect the country's foreign investment.

The main purpose of this study was to prove our research results. In this study, 39 professors, 11 experts, mining researchers, engineers, and professionals from the Ministry of Finance, Ministry of Foreign Affairs, Central Bank of Mongolia, Regulatory Agency of Government National Development Agency, National Statistics Office of Mongolia, Ulaanbaatar Chamber of Commerce, Ministry of Justice and Home Affairs, Mongolian Academy of International Trade, Business and Management, University of Finance and Economics, Mongolian University of Science and Technology-School of Business Management and Humanities, National University of Mongolia-Business School and School of Law, Ulaanbaatar Science University were involved.
Table 4. The study of the composition of experts and their capacities

<table>
<thead>
<tr>
<th>Academic degree/ percent</th>
<th>The field of work/ percent</th>
<th>Year of work/ percent</th>
<th>Year/ percent</th>
<th>Qualifications/ percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master</td>
<td>Faculty members and</td>
<td>48.4</td>
<td>10-20</td>
<td>26.7</td>
</tr>
<tr>
<td></td>
<td>researchers of research organizations and universities</td>
<td></td>
<td>21-30</td>
<td>26.7</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>31-40</td>
<td>26.7</td>
</tr>
<tr>
<td>Professional who qualified in state and service organizations</td>
<td></td>
<td></td>
<td>51.6</td>
<td>41-50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Above 50</td>
<td>3.3</td>
</tr>
<tr>
<td>Total percent</td>
<td></td>
<td></td>
<td>Total percent</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Foreign Investment and Management Studies in the Mining Sector. 2020
Table 5. Foreign Investment, experts’ assessment of the current state of its management

<table>
<thead>
<tr>
<th>Main content of questions</th>
<th>Percent of experts’ polls</th>
<th>The general direction of the answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Foreign investors are becoming hesitant due to Mongolia’s unstable and constantly changing legal environment. Do you agree with that?</td>
<td>85.9 %</td>
<td>Agreed</td>
</tr>
<tr>
<td>2. The banking and financial system cannot impact economic development positively. In other words, it demonstrates that conditions to improve the benefits of foreign investment and absorption capacity cannot be created.</td>
<td>80.6%</td>
<td>Agreed</td>
</tr>
<tr>
<td>3. The instability of the political condition is one of the main obstacles to attract foreign investment.</td>
<td>93.6%</td>
<td>Agreed</td>
</tr>
<tr>
<td>4. Is it necessary to attract FDI to sectors other than mineral exploration and mining, to set quotas for natural resource-seeking sectors, including the mining sector, or to reconsider the current preferential terms?</td>
<td>77.4 %</td>
<td>Make a solution based on the research results</td>
</tr>
<tr>
<td>5. The instability of the national currency makes our economy increasingly dependent on foreign markets, which in turn hinders FDI.</td>
<td>90.6%</td>
<td>Agreed</td>
</tr>
<tr>
<td>6. How does the current dominance of the mining sector fit into the future development of our country?</td>
<td>74.2 %</td>
<td>They didn’t agree, but the government needs to have the policy to develop the processing sector and other sectors based on this.</td>
</tr>
<tr>
<td>7. Despite the advantages of natural resources and the rate of taxes, it is argued that the mining sector will not be able to attract investment without providing other factors, such as poor mining education of the workforce, governance, the political situation, and the absence of corruption.</td>
<td>84%</td>
<td>Not created</td>
</tr>
<tr>
<td>At the government policy level, investors are required to empower national workers, specialists and increase the number of jobs they can employ in foreign companies.</td>
<td>85.6 %</td>
<td>Agreed</td>
</tr>
</tbody>
</table>

Source: Foreign Investment and Management Studies in the Mining Sector. 2020

Pearson correlation coefficient was used to assess the consensus of the experts. The calculated value is found by the \( X_T^2 = m(n-1)W \) formula. After that, we compared the calculated values with \( q, f = n-1 \) from the given table. If the formula is \( X_T^2 > X_q^2 \), it is considered to be consistent.

Meaning of Person’s correlation coefficient

\[
X_T^2 = m(n-1)W = 31(19-1)^*0.97 = 541.26
\]

\[ F = n-1 = 19-1 = 18 \]

This indicates a good consensus of 541.26. This suggests that the experts’ consensus is good which means the findings of the previous study overlap with the evidence.
5. Conclusion

In the past, the economy of our country became highly dependent on the mining industry when the price of products dropped in the international markets, foreign currencies went up making the domestic currency drop in value, inflation increased, and made the economy freeze. On the contrary, when the price of the minerals, raw materials, and products of the mining and exploration sectors scaled up in the foreign markets, there were circumstances that saw foreign currencies go down, making the local currency increase in value that led to a decrease in inflation, and help in an upturn in economic growth. Such cases make our economy highly dependent on foreign markets, vulnerable, and make it more difficult to get investments from foreign countries.

Although world-renowned multinational companies such as Rio Tinto, Petro China Daqing Tamsag, and Winsway Resources are investing in Mongolia, these companies have not been able to stimulate the country's financial markets and reduce capital shortages, improve the structure of the economy, ensure sustainable economic growth, modernize fixed assets in the industry, introduce new advanced technologies, improve the range, quality, and standards of goods and services, increase the share of finished products in the export structure, increase social vulnerability, and support poverty reduction.

Foreign investment is failing to increase Mongolian development, workforce skills, awareness, and productivity. In particular, by improving the health, knowledge, experience, and skills of Mongolians, increasing motivation, and building a positive attitude, we are not able to reduce the potential risks to foreign investors, increase their return on investment in the long run.

In the mining industry, most of the positions are available or filled by contracted foreign workers; although the number of Mongolian skillful workers is low, here, it means the number of professionals and experts is insufficient. Therefore, it’s necessary to focus on the preparation of a capable workforce and invest in employees’ mindset to get work in the mining sector.

Mongolia's tax rates are relatively low but the country's instability, contradictive non-optimal governance system, corruption and bribery in the civil service, bureaucracy, uncomfortable macroeconomic and financial environment, low national savings, poor development of infrastructure, weak knowledge and skills of human development and workforce, low labor productivity, and the constantly changing legal environment, etc. prove to be obstacles for the national economy, especially in the “processing” sector.

It is clear from the study that there are three main goals in managing foreign investment in the mining sector: attracting investment, maintaining and retaining existing investment, and at the same time retaining the benefits for the country. These goals are not easy to set and achieve, and the researcher concludes that we have so far focused on attracting investment.

In light of the above, there is an urgent need to radically change the management and regulation of foreign investment in the mining sector and to implement sustainable development management based on research and regulation.

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外国投资企业《中华人民共和国外资企业法》(2017) 年

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Decentralization and Coordination Failures: Evaluating Pakistan’s 7th National Finance Commission Award

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**Abstract**

Many countries in the world have embarked on ambitious fiscal decentralization through reforms, essentially re-assigning greater responsibilities related to fiscal expenditures and revenues from federal government to state and local governments. However, devising an equity-based revenue-sharing mechanism and conducting well-coordinated fiscal operations among various levels of government, for desired consolidated fiscal outcomes, remains wanting. Pakistan opted for greater fiscal decentralization through 18th Amendment in her constitution in 2010 granting greater autonomy to provincial governments for expenditures and provincial debt generation, matched by higher revenue shares in divisible tax pool, from 41.5% to 57.5% for provincial government, set forth in 7th National Finance Commission Award. This study evaluates the said NFC Award in terms of consolidated fiscal deficits for the last decade. A careful analysis of the annual budgetary data of central and provincial governments reveals that by devolving higher revenues to provincial governments, the central government is struggling to meet its annual deficits targets in face of heavy defense spending, interest payments and power sector debts. As a result, central government has been relying heavily on borrowed financing and Debt to GDP ratio of the country has reached from 60.1% in 2010 to 104% in 2020. While central government relies on provincial governments’ surpluses when announcing a target deficit for the fiscal year, the provinces are not bound by any rule to generate those surpluses. This obvious lack of coordination leads to higher than estimated deficits each year. We conclude that there is a need to revisit the NFC Award to provide the federal government some fiscal space and to devise a well-coordinated system of conditions forcing all levels of government to contribute for consolidated fiscal targets.

**Keywords:** Decentralization, Fiscal Policy, Coordination failures

**JEL Codes:** E62, H72

1. Introduction

Decentralization refers to the transfer of authority from a central government to a sub-national entity. (Boko 2002). Essentially it is a direct transfer of some powers and authorities related to public goods and services delivery from a central government to state and local governments. This includes re-assigning tasks related to expenditure on public goods to state and local governments and also devolving revenues to state and local governments to meet those expenditures. Many countries in the world have embarked on fiscal decentralization programs devolving much of tasks related to direct provision of goods and services to citizens to state and local governments. Perhaps the most powerful force behind these reforms is the principle of subsidiarity. This principle, somewhat simplified, holds that a larger and higher ranking body should not exercise those functions which could be efficiently carried out by a smaller and lesser body. (Mele D. 2005). Broadly, the central government should let the state and local governments perform the tasks which are required at more local level. The rationale two-fold: first, the electorates’ perception about central government inability to provide for local needs of public goods (Tanzi 1999). Second, the increased efficiency and reduced information and transactions costs at local level. (World Bank, 1997). Since the local and state governments are supposedly closer to the citizens, they have better information about the needs of the citizens. Furthermore, accountability can also be enhanced by bringing expenditures close to the revenue sources.

The decentralization of expenditure functions and revenue sources also call for decentralized fiscal policy making (De Mello, 2000). Decentralized fiscal policy making is a process through which the sub-national governments are given authority to generate their own revenues, incur expenditures and generate debts independent of the national
or central government. In most cases, the central government is tasked to collect revenues from major tax sources like income and sales tax. These revenues are part of a common divisible pool from which central and each state government take their share decided through some “criteria”. Defining this criterion needs careful deliberation to answer questions like; how much should central government keep? How much should be share of each sub national government and why? Which factors and what weights should be considered in determining the revenue share of each government? Indeed, the single most prominent rule that should answer all the questions in “Equity”. The revenues should be divided among all government levels in such a way that improves overall welfare of the society. This calls for a redistribution process through which resources are directed from the wealthy to the poor, from developed areas to least developed area and from one authority to many small authorities.

Though decentralization brings overall improvements in service delivery, it is not without pitfalls. The most worrisome problem which has puzzled theoreticians with a decentralized government system is the intergovernmental fiscal coordination (Poterba, 1996). Since decentralization gives greater autonomy to the sub-national governments, it is quite challenging to design a system of intergovernmental fiscal policy which not only improves government performance at all levels, but also ensure macroeconomic stability. The subnational governments are focused more on the provision of goods and services whereas the central government has a focus on the macroeconomic stability. This difference in basic objectives calls for well-coordinated actions on both sides. While devolving major chunks of revenue pie to the subnational authorities reduces the central government’s fiscal space, it becomes, at times, difficult to conduct fiscal policy at center. Revenue collection is another area which require careful deliberation. The local and state level governments have very little capacity to generate their own revenues because the tax bases that are easy to manage at local level are narrow. (Bird, 1992). Non tax revenues like user charges, fees, rents, royalties etc.s are very limited in scope. Taxes with broad bases cannot be efficiently collected at local levels due to possibility of tax exportation, externalities, and economies of scale and factor mobility. Hence, central government collects taxes from broad bases and major revenue source for subnational governments is usually direct vertical transfers from the central government. In a decentralized fiscal policy making, the task is to manage intergovernmental fiscal relations in the face of growing needs for public goods and services and, on the other hand, maintaining fiscal discipline both nationally and sub nationally. This requires strong coordination, institutional clarity and transparency in budget making process such that revenues match the expenditures at sub national level. Without transparency and institutional clarity, the fiscal policy can be prone to coordination failures. These coordination failures can manifest into deficit bias spending by the subnational governments and may aggravate, rather than reduce, fiscal imbalances and consequently endanger overall macroeconomic stability (Prud’honne 1995, Huther and Shah 1995). To encourage sub national governments to act in fiscal discipline, decentralization package should include incentives for fiscal prudence in debt and expenditure management. Furthermore, constraints on subnational governments, strong monitoring system and availability of strong expertise at subnational governments to manage additional resources are strong prerequisites for successful decentralized fiscal policy making. (Fukasaku & De Mello, 1998).

The state of Islamic Republic of Pakistan consists of four provinces namely Punjab, Sind, Khyber-Pakhtunkhwa (KPK) and Balochistan, and AJK and Gilgit-Baltistan area, and a federal capital territory. Areas previously known as Federally Administered Tribal Areas (FATA) have been merged into Khyber-Pakhtunkhwa province. Unfortunately the country has been under direct military rule for about three decades. The prominent features of these military rules was the concentrations of powers at the center. Even though the constitution calls for a federal parliamentary system, decentralized into provincial and local governments, the first major reforms at establishing decentralized system of governments was the 18th amendment in constitution in 2010. Through this amendment, the executive powers of running state affairs were returned from the president to the parliament with the prime minister as its head. The president’s role has become more symbolic and advisory. This amendment devolved as many as seventeen ministries related to public sector service delivery, including health and education, to the provinces paving way for greater decentralized decision making and greater autonomy to provinces. The Constitution of Pakistan (1973) requires the government to establish a National Finance Commission (NFC) award for a period not extending five years which basically decides the revenue sharing formula between center and provinces. The passing of 18th amendment gave greater responsibilities to the provinces, but also called for greater resource needs to meet those responsibility, so the 7th NFC award was issued in 2010. This study evaluates the 7th NFC award and the fiscal policy making process and consequences post decentralization. The main objective is to assess the performance of this NFC award whether there is a need to revisit this NFC award. The next section provides some salient features of the NFC award followed by fiscal policy post decentralization. The last section concludes the study.
2. Salient Features of 7th NFC Award

The 7th NFC award of 2010 solved the major long standing issue of resource distribution among center and provinces. This award was reached with consensus and there was no vote of dissent from any province. The awards increase provincial shares in the divisible pool of taxes and adopted multi factor formula for horizontal resource distribution. The provincial share from the divisible pool was decided to be 56% in first year and further increased to 57.5% in the subsequent years.

![Figure 1. Share of Provinces and Federal Govt in Total Taxes](image)

The key difference in the 7th NFC award was the horizontal distribution of resources among the provinces. Punjab is the most and Balochistan is least populated provinces in Pakistan. Sindh has country’s largest port and highest tax collector in the country whereas KPK is has many hydel power sources. The revenues sharing problems existed among provinces because population was the sole factor in deciding horizontal resource distribution prior to the 7th NFC award. The horizontal resource distribution formula agreed in the award is given in table 1.

Table 1. Horizontal Resource Distribution in all NFC awards.

<table>
<thead>
<tr>
<th>Indicators for Horizontal Distribution of Revenue</th>
<th>NFC (1974 to 2010)</th>
<th>NFC 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>100%</td>
<td>82.5%</td>
</tr>
<tr>
<td>Poverty/ Backwardness</td>
<td>-</td>
<td>10.3 %</td>
</tr>
<tr>
<td>Revenue Collection/ Generation</td>
<td>-</td>
<td>5 %</td>
</tr>
<tr>
<td>Inverse population density</td>
<td>-</td>
<td>2.7 %</td>
</tr>
</tbody>
</table>

Source: Sabir (2010)

As indicated in table 1. Population was sole criteria for horizontal distribution of provincial share in divisible pool. However, this created rifts among provinces as Balochistan was the least populated and it was the least developed as well with biggest area in the country. Similarly, Sindh was highest tax collector and demanded extra share for increased revenue collection efforts. Inverse population density is given some weightage too as its expensive to provide services to a scattered population in a vast area (the case of Balochistan). Sindh and KPK increased their share through higher revenue collection and generation. Overall it was a much more just and equity-based formula. The provincial revenue shares based on this formula are given in table 2.
Table 2. Province wise Share in Divisible pool

<table>
<thead>
<tr>
<th>Province</th>
<th>% Share in Divisible Province Pool under 7th NFC</th>
<th>% Reduction in Share</th>
<th>Additional Budget %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Punjab</td>
<td>51.74</td>
<td>1.27</td>
<td>48</td>
</tr>
<tr>
<td>Sindh</td>
<td>24.55</td>
<td>0.39</td>
<td>61</td>
</tr>
<tr>
<td>KPK</td>
<td>14.62</td>
<td>0.26</td>
<td>79</td>
</tr>
<tr>
<td>Balochistan</td>
<td>9.09</td>
<td>(+1.82%)</td>
<td>175</td>
</tr>
</tbody>
</table>

Source: Mustufa (2010)

Understanding the needs of Balochistan province and by adoption of multi factor criteria for distribution, provinces other than Balochistan lost some of their share in favor of Balochistan. However, because of increased share in the vertical distribution, each share saw a massive increase in their budgets transferred from the central government. Moreover, the tax collection charges which previously were charged at 5% of total pool were also reduced to just 1% of the pool, increasing provincial share by 4% in total. Also, considering losses to KPK province due to war on terror, the province was given additional 1% of the total pool. Though this award was accepted with consensus and with greater hype of national unity, the macroeconomic fiscal impacts of the award required greater fiscal discipline.

3. Fiscal Policy post Decentralization

After the implementation of the 7th NFC award in 2010, the role of provincial governments in consolidated fiscal policy process in the country became significant. The main budgetary figures related to tax collection and transfers to provinces are given in the following chart.

Figure 2. Federal and Provincial Share in total Taxes (Billion Rupees)

Source: Public Sector data from State Bank of Pakistan

While the chart itself is quite evident of the fact that the NFC award is implemented, provinces are getting more than half of the total tax collection. Problems arise in federal government’s inability to sustain its expenditures due to its restricted fiscal space. The consolidated fiscal outcomes depend highly on the fiscal outcomes of the provinces. Since federal government has to deficit finance most of the time due to heavy expenditures on defense, interest payments and Public Sector Enterprises losses, it heavily relies on the provincial governments to generate...
surpluses in their budgets in order to keep consolidated fiscal deficits in check. However, the provincial governments are not bound by any rule to generate those surpluses. This leads to a serious coordination failure on both parts. Hence fiscal policy targets are more arbitrary than binding. If for some reasons, provincial governments are able to generate surpluses, the overall fiscal deficit remains low. But if provincial governments generate deficits themselves, overall fiscal deficits are huge and require more debt financing. The overall and provincial fiscal deficits of Pakistan are presented in table 3 below.

**Table 3. Fiscal Deficits and Total debt as percent of GDP**

<table>
<thead>
<tr>
<th>Year</th>
<th>Overall Fiscal Deficit</th>
<th>Total Debt</th>
<th>Provincial Fiscal Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-11</td>
<td>6.5</td>
<td>68.6</td>
<td>0.7</td>
</tr>
<tr>
<td>2011-12</td>
<td>8.8</td>
<td>72.6</td>
<td>(0.1)</td>
</tr>
<tr>
<td>2012-13</td>
<td>8.2</td>
<td>73</td>
<td>0.3</td>
</tr>
<tr>
<td>2013-14</td>
<td>5.5</td>
<td>72.7</td>
<td>0.6</td>
</tr>
<tr>
<td>2014-15</td>
<td>5.3</td>
<td>72.5</td>
<td>--</td>
</tr>
<tr>
<td>2015-16</td>
<td>4.6</td>
<td>77.6</td>
<td>0.5</td>
</tr>
<tr>
<td>2016-17</td>
<td>5.8</td>
<td>78.6</td>
<td>(0.5)</td>
</tr>
<tr>
<td>2017-18</td>
<td>6.5</td>
<td>86.3</td>
<td>(0.1)</td>
</tr>
<tr>
<td>2018-19</td>
<td>9.1</td>
<td>104.3</td>
<td>0.4</td>
</tr>
</tbody>
</table>


The table present an interesting insight. The provincial governments are producing surpluses most of the time whereas the federal government is incurring huge deficits during all these years. The rationale is simple; provincial governments take more than half of the tax collections and federal government is left with just around 42% of collected taxes. These resources of federal government are not enough to meet huge expenses related to interest payments, defense expenditures and public sector enterprises losses. As a result, federal government has to borrow to finance these deficits and over the span of just one decade, the debt to GDP ratio of the country has increase from 68.6% in 2010-11 to 104.3% in 2018-19. These numbers indicate towards a more serious debt problem emerging sooner than later. Soon enough the debt servicing, which is enormously high even now at 9% of GDP, will wipe out most of federal government receipts. The following graph presents an alarming picture of the debt situation.

**Figure 3. Debt service/GDP percentage**

*Source: State bank of Pakistan*
The Federal government is in a fix. It cannot alter the NFC awards unilaterally. Almost all efforts to bring consensus on a new NFC awards have failed so far. Moreover, the 18th constitutional provides that the share of provinces in a new NFC award cannot be less than the previous NFC award. This presents a difficulty in altering the 7th NFC award. Managing fiscal policy in such environment has become increasingly difficult. This is where provinces and federal government need to coordinate effectively again and try to reach out a mechanism through which the provinces share some responsibility of consolidated fiscal outcomes and debt issues could be resolved before the risks are further aggravated.

4. Conclusion

Decentralization is an important reform in public sector for efficient and effective provision of public sector goods and services. It brings the government and authority closer to people and those taking decisions for expenditures are actually closer to the public and know their needs and wants. However, decentralization requires careful deliberations of issues of revenue sharing and fiscal policy making. Institutional clarity and expertise for efficient resource management are important prerequisites of decentralization. Since the provincial and local governments have limited capacity of generated broad tax based revenues, usually it is the federal government that collects those revenues and then transfers to provinces. Those resource transfers need to be done on equity basis so as to increase overall welfare in the country. An important feature of decentralization is that it should create fiscal discipline in both federal and provincial government. That can be achieved through proper fiscal management and combined efforts for a stable macroeconomic outlook.

In Pakistan, decentralization was adopted in 2010, accompanied by a new revenue sharing formula, the so called 7th NFC award. This formula included population, poverty and backwardness, revenue collection and inverse population density as weighted factors for horizontal resource distribution. The award also significantly decrease federal government share in total taxes. However, ever since this award implemented, it has become increasingly difficult for federal government to run its affairs due to fiscal crunch. As a result, there has been alarming increase in debt creation. Debt has reached to over 100% of GDP from 68% in just a decade. The provinces seem least bothered with it as they see it as federal government’s problem. The provincial autonomy saves them from this headache. However, there is need for a coordinated effort among all levels of governments to address this problem. Any negotiations to devise a new NFC award have failed. Under the current system, the problem seems to go nowhere. We suggest that efforts to manage the deficits issues are needed sooner than later. No level of government can be winner in case of a macroeconomic instability. Provinces need to realize that the problem exists and it will take a joint coordinated effort to address it. Without successful coordination, Pakistan may end up in a debt crisis too big to handle.

References


How Industry 4.0 is Linked to Servitization and Service Innovation in the Manufacturing Sector: Review of Literature

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Abstract

Industry 4.0 is a term that is often used to indicate the development process of the manufacturing industries in form of management and chain production. Here the companies give more importance to individual customers rather than the mass and decide their production dynamics with the choices of individual buyers. The technological thought goes beyond the digital manufacturing wherein the companies tries to take advantages by using Internet of Things (IOT), Big Data, Robotics, Cloud Computing and similar things. It is basically a paradigm of shift in resources and opportunities. There is a whole new world of smart cities, smart factories and smart agri-production. It brings a complete new perspective to industries where they can use new methods and techniques to have optimum return by using minimum resources. Servitization is a service component which is delivered as an additional value while delivering the products. Servitization is a transition phase of product to service which happens to be the reason of change in manufacturing landscape. In the first part of the paper industry 4.0 and servitization are brought together to understand whether there is any interface between the two? In the second part, the challenges of servitization in the manufacturing sector is studied and checked to know whether industry 4.0 meets the challenges.

Keywords: Industry 4.0, Servitization, Interface

Jel codes: A12, O14, O32

1. Introduction

Manufacturing industry is increasingly competitive such that manufacturing organizations in the global market are continuously finding ways to decrease cost and increase profits. Researchers projected that the manufacturing industry will fully adopt technological innovation to remain competitive. Current technologies in manufacturing are the Cyber-Physical System (CPS) and the Internet of Things (IoT), which are both the core of enabling the fourth industrial revolution (Industry 4.0) (Davies, Coole, & Smith, 2017). Mastery of the two core technologies could allow the creation of a smart factory – a virtual copy of the physical factory system but has a broader interconnection of network that will allow real-time analysis of large data sets using artificial intelligence, resulting in increased efficiency of addressing customer needs (Davies et al., 2017). Hence, the manufacturing organization will be adopting a digital transformation that will create internal and external optimization (Ibarra, Ganzarain, & Igartua, 2018).

The optimization process in embracing Industry 4.0 poses six major challenges for manufacturing organizations (Muller, Buliga, & Voigt, 2018). First, organizations need to make high-cost investments such as machineries and infrastructure in the short run, while not expecting immediate returns on investments. Second, organizations need increased data security. Third, organizations need to be prepared for decreased output per production with the increase in highly customized products. Fourth, organizations need to master automation. Fifth, organizations need to turn information into solutions to turn value offer into actual created value. Lastly, organizations need to implement standard procedures despite providing for individual customer demands (Muller et al., 2018). On the other hand, Industry 4.0 may also likely lead to a sustainable value creation (Kamble, Gunasekaran, & Gawankar, 2018). Recent studies have shown economic and environmental sustainability as outcomes of Industry 4.0 (Kamble, et al., 2018; Lee, Lee, & Chou, 2017; Lee, Yoon, & Kin, 2017; Stock & Seliger, 2016; Waibel, Steenkamp, Moloko, & Oosthuizen, 2017). In order to achieve sustainable outcomes, researchers recommended that apart from technological innovations, organizations needed to adopt other types of innovations such as social innovation (Morrar, Arman, & Mousa, 2017) and service innovation (Djellal & Gallouj, 2011).
In the last two decades, researchers have focused on the benefits of service innovation to the manufacturing industry despite several converging socioeconomic points (Djellal & Gallouj, 2011). Currently, a general problem exists on how companies can maximize the outcomes of Industry 4.0 through servitization and service innovation. The question in considering whether to adopt Industry 4.0 is not only due to missing out on the benefits, but also the possible losses when an organization chooses not to adopt (Davies et al., 2017). In sales and marketing, historical data show that companies that choose not to adopt emerging technologies or adopt technologies later than competitors tend to perform worse than companies that adopt the technologies earlier. In manufacturing, emerging production systems tend to yield success in mass production. The current production systems are focused on maintaining connectedness to mainstream customers (Davies et al., 2017). Service innovation is considered to be embedded in human interaction, particularly in client interaction (Gallouj, Rubalcaba, Toivonen, & Windrum, 2018). Gallouj et al. (2018) reiterated that service innovation countly yet dependently enhance the value created by an organization through resolving organizational and structural issues. Service innovation in the manufacturing industry are also established to involve processes that accentuate multi-level collaboration of stakeholders (Aksoy et al., 2019; Gallouj et al., 2018; Wu, Liu, Chin, & Zhu, 2018). With the focus on collaboration, the macro-level of technological advances brought about by Industry 4.0, as technology could potentially obstruct communication in the meso-level within the organization, and the micro-level between human to human (Kabadayi et al., 2019). However, Industry 4.0 also highlighted the introduction of intelligent monitoring, cost reduction framework, focusing on the highly prioritized people skills (Huxtable & Schaefer, 2016). Additionally, servitization “promotes intense customer relationships” (Baines, 2015, p. 9). A specific problem, therefore, exists on the processes of service innovation resolving individual, organizational, and societal issues in the context of servitization and Industry 4.0 in the manufacturing industry.

Despite the benefits of servitization, researchers have also found that servitization is complex and difficult to understand, particularly in terms of digitization and supply chain interdependency (Vendrell-Herrero et al., 2017). Due to this complexity, researchers have noted that there is a lack of consensus in the concepts and definitions related to servitization (Kowalkowski et al., 2017). Moreover, despite the growing implementation of servitization, success through the transition to servitization is not guaranteed (Rabetino et al., 2016). Specifically, poor implementation of servitization may yield negative outcomes for manufacturers (Rabetino et al., 2016). Within servitization, value-creating processes include operations management processes, customer management processes, and innovation processes (Rabetino et al., 2016).

With the widespread prominence of digitization in recent years, servitization in the manufacturing industry has been the emphasis of business elites worldwide (Schroeder, 2016). Digitization is one of the features of Industry 4.0, in which the use of technological resources such as smart phones, social media, and cloud computing are expected to bring about changes specific to the level of organization and control over the value chain and life cycle of products, and to effectively respond to consumer demands (Huxtable & Schaefer, 2016; Schmitt, 2017; Vaida et al., 2018). Industry 4.0 is the interconnected value creation of human resources, machineries, and products working together within the Internet of Things (Morrar et al., 2017; Muller, Buliga, & Voigt, 2018). The concept of identifying solutions through the use of technologies within Industry 4.0 includes the following four base technologies: The Internet, cloud services, Big Data and Analytics (Frank et al., 2019), with the following elements: The Internet of things (IoT), the Internet of services, cyber-physical systems, smart factories, cybersecurity, and autonomy (Buhr, 2015; Morrar et al., 2017). Researchers established that the elements of Industry 4.0 allow for greater efficiency and the ability to identify solutions to challenges (Huxtable & Schaefer, 2016; Morrar et al., 2017).

2. Literature Review

2.1. Industry 4.0

In this section the evidence pertaining to Industry 4.0 identified in the review of the literature will be presented. Industry 4.0 was described by Vaidya et al. (2018) as the fourth industrial revolution due to a change in the level of organization and control over the value chain and life cycle of products. Ślusarczyk (2018) explained that in the concept of Industry 4.0, innovation and technological development in an organization are important. Specifically, in Industry 4.0, there is a change in the products and production systems pertaining to design, processes, operations, and services (Ślusarczyk, 2018).
Industry 4.0 enables systems to be more productive when systems are successfully adapted to Industry 4.0 (Ustundag & Cevikcan, 2018). In consideration of successful system adaptation, the following factors must be considered, according to Ustundag and Cevikcan (2017):

- Horizontal integration through value chains
- Vertical integration and networking of manufacturing or service systems
- End-to-end engineering of the value chain

Industry 4.0 has emerged due to increased digitization and intelligentization of manufacturing processes within the industry to provide customized production for clients (Vaidya et al., 2018). The importance of Industry 4.0 for the manufacturing industry is the increased focus on meeting individualized customer needs (Vaidya et al., 2018). Vaidya et al. (2018) explained that Industry 4.0 includes the following aspects: a) Internet of Things (IoT), b) Industrial Internet, c) Smart Manufacturing, and d) Cloud based Manufacturing.

In their paper, Vaidya et al. (2018) presented nine pillars of Industry 4.0 that represent the challenges and issues associated with the implementation of Industry 4.0 in the manufacturing sector:

- Intelligent Decision-Making and Negotiation Mechanism: the issue of autonomy and social capabilities in smart manufacturing systems
- High Speed IWN Protocols: the need for increased bandwidth for heavy communication and the transfer of a high volume of data
- Manufacturing Specific Big Data and Analytics: the challenge of ensuring high quality and integrity of the data that is recorded from the manufacturing system
- System Modeling and Analysis: the need for appropriate control modeling, including additional research on the appropriate modeling and analysis of complex systems
- Cyber Security: a need to protect industrial systems, manufacturing lines, and systems data from cyber security threats
- Modularized and flexible physical artifacts: the need for modularized and smart conveying units that can be used for processing a product and for distributed decision making
- Investment issues: there is a significant investment for the implementation of new technology for Industry 4.0.

Based on the considerations for the implementation of Industry 4.0 in the manufacturing industry pertaining to the factors within these nine pillars, Vaidya et al. (2018) concluded that Industry 4.0 allows for smart, efficient, effective, individualized, and customized production through the use of technology. Vaidya et al. (2018) noted that the nine pillars described are important because they help to better understand the challenges and issues pertaining to the implementation of Industry 4.0 particularly in the manufacturing industry. Vaidya et al. (2018) is relevant to the proposed case study because they explored the challenges that are associated with the implementation of Industry 4.0 in the manufacturing sector, which may be important to understand in relation to servitization and innovation through Industry 4.0 in the proposed study.

In a presentation on the opportunities for sustainable manufacturing in Industry 4.0, Stock and Selinger (2016) explained that globalization has led to an increased global demand for sustainability. Stock and Selinger (2016) specifically noted the increased need for industrial value creation as an aspect of sustainable manufacturing. Stock and Selinger (2016) highlighted that Industry 4.0 has had a substantial influence on the manufacturing industry. Specifically, Industry 4.0 has allowed for development within the industry through the establishment of smart factories, smart products, and smart services (Stock & Selinger, 2016). Each of these developments within the industry has involved the integration of the internet of things and of the industrial internet (Stock & Selinger, 2016). Similar to the concept of sustainable manufacturing presented by Stock and Selinger (2016), Zhong et al. (2017) explored the topic of intelligent manufacturing within the context of Industry 4.0.

Zhong et al. (2017) suggested that Industry 4.0 provides for increased flexibility, mass customization, better quality, and improved productivity in the manufacturing industry. Zhong et al. (2017) highlighted that an important aspect of Industry 4.0 is intelligent manufacturing in which intelligent objects are able to sense, act, and behave
within a smart environment. As in Vaidya et al. (2018), Zhong et al. (2017) referred to the use of the Internet of Things and intelligent manufacturing within Industry 4.0 as the Fourth Industrial Revolution.

In a systematic review of the past, present, and future of Industry 4.0, Liao et al. (2017) explained that the three industrial revolutions prior to Industry 4.0 as the Fourth Industrial Revolution were the result of the following:

- The introduction of water and mechanical manufacturing facilities powered by steam
- The use of electrically-powered mass production technologies through the division of labor
- The use of information technology to support the automation of manufacturing

Based on their systematic review of the literature, Liao et al. (2017), consistent with Ustundag and Cevikcan (2017) noted horizontal integration, vertical integration, and end-to-end digital integration as the three necessary integration features of Industry 4.0. In defining the areas for action related to Industry 4.0, Liao et al. (2017) highlighted the following eight priority areas:

- Standardization and reference architecture
- Managing complex systems
- Delivering a comprehensive broadband infrastructure
- Safety and security
- Work organization and design
- Training and continuing professional development
- Regulatory framework
- Resource productivity and efficiency

The eight priority areas for action presented by Liao et al. (2017) are consistent with some of the challenges and factors presented by Vaidya et al. (2018) above.

In a separate review of the literature related to Industry 4.0, Ghobakhloo (2018) explored Industry 4.0 as a phenomenon, including the principles and technology trends. The purpose of the review conducted by Ghobakhloo (2018) was to provide a guide for manufacturers in the transition to 4.0. To conduct the study, Ghobakhloo (2018) completed a systematic and content-centric review of the literature. The systematic and content-centric review was based on a six-stage approach with the purpose of identifying key design principles and technology trends pertaining to Industry 4.0. The findings of Ghobakhloo (2018) were that Industry 4.0 is an integrative system. Ghobakhloo (2018) determined that the integrative system of Industry 4.0 was comprised of twelve design principles and fourteen technology trends. The twelve design principles identified by Ghobakhloo (2018) are as follows:

- Service orientation
- Smart product
- Smart factory
- Interoperability
- Modularity
- Decentralization
- Virtualization
- Real-time capability
- Vertical integration
- Horizontal integration
- Product personalization
Corporate social responsibility

The fourteen technology trends identified by Ghobakhloo (2018) were:

- Internet of Things (IoT): refers to the industrial application of IoT (Wang et al., 2016) including the network of physical objects within industry as well as the digital representations of products, processes, and manufacturing infrastructure (Jeschke et al., 2017; Gilchrist, 2016)
- Internet of Service (IoS): includes the systematic use of the internet for value creation
- Internet of People (IoP): involves the complex socio-technical system in which humans and their personal devices are considered active elements of the internet (Conti et al., 2017) and their intentions in using their personal devices must be considered (Miranda et al., 2015)
- Internet of Data (IoD): the extension of IoT in the digital world as an effective means of data transfer, storage, management, and processing in the IoT environment (Anderl, 2014; Anderl, 2018; Fan et al., 2012)
- Cloud computing: cloud computing does not have a standard definition but is based on advancements in hardware, virtualization technology, distributed computer, and service delivery using the internet (Oliveira et al., 2014)
- Big data analytics: the use of big data technologies to identify insights and trends to be used for decision-making and to sustain competitiveness (Hu et al., 2014)
- Blockchain: also referred to as distributed ledger technology, enables transparent, secure, and trustworthy, and fast public or private solutions (Underwood, 2016), in a way that is automated and does not require human intervention (Devezas & Sarygulov, 2017; Sikorski et al., 2017)
- Cybersecurity: a key element of Industry 4.0 due to the risk of attack of organizations using the internet. Cybersecurity issues pertaining to Industry 4.0 include both traditional security and privacy issues as well as new challenges that may emerge with Industry 4.0 (Thames & Schaefer, 2017).
- Augmented reality: a technology that enables visualization of computer graphics that are placed in the real environment (Yew et al., 2016) and can be used to support monitoring, diagnostic and recover, and training (Doshi et al., 2017; Khan et al., 2011), including employee training, quality management and control practices, and product design (Elia et al., 2016)
- Automation and industrial robots: automation and industrial robotics are important due to the increase in demand for industrial robots and the trend toward automation in the manufacturing industry (Esmaeilian et al., 2016).
- Additive manufacturing: refers to the manufacturing technique that is based on Computer-Aided Design (CAD) modules (Esmaeilian et al., 2016). Additive manufacturing enables manufacturers to produce prototypes and proofs of concept (Gilchrist, 2016).
- Simulation and modeling: simulation and modeling techniques, particularly in smart factories, provide the opportunity to mirror the physical world in a virtual model. Simulation and modeling therefore provide the opportunity for manufacturers to identify and prevent errors at an early stage in the manufacturing process (Gilchris, 2016).
- Cyber-physical systems (CPS): CPS refers to several transformative technologies that connect the operations of physical assets and computational capabilities (Lee et al., 2015).
- Semantic technologies: semantic technologies help to provide a standardized language for communication and the exchange of information between different aspects of Industry 4.0 (Janev and Vraneš, 2011).

Based on the identification of these twelve design principles and fourteen technology trends, Ghobakhloo (2018) concluded that manufacturers must transition to Industry 4.0 sooner rather than later as Industry 4.0 has become a necessary transition in manufacturing. Ghobakhloo (2018) explained that because Industry 4.0 is no longer a future
trend, manufacturers must transition. To support this transition, Ghobakloo (2018) proposed the following roadmap, which is based on six separate phases to be used by manufacturers for the transition toward Industry 4.0:

- Phase one: strategic management
- Phase two: marketing strategy
- Phase three: human resources strategy
- Phase four: IT maturity strategy
- Phase five: smart manufacturing strategy
- Phase six: smart supply chain management strategy

In a special focus paper, Rojko (2017) explained the concepts, drivers, enablers, goals, and limitations of Industry 4.0, also referring to Industry 4.0 as the Fourth Industrial Revolution. Rojko (2017) suggested that Industry 4.0 allows new technologies and concepts to be exploited. Specifically, Rojko (2017) noted that the following technologies and concepts are relevant to Industry 4.0:

- The use and availability of the Internet and Internet of Things
- Integration of technical and business processes
- Digital mapping and virtualization of aspects of the real world
- The use of ‘smart’ factories, including ‘smart’ industrial production and ‘smart’ products

Regarding the benefits of Industry 4.0 for the manufacturing sector, Rojko (2017) highlighted the following benefits associated with the use of Industry 4.0 in the manufacturing industry:

- Shorter time-to-market for new products
- Improved responsiveness to consumers
- Custom mass production without significant increases to overall production costs
- Flexible and friendlier work environments
- Increased efficiency in the use of natural resources and energy

In highlighting the benefits and factors related to Industry 4.0, Rojko (2017) described Industry 4.0 production systems as ‘smart’ factories that are supported by the use of technology. Considering the importance of the use of technologies in Industry 4.0, the following supportive technologies were highlighted by Ustundag and Cevikan (2017) as important for the system:

- Adaptive robotics
- Embedded systems (Cyber physical infrastructure)
- Additive manufacturing
- Cloud technologies
- Virtualization technologies such as virtual reality and augmented reality
- Simulation
- Data analytics and artificial intelligence
- Communication and networking (industrial internet)
- RTLS and RFID technologies
- Cyber security
- Sensors and actuators
- Mobile technologies
Relevant to the manufacturing industry, Qin et al. (2016) presented a categorical framework of manufacturing for Industry 4.0, noting that the achievement criteria of Industry 4.0 are still uncertain. Qin et al. (2016) explained that the vision and concept of Industry 4.0 includes the following factors:

- Smart factories in which factories are integrative and intelligent
- Businesses that are optimized through a communication network between different companies, factories, suppliers, logistics, resources, customers, etc.
- The manufacturing of smart products and also provide feedback from customers to manufacturing systems
- Customers are able to order products based on their needs and behaviors

Qin et al. (2016) concluded that there is a gap between industry and achievement of Industry 4.0 and suggested that the manufacturing industry is developing towards Industry 4.0. In the following section, the identified literature pertaining to servitization will be presented.

2.2. Servitization

Sousa and de Silveira (2017) highlighted that manufacturing units have increasingly adopted servitization as a means of competing with product-service systems rather than only products. Servitization has therefore been described as the addition of services to the core products offered by manufacturers in order to provide additional value to the consumer (Raddats et al., 2019). In their study, Sousa and de Silveira (2017) theoretically articulated and empirically tested and integrated model to identify the capability antecedents and performance outcomes of servitization.

The two servitization strategies explored by Sousa and de Silveira (2017) were the offering of Basic Services (BAS) and Advanced Services (ADS). BAS was defined as the aim to install and maintain basic product functionality whereas ADS involves working closely with customers to co-create value beyond basic product operation (Sousa & de Silveira, 2017). ADS, therefore, requires adapting the product use to the needs and usage situation of the consumer (Sousa & de Silveira, 2017). Based on the testing of BAS and ADS, Sousa and de Silveira (2017) found that BAS did not impact financial performance. Sousa and de Silveira (2017) also determined that there was a gradual development of BAS and ADS, which were related to adequate levels of manufacturing and service capabilities (Sousa & de Silveira, 2017). In a thematic review of the literature, Raddats et al. (2019) identified knowledge gaps and research priorities pertaining to servitization. From the systematic review of 219 papers, Raddats et al. (2019) identified the following five themes pertaining to servitization: a) service offerings, b) strategy and structure, c) motivations and performance, c) resources and capabilities, and d) service development, sales and delivery.

In a separate review of the literature, Zhang and Banerji (2017) explored the challenges of servitization. In their review of the research, Zhang and Banerji (2017) identified the following five constructs pertaining to servitization challenges:

- Organizational structure: defined as the formal allocation of work roles as well as the development of a management mechanism. The management mechanism is used to control internal activities and support business strategy implementation within an organization.
- Business model: includes how a company creates, develops, and delivers value to consumers
- Development process: the overall approach that turns an idea into a deliverable
- Customer management: includes building and maintaining a close relationship with customers. The relationship with customers can be built and maintained through effective interactions and communications.

In a study on how digitization can enable servitization, for manufactures, Coreynen et al. (2017) used a multiple case study approach conducted at four manufacturing companies. Coreynen et al. (2017) noted that there was a lack of literature on how digitization can enable servitization for manufacturers. Based on the results of the analysis of the four manufacturing companies as cased, Coreynen et al. (2017) concluded that there is a priming and capability effect associated with digitization and servitization. Specifically, Coreynen et al. (2017) found that certain digitization options lead to three servitization pathways. The three servitization pathways identified from the analysis of the study results were industrial, commercial, and value servitization (Coreynen et al., 2017).
Noting the transition in manufacturing from products to customer solutions, Rabetino et al. (2016) developed a strategy map for servitization among three leading corporations. The purpose of the study was to provide a strategy map for manufacturing firms, which could be used as a framework and tool for benchmarking, developing, and implementing a strategy (Rabetino et al., 2016). In the mapping of the strategy, Rabetino et al. (2016) presented a financial perspective, customer perspective, internal perspective (value-creating processes), and learning and growth perspective (intangible assets).

In describing servitization and deservitization, Kowalkowski et al. (2017) explained that servitization had involved developments in the industry in which organizations offer a bundle of goods, services, support, knowledge, and self-service rather than only products and services. Noting the importance of digitization in servitization, Vendrell-Herrero et al. (2017) highlighted the intersection of servitization, digital business models, and supply chain management, which has established interdependencies in servitization within the industry. In summarizing servitization, (Gomes et al., 2019) described servitization as the expansion of manufacturing activities (Ohuallachain et al., 2017; Vendrell-Herrero et al., 2018). In this process, manufacturing organizations have transition to competition based on differentiation, or service innovation, and cost leadership (Baines et al., 2017; Gomes et al., 2019; Ulaga & Reinartz, 2011).

2.3. Service Innovation

As described previously, service innovation, particularly in the context of servitization involves differentiation (Gomes et al., 2019). Bettencourt (2019) explained that service innovation is not offering a service to customers but rather offering them something that provides a solution. Service innovation, or differentiation, requires decisions to be made by servitizing manufacturers, such as whether they will develop service innovation internally or through a strategic partnership (Bustinza et al., 2017; Gomes et al., 2019; Rabetino et al., 2017). Service innovation is important as it has the potential to increase the competitiveness of an organization based on differentiation (Gomes et al., 2019).

In a review and synthesis of service innovation, Witell et al. (2016) aimed to define service innovation, noting that research on service innovation has been conducted in several different disciplines but there was a lack of an explicit definition of service innovation. Witell et al. (2016) therefore conducted a systematic review of 1301 articles on service innovation. Based on this systemic review, Witell et al. (2016) identified key characteristics of service innovation based on 84 identified definitions in different perspectives.

In assimilation perspective in defining service innovation, Witell et al. (2016) explained that based on assimilation, services innovation was based on the term “innovation” and that service was not a separate category. Instead, the term “innovation” was used to encompass products, services, and processes (Witell et al., 2016). In the demarcation perspective of service innovation, service innovation was viewed as a new service or offer that involved a change for either the organization or the customer (Witell et al., 2016). In the demarcation perspective, there was less focus on the benefit of the innovation. Defining service innovation from the synthesis perspective, Witell et al. (2016) found that service innovation included a focus on a new service, product, or service, that involved a change for the consumer. Moreover, in the synthesis perspective, there was emphasis on the benefit and value involved in service innovation (Witell et al., 2016). Based on the analysis of the definition of service innovation from various perspectives, Witell et al. (2016) concluded that the various definitions of the term and lack of a clear meaning have prevented further development in a comprehensive understanding of service innovation.

Consistent with Witell et al. (2016), Snyder et al. (2016) also attempted to define and identify categories of service innovation through a review and synthesis of the literature. Based on a review of 1,046 academic articles, Snyder et al. (2016) identified four service innovation categories. The categories identified by Snyder et al. (2016) were a) degree of change, b) type of change, c) newness, and d) means of provision. Snyder et al. (2016) also found that the published literature included a focus on service innovation as only something new to the firm. Synder et al. (2016) also concluded that categorizations of service innovation did not include customer value and financial performance.

3. Conclusion and discussion

As reflected in this review of the literature, the topics of Industry 4.0 and service innovation, particularly in the manufacturing sector are emerging topics that are still being defined by researchers. The proposed study therefore contributes to the existing literature by providing a more comprehensive understanding of the intersections between Industry 4.0, servitization, and service innovation in the manufacturing sector.
Where the Research Is Valuable?

Industry 4.0 is important due to the increased focus on responsiveness, innovation, product customization, and energy solutions (Schmitt, 2017). Industry 4.0 highlights the IoT, with the focus being on connectivity whenever, wherever, and using whatever path, network, and service by whoever that has access. Industry 4.0 makes interoperability, virtualization, decentralization, real-time capabilities, service orientation and modularity imperative (Vermesan et al., 2014).

This proposed study is valuable for the field because it will expand current evidence on the association between servitization and Industry 4.0 by understanding the potential impact of Industry 4.0 on servitization within the manufacturing organizations. Understanding the potential role of Industry 4.0 on servitization and innovation within the manufacturing organizations is significant in understanding the potential developments that may be experienced within manufacturing organizations in the future. The proposed study may therefore potentially inform firms in how they may be impacted in Industry 4.0 based on its relation to innovation and servitization.

This study attempts to highlight the implementation step of Industry 4.0 in manufacturing firms based on servitization and innovation. Muller et al. (2018) recommended future studies to include a multi-faceted data collection method to examine the steps regarding how Industry 4.0 is implemented in manufacturing. Kamble, Gunasekaran, and Gawankar (2018) suggested further examination of influencing factors required to increase the successful implementation of Industry 4.0 in the manufacturing industry.

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Economic Relations Between the United Kingdom and Azerbaijan: Possible Consequences after Brexit Era

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Abstract
Diplomatic and economic relations between Azerbaijan and the United Kingdom were established in the 1990s. After the Cold War, bilateral relations took shape in three main stages, which have been early period, founding economic relations and establishing strategic cooperation. Despite the European Union could not deal with the South Caucasus region until 2004 due to the intense domestic political agenda, relations with the United Kingdom have been of strategic importance for Azerbaijan since the 1990s. The main purpose of this study is to examine the bilateral relations established after the 1990s through a political economy and to reveal the possible effects of Brexit, considering the historical background. In the study, bilateral trade relations and capital flows are analyzed by qualitative analysis method. It is expected that Brexit will have economic and political effects on Azerbaijani economy to some extent. Despite losing the greatest political support within the European Union institutions, the strategic impact of Brexit on economic relations is expected to be weak for Azerbaijan. Azerbaijan’s relations with the European Union have not been consisted with traditional policies of the European Union. Additionally, in the post-Brexit period, economic relations of Azerbaijan with the United Kingdom have great potential for further improvement with bilateral agreements.

Keywords: Azerbaijan, UK, Brexit, oil, energy, trade

JEL Codes: F15, F18, P48, P28, Q43

1. Introduction
Although the European Union could not establish deep and strategically important relations with the South Caucasus region and Azerbaijan at the end of the Cold War due to its intense political agenda, the United Kingdom-Azerbaijan relations began to be established in the early 1990s. For Azerbaijan, which gained its new independence at that time and carried out an economic development policy through free market economy, establishing relations with the United Kingdom based on mutual interests was one of the most important steps for its integration into the world economy. In terms of the United Kingdom, establishing economic and political relations with Azerbaijan has a key role in using Caspian energy reserves and bringing them to the world markets. Therefore, relations with the United Kingdom accelerated the integration of Azerbaijan into the world economy and led to the realization of mega-energy projects. Relations with the European Union were established with the signing of the Partnership and Cooperation Agreement in 1996 and its ratification in 1999, and the biggest supporter of Azerbaijan among the union institutions was the United Kingdom.

The aim of the study is to examine the nature of the relations between the United Kingdom and Azerbaijan since the 1990s according to historical chronology and to examine the effects of Brexit on bilateral relations. It is assumed that the potential to be affected by Brexit is less because bilateral relations have a strategic structure and economic ties are more intense in the field of energy.

For this reason, in the first part, the historical background and legislative bases of economic ties of the relations between Azerbaijan and the United Kingdom will be examined and its nature will be revealed. In the second part, bilateral trade and capital flows will be analyzed especially for the 1990 and 2020 period. Possible effects of Brexit on bilateral ties will be the main topic of third part. Depending on these factors, the future perspectives of bilateral
relations and the investment opportunities of the United Kingdom, which left the European Union, in Azerbaijan and the future perspective of the relations will be explained and discussions will be expanded.

2. The United Kingdom and Azerbaijan: Historical Background

The Caucasus was the region where the rivalry between the British and Russia empires, in other words the “Great Game”, was staged in the 19th century. While the rivalry between the two powers came to an end, the Caucasus witnessed the “Second Great Game” in the late 20th century as well. In contrast to the 19th century version, this new version of the Great Game has new actors, such as China, Turkey, and many Western states.

The roots of the relations between Britain and Azerbaijan go back to the period when the Azerbaijani oil industry was on the rise in the end of 19th century and beginning of 20th. Baku, as a part of the Russian Empire in relevant period, was among the first center of the world oil industry and attracted the attention of other European foreign capital, especially Britain (Rzayev, 2017: 399). After the liberalization and tax regulation policies of Russian government related to oil fields was key point for foreign capital and growth of oil industry of region. Despite total amount of world oil production was 11.4 million tons and half of this amount was produced in Azerbaijan in 1901 (Akhmamedov, 2018: 45). British companies were owner % 11 of oil wells and their production amount was 1/6 ratio of total. During the period, 12 British companies with a total capital of 50-60 million rubles were operating in Baku which that amount of capital was more than 70% of total British capital inside Russian empire. However, instead of developing production technology and drilling new wells in Baku, these companies bought bankrupt companies which are were operating by national entrepreneurs (Presidential Library, 1997:28).

During World War I Azerbaijani oil industry had strategic importance for Britain, Germany, Russia, and Ottoman Empire. Therefore, Winston Churchill decided to change fuel of Britain’s navy from coal which come from Wales to oil changed British-Azerbaijani relations structure (Yergin, 2006: 1-2). These developments were milestones of Azerbaijan-British historical close ties and emphasized strategic significance of Azerbaijan’s oil for British foreign policy.

The Bolshevik revolution in Russia reinforced the British ambitious to have a say on Baku oil. British military forces under the leadership of General Thomson arrived in Baku both to ensure the energy security of the navy and to prevent the Bolsheviks from getting stronger in Azerbaijan (Hasanli, 2009: 158). Relations with Britain continued to rise with the establishment of the Azerbaijan Democratic Republic in 1918. After the Bolshevik invasion of the Azerbaijan Democratic Republic in 1920, bilateral political relations broke down. Although political relations ended with Azerbaijan after occupation of Azerbaijan Democratic Republic, economic relations did not end. Despite this development, the British capital continued to exist in Azerbaijan until the 1930s. Specifically “Metropolitan-Vickers” company played significant role for electrification of Baku city (Rzayev, 2017: 400).

Relations between Azerbaijan and the UK reunified after disintegration of Soviet Union and the structural changing of world political system. The end of Cold War and the collapse of the Soviet Union made geopolitical gap in the Caspian Region. Energy reserves of the Caspian Sea became the geopolitical power struggling area of great powers such as Russia, USA, UK, and Turkey (Hasanov, 1998: 38). Azerbaijan’s geopolitical position and importance was different than other South Caucasus republics due to its oil and natural gas reserves. Therefore, UK was more willing to establish diplomatic ties with Azerbaijan because of historical close ties and new economic opportunities in the region.

It is not surprised that the UK was identified Azerbaijan as a sovereign Republic on the 31st of December 1991 two days later of independence referendum. On the same day, British foreign office minister Douglas Hogg and the Prime Minister of the Republic of Azerbaijan Hasan Hasanov signed a memorandum on the establishment of diplomatic relations between the two countries. This was the first document that formed the legal basis of relations between the two countries. Thus, Azerbaijan-Britain diplomatic relations were established on March 11 (Qasimli, 2015: 31).

In September 1992, former prime minister Margaret Thatcher and BP officials came to Azerbaijan. During this visit, agreements were signed for “Chirag” oil and “Shah Deniz” natural gas fields (Washington Post, 1998). Then, on September 28, 1992, the “Joint Declaration on Commercial and Economic Cooperation” was signed between Azerbaijan and the UK. The legal foundations of economic relations were laid after that document (Rzayev, 2017: 402). Naturally, although the British government wanted to establish deep and comprehensive relations with
Azerbaijan, the Karabakh War and internal political conflicts in the relevant period prevented the development of bilateral relations (Hasanov, 1998: 42).

From the point of view of the Great Game, the most important difference between the two periods, was in their sphere of influence. While the aim in the 19th century was to gain political influence and strategic advantage, in the 20th century the axis shifted mostly to the fields of economy and energy. In this context, economic interests, pipeline politics, alternative energy sources, finding new markets and making investments in newly independent countries have been at the center of the Second Great Game.

3. Economic Relations between UK and Azerbaijan in Post-Soviet Era

Today, bilateral relations between two sides are mostly based on economic relations and energy fields. Although the bilateral relations between 1991-1993 could not be established at the required level due to the Karabakh War and internal political instability in Azerbaijan, they continued to strengthen after 1994. For Azerbaijan, relations with the UK have stood out more than any other European country. The historical revolution of relations can be emphasized on three steps:

- **Initial phase:** This phase continues from the last years of the Cold War to the middle of 1993. In the relevant period, bilateral diplomatic relations were established and visits of British Petroleum and senior UK officials to Azerbaijan were made. In the relevant period, the main issue of bilateral relations was the establishment of diplomatic relations, recognition of the territorial integrity of Azerbaijan by the UK, and the use of Azerbaijani energy reserves (Hasanov, 1998: 41-43). This period has come to end with the Azerbaijani government's distant attitude related to oil and gas agreements, internal political turmoil, and the change of government in Azerbaijan (Hasanov, 2005: 183-185).

- **Second phase:** The second period in the relations between Britain and Azerbaijan started after Heydar Aliyev came to the power. Milestones of bilateral relations the British embassy was opened in Baku in September 1993 and the Azerbaijani embassy in London in January 1994. The fundamental developments that make up today’s economic relations took place in this period (Qasimli, 2015:36). The main objectives in relations with the UK can be listed as introducing Azerbaijan to business circles, attracting British capital to Azerbaijan, benefiting from the UK's experience in the field of oil and natural gas (technology transfer) and strengthening economic ties (Mammadli, 2003: 22-27). The agreements signed during H. Aliyev's first official visit to the UK in February 1994 were primary steps towards achieving these goals and establishing bilateral economic relations (see Table 1).
Table 1. Basic documents on the legal basis of economic relations between Azerbaijan and the UK (1992-2020)

<table>
<thead>
<tr>
<th>No</th>
<th>Name of Document</th>
<th>Date of agreement</th>
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<tbody>
<tr>
<td>1</td>
<td>Memorandum on the establishment of diplomatic relations between the Azerbaijan and United Kingdom</td>
<td>11.03.1992</td>
</tr>
<tr>
<td>2</td>
<td>Declaration on trade and economic cooperation between the two countries</td>
<td>28.09.1992</td>
</tr>
<tr>
<td>3</td>
<td>Joint Declaration on Friendship and Cooperation between the Republic of Azerbaijan and the United Kingdom</td>
<td>23.02.1994</td>
</tr>
<tr>
<td>4</td>
<td>Memorandum on energy cooperation between the Republic of Azerbaijan and the United Kingdom</td>
<td>23.02.1994</td>
</tr>
<tr>
<td>8</td>
<td>Memorandum of Understanding on the Establishment of the Azerbaijan-British Trade and Industry Council</td>
<td>29.11.1995</td>
</tr>
<tr>
<td>9</td>
<td>“On the exchange of experience and best practices in the field of the exploitation of oil and gas resources worldwide”, Memorandum of Understanding between the Office of Oil and Gas Projects and Supply, representing the Ministry of Trade and Industry of the United Kingdom of Great Britain and Northern Ireland, acting on behalf of the British Oil and Gas Supply Industry and the State Oil Company of the Republic of Azerbaijan and the “Azneftkimyamash” Company representing the Government of Azerbaijan,</td>
<td>23.05.1995</td>
</tr>
<tr>
<td>10</td>
<td>On promotion and protection of investments between the Government of the Republic of Azerbaijan and the Government of the United Kingdom</td>
<td>04.01.1996</td>
</tr>
<tr>
<td>11</td>
<td>Memorandum of Understanding on Economic and Trade Cooperation between the Government of the Republic of Azerbaijan and the Government of the United Kingdom</td>
<td>02.03.2015</td>
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In November 1995, the international conference “Investment Opportunities in Azerbaijan” organized by A. Smith University in London (Aliyev, 1998: 22) served to strengthen economic relations with the UK and during the visit on the 29th of November “Memorandum of Understanding on the Establishment of the Azerbaijan-British Trade and Industry Council” have been signed (see Table 1). After this progress, more than 40 British company came to Azerbaijan and made investments (Qasimli, 2015: 41) Thus, in 1994, Project Sharing Agreement (PSA) on Azeri-Chiraq-Guneshli oil fields and in early 1996 Shah Deniz natural gas field initial agreements (BP, 2021) have been
sion. These developments have been important milestones for the transformation of bilateral relations into strategic partnerships (Mizrabayli, 2001: 47).

- **Third phase:** Oil and gas agreements signed during second period were the fundamental steps for Azerbaijan’s integration into the world economy. The energy policy of Azerbaijan has been harmonized with the foreign policy of the country. Therefore, the cooperation has been made with regional and global powers for the transportation of energy reserves to the European and world markets. Naturally, the relations establishing energetic ties have been established with countries such as Russia, USA, UK within the framework of “balanced policy” (Hasanov, 1998: 31). Heydar Aliyev’s second official visit to the UK transformed bilateral relations. During the visit “Joint Declaration on Friendship and Cooperation between the Republic of Azerbaijan and the UK” has been signed which includes deeper cooperation for liberalization of Azerbaijan economy, comprehensive partnership in energy sector (Aliyev, 2005: 151-152). During the visit BP takes 30 % shares from agreement on Production Sharing Agreement for Alov, Araz and Shahr oil field (Qasimli, 2015: 46). The Azerbaijan International Operating Company (AIOC), established in February 1995 to implement a production sharing agreement, appointed British BP in 1999 as the main operator in the oil fields (BP, 2021).

Although the Partnership and Cooperation Agreements was signed in 1996 and entered into force in 1999, the European Union could not interest in with the South Caucasus countries until 2004. Even though the European Union tried to support the countries in the region with programs such as TACIS, INOGATE and TRASECA in the 1990s, technical support programs could not have sufficient effect (Lynch, 2005: 34-35). Despite the European Union tried to establish closer relations with Azerbaijan through policies such as ENP and Eastern Partnership, other mechanisms were used related to energy issues, Karabakh problem, and economic cooperation (Oktay, 2015: 77).

While Azerbaijan does eager to take a safe place in the European energy market, it does not have the aim of full membership to the EU in the short or long term. For this reason, it attaches importance to economic relations besides political cooperation. On the other hand, due to the rich oil and natural gas reserves Azerbaijan has, the soft power of the European Union has weak power over Azerbaijan. Other issues related to energy cooperation are handled through other channels (Delcour and Duhot, 2011:42). Depending on these conditions, although it is included in the European Union (until 2021), relations with the UK are much perceived as a strategic partnership for Azerbaijan than EU.

3.1. **Trade Relations: Constraints in Azerbaijani Exports**

Currently, Azerbaijani economy is mostly dependent on oil sector. According to 2019 data, the share of the oil sector was 36% in country’s GDP, 90% in total exports and 47% in budget revenues (SSCRA, 2020b). Booming oil production helped the country to take advantage from its enormous natural resource wealth. Therefore, in 1991 GDP per capita was $180, raised $ 5922 in 2010, as of 2019 was $4851.

**Table 2:** Foreign Trade Dynamics of Azerbaijan (2010-2019, in billion $)

<table>
<thead>
<tr>
<th></th>
<th>Turnover</th>
<th>Import</th>
<th>Export</th>
<th>Balance</th>
<th>Turnover</th>
<th>Import Growth (%)</th>
<th>Export Growth (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>33,160.7</td>
<td>6,600.6</td>
<td>26,560.1</td>
<td>19,959.5</td>
<td>106.5</td>
<td>105.0</td>
<td>106.9</td>
</tr>
<tr>
<td>2011</td>
<td>44,161.7</td>
<td>9,756.0</td>
<td>34,405.7</td>
<td>24,649.7</td>
<td>104.0</td>
<td>145.3</td>
<td>92.6</td>
</tr>
<tr>
<td>2012</td>
<td>43,813.5</td>
<td>9,652.9</td>
<td>34,160.6</td>
<td>24,507.7</td>
<td>95.5</td>
<td>96.9</td>
<td>95.1</td>
</tr>
<tr>
<td>2013</td>
<td>43,554.1</td>
<td>10,712.5</td>
<td>32,841.6</td>
<td>22,129.1</td>
<td>102.7</td>
<td>109.1</td>
<td>100.7</td>
</tr>
<tr>
<td>2014</td>
<td>39,407.5</td>
<td>9,187.7</td>
<td>30,219.8</td>
<td>21,032.1</td>
<td>95.7</td>
<td>85.4</td>
<td>99.0</td>
</tr>
<tr>
<td>2015</td>
<td>25,809.0</td>
<td>9,216.7</td>
<td>16,592.3</td>
<td>7,375.6</td>
<td>99.9</td>
<td>99.5</td>
<td>100.1</td>
</tr>
<tr>
<td>2016</td>
<td>21,596.6</td>
<td>8,489.1</td>
<td>13,107.5</td>
<td>4,618.4</td>
<td>92.7</td>
<td>89.6</td>
<td>94.4</td>
</tr>
<tr>
<td>2017</td>
<td>24,263.8</td>
<td>8,783.3</td>
<td>15,480.5</td>
<td>6,697.2</td>
<td>89.3</td>
<td>83.8</td>
<td>92.9</td>
</tr>
<tr>
<td>2018</td>
<td>31,782.7</td>
<td>11,465.9</td>
<td>20,316.8</td>
<td>8,850.9</td>
<td>100.5</td>
<td>100.2</td>
<td>100.7</td>
</tr>
<tr>
<td>2019</td>
<td>33,138.5</td>
<td>13,667.2</td>
<td>19,471.3</td>
<td>5,804.1</td>
<td>96.3</td>
<td>93.5</td>
<td>98.0</td>
</tr>
</tbody>
</table>

**Source:** Adapted from SSCRA, 2020a.
Azerbaijan foreign trade, especially after 2000 have shown tremendous growth. Comparing with 1990, trade volume increased eight times from four billion to 33 billion US dollars in 2010. In relevant period import volume raised six times from 1 billion to 6 billion dollars and export from 2 billion to 26 billion US dollars. Raising of trade indicators have continued in 2010-2019 period. As shown on Table 2, Azerbaijan is a net exporter country with respect to total trade volume. In 2010 and 2013 period, foreign trade balance was over than 20 billion US dollars. Due to undiversified economic production, foreign trade balance declined sharply in 2015. Main reason of this trend was falling oil prices in the world markets.

Table 3. Azerbaijan’s Foreign Trade with UK (2010-2019, in million $)

<table>
<thead>
<tr>
<th>Years</th>
<th>Export to UK</th>
<th>Growth (%)</th>
<th>Share of UK (%)</th>
<th>Import from UK</th>
<th>Growth (%)</th>
<th>Share of UK (%)</th>
<th>Balance</th>
<th>Total Trade</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>6.44</td>
<td>-</td>
<td>0.03</td>
<td>302.76</td>
<td>-</td>
<td>4.59</td>
<td>-296.32</td>
<td>309.20</td>
</tr>
<tr>
<td>2011</td>
<td>15.87</td>
<td>146.43</td>
<td>0.06</td>
<td>485.72</td>
<td>60.43</td>
<td>4.98</td>
<td>-469.85</td>
<td>501.59</td>
</tr>
<tr>
<td>2012</td>
<td>326.66</td>
<td>1958.35</td>
<td>1.37</td>
<td>496.19</td>
<td>2.16</td>
<td>5.14</td>
<td>-169.53</td>
<td>822.85</td>
</tr>
<tr>
<td>2013</td>
<td>484.36</td>
<td>48.28</td>
<td>2.02</td>
<td>1333.99</td>
<td>168.85</td>
<td>12.45</td>
<td>-849.63</td>
<td>1818.35</td>
</tr>
<tr>
<td>2014</td>
<td>126.45</td>
<td>-73.89</td>
<td>0.58</td>
<td>978.34</td>
<td>-26.66</td>
<td>10.65</td>
<td>-851.89</td>
<td>1104.79</td>
</tr>
<tr>
<td>2015</td>
<td>10.42</td>
<td>-91.76</td>
<td>0.08</td>
<td>553.32</td>
<td>-43.44</td>
<td>6.00</td>
<td>-542.90</td>
<td>563.74</td>
</tr>
<tr>
<td>2016</td>
<td>79.92</td>
<td>666.99</td>
<td>0.59</td>
<td>495.21</td>
<td>-10.50</td>
<td>5.83</td>
<td>-415.29</td>
<td>575.13</td>
</tr>
<tr>
<td>2017</td>
<td>41.20</td>
<td>-48.45</td>
<td>0.30</td>
<td>239.86</td>
<td>-51.56</td>
<td>2.73</td>
<td>-198.66</td>
<td>281.06</td>
</tr>
<tr>
<td>2018</td>
<td>261.45</td>
<td>534.59</td>
<td>1.34</td>
<td>263.72</td>
<td>9.95</td>
<td>2.30</td>
<td>-2.27</td>
<td>525.17</td>
</tr>
<tr>
<td>2019</td>
<td>471.94</td>
<td>80.51</td>
<td>2.40</td>
<td>232.63</td>
<td>-11.79</td>
<td>1.70</td>
<td>239.31</td>
<td>704.57</td>
</tr>
</tbody>
</table>

Source: Adapted from SSCRA, 2020a.

Azerbaijan’s export to the UK is very volatile because country’s export composition has some restrictions. As a matter of fact, exports, which were 6.44 million dollars in 2010, reached the maximum level in 2013 and realized as 484.36 million and continued to fluctuate depending on the developments in oil prices. In 2019, exports of 471.94 million dollars were made, which corresponds to 2.40% of Azerbaijan’s total exports. The UK has played important role in Azerbaijan’s import. From 2010 to 2013, the share of the UK in imports increased from 4.59% to 12% and then decreased gradually and observed as 1.70% in 2019 (See Table 3). Negative trend in import volume between 2014 and 2017 was a result of GDP decline in Azerbaijan economy due to oil price decreasing. A foreign trade deficit was observed in Azerbaijan’s trade relations with the UK until 2018 and this trend turned into a foreign trade surplus in 2019 (SSCRA, 2020a). Although, trade volume increased between 2010-2013 from 309.2 million to 1.8 billion and decreased sharply in 2014, but it realized as 704.54 million US dollars in 2019. It can be expected that positive trend will continue.

Table 4. Azerbaijani Export by Product Group (SITC) to the UK (2010-2018, %)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital goods</td>
<td>9.14</td>
<td>3.68</td>
<td>0.67</td>
<td>1.44</td>
<td>2.77</td>
<td>48.33</td>
<td>4.64</td>
<td>9.35</td>
<td>2.01</td>
</tr>
<tr>
<td>Consumer goods</td>
<td>67.32</td>
<td>55.56</td>
<td>8.06</td>
<td>1.19</td>
<td>6.00</td>
<td>46.10</td>
<td>1.78</td>
<td>3.36</td>
<td>4.18</td>
</tr>
<tr>
<td>Intermediate goods</td>
<td>6.08</td>
<td>2.82</td>
<td>0.67</td>
<td>0.02</td>
<td>1.16</td>
<td>3.73</td>
<td>1.92</td>
<td>10.94</td>
<td>1.23</td>
</tr>
<tr>
<td>Raw materials</td>
<td>17.46</td>
<td>37.93</td>
<td>90.60</td>
<td>97.35</td>
<td>90.07</td>
<td>1.67</td>
<td>91.51</td>
<td>76.26</td>
<td>92.57</td>
</tr>
<tr>
<td>All Products</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Adapted from WITS, 2020.

Petroleum and oil products have the largest share in Azerbaijan’s exports. Despite the positive developments in foreign trade volume with the rapid increase in oil production, no serious change has been observed in the basic components of exports since 2000s. The same trend can be observed in the country’s trade relations with the UK.
Thus, main part of the export is fuel which approximately share 95% of in all export products. Another important point is that oil products has been exporting to the UK as a raw material. Main reason behind export fluctuation is general progress in oil sector (WITS, 2020).

Table 5. Import by product group (SITC) from the United Kingdom (2010-2018, %)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital goods</td>
<td>58.48</td>
<td>59.75</td>
<td>59.21</td>
<td>22.86</td>
<td>30.59</td>
<td>60.63</td>
<td>57.13</td>
<td>48.45</td>
<td>37.18</td>
</tr>
<tr>
<td>Consumer goods</td>
<td>22.88</td>
<td>20.12</td>
<td>20.38</td>
<td>10.39</td>
<td>12.30</td>
<td>21.02</td>
<td>26.04</td>
<td>30.94</td>
<td>49.89</td>
</tr>
<tr>
<td>Raw materials</td>
<td>0.64</td>
<td>0.27</td>
<td>0.02</td>
<td>0.07</td>
<td>0.03</td>
<td>0.23</td>
<td>0.09</td>
<td>0.22</td>
<td>0.15</td>
</tr>
<tr>
<td>All Products</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Adapted from WITS, 2020.

Main components of Azerbaijan’s import from the UK have very different features comparing with export products. Structure of import diversification seem very clear. Contrary to export composition, raw materials have small percentage in imported products. In the 2010-2018 period share of raw materials in import was under 1% and almost unchanged. Prominent fluctuation was observed in consumer goods share within all products. In relevant period the biggest share was belong to capital goods due to British investments in Azerbaijan (WITS, 2020). Azerbaijani oil sector has been dominated by British capital as in 1900s. Therefore, fundamental contents of import structure about British capital in oil and gas sector and consumer goods demand (Mehtiyev, 2018).

With the slowdown in the growth rate of the economy since 2013 and the decrease in oil prices in the world markets since 2014, the development of non-oil sectors in the Azerbaijani economy and diversification of exports started to increase. Depending on economic diversification of sectors, trade relations with Azerbaijan and the UK may improve. The UK can be considered as a market for Azerbaijani export of food products, which is in second place after oil in total exports (Imamverdiyeva and Aliyev, 2015). The non-diversification of Azerbaijani exports increases its dependence on imports and its potential to be affected by external shocks. For this reason, the economy needs to be diversified and therefore to move away from the hydrocarbon economy. Although there are various obstacles on the diversification of export of Azerbaijan's WTO membership will have a positive impact. Azerbaijan declared its membership of the WTO in 1997, but these negotiations have not ended so far.

One of the main reasons for this is that the ratio of agricultural subsidies to total production in Azerbaijan is over 10%. The share of agriculture in GDP is around 11% and constitute 36% of the country’s employment (SSCRA, 2020d: 108). The mismatch between the share of the agricultural sector in GDP and employment rates indicates that the country’s production is largely made by households and small businesses and is closed to international competition due to the possibility of membership in the World Trade Organization (WTO). Another problem is that some interest groups in Azerbaijan suffer from WTO membership. Therefore, WTO membership has been going on for many years and is still not finalized (Juan and Orujova, 2016: 33). Therefore, trade relations of Azerbaijan with Britain are not specific to bilateral relations. Rather, it stems from the internal dynamics of the economy.

3.2. Capital Movements

It is possible to say that Foreign Direct Investments (FDI) came to independent Azerbaijan with the “Contract of the Century” signed after 1994. In the first years of independence, due to the Karabakh War, deep economic depression and domestic political problems prevented FDI. After 1994, British capital also came to Azerbaijan. According to SSCRA (2020a) data, 277 billion dollars of investment was made in the Azerbaijani economy between 1995 and 2019, of which 136 billion dollars (50%) was made up of foreign capital.

The Azerbaijani economy has attracted the most foreign capital (90%) after the 2000s. The share of the oil sector in foreign investments directed to the country is quite large. For example, in 2000, 82% of foreign direct investment in the country belonged to the oil sector and 18% to non-oil fields. Over the years, foreign investments in the form of financial loans have increased, but the biggest share is again directed to the oil sector. The same trend continued in 2019 and 78% of foreign direct investment went to the oil sector and 22% to non-oil sectors (see Table 6).
The UK remains the leader in terms of investment in Azerbaijan with over $27 billion. Today there are about more than 500 companies with British capital in Azerbaijan, most of them operating in the oil sector. Currently, great importance is attached to the development of bilateral relations in the non-oil sector. About 10 business forums and investment summits have been held between Azerbaijan and the UK so far. The UK’s share in both oil and non-oil sectors in Azerbaijan’s foreign direct investments is considerably high (Heydar Aliyev Heritage, 2020).

British investments in Azerbaijan come mostly in the form of fixed investments in the oil and gas sector. The general distribution of such investments by country in Azerbaijan does not differ significantly between 2002-2019. In 2002, 96.8% of total foreign fixed capital investments were made by the partners of the “Contract of the Century” and the UK ranked first with 32.80%. The UK's share in total fixed capital investments between 2002 and 2019 has always been more than 20%. Therefore, the main determinants of capital flows between the UK and Azerbaijan are long-term mega-energy projects and fixed investments (SSCRA, 2020e). Indeed, despite being the largest investor in Azerbaijani oil sector, the UK ranks second after Turkey in the non-oil sector. The barriers to British capital in non-oil sectors are not problems arising from bilateral relations (Mehtiyev, 2018).

Several regulatory and incentive measures have been taken to encourage the protection of investments in the country. For example, Azerbaijan has signed bilateral investment agreements with 51 countries and double taxation agreements with 53 countries including the UK. Apart from this, there are incentives such as exemption from tax for 7 years for those who receive investment incentive certificate, and VAT exemption for the technology equipment to be imported within the framework of the project (Azpromo, 2020). However, even these measures are not enough for non-oil sectors to attract foreign investment. One of the most important factors affecting investments in non-oil sectors is that the country is ranked 129 among 180 economies in the “Corruption Perceptions Index-2020” (Transparency International, 2020). It is known that the development level of more than 90% of the banks in the financial sector is low. Another factor affecting foreign investments in non-oil sectors is the exchange rate system. Although the Central Bank has stated that it has switched to a floating exchange rate system since 2016, a real floating exchange rate system is not applied, an intermediate regime equaling 1 USD = 1.70 AZN is maintained. This increases the dependence of the financial sector in the country to foreign influences (U.S Department of State, 2020). According to the World Bank’s “Doing Business 2020” report, Azerbaijan rose from 80th in 2015 to 34th in 2020. Although this is a very positive development for the Azerbaijani economy, it falls behind in other sub-indexes. For example, it ranked 80th in connection to the electricity grid, 59th in obtaining zoning permits, and 83rd in foreign trade sub-indexes (World Bank, 2020).

The negative factors listed above reduce the temptation to invest in non-oil sectors for other foreign countries, including the UK. Renewable energy cooperation between two countries will be able to increase capital flows from the UK.

Table 6. Foreign investments structure in Azerbaijan (2000-2019, million $)

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Credits</td>
<td>262.9</td>
<td>698.4</td>
<td>3405.9</td>
<td>1880.6</td>
<td>2210.2</td>
<td>2197.8</td>
<td>1783.3</td>
<td>2880.0</td>
<td>1736.1</td>
</tr>
<tr>
<td>Direct Investments</td>
<td>664.1</td>
<td>4030.4</td>
<td>3614.9</td>
<td>8049.2</td>
<td>7483.1</td>
<td>7323.6</td>
<td>5713.8</td>
<td>4109.1</td>
<td>4275.3</td>
</tr>
<tr>
<td>of which oil sector</td>
<td>546.1</td>
<td>3799.9</td>
<td>2955.3</td>
<td>6730.7</td>
<td>6622.7</td>
<td>5617.4</td>
<td>4900.8</td>
<td>3142.0</td>
<td>3345.2</td>
</tr>
<tr>
<td>of which non-oil sector</td>
<td>118.0</td>
<td>230.5</td>
<td>659.6</td>
<td>1318.5</td>
<td>860.4</td>
<td>1706.2</td>
<td>813.0</td>
<td>967.1</td>
<td>930.1</td>
</tr>
<tr>
<td>Oil Bonus</td>
<td>-</td>
<td>1.0</td>
<td>2.0</td>
<td>17.0</td>
<td>2.0</td>
<td>0.1</td>
<td>1.4</td>
<td>450.1</td>
<td>450.8</td>
</tr>
<tr>
<td>Other Investments</td>
<td>-</td>
<td>163.4</td>
<td>1225.0</td>
<td>1750.9</td>
<td>1023.8</td>
<td>639.6</td>
<td>1622.0</td>
<td>797.3</td>
<td>666.9</td>
</tr>
<tr>
<td>Total</td>
<td>927.0</td>
<td>4893.2</td>
<td>8247.8</td>
<td>11697.7</td>
<td>10719.1</td>
<td>10161.1</td>
<td>9120.5</td>
<td>8236.5</td>
<td>7129.1</td>
</tr>
</tbody>
</table>

Source: Adapted from SSCRA, 2020c and SSCRA, 2020d.

The negative factors listed above reduce the temptation to invest in non-oil sectors for other foreign countries, including the UK. Renewable energy cooperation between two countries will be able to increase capital flows from the UK.
4. UK and Azerbaijan: After Brexit

Although more pessimistic pictures were taken in the initial studies on the economic and political consequences of Brexit, difficult negotiations came to an end and the UK officially left the European Union by 2021. Great uncertainties persist in Britain’s relations with both the European Union and other countries. It is estimated that Brexit will hurt both the European Union and the UK relations. However, the extent of this damage will depend on the bargaining power and bilateral relations to be signed (Chang, 2018: 2350).

The country’s rich energy reserves and geopolitical position remain the main determinants of Azerbaijan-UK and Azerbaijan-European Union relations. The wealth of natural resources of Azerbaijan increases its maneuverability in its foreign policy and bilateral relations. Azerbaijan does not have a goal of full integration to the European Union in contrast with Armenia and Georgia although the foundations of bilateral relations were laid with the Partnership and Cooperation Agreement (PCA) signed in 1999, (Aliyeva, Delcaur and Kostanyan, 2017: 20). On the other hand, the European Union’s inability to take an active role in the solution of the Nagorno-Karabakh conflict and its proposals within the framework of the European Neighborhood Policy (ENP) and the Eastern Partnership initiative were not attractive to Azerbaijan, causing bilateral relations to be carried out in the form of strategic cooperation over the energy field (Gils, 2018; Hajiyev and Abilov, 2019: 54-55). The incompatibilities between what the European Neighborhood Policy promises and demands to the member countries and the top-down and unilateral approach of the European Union have led to questioning the credibility of this policy. In a long-term perspective, close cooperation with the European Union in the field of energy and transport has strategic importance for Azerbaijan. Azerbaijan sees the European Union as a major market for its export commodities and is eager taking part in European energy security (Oktay, 2017: 95).

The European Union considers Azerbaijan as an alternative route to ensure its own energy security and to reduce dependence on Russian energy resources. Therefore, cooperation in the field of energy and transport has common strategic importance for both parties (Frank et al. 2010; Abilov and Hajiyev; 2019: 57). As a matter of fact, the “Memorandum of Understanding on Strategic Partnership in the field of energy” agreement between the European Union and Azerbaijan was signed on November 7, 2006, one week before the action plan signed within the framework of the European Neighborhood Policy (Aliyeva, Delcaur and Kostanyan; 2017: 25). Relations between Europe and Azerbaijan have entered a new phase since 2016. Negotiations are underway for an agreement to replace the 1996 PCA agreement, which envisages more frequent cooperation and coordination. Regardless of the realization of Brexit, since relations between the European Union and Azerbaijan are based on a pragmatic ground, it is possible to predict that these relations will continue and strengthen as long as bilateral interests are protected (Gils, 2018: 1589).

When we evaluate the relations between Azerbaijan and the UK from the perspective of bilateral trade relations and capital flows, there is very different panorama. The strategic energy investments of the UK in Azerbaijan are more than investments in non-energy sectors. The “Contract of the Century” was renewed in 2017 and the term of the agreement was extended until 2050. Therefore, it is possible to predict that the British capital will remain in Azerbaijan until 2050 because BP is main operator of projects (BP, 2021). According to Dunning and Lundon (2008), they show different reactions depending on the political decisions of the country and the investment environment due to the type of foreign direct investments coming to the country. According to the authors’ opinion, investors who invest in natural resources and strategic assets are not much affected by political decisions and changes in the investment environment (Dunning and Lundon, 2008: 62-68).

Sheperd and Peters (2020) argue that there will be a demand shift from Britain towards developing countries, including Azerbaijan, after Brexit. Although Brexit does not have a serious impact on Azerbaijan’s exports to the EU-27, it has the potential to increase its exports to the UK by approximately 1% compared to 2015 (Shepherd and Peters, 2020: 25). The course of bilateral relations will mostly depend on the agreements to be signed between countries. Recent developments indicate that the two countries will act jointly not only in the oil and natural gas sectors but also in the renewable energy sector. As a matter of fact, after the Azerbaijan Joint Intergovernmental Commission (JIC) meeting between the Ministry of Energy of Azerbaijan and the Ministry of Trade Policies of the UK on 22 May 2019, it was declared that the two countries will act jointly in the field of renewable energy (UK Government, 2019).

The “Memorandum of Understanding on Economic and Trade Cooperation between the Government of the Republic of Azerbaijan and the Government of the UK” signed between Azerbaijan and the UK in 2015 will be the building block for increasing bilateral relations in non-oil sectors as well (See Table 1). The loss of the biggest political support of Azerbaijan within the European Union mostly creates uncertainties during relations with the European Union, although there are some arguments that Brexit has a weak effect on bilateral economic relations.
It will be very difficult for Baku making lobby for gas and other transport projects to Europe in the absence of London in the European Union (Valiyev, 2017: 3).

Because Azerbaijani economy does depend on oil production and export, signing a comprehensive Free Trade Agreement with the European Union does not have much economic benefit. Therefore, without achieving export potential and development of the manufacturing industry, agriculture, processed food, textile sectors and the signing of such an agreement will put domestic producers in a difficult situation and reduce the budget revenues only in the highlighted sectors (Juan and Orujova, 2016: 32). It is known from the research that the customs tariffs are applied for financial purposes rather than for protection (Seyfullayev, 2020: 127). On the other hand, being a member of WTO is a prerequisite for signing a DCFTA (Deep and Comprehensive Free Trade Area) type agreement with the European Union. Therefore, the economic benefits of signing a DCFTA type agreement in a short term are not great (Hajiyev and Abilov, 2019: 56-57). Azerbaijan has free trade agreements only with Commonwealth of Independent States (CIS) countries. In the short and medium term, it is possible to expect the signing of a Preferential Trade Agreement between Azerbaijan and the UK. Although in the statement made by the Ministry of Foreign Affairs of Azerbaijan, it was stated that preparations for signing a new trade agreement with the UK have started, however no such agreement has been signed until today.

5. Conclusion

After Azerbaijan gained its independence, processes of country’s went forward to three stages. In the first phase, bilateral diplomatic relations were established between 1991 and 1994. However, commercial and political relations could not progress at the desired level in Azerbaijan due to internal political problems and the Karabakh War. Between 1994 and 1998, trade relations were more established, and British capital directed to newly independent Azerbaijan. Since 1999, last instrument has centered at the level of strategic cooperation. The relations between United Kingdom and Azerbaijan continued to rise after the strategic cooperation phase.

The country that invests the most in the Azerbaijani oil sector has been the United Kingdom. All types of investment are not affected by political decisions since they have a long-term and strategic nature. When the foreign trade flows between the two countries are examined, it has been determined that 90% of the exports from Azerbaijan are petroleum products. On the import side, it has been determined that mostly capital, consumption and intermediate goods constitute 97% of the total imports from the United Kingdom. The most important factor affecting the trade between the United Kingdom and Azerbaijan is oil prices, consumers demand and companies’ investments expenditure.

When the investment portfolio of the United Kingdom in Azerbaijan is examined, capital flows between the two countries do not overreact to Brexit. Initiatives to deepen cooperation in the field of renewable energy between Azerbaijan and the United Kingdom have been identified. These initiatives give hints that British capital will increase in the non-oil sectors of Azerbaijan. Considering that bilateral trade relations are more dependent on oil trade, there is a possibility of signing a preferential trade agreement between Azerbaijan and the UK. Despite losing its most important supporter in the European Union after Brexit, Azerbaijan remains a new investment area for British companies whose activities were restricted within the European Union.

References


