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47th RSEP International Multidisciplinary Conference

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ISBN: 978-625-90336-0-0/June 2026
HCC. ST. MORITZ HOTEL

May 15-16, 2026
Barcelona, SPAIN

47th RSEP International Multidisciplinary Conference
ISBN: 978-625-90336-0-0/June 2026

BC GRUP INC

Editors
M. Veysel Kaya
Patrycja Chodnicka - Jaworska

Publisher: BC GRUP INC
Certificate No: 6641
Address: Mustafa Kemal Mah. 2134. Sokak Dereli Apt. No:15/2 Cankaya/Ankara/Turkey

Publication Date: 01.06.2026

ISBN: 978-625-90336-0-0/June 2026

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The Impact of Economic Growth on Poverty and Regional Inequalities in Tunisia: An Econometric Panel Data Approach

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Abstract

This paper examines the impact of economic growth on poverty and regional income inequality in Tunisia using a dynamic panel data approach covering the country’s main regions over the period 1990–2025. The analysis is framed within the growth–inequality–poverty triangle to explore the interdependencies among these three dimensions of development. Following a descriptive analysis of regional dynamics, including summary statistics and correlations, the study estimates a set of interrelated dynamic equations using fixed-effects models to account for temporal persistence and unobserved regional heterogeneity.

The results indicate that economic growth in Tunisia has not consistently been pro-poor and has had limited impact on poverty reduction due to weak job creation and uneven distribution of growth benefits across regions. The relationship between growth and inequality is only partially consistent with the Kuznets hypothesis, and persistent regional disparities highlight that growth remains concentrated in coastal and wealthier regions, whereas inland areas continue to lag. Institutional and socio-economic factors emerge as key determinants of inequality and poverty outcomes. From a policy perspective, the findings underscore the importance of designing targeted regional development strategies, promoting inclusive governance, and ensuring equitable allocation of public investment to transform economic growth into an effective instrument for reducing poverty and regional disparities in Tunisia.

Keywords: Economic growth; Poverty; Income inequality; Regional disparities; Tunisia; Fixed-effects panel models
Jel codes: O47, I32, R11

Public Debt, GDP Contraction in 2020, and The Speed of Recovery to the Pre-crisis Output Level: Evidence from the COVID-19 Crisis

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Abstract

This article examines whether the public debt-to-GDP ratio before the COVID-19 crisis was associated with a deeper output contraction in 2020 and a longer period of recovery to the pre-crisis GDP level. Using a cross-country quantitative design and multifactor linear regression models, the study evaluates two dependent variables: GDP growth in 2020 and the number of years required to return to the 2019 GDP level. The main explanatory variable is government debt in 2019, while lockdown stringency, investment share, institutional quality, population, and tourism exposure are used as controls. The results suggest that higher pre-crisis public debt was systematically associated with both a larger GDP decline in 2020 and a slower recovery path. The debt coefficient remains statistically significant across baseline and extended specifications, while supplementary models show that institutional quality and government effectiveness improved crisis performance but did not eliminate the adverse debt effect. The article argues that public debt should be interpreted as a crisis-preparedness variable because it shapes fiscal space, policy credibility, and the efficiency of discretionary intervention during large shocks. The findings contribute to the literature by shifting attention from the size of fiscal packages during the pandemic to the pre-crisis balance-sheet conditions under which those packages were deployed. The policy implication is that rebuilding fiscal space in normal times is not merely a question of formal fiscal discipline; it is also a condition for macroeconomic resilience when the next systemic crisis arrives.

Keywords: public debt; GDP contraction; recovery duration; COVID-19 crisis; fiscal space
Jel codes: E62, H63, O11, O47

Organizational Behavior in Education Using AI Technology

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Abstract

Education and educational economics are closely related, focusing on different aspects of the functioning of education. AI is a ubiquitous new curriculum at colleges and universities, studies and motivational processes, school practitioners are unprepared for greater financial investments and therefore step unprepared into the future. What activities and investments are ahead of higher education so that universities and polytechnics can develop effective curricula for the AI. Education is the broad field that studies teaching, learning, schools, and educational systems. Main Focus: How people learn, Teaching methods and curriculum design, Child and adult development, Educational psychology, School leadership and policy. Education Economics applies economic theory and statistical methods to analyze education systems. More education → more AI → better skills → higher productivity → higher wages.

Keywords: Education, AI Technology, How people learn, Education Economics
Jel codes: I20, I23, O33

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The Effect of Government Expenditure on Private Consumption in Selected MENA Countries

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Abstract

This study examines the effect of government expenditure on private consumption in twelve selected MENA countries over the period 1994–2022. The analysis employs panel Autoregressive Distributed Lag (ARDL) estimators and Common Correlated Effects approaches to account for slope heterogeneity and cross-sectional dependence. The empirical findings indicate that real GDP has a positive effect on private consumption in the short run. In the long run, the Mean Group (MG) and Common Correlated Effects Mean Group (CCEMG) estimators show that government expenditure has a positive and statistically significant effect on private consumption. The error-correction results confirm adjustment toward the long-run equilibrium, while the causality analysis indicates bidirectional causality between government expenditure and private consumption. Overall, the findings suggest that fiscal policy plays an important role in shaping household consumption in MENA economies. The study provides policy-relevant evidence on the use of public expenditure to support private consumption while maintaining fiscal sustainability.

Keywords: Government expenditure; Private consumption; Panel ARDL; Common Correlated Effects; MENA.
Jel codes: H50, E21

Macroeconomic Determinants of Amman Stock Exchange Development: Evidence from Johansen Cointegration and VECM

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Abstract

This paper examines the macroeconomic determinants of Amman Stock Exchange development in Jordan over the period 1980–2018. Stock-market development is measured using the market-capitalization ratio, while domestic savings, foreign direct investment, real income per capita, market liquidity, trade openness, and crisis-period effects are included as explanatory variables. Using annual data from the Amman Stock Exchange, the World Bank, and the Central Bank of Jordan, the study applies ADF unit-root testing, Johansen cointegration, and Vector Error Correction Model estimation. The results confirm the existence of a long-run relationship between ASE development and the selected macroeconomic variables. Domestic savings and market liquidity are positively associated with stock-market development in the long run, whereas real income per capita and crisis-period shocks have negative long-run effects. Foreign direct investment and trade openness are not statistically significant in the long run. In the short run, market liquidity and trade openness are the only significant variables, with market liquidity showing a negative effect and trade openness showing a positive effect. The findings suggest that ASE development depends more on domestic savings, market liquidity, and macroeconomic stability than on foreign capital inflows. Strengthening savings mobilization, improving market depth, and reducing crisis-related uncertainty may therefore support the long-term development of Jordan’s stock market.

Keywords: Amman Stock Exchange, macroeconomic determinants, market capitalization, VECM, Jordan.
Jel codes: G10, C32

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Renewable Energy, Carbon Emissions, and Current-Account Dynamics in Morocco: Evidence from a VECM Approach

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Abstract

This paper examines the relationship between renewable energy consumption, industrial-process CO_2 emissions, economic complexity, and Morocco’s current-account balance over the period 2001–2022, and relates the current account to renewable energy consumption, industrial-process CO_2 emissions, and economic complexity. The results indicate that the variables are cointegrated, which supports the estimation of a VECM. The main long-run result is that industrial-process CO_2 emissions are negatively associated with the current account. Renewable energy consumption and economic complexity, however, do not show statistically significant effects in the estimated model. The short-run results also provide no clear evidence that changes in these variables explain movements in the current account. These findings suggest that Morocco’s external balance is still more closely linked to carbon-intensive production than to the benefits expected from renewable-energy consumption. The results also imply that renewable energy may contribute more to the current account only when the transition becomes less dependent on imported equipment, technology, and intermediate inputs.

Keywords: Renewable energy; Current account; CO_2 emissions; Economic complexity; Morocco, VECM.
Jel codes: Q43, F32

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Sustainability, Climate Risks and Green Insurance Products: An Integrated Framework Analysis

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Abstract

The insurance sector, as one of the most critical institutions of the global financial system, is at the forefront of playing an effective role against the effects that increase the impact of climate change. This study presents a comprehensive, general framework addressing the principles of sustainability, climate-related risks, and the effects of the emergence of green insurance products. The UNEP-FI Sustainable Insurance Principles (PSI), drawing on national and international sustainability standards, primarily the Paris Agreement and the latest IPCC assessment reports, prepare a role map for how the insurance sector is adapting to the rapidly changing risk landscape. It argues that climate change not only challenges traditional actuarial models based solely on historical claims data but also creates structural incentives for innovation in product design. Green insurance products, highlighting renewable energy companies, green buildings (LEED certified), organic farming, low-carbon transportation, environmental pollution liability, and wildfire protection, are identified as key tools for aligning the sector with the global net-zero transition agenda. The role of major reinsurers—Swiss Re and Munich Re—in guiding climate-resilient solutions is critically evaluated. Furthermore, Turkey's 2053 Net-Zero Emissions Target and long-term climate change strategy are examined as a regional case study. The findings are as follows: This demonstrates that scaling up green insurance penetration, strengthening public-private partnerships, and incorporating ESG criteria as a measure of insurance value are essential for both financial resilience and achieving sustainable development goals.

Keywords: Climate change, sustainability, green insurance, natural disaster, risk management, ESG, net zero, reinsurance
Jel codes: G22, Q54

Bayesian State-Space Modeling of the Yield Curve with Fan Chart Forecasts

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Abstract

This paper develops a Bayesian state-space modeling approach for the yield curve, emphasizing the construction of fan charts for probabilistic forecasting. By incorporating key macroeconomic indicators and policy rates, the model captures both level and slope dynamics while providing a transparent depiction of forecast uncertainty. Bayesian updating allows the model to integrate new information sequentially, improving predictive accuracy. Empirical results demonstrate the model's effectiveness in generating reliable yield curve forecasts and associated fan charts, offering a robust tool for risk assessment and financial decision-making.

Keywords: Yield curve forecasting, Bayesian state-space model, Macroeconomic indicators, Monetary policy
Jel Codes: C11, E43, E52, G17

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Ordoliberal Economic Policy: A Framework for Stability in an Unstable World

Piotr Pysz & Anna Jurczuk & Michał Moszyński
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Abstract

Ordoliberalism advocates a regulatory framework that ensures competitive markets while maintaining state intervention to prevent monopolies and economic instability. In recent years, increasing global uncertainty has tested models of economic governance around the world. Therefore, ordoliberal rules should regain relevance in contemporary discussions as states grapple with dysfunctions and crises affecting the economy, including climate change, the rise of populism and protectionism. The aim of this article is to assess the ability of ordoliberal theory to offer an economic policy framework that balances market efficiency with resilience to contemporary governance challenges. In particular, it analyses how ordoliberalism can deal with contemporary crises while avoiding the pitfalls of excessive state intervention or the weaknesses of the laissez-faire approach. Methods: The research methodology involves a critical analysis of the works of the most essential representatives of ordoliberal thought, particularly Walter Eucken and others, from the perspective of the above mentioned purpose of the study. This requires examining German-Polish and English-language publications of the authors included in the mainstream ordoliberalism. Findings & Value Added: Ordoliberalism, as a synthetic concept combining sustainable socio-economic order with a market-based economic process and fundamental ethical values offers a suitable theoretical rationale for reformulating socio-economic policy. The ordoliberal conception of the state, with its emphasis on the rule of law and the constitutional limitation of state intervention in the economic process, serves as a real counterbalance to populist tendencies that prioritise short-term economic solutions. Such research marks a return to thinking in terms of economic order, thus contributing to the development of ordoliberal theory.

Keywords: ordoliberalism; liberalism; neoliberalism; economic order
Jel Codes: B25; B59

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China's Outward Foreign Direct Investment: Determinants, Patterns and Emerging Challenges

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Abstract

The rapid growth of China's outward foreign direct investment (OFDI) reflects the country's expanding role in the global economy and its increasing capacity to shape international economic relations. Over the past two decades, China has significantly intensified its investment activity across both developed and developing regions, leading to notable shifts in the geographical and sectoral distribution of global capital flows. The objective of this paper is to examine the determinants, patterns, and emerging challenges of China's outward FDI. In particular, the study analyzes the geographical and sectoral allocation of Chinese investments and identifies the key economic, strategic, and policy-driven factors underlying China's global expansion. The empirical analysis is based on data from multiple national and international sources, including MOFCOM, UNCTAD, and the American Enterprise Institute's China Global Investment Tracker. Quantitative methods are employed to assess trends in the spatial and sectoral distribution of Chinese OFDI, with particular attention to changes in investment destinations and sectoral priorities over time. In addition, a critical review of the literature, supported by selected case studies of major Chinese investments, provides qualitative insights into the strategic motivations driving China's outward investment. The findings highlight the evolving nature of China's OFDI, including a gradual shift toward more diversified and technology-oriented investments, as well as the growing importance of policy frameworks such as the Belt and Road Initiative. At the same time, the paper identifies emerging challenges related to geopolitical tensions, regulatory constraints, and increasing scrutiny of Chinese investments in host economies. The study contributes to a more comprehensive understanding of the dynamics and implications of China's outward FDI in a changing global environment.

Keywords: Chinese FDI, global expansion, strategic asset-seeking, energy security, Belt and Road Initiative, China's economic activities
Jel Codes: F21, F23, O53

The Practicability of the Bank Secrecy Act in Combating Illegal Financial Flow: A Sequential Explanatory and Non-Experimental Correlational Study

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Abstract

The Bank Secrecy Act, passed by Congress and signed by President Nixon on October 26, 1970, was intended to help banks detect and prevent money laundering and other financial crimes. While the Act had good intentions, it has faced challenges, particularly due to high compliance costs, casting doubt on its effectiveness. This study examines how compliance with the Act relates to illegal financial flow activities and the factors that have led to noncompliance. The main problem is that the Bank Secrecy Act has struggled to curb illegal financial flows due to these compliance challenges. This study focused on 72 commercial banks in New Jersey and included participants such as Bank Secrecy Act officers, auditors, IT officers, management staff, and CEOs. The study employed a mixed-methods design using random and purposive sampling. Data was collected via an online questionnaire in Qualtrics, and selected government reports and archives were reviewed to support the findings. The analysis employed Spearman's correlation and content analysis of archived records. The results showed a moderate association between compliance with the Bank Secrecy Act and the occurrence of illegal financial flows. However, the Act has not been very effective, mainly due to noncompliance. Noncompliance has been due to various reasons, including the costs of complying with the rules and the specific goals organizations pursue. All parties and stakeholders, especially enforcement agencies, need to work together to encourage compliance with the Act rather than relying solely on fines and penalties. If these noncompliance issues are not tackled, they could harm the integrity of financial systems. It is recommended to examine broader motivational factors to improve compliance rather than relying solely on punitive measures. A nationwide survey could also help capture a wider variety of responses and identify overall trends related to this problem. By George Ampofo

Keywords: Bank Secrecy Act, Illegal Financial Flow, Compliance
Jel Codes: C12, B29

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Examining the Interaction Between Tax Audit and Amnesty in Corporate Tax Compliance: Evidence from Indonesia’s Natural Resource Sector

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Abstract

Indonesia’s natural resource sector contributes substantially to GDP (12.44%) but relatively less to tax revenue (10.22%), indicating a gap in tax compliance. This study examines the causal and dynamic impact of tax audits on corporate tax compliance in the sector and explores how these effects interact with the Tax Amnesty Program. Using administrative panel data from the Directorate General of Taxes (2012–2020), this study applies a quasi-experimental approach with staggered difference-in-differences to address variation in audit timing across firms. To mitigate selection bias from non-random audit assignment, entropy balancing is employed, alongside tests of the parallel trends assumption. The analysis further leverages variation in tax amnesty participation to estimate interaction effects between audit exposure and program participation. Tax compliance is measured using the corporate tax turnover ratio, timely filing, and timely payment. The results indicate that tax audits are effective in increasing compliance in the short term, consistent with a deterrence effect. However, this impact diminishes over time, suggesting a decaying behavioural response. Additionally, firms audited and subsequently participating in the tax amnesty exhibit a weaker enforcement effect, suggesting possible moral hazard or strategic reporting behaviour. This study contributes by providing causal evidence on the temporal dynamics of audit effectiveness and highlights the interaction between enforcement and amnesty policies using administrative data. It also offers insights into whether tax amnesty programs complement or substitute traditional enforcement mechanisms in improving compliance.

Keywords: deterrence; enforcement; firm heterogeneity; policy evaluation; staggered
Jel Codes: H26; H25; C23; C21

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When Policy Coordination Matters: Monetary Fiscal Regimes and Debt Dynamics: Evidence From Indonesia, Philippines and Thailand 2011-2025

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Abstract

The interaction between fiscal and monetary policy has become increasingly important in emerging economies facing rising public debt and tightening global financial conditions. This study investigates how monetary-fiscal policy regimes affect public debt dynamics in Indonesia, the Philippines, and Thailand using quarterly data from 2011Q1 to 2025Q3. A Markov-switching framework is employed to estimate monetary policy rules and fiscal reaction functions in order to identify active and passive policy regimes. These regimes are subsequently combined to construct monetary-fiscal policy configurations and evaluate the degree of policy coordination. Fiscal sustainability is further assessed using the government debt dynamics equation and the debt-stabilizing primary balance, while a Vector Autoregression (VAR) model is applied to examine the responses of debt dynamics to monetary, fiscal, and macroeconomic shocks. The findings reveal substantial cross-country heterogeneity. Indonesia is predominantly characterized by an active monetary-passive fiscal regime, reflecting relatively strong policy coordination and more stable debt dynamics. In contrast, the Philippines exhibits a passive monetary-active fiscal configuration associated with fiscal dominance and higher vulnerability to policy shocks. Thailand is mainly dominated by a passive monetary-passive fiscal regime, indicating weaker macroeconomic adjustment mechanisms. Overall, the results highlight the critical role of monetary-fiscal policy coordination in maintaining macroeconomic stability and ensuring public debt sustainability in ASEAN emerging economies.

Keywords: fiscal-monetary coordination, policy regimes, public debt dynamics, Markov-switching, fiscal sustainability
Jel Codes: E52, E62, H63, C34

Technology and Value Creation in Healthcare Services: An Empirical Study

Moataz Mobasher
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Abstract

This paper examines how digital technologies contribute to value creation in medical services, combining empirical analysis with relevant theoretical perspectives. The study focuses on the role of technologies such as telemedicine platforms, electronic health records, and AI-assisted diagnostics in shaping interactions between healthcare providers, patients, and supporting institutions. Drawing on service-dominant logic and value co-creation theory, technology is approached as an enabler of service processes rather than as an isolated resource. The empirical component investigates how the use of digital technologies influences key dimensions of medical service delivery, including accessibility, efficiency, and the quality of patient-provider interactions. The findings indicate that technology supports more timely access to care, facilitates information sharing, and contributes to more coordinated service provision across different actors within the healthcare system. The study identifies several constraints that affect the extent to which value can be realized, including issues related to data management, system interoperability, and unequal access to digital infrastructure. These limitations suggest that the benefits of technology depend not only on adoption but also on how it is integrated into existing service structures. The paper contributes to a better understanding of how technology shapes value creation in healthcare. It also offers practical insights into how digital tools can be more effectively embedded in medical services to support consistent and accessible care delivery.

Keywords: healthcare services, value creation, digital technology, telemedicine, service quality
Jel Codes: O33, L86

Between Moscow and Beijing, Energy Security Competition in Kazakhstan

Javidan Guliyev
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Abstract

The study demonstrates that Kazakhstan's energy autonomy will be persistently shaped by structural constraints, namely, reliance on Russian-controlled transit infrastructure, especially the Caspian Pipeline Consortium, continued deep economic interpenetration within the Eurasian Economic Union, and an expanding Chinese investment and import presence, which identifies strong evidence of strategic means at the same time. Kazakhstan has been interested in diversifying its export routes (through the Trans-Caspian Middle Corridor and the Baku-Tbilisi-Ceyhan pipeline) while maintaining a multi-vector diplomatic stance against Moscow and Beijing. Kazakhstan utilizes the differences between Russian and Chinese interests to widen its strategic space. The country's geographical position, situated between two rival powers, rather than being a disadvantage, turned into a diplomatic advantage. The results underscore the strategies adopted by medium states facing superior odds in asymmetrical international structures in the light of evolving great power mechanics. These findings carry broader theoretical implications, suggesting that structural dependence and strategic agency are not mutually exclusive but instead coexist in ways that reward careful diplomatic management over outright alignment.

Keywords: energy security, strategic hedging, multi-vector foreign policy, neoclassical realism
Jel Codes: F51, F52, Q48, F15

Firm Capacity and Financial Constraints in Green Adoption: Evidence from SMEs in the Western Balkans

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Abstract

This paper examines the determinants of green adoption among small and medium sized enterprises in the Western Balkans. Although the green transition has gained policy attention in recent years, evidence at the firm level in this context remains limited. The analysis uses data from the Regional Cooperation Council Balkan Barometer Business Opinion Survey (2025) and considers three outcomes: the adoption of low cost green practices, investment in capital intensive green technologies, and engagement in any green action. Logistic regression models are estimated on subsamples ranging from approximately 550 to 890 firms. The results indicate that ownership characteristics, including women’s ownership, are not statistically associated with green behavior. In contrast, firm size is consistently relevant. Small and medium sized firms are more likely to engage in green activities than micro firms, particularly when considering overall adoption. Access to financial support is also positively associated with capital intensive investments, suggesting that financial constraints remain an important factor. The role of the business environment is less consistent. Perceived informality does not show a significant relationship with green behavior. Corruption, measured through exposure to unofficial payments, is negatively associated with engagement in green practices. Firm age does not display a stable effect across specifications. Overall, the findings suggest that firm capacity and access to finance are more closely linked to green adoption than ownership structure or perceived constraints.

Keywords: Green adoption; SMEs; Western Balkans; financial constraints; firm size; corruption
Jel Codes: Q56, Q55, L25, O12

Silver vs. Gold in the Age of AI: An Empirical Analysis of Return Sensitivities to Technology and Semiconductor Proxies

Keanu Moseler
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Abstract

This paper examines whether silver has a higher sensitivity to returns than gold with respect to AI-related equity proxies in the recent technology and semiconductor cycle. Gold is primarily regarded as a monetary asset and a safe-haven instrument, while silver combines monetary characteristics with a substantially stronger industrial demand base, particularly in electronics and related technologies. Against this backdrop, the study analyzes the weekly log returns of gold, silver, and selected equity proxies from April 13, 2021, to April 13, 2026. The empirical design incorporates baseline regressions, 52-week rolling beta analyses, control models with broader equity market and U.S. dollar proxies, a delta model based on the return differential between silver and gold, a subperiod split, and a comparison with a broad global equity benchmark. The results show that, with respect to SOXX, SMH, and NVDA, silver consistently exhibits higher baseline and rolling betas than gold. This difference becomes more pronounced in the 2024–2026 subperiod, which coincides with the market's intensified focus on generative AI and semiconductor-related growth segments. However, once broader market and USD influences are considered, the effect weakens considerably. Additionally, silver reacts substantially more strongly than gold to the broad world-equity proxy URTH. Therefore, the findings suggest that silver's stronger response is more indicative of generally higher equity, growth, and cyclical sensitivity than of isolated AI exposure. Overall, the paper supports the initial hypothesis regarding simple return sensitivities while qualifying its broader market interpretation.

Keywords: Precious Metals, Silver, Gold, Artificial Intelligence (AI), Semiconductor Equities,
Jel Codes: G11, G12, G15, Q02, E44, O33

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Indirect Effects of GST on Agricultural Input Costs and Sectoral Performance in India

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Abstract

The introduction of the Goods and Services Tax (GST) in 2017 marked a major reform in India’s indirect tax system, aiming to create a unified national market and improve tax efficiency. Although agricultural produce is largely exempt from GST, the sector is indirectly affected through taxation on various agricultural inputs, logistics, and agro-processing activities. This study assesses the indirect impact of GST on agricultural input costs and overall sectoral performance in India. The research employs a descriptive and analytical approach using secondary data obtained from government reports, the Economic Survey, Reserve Bank of India publications, and other credible sources. An econometric framework is used to examine the relationship between agricultural sector growth and key variables such as GST implementation, rainfall deviation, fertilizer consumption, and agricultural credit. Additionally, the study evaluates changes in input costs associated with GST through a dummy variable approach comparing the pre-GST and post-GST periods. The findings highlight that while GST has contributed to simplifying the tax structure and improving supply chain transparency, it has also led to increased costs for certain agricultural inputs and services. The study concludes that GST has both positive and negative indirect implications for the agricultural sector. Therefore, policy measures such as rationalizing tax rates on essential agricultural inputs and strengthening institutional support for farmers are necessary to ensure sustainable agricultural growth in the GST regime.

Keywords: Keywords: GST, Agricultural Inputs, Agricultural Growth, Indirect Tax Reform, India.
Jel Codes: Q14, H25, O13

www.rsepconferences.com CONFERENCE PROCEEDINGS/ABSTRACTS ISBN: 978-625-90336-0-0 /June 2026

Nonlinear Effects of Economic Growth on Vulnerable Employment: Evidence from Semiparametric Dynamic Panel Model in Developing Countries

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Abstract

This paper examines the relationship between economic growth and vulnerable employment in developing countries using a semiparametric dynamic panel model. While standard approaches typically impose linear or quadratic specifications, this study allows the effect of economic growth to vary flexibly across income levels. Using a balanced panel of 110 developing countries over the period 1991–2019, the results reveal a robust inverted U-shaped relationship. At low levels of economic development, economic growth is associated with an increase in vulnerable employment, reflecting limited absorptive capacity in the formal sector. Beyond a critical threshold, however, further growth reduces labour market vulnerability as structural transformation progresses. These findings highlight the importance of nonlinear modelling approaches in capturing heterogeneous labour market dynamics and provide new evidence on the stage-dependent effects of economic growth. The results also carry important policy implications, suggesting that growth alone may be insufficient to improve employment quality without complementary structural policies.

Keywords: Vulnerable employment; Economic growth; Nonlinearity; Semiparametric panel model
Jel Codes: J46; J21; O10; C23; C14

Technological Integration of Artificial Intelligence in Marketing Systems: Enhancing Organizational Performance through Algorithmic Consumer Insights

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Abstract

The rapid evolution of Artificial Intelligence (AI) has transcended its role as a mere operational tool, becoming a core scientific driver for organizational transformation. In the field of management and technology, the integration of advanced algorithms specifically Machine Learning (ML) and Natural Language Processing (NLP) is redefining how businesses interact with their environment. This paper examines the technical mechanisms through which AI-driven systems enhance managerial performance by optimizing the co-creation of customer experience. The research investigates the scientific synergy between data science and marketing strategy by utilizing predictive analytics, organizations can now process vast datasets to anticipate consumer behavior with unprecedented accuracy. This technological shift moves beyond traditional CRM systems towards "Intelligent Engagement Ecosystems." The study adopts a multidisciplinary methodology, combining a systematic review of AI integration frameworks with empirical observations of digital transformation in emerging markets. Key findings highlight that the scientific deployment of AI facilitates a more robust engagement model, where value is co-created through real-time algorithmic feedback loops. The paper concludes that for AI to serve as a sustainable pillar of organizational performance it must be integrated not just as a software solution, but as a scientific methodology that bridges the gap between technological innovation and human-centric management.

Keywords: Artificial Intelligence, Machine Learning, Technology Management, Algorithmic Decision-Making, Digital Performance
Jel Codes: M31 and D83

Human Capital Readiness for Artificial Intelligence in North Africa: A Comparative Study

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Abstract

Artificial Intelligence (AI) is transforming economies and organizations worldwide, but North African countries face challenges in preparing their workforce to adopt these technologies. This study examines the readiness of human capital in Algeria, Tunisia, Morocco, and Egypt to embrace AI in both public and private sectors. Using international data from Oxford Insights, World Bank, UNESCO, and ITU, the research analyzes digital skills, technical education, and vocational training, while also considering the role of digital infrastructure, including internet access and data centers. The study addresses four main questions: (1) How ready is each country for AI adoption according to international indicators? (2) What is the relationship between human capital and AI readiness? (3) How does digital infrastructure affect this readiness? (4) What policies and strategies can strengthen workforce preparedness? The findings will identify gaps, highlight opportunities, and provide practical recommendations for policymakers, HR professionals, and organizational leaders to develop AI-ready skills and strategies. By linking human capital and AI adoption, this research contributes to building a skilled workforce and supporting sustainable digital transformation in North Africa.

Keywords: Human capital, AI readiness, digital skills, North Africa, workforce development, public and private sectors, comparative analysis.
Jel Codes: J24, O33, O15

Bio-inspired Robotics: Adaptive Object Handling Through Cellular Mechanics and Artificial Intelligence

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Abstract

Cells regulate force through molecular clutch mechanisms that dynamically bind and unbind in response to mechanical load. This allows biological systems to adapt to varying stiffness and resistance. In contrast, conventional robotic grippers rely on fixed or PID-based control strategies, which often fail when object properties are unknown or variable. This project develops a bio-inspired computational framework for adaptive robotic gripping based on clutch-like dynamics. A physics-based simulation was implemented in Python, modeling each clutch element as a two-state system with force-dependent transition rates using the Bell model. State transitions were updated probabilistically through a Monte Carlo process. The gripper-object interaction was represented as springs in series using Hookean mechanics, while object properties were derived from the Yale-CMU-Berkeley (YCB) dataset to ensure mechanical realism. From each simulation, key features such as steady-state force, estimated stiffness, binding fraction, and maximum supported load were extracted. To ensure robustness, controller performance was evaluated using nonparametric statistical methods. Permutation testing assessed whether observed differences could arise under the null hypothesis, while bootstrap resampling was used to compute 95% confidence intervals. Across 20,000 trials, the adaptive controller increased mean time-to-slip relative to fixed-force control and showed smaller but consistent improvements over PID control. Unsupervised learning (K-means clustering) grouped objects into mechanically distinct categories, enabling cluster-specific optimal grip forces defined as the minimum force preventing slip without exceeding damage thresholds. Compared to baseline controllers, the adaptive strategy reduced force variability and improved grip stability, demonstrating that clutch-inspired control can enhance robotic manipulation under uncertainty without requiring labeled data.

Keywords: Bio-inspired, Cellular Mechanics, Confidence Intervals, Adaptive Grippers
Jel Codes: C63, O33

Exchange Rate Volatility and Cost Pass-Through in Nigeria's Paint Chemicals Import Sector: A TiO2 Case Study

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Abstract

Naira's depreciation since 2020 has amplified input costs for Nigeria's import-dependent paint industry, but pass-through dynamics to distributors remain underexplored. This paper examines TiO2 price transmission using transaction-level data from Norahlee-Buzor Global Nigeria Limited (2018-2025, n=450), capturing forex shocks, freight volatility, and local demand. A structural vector autoregression (SVAR) model, instrumented by global TiO2 indices and CBN policy rates, reveals asymmetric pass-through: 10% naira weakening raises wholesale prices by 7.1% ($p<0.01$), with lags from inventory buffering, while appreciations show incomplete reversal. Firm margins absorb 35% of shocks, moderated by scale and hedging. These findings inform currency risk strategies for commodity importers in volatile emerging markets, advocating forward contracts and local production incentives for industrial resilience.

Keywords: Supply chain disruptions, Nigeria chemicals.
Jel Codes: JEL Codes: F14, L11, D22, O24

The Innovation Generator Ecosystem Framework for University–Industry Collaboration

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Abstract

University–industry cooperation is widely recognized as a key driver of innovation, yet in emerging markets its effectiveness is often constrained by structural and institutional barriers. This paper argues that the main challenge lies not in the absence of actors, but in the lack of governance mechanisms capable of coordinating their interaction. Drawing on the Triple Helix framework, open innovation, and the literature on innovation intermediaries, the study proposes the Innovation Generator Ecosystem as a platform-based solution to fragmented university–industry collaboration. The model integrates universities, university startup studios, industry, and government into a coordinated innovation pipeline supported by a central orchestration mechanism. Unlike conventional cooperation models, it emphasizes stakeholder alignment, communication, project structuring, and commercialization support. The paper contributes to the literature by shifting attention from actor composition to coordination architecture. It also offers practical implications for policymakers, universities, and firms seeking to build more scalable, resilient, and institutionally grounded innovation systems in emerging markets.

Keywords: University–industry cooperation, innovation, academic entrepreneurship
Jel Codes: O31, O38, L26

www.rsepconferences.com CONFERENCE PROCEEDINGS/ABSTRACTS ISBN: 978-625-90336-0-0 /June 2026

Financial Markets and Renewable Energy Transitions: Evidence from Energy Investment, Domestic Credit, Market Capitalisation and Institutional Quality

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Abstract

The increasing demand for financial investors, multilateral establishments, and private capital markets in renewable energy funding reveals the strategic role of finance in determining future energy directions. The study investigates the role of energy investment, financial markets and domestic credit dynamics in enhancing clean energy adoption in the Next Eleven (N-11) countries, while considering the moderating role of institutional quality. The study disaggregates RE into Solar PV Power, Wind Power, and Hydro Power, capturing and revealing more robust dimensions. The study used data from 2000 to 2024 and adopted the Driscoll-Kraay Fixed Effects model to handle cross-sectional dependence and heteroskedasticity. The results show that energy investment has a constant, significant positive direct contribution to both solar photovoltaic (PV) and wind power capacity. Domestic credit imposes significant positive effects on solar PV, wind power, and hydropower. Market capitalisation effect is also positive and significant in the case of all renewable power capacities, indicating the influence of deeper and more liquid capital markets in attracting capital in renewable power infrastructure. The moderation test showed domestic credit to have negative marginal effects for solar and wind development. It also showed positive market capitalisation effects for solar but negative effects for wind and hydropower under varying institutional conditions. The study recommends that by deepening and greening domestic credit markets, creating vibrant capital markets for clean energy, and improving institutional frameworks, the N-11 can accelerate their transition to sustainable energy systems, mobilise private investment at scale, and advance their climate and development goals simultaneously.

Keywords: Financial markets; Geopolitical tensions; Institutional investors; Renewable infrastructure; Sustainable development
Jel Codes: Q2, Q4, G1, O1, P4

www.rsepconferences.com CONFERENCE PROCEEDINGS/ABSTRACTS ISBN: 978-625-90336-0-0 /June 2026

Climate Risk Engagements

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Abstract

We study climate risk engagements by one of the world's largest institutional investors. They account for a substantial share of ESG engagements and target mostly firms with large carbon footprints and exposure to transition risk. Following engagement, targeted firms are more likely to adopt science-based climate targets and to disclose climate-related information. They also experience a modest reduction in emissions intensity. Moreover, climate risk engagements are associated with greater shareholder support for management in voting outcomes. The recent ESG backlash has led to a reduction in climate risk engagements, concentrated mostly in firms for which climate issues are financially immaterial.

Keywords: Shareholder Engagement, Climate Change, Carbon Emissions, ESG, Activism
Jel Codes: D62, G23, G32, G34, M14, Q54

www.rsepconferences.com CONFERENCE PROCEEDINGS/ABSTRACTS ISBN: 978-625-90336-0-0 /June 2026

Mapping Chinese Firms in Brazil: Territorial Concentration, Regional Expansion, and Green Sector Engagement

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Abstract

The rapid internationalization of Chinese firms since the early 2000s has reshaped global investment patterns, yet micro-level evidence on their territorial and sectoral distribution in host economies remains limited. This paper addresses this gap by mapping and characterizing the presence of Chinese firms in Brazil, with a focus on their spatial distribution, sectoral composition, temporal evolution, and engagement in green sectors. We construct an original georeferenced firm-level database by integrating administrative records from the Brazilian CNPJ with multiple international investment datasets, applying a novel multi-criteria identification strategy to capture both direct and indirect Chinese capital. Using CNAE-based classification, spatial econometrics, and geospatial analysis, the results reveal a strong and persistent concentration of Chinese firms in Brazil's Southeast region, particularly in industrial and infrastructure-intensive states. However, the analysis also identifies a recent and significant expansion toward other regions, especially the Northeast, North, and Center-West—driven by the search for renewable energy potential and access to strategic natural resources. This spatial reconfiguration reflects both domestic locational advantages and global shifts associated with the energy transition and resource security. Additionally, the application of a green sector taxonomy shows a growing—though still uneven—presence of Chinese firms in renewable energy and low-carbon industries. By providing the first comprehensive, high-resolution mapping of Chinese firms in Brazil, this study contributes to the literature on foreign direct investment, global value chains, and economic geography, offering new insights into how Chinese capital is reshaping regional development patterns and the geography of the green transition in emerging economies.

Keywords: Chinese firms; Foreign direct investment (FDI); Brazil; Global value chains (GVCs); Green sectors
Jel Codes: F21; F23; O14

www.rsepconferences.com CONFERENCE PROCEEDINGS/ABSTRACTS ISBN: 978-625-90336-0-0 /June 2026

Blue Carbon and the Economic Valuation of Mangrove Ecosystem Services in Brazil

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Abstract

Coastal ecosystems such as mangroves provide a wide range of ecosystem services that are essential for climate regulation, biodiversity conservation and the livelihoods of coastal communities. In recent years, growing attention has been given to the role of these ecosystems in carbon sequestration and storage, commonly referred to as “blue carbon”. Mangroves are among the most efficient natural carbon sinks, storing large quantities of carbon in both biomass and sediments (Donato et al., 2011; Mcleod et al., 2011). Despite their ecological importance, these ecosystems remain significantly undervalued in economic decision-making and development planning.
This paper examines the economic value of ecosystem services provided by mangrove ecosystems in Brazil, with particular emphasis on blue carbon storage and sequestration. The analysis focuses on coastal areas of high ecological and socio-economic relevance, including the Mundaú Lagoon system and the mangrove ecosystems of the Guaratiba Biological Reserve. These areas illustrate the complex interaction between ecological processes, local livelihoods and environmental governance in coastal regions.
The study applies ecosystem service valuation approaches, drawing on ecological and socio-economic data to estimate the economic significance of key services provided by mangrove ecosystems. Particular attention is given to regulating services such as carbon sequestration and coastal protection, as well as provisioning services related to fisheries and local resource use. By highlighting the economic value of these services, the research contributes to ongoing debates on the integration of ecosystem services into economic analysis and public policy (Costanza et al., 1997; Daily et al., 2009). By combining perspectives from ecological economics and ecosystem service valuation, this study contributes to broader discussions on how environmental values can be incorporated into economic decision-making and climate policy.

Keywords: Blue Carbon; Ecosystem Services; Mangroves; Climate Policy; Brazil.
Jel Codes: Q51, Q57 e Q54

www.rsepconferences.com CONFERENCE PROCEEDINGS/ABSTRACTS ISBN: 978-625-90336-0-0 /June 2026

Smoke in the Womb: Prenatal Air Pollution, Maternal Nutrition Access, and Child Health

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Abstract

This paper examines the causal effects of prenatal exposure to air pollution from agricultural stubble burning and forest fires on child health outcomes in India. Combining high-resolution satellite data on fire activity and $PM_{2.5}$ concentrations with household-level data from the National Family Health Survey (NFHS-5), the analysis constructs trimester-specific measures of pollution exposure during pregnancy. To address endogeneity concerns, the paper employs an instrumental variables strategy that exploits variation in burning intensity and wind direction to generate exogenous changes in local pollution exposure. The results show that increased prenatal exposure to $PM_{2.5}$ significantly raises the probability of child stunting and underweight. The effects are largest during the second trimester, highlighting mid-pregnancy as a critical window of vulnerability for fetal development. In addition, higher pollution exposure alters maternal health behavior by reducing access to antenatal care, during early pregnancy. These findings provide new causal evidence on the developmental impacts of pollution generated by agricultural burning and highlight the dual biological and behavioral channels through which environmental shocks affect early-life health. The results underscore the importance of policies aimed at reducing pollution exposure and strengthening maternal health interventions during high-pollution periods.

Keywords: $PM_{2.5}$, prenatal exposure, child health, stubble burning, forest fires
Jel Codes: Q53, I15, I18, J13, C26