

**“48th RSEP International Conference on Economics, Finance and Business” 1-2 October
2026, University of Washington Rome Center, Rome, Italy**

Female Longevity and Career Interruptions as Parameters of Integrated Household Financial Stability Audit

Angelina Shyltsyna

Bachelor of science in economics, Independent researcher, New York, USA

E-mail: ashyltsyna@barnumfg.com

DOI: <https://doi.org/10.19275/RSEPCONFERENCES404>

Abstract

The classic safe withdrawal rate was calibrated to a continuous 30-year horizon that matches neither the survival profile nor the employment history of most women, while integrated audits of household finances treat the retirement domain as gender-neutral. This paper embeds the Women Wise Longevity Planner, a retirement-planning model developed in advisory practice, into a six-domain financial stability matrix built on qualimetric scoring, analytic hierarchy weighting, and hybrid additive-multiplicative aggregation. The retirement domain is calibrated with a cohort-based longevity stretch factor, a scenario-specific career interruption factor, a residual gender pay gap offset, and an early reserve window that begins 10 years before retirement. Monte Carlo recomputation with open parameters reproduces the published ruin probabilities within 1 to 3 percentage points and yields four results. First, calibrating the retirement domain to the female trajectory shifts the integral index by 3 to 12 points on the 0 to 100 scale, depending on the scenario and life-cycle stage, and moves interrupted-career households across a stability-tier boundary. Second, longevity and career breaks enter the ruin probability through a product of horizon and accumulated capital, so their joint effect exceeds the sum of isolated effects by about 2 percentage points. Third, separating the interruption effect from the residual pay gap removes a double count present in the first specification and reconciles the withdrawal rate formula with its published value of 3.3%. Fourth, the early reserve window operates on the lower tail of wealth at retirement and on the frequency of forced sales, leaving the lifetime ruin probability unchanged. The findings apply to advisors auditing multigenerational households and to designers of composite financial health indices.

Keywords: household financial stability audit, female longevity, career interruptions, gender pension gap, safe withdrawal rate

JEL codes: D14, G51, J16, J26

1. Introduction

Two standards that govern retirement planning in advisory practice were built on incompatible assumptions. The safe withdrawal rate of 4% is derived from historical simulations that fix the payout period at 30 years (Bengen, 1994) and were confirmed on the same fixed horizon for equity-heavy portfolios (Cooley et al., 1998), and both presume an uninterrupted earnings path before retirement. The professional standards that define comprehensive financial planning through six functional domains require the retirement domain to account for longevity risk, yet they carry no provision for the shape of the working life that precedes retirement. A household audit that rests on both standards inherits a retirement domain calibrated for a reference case that most women never occupy.



The articles on the RSEP Conferences website are bear Creative Commons Licenses either CC BY or CC BY-NC-ND licenses that allow the articles to be immediately, freely, and permanently available on-line for everyone to read, download, and share.

Three structural departures from that reference case are documented in public statistics. A woman reaching age 65 in 2024 has a cohort life expectancy of 21.8 years, compared with 19.2 years for a man, and the figure for women reaching 65 in 2050 rises to 23.3 years (Social Security Administration, 2024). Women accumulate 8.6 years of paid work for every 10 years recorded by men because of shorter hours, longer breaks between jobs, and part-time roles (McKinsey Global Institute, 2025). Across OECD countries, the gap in lifetime earnings between men and women averages 35%, and the resulting gender pension gap stood at 23% in 2024, down from 28% in 2007 (OECD, 2025). The first departure lengthens the decumulation horizon; the second and third compress the capital available at the retirement date; and a rule calibrated for a shorter, smoother path leaves the household exposed on both sides.

The Women Wise Longevity Planner, hereafter WWLP, was developed firsthand within advisory practice at Barnum Financial Group in response to that mismatch and was published as a lifecycle model that recalibrates the withdrawal rate, the accumulation target, and the timing of portfolio de-risking to female demographic conditions (Shyltsyna, 2025a). The project received the Innovator of the Year award in financial services at the Cases and Faces international business conference in 2025, which confirmed practitioner demand for a gender-aware planning rule. In parallel, direct work with multigenerational households produced a matrix methodology for systemic wealth auditing in which six domains of household finance are scored on a 0-100 scale, weighted by life-cycle stage, and aggregated into a single Financial Health Index (Shyltsyna, 2026). Each publication treats its subject in isolation. The model calibrates one domain without reference to the others, and the matrix scores the retirement domain without reference to gender.

This paper closes that gap by placing WWLP inside the matrix as the module that calibrates the retirement domain and by asking what happens to the integral index when the calibration follows the actual shape of the female trajectory. In the available literature, no composite household index has been recalibrated in this way, and no gender-specific withdrawal model has been evaluated through its effect on an integral score. Four claims organize the argument. First, the integral assessment of household stability changes when the retirement domain is calibrated to female longevity and career interruptions. Second, longevity and career breaks act on the index through different channels, and their combined effect is not additive, which is why the two must be modeled within a single framework. Third, separating the effect of career interruptions from that of the residual pay gap avoids double-counting and constitutes a methodological result in its own right. Fourth, an early transition to the reserve segment of the portfolio serves as a compensating lever within the retirement domain, improving it without raising the savings rate.

Section 2 reviews the literature. Section 3 sets out the data, the second iteration of the model specification, the simulation parameters, and the coupling construct that turns a ruin probability into a domain score. Section 4 reports the recomputation and the four results. Section 5 discusses implications for audit practice, situates the findings against the decumulation literature, and states the limitations. Section 6 concludes.

2. Literature Review

2.1. *Safe withdrawal rates and the probability of ruin*

The 4% rule emerged from overlapping 30-year windows of United States returns and an equity allocation between 50 and 75% (Bengen, 1994). The Trinity study confirmed the range of data from 1926 to 1995 and tied success to a fixed 30-year payout (Cooley et al., 1998). Recent evidence undermines both the return assumption and the horizon assumption. On asset returns from 38 developed markets, a 65-year-old couple willing to accept a 5% chance of ruin can withdraw 2.31% per year, a rate far below conventional advice (Anarkulova et al., 2025). The same study replaces the fixed horizon with mortality tables, so that the withdrawal problem becomes a survival problem under an uncertain lifetime. A ruin-theory approach applied to the transaction records of more than 4,500 Canadian retirees estimates the time to exhaustion of funds and the probability of ruin within remaining life expectancy for men and women separately (Daraei and Sendova, 2024). That study is the closest antecedent to the present paper because it treats gender as a dimension of ruin probability, although it stops short of connecting the result to any integral measure of household condition. The binary failure metric itself has been questioned in favor of utility-based evaluation that weighs the size of shortfalls and the value of consumption (Blanchett, 2023). The present paper uses the ruin probability as the working metric because the matrix converts it into a domain score, and it returns to the utility critique in the limitations section.

2.2. *Decumulation strategies, buckets, and glide paths*

A review of 72 peer-reviewed articles on decumulation products identifies tontine-like structures, deferred annuitization, and combinations with long-term care as the main innovations, while noting that the retiree perspective and behavioral considerations remain underexplored (Bär and Gatzert, 2023). Within that literature, the bucket approach holds a contested place, because a cash reserve carries a drag on returns over a long horizon,

and its value has been sought in behavior under drawdown as much as in the frequency of failure. The transition into retirement raises a related question, since reducing equity exposure ahead of the retirement date can narrow the dispersion of wealth at that date at the cost of median wealth. Section 4 tests the early reserve window on both counts and reframes its contribution accordingly.

2.3. Career interruptions and the gender pay gap

Parenthood is the dominant source of gender inequality in employment across the developed world. An atlas of child penalties, built on microdata from 134 countries, shows that men and women follow parallel trends before the first birth and diverge sharply and persistently afterward, with the fraction of gender inequality explained by child penalties rising with economic development (Kleven et al., 2025). Evidence from 86,000 career histories in the United States decomposes the 27-cent gender pay gap among professional workers, with close to 80% attributable to differences in work experience; one-third of that share reflects less time on the job, and two-thirds reflects different career pathways (McKinsey Global Institute, 2025). Two implications follow for model specification. The headline pay gap already contains the effect of career breaks, so a model that applies a full pay-gap multiplier alongside a separate interruption coefficient counts the breaks twice. The share of the gap that survives after work-experience effects are removed, about 20% of 27 cents or 5.4 percentage points, is the quantity that a residual pay-gap offset should capture.

2.4. The gender pension gap

The average gender pension gap across OECD countries has declined from 28% in 2007 to 23% in 2024, and gender differences in lifetime earnings, driven by employment, hours, and hourly wages, remain the main driver (OECD, 2025). Cluster analysis of European countries links the size of the gap to life-cycle demography, employment patterns, and childcare support (Jędrzychowska et al., 2024). Register-linked evidence from Germany disaggregates the gap by work-family life course and shows that marital dissolution redistributes pension entitlements in ways that, in part, equalize outcomes (Kreyenfeld et al., 2023). These studies operate at the level of populations and pension systems. None of them translates the gap into a planning parameter for a single household, which is the step the audit's retirement domain requires.

2.5. Measuring household financial condition

The household finance literature treats the household as an economic agent that saves, borrows, insures, and invests under life-cycle constraints (Gomes et al., 2021). Composite measures of financial condition have moved from unidimensional sums toward validated multidimensional constructs. A longitudinal assessment across 12 European countries confirms that financial well-being has at least two dimensions with longitudinal measurement invariance, and it cautions against single-score summaries (Riitsalu et al., 2025). Multi-criteria decision methods provide the aggregation machinery for such constructs, and recent applications in corporate performance evaluation combine data-driven weighting with sensitivity analysis over weight scenarios (Ersoy, 2023). The matrix methodology used here belongs to that family, since it applies qualimetric normalization, analytic hierarchy weights by life-cycle stage, and the hybrid additive-multiplicative WASPAS aggregation (Shyltsyna, 2026). A gender gap in economic and financial literacy, favoring men, persists across age groups and is more pronounced in developed countries (Haag and Brahm, 2025), which matters for audit design because a calibration that depends on client-reported plans will inherit that gap.

2.6. Synthesis

The strands reviewed above run in parallel. The withdrawal-rate literature has lowered the safe rate and introduced mortality, yet it remains within a single domain. The gender literature has measured the interruption penalty and the pension gap, yet it stays at the population level. The measurement literature has developed multidimensional indices, yet it treats the retirement domain as gender-neutral. No study in the available literature places a gender-specific retirement calibration inside an integral household index, and that is the gap the following sections address.

3. Data & Methodology

3.1. Type of study and data sources

The paper is a review with model computations. Its evidence base consists of public statistics and of simulations run on the model described below. Demographic inputs come from the period and cohort life tables of the Social Security Administration (2024), labor-market inputs from the decomposition of career histories (McKinsey Global Institute, 2025), and pension-gap benchmarks from the OECD (2025). No primary client data entered the analysis. Client portfolios and account records of a FINRA-registered broker-dealer stay inside its compliance perimeter, so every number reported below is either a public figure or a model output under stated assumptions.

3.2. The financial stability matrix

The matrix framework scores a household across six functional domains recognized in professional planning standards: cash flow and debt, risk management and protection, investment, tax, retirement, and estate (Shyltsyna, 2026). Each domain receives a score from 0 to 100 via a normalization function tailored to the indicator's economic nature, with min-max scaling for stimulators, distance-to-target scaling for indicators with a saturation point, and inverse scaling for destimulators. Domain weights come from the analytic hierarchy process and change with life-cycle stage. In the published weight matrix, the retirement domain carries 15% of the index during accumulation between ages 20 and 45, 25% during preservation between 45 and 60, and 30% during distribution after 60. Aggregation follows the WASPAS scheme, in which the Financial Health Index, hereafter FHI, equals one-half of the weighted sum plus one-half of the weighted product of domain scores. The multiplicative half enforces a weakest-link logic under which a failing domain drags the index down regardless of strength elsewhere. The framework also maps the index to five stability tiers, from in-crisis to thriving, and reports a strong inverse association between FHI and the risk of ruin, with households above 80 points facing a ruin risk under 5% and households below 50 points facing a risk above 40%. Two entries of the cross-impact matrix of the framework matter here. Cash flow affects the retirement domain through the savings rate with a critical impact, and the retirement domain affects the investment domain through the planning horizon with a medium impact. Those two links are the channels through which career interruptions and longevity are included in the index.

3.3. Second iteration of the WWLP specification

WWLP adjusts the classic withdrawal rate with four planning levers (Shyltsyna, 2025a). The Longevity Stretch Factor, hereafter LSF, measures how far the female survival tail exceeds the 30-year benchmark. The Career Interruption Factor, hereafter CIF, converts lost years of paid work into a reduction of the accumulation flow. The Gender Pay Gap Offset, hereafter GPGO, raises the required capital in proportion to lower lifetime earnings. The Early Bucket Trigger, hereafter EBT, moves the construction of a reserve segment to 10 years before the planned retirement date. The withdrawal rate that combines the first three levers is

$$WWWR = 4.0\% \times (1 - LSF) \times (1 - 0.5 \cdot CIF) \div GPGO,$$

with EBT applied as a timing rule for reserve construction. The specification used in this paper is the second iteration of the model and differs from the first in three respects. LSF is defined on cohort tables. In the 2023 period table, the 90th percentile of remaining life for a 65-year-old woman is 31.5 years, which corresponds to an LSF of 0.05, while 34 years corresponds to the 95th percentile. Cohort mortality with projected improvement pushes the 90th percentile for women who reach 65 near 2050 toward 34 years, so LSF is set at 0.13 for a woman aged about 40 in 2024, who reaches 65 near 2050 and to whose cohort the scenarios below belong, and the period-table value is reported alongside it as a sensitivity bound. CIF becomes scenario-specific and applies to the accumulation phase. Its baseline value is 0.00 for an uninterrupted career, and in interrupted careers, it equals the share of contribution years lost over a 40-year working horizon adjusted upward for the wage-progression loss after re-entry, which gives about 0.06 for a two-year break at ages 30 to 32 and about 0.12 for a five-year break at ages 50 to 55 followed by a return at 80% of prior earnings. GPGO is redefined on the residual pay gap that remains after work-experience effects are removed. The residual is 20% of the 27-cent gap, or 5.4 points. The model carries a residual of 5.1%, the value published in its second iteration, which lies within one percentage point of that figure and converts into a multiplier of 1.05. The first iteration applied $CIF = 0.14$ and $GPGO = 1.12$ and combined them on the grounds that interruptions and underpayment reinforce one another, which is the double count identified in Section 2.3. With the baseline values, the formula yields $4.0\% \times 0.87 \times 1.00 \div 1.05 = 3.31\%$, which matches the published figure of 3.3%, whereas the first specification yields 2.7-2.9% and cannot reproduce it. The first iteration also credited EBT with a decisive share of the reduction in ruin. The recomputation in Section 4 separates the contribution of the withdrawal-rate calibration from the contribution of the reserve window, and the two turn out to act on different quantities.

3.4. Simulation parameters

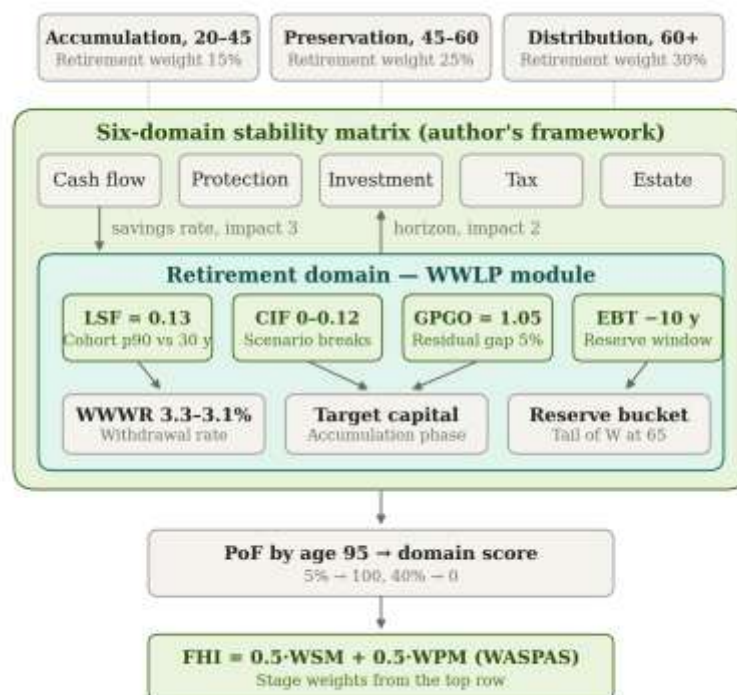
All results in Section 4 are from a Monte Carlo recomputation with parameters stated in full, so the numbers can be reproduced. Annual real returns are lognormal with a mean of 7% and a standard deviation of 17% for equities, a mean of 2% and a standard deviation of 6% for bonds, and a correlation of 0.10 between the two. The portfolio holds 60% equity and 40% bonds and is rebalanced each year. Accumulation runs from age 25 to 65, with a savings rate of 12% of salary, real wage growth of 1.5% per year, and a real return of 4% on accumulated balances. Withdrawals are fixed real amounts equal to a chosen rate times the baseline capital at 65, so that a household with less capital faces a higher effective rate for the same consumption need. Ruin is defined as wealth falling to zero before the end of the horizon, which is 30 years in the classic case and 34 years in the

female case. Each configuration is evaluated over 40,000 paths from a fixed random seed, and the standard error of the ruin probability near 5% is about 0.1 percentage points. Three scenarios follow the model's case set. The baseline scenario has no break. The maternity scenario removes contributions for two years, ages 30 to 32, and yields capital at 65 equal to 0.91 of the baseline. The caregiving scenario removes contributions for 5 years, from ages 50 to 55, resumes work at 80% of prior earnings, and yields capital equal to 0.86 of the baseline. The reserve window is modeled as a glide path from 60 to 30% equity over the 10 years before retirement, with contributions of 3% of wealth per year during that window, against a constant 60/40 allocation.

3.5. The coupling construct

The retirement domain of the matrix is scored based on the ruin probability produced by WWLP. Ruin probability is a destimulator, so the domain score follows inverse normalization between two thresholds taken from the framework itself: a probability of 5% or lower maps to 100 points, a probability of 40% or higher maps to 0 points, and intermediate values are interpolated linearly. The five other domains are held at 70 points, which places the reference household near the boundary between the stable and the self-sufficient tiers and isolates the effect of the retirement calibration. Tier labels follow a working mapping of the index in 20-point bands, with the stable tier from 50 to 70 points and the self-sufficient tier from 70 to 90 points, which agrees with the association between index levels and ruin risk reported in the framework. FHI is then computed under the preservation weights and under the distribution weights. Two calibrations are compared for each scenario. The reference calibration applies the classic 4% rate on a 30-year horizon. The female calibration applies the scenario-specific WWWR on a 34-year horizon. Figure 1 summarizes the architecture, with the life-cycle stages on top, the six domains inside the matrix, the four WWLP levers inside the retirement domain, and the path from ruin probability to the index at the bottom.

Figure 1. WWLP as the retirement-domain module of the six-domain stability matrix



Source: elaboration on the matrix audit framework (Shyltsyna, 2026) and the WWLP specification (Shyltsyna, 2025a).

3.6. Statistical status of the results

Every figure reported below is a model output under stated assumptions. Simulation noise is small relative to the differences discussed, since 40,000 paths bound the standard error of a probability near 10% at 0.15 points, but a difference that exceeds simulation noise is no empirical finding about households. The distinction between a modeled quantity and an estimated effect follows the treatment of significance levels in financial decision-making set out in Shyltsyna (2025b), where the choice of a threshold is tied to the structure of the data and the

cost of each type of error. The results section states model outputs as such and reserves empirical language for the public statistics that feed the model.

4. Results

4.1. Reproduction and sensitivity grid

Table 1 reports the ruin probability by age 95 for six withdrawal rates, two horizons, and three scenarios. Rates are expressed as a share of baseline capital, so the columns for interrupted careers embed the smaller capital of those households.

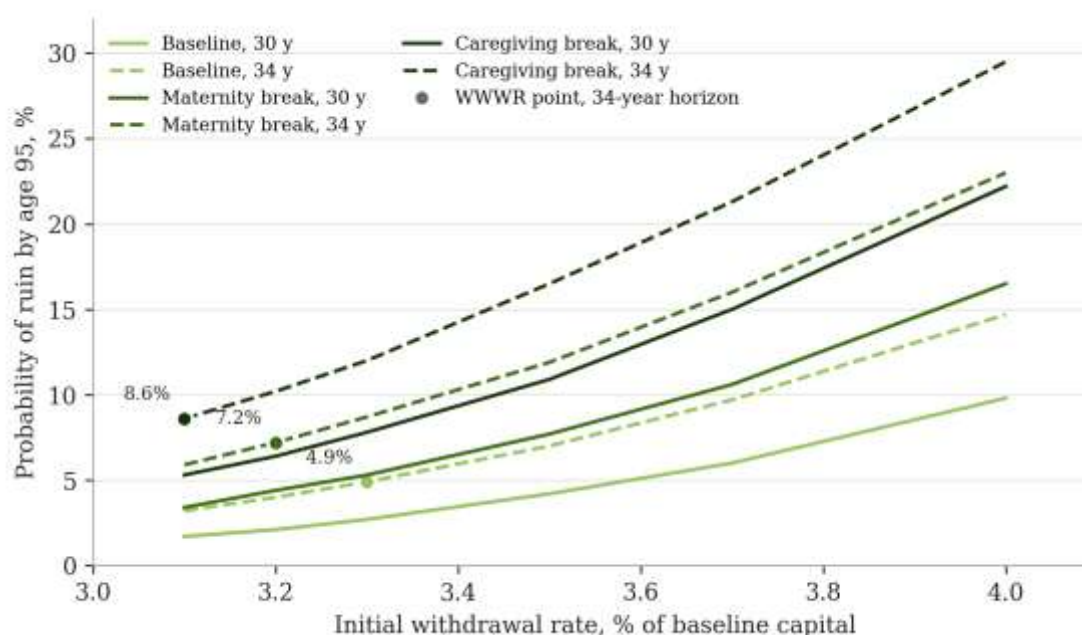
Table 1. Probability of ruin by age 95 in percent, by withdrawal rate, horizon, and scenario

Withdrawal rate	Baseline, T = 30	Maternity, T = 30	Caregiving, T = 30	Baseline, T = 34	Maternity, T = 34	Caregiving, T = 34
4.0%, classic	9.8	16.5	22.2	14.7	23.0	29.5
3.7%	6.0	10.6	15.0	9.7	16.0	21.3
3.5%	4.2	7.7	10.9	7.0	11.9	16.5
3.3%, WWR baseline	2.7	5.3	7.8	4.9	8.7	12.0
3.2%, WWR maternity	2.1	4.4	6.4	4.0	7.2	10.2
3.1%, WWR caregiving	1.7	3.4	5.3	3.2	5.9	8.6

Source: model recomputation, 40,000 paths, 60/40 portfolio, real returns of 7% with volatility of 17% for equity and 2% with volatility of 6% for bonds.

Under the classic rate on the classic horizon, the baseline household faces a ruin probability of 9.8%, the maternity household 16.5%, and the caregiving household 22.2%. The published values for the model are 11%, 18%, and 25% (Shyltsyna, 2025a). Under the female calibration, the same households face 4.9%, 7.2%, and 8.6%, compared with published values of 5%, 8%, and 10%. The recomputation therefore reproduces the model within 1 to 3 percentage points using parameters that differ from those of the original run, indicating that the published results are robust to reasonable variation in return and savings assumptions. The grid also allows a reading of exchange rates between parameters. Moving the horizon from 30 to 34 years raises the baseline ruin probability at 4% by 4.9 points, an effect equal to raising the withdrawal rate by about 0.4 points on the 30-year horizon. The caregiving break raises the probability by 12.4 points at 4%, an effect that would require a rate increase of close to 1 point to replicate. Graph 1 draws the same information as curves, with markers at the WWR points on the 34-year horizon.

Graph 1. Probability of ruin by age 95 as a function of the initial withdrawal rate for three scenarios and two horizons



Source: model recomputation, 40,000 paths, parameters of Section 3.4.

The curves show that the two horizons form parallel bands whose vertical distance grows with the withdrawal rate, and that the spacing between scenarios exceeds the spacing between horizons at every rate. The WWWR points sit at or below the 5% line for the baseline and below 9% for the caregiving scenario, whereas the classic rate on the female horizon places the caregiving household at 29.5%.

4.2. Retirement domain score and the integral index

Table 2 converts the headline ruin probabilities into domain scores, then into FHI, under the two weight sets, with the five other domains fixed at 70 points.

Table 2. Retirement domain score and Financial Health Index under two calibrations

Scenario	Calibration	PoF by 95, %	Retirement domain score	FHI, preservation weights	FHI, distribution weights	Stability tier
Baseline	Classic 4%	9.8	86	73.9	74.7	Self-sufficient
Baseline	WWLP	4.9	100	77.0	78.5	Self-sufficient
Maternity break	Classic 4%	16.5	67	69.3	69.2	Stable
Maternity break	WWLP	7.2	94	75.6	76.7	Self-sufficient
Caregiving break	Classic 4%	22.2	51	64.9	63.9	Stable
Caregiving break	WWLP	8.6	90	74.7	75.7	Self-sufficient

Source: model computation on the matrix audit framework with the WWLP module, domain score by inverse normalization between 5% and 40% ruin probability, WASPAS with $\lambda = 0.5$.

The baseline household moves from 86 to 100 points on the retirement domain, gaining 3 to 4 index points. The interrupted-career households show larger movements. The maternity household moves from 67 to 94 domain points and from 69.3 to 75.6 index points under preservation weights. The caregiving household moves from 51 to 90 domain points and from 64.9 to 74.7 index points, a gain of close to 10 points on the 0 to 100 scale. Under distribution weights, with the retirement domain accounting for 30% of the index, the gains are even larger. For both interrupted-career households, the calibration moves the index across the boundary between the stable and the self-sufficient tiers of the framework. The first claim of the paper follows from these numbers. An audit that scores the retirement domain on a continuous 30-year benchmark assigns a household with a late caregiving break to a lower tier than it would receive once the domain is calibrated to its actual trajectory, and the difference is large enough to change the recommendation that follows from the audit.

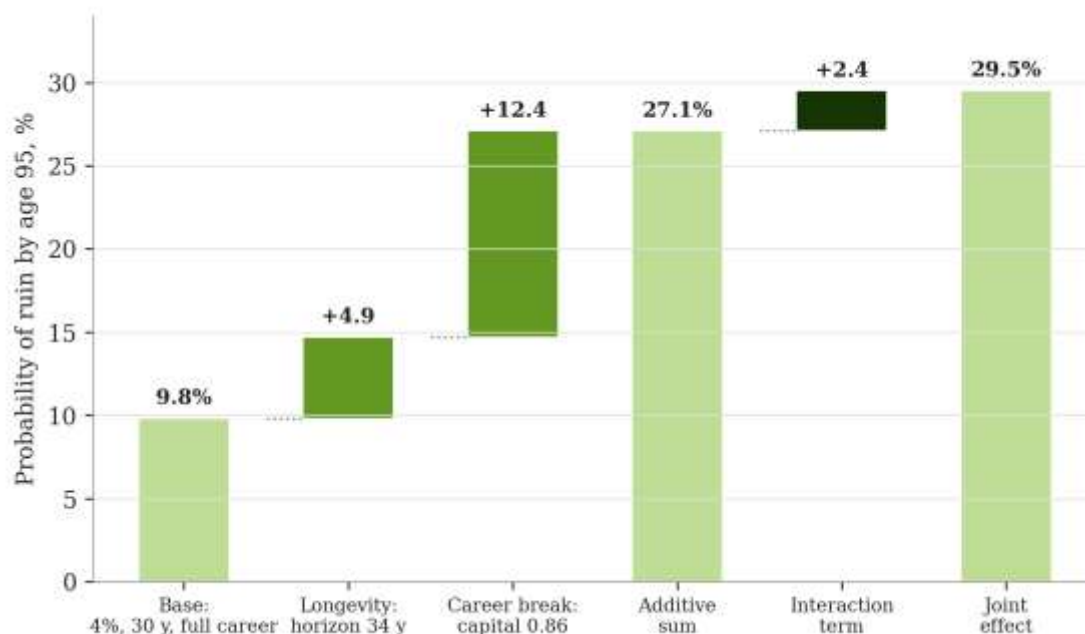
4.3. Decomposition of the joint effect and the interaction term

The two demographic parameters enter the ruin probability through different channels. Longevity extends the horizon over which withdrawals must be sustained and, through LSF, lowers the admissible rate. Career interruptions reduce the capital with which decumulation begins and, through CIF, raise the required accumulation. The upper bound on the ruin probability derived in the first iteration of the model through Wald's inequality has the form

$$\text{PoF} \leq \exp(-\kappa W_0 [\mu - \sigma^2/2 - r]),$$

where W_0 is the capital at the retirement date, κ depends on return variance and on the lifetime distribution, μ and σ^2 are the mean and the variance of the annual log return, and r is the withdrawal rate. Capital and the bracketed term enter as a product, so a reduction in W_0 scales the entire exponent, and any change in the rate or in the horizon that sits inside the bracket is amplified by the reduction in capital. The matrix adds a second nonlinearity through the multiplicative half of WASPAS. Graph 2 quantifies the interaction for the caregiving scenario at the classic rate of 4%.

Graph 2. Decomposition of the ruin probability for the caregiving scenario at a 4% withdrawal rate



Source: model recomputation, values from Table 1.

Starting from the base of 9.8%, extending the horizon alone adds 4.9 points, and the break alone adds 12.4 points, so an additive model predicts 27.1%. The joint configuration yields 29.5%, and the 2.4-point difference is the interaction term. The sign is positive, which means the two effects reinforce each other, and the magnitude is about half of the longevity effect on its own. A pair of independent corrections would understate the risk of an interrupted-career household on a long horizon by that amount. The second claim of the paper rests on this decomposition because the outcome depends on the product of the two parameters, and the two must be modeled within a single framework.

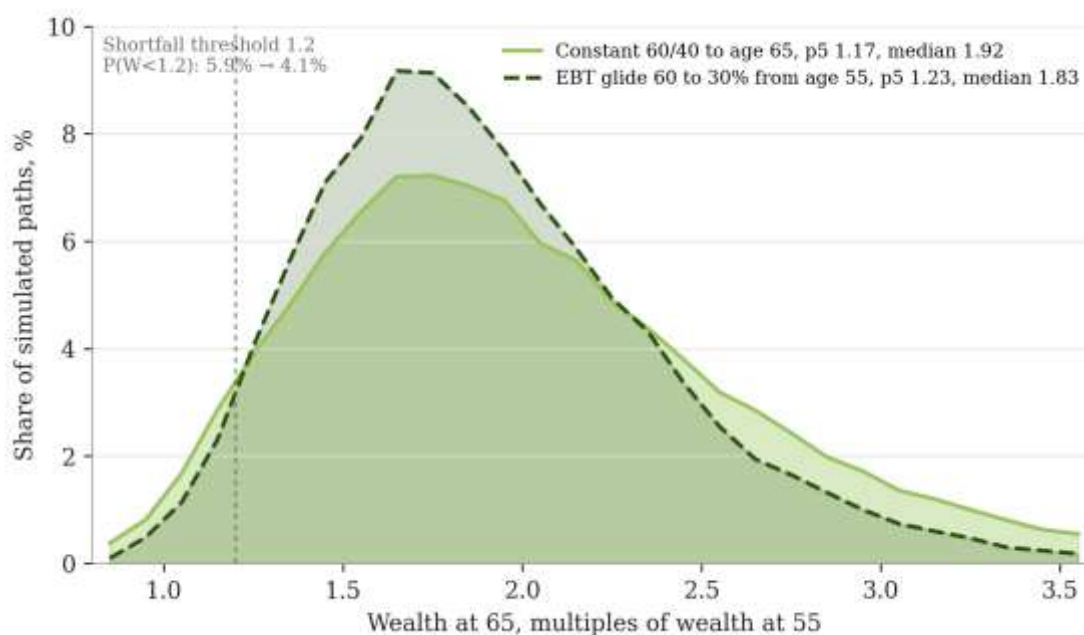
4.4. Coefficient specification and the removal of the double count

The third claim concerns the internal consistency of the model. With CIF at 0.14 and GPGO at 1.12, the withdrawal formula returns 2.7% when CIF enters at full weight and 2.9% when it enters at half weight, neither of which matches the published 3.3%. With CIF at 0.00 for the uninterrupted baseline and GPGO at 1.05, the formula returns 3.31%. The second specification reconciles the formula with the stated rate by applying each source of shortfall only once. The break lowers the capital, the residual pay gap lowers the rate, and the population-level share of the pay gap that arises from breaks appears in no coefficient twice. The specification also passes an external check. The simulated gap in capital at 65 between the caregiving household and the baseline is 14%, and between the maternity household and the baseline it is 9%. Combined with the residual earnings effect of about 5%, these figures remain below the 23% average pension gap and the 35% lifetime earnings gap reported for OECD countries, which is the expected ordering for households with a single break, since the population averages accumulate several breaks, shorter hours, and occupational sorting over a full career. The double count in the first iteration would have pushed households with one interruption past the population average, an ordering that the model could not defend.

4.5. The early reserve window as a tail lever

The fourth claim required reformulation during the recomputation. Three variants of a bucket rule were tested in the decumulation phase: a reserve of three years of spending funded from bonds, a reserve funded from the whole portfolio, and a reserve of five years. In none of them did the lifetime ruin probability fall below the constant-mix benchmark. At the WWWR rate of 3.3% on the 34-year horizon, it rose from 4.9% to between 6.5 and 8.6%, and at the classic rate of 4%, it rose from 14.7% to between 18.2 and 22.1%, because the reserve carries a cash drag over a long horizon. The entire reduction of the ruin probability from 9.8 to 4.9% in the baseline scenario is attributable to the withdrawal-rate calibration. The reserve window does its work elsewhere. Graph 3 compares the distribution of wealth at retirement under a constant 60/40 allocation and under a glide from 60% to 30% equity over the 10 years before retirement.

Graph 3. Distribution of wealth at the retirement date under a constant allocation and under the early reserve window



Source: model recomputation, 40,000 paths over the 10 years before retirement, parameters of Section 3.4.

The glide raises the 5th percentile of wealth at 65 from 1.17 to 1.23 times wealth at 55, lowers the median from 1.92 to 1.83, and cuts the probability of falling below a shortfall threshold of 1.2 from 5.9 to 4.1%. When the same spending rule is then applied to both distributions over 34 years, the lifetime ruin probability is unchanged. The reserve window compresses the left tail of the capital with which retirement begins and reduces the frequency with which equities must be sold after a decline, while leaving the median household with less. Inside the matrix, this is an improvement of the liquidity-mapping sub-indicator that the framework assigns to the retirement and investment domains, achieved without any change in the savings rate. That is the form in which the fourth claim holds.

5. Discussion

5.1. Implications for the audit

The retirement domain of a household audit ceases to be gender-neutral once its score depends on a ruin probability computed using the actual survival tail and the actual employment path. The preservation stage of the framework already lists the sandwich generation and sequence-of-returns risk as the priorities of the years between 45 and 60, and the caregiving scenario is the concrete form those priorities take for many women. A calibration that assigns 51 points to such a household under the reference rule and 90 points under the female rule changes, which domain the auditor flags as the weakest link, and under the multiplicative half of the index, the weakest link determines the tier. The practical consequence is that an audit of the reference benchmark can classify an interrupted-career household as stable, while the same data can classify it as self-sufficient under a calibration that fits, or the reverse for a household whose plan ignores its own horizon. The direction of the error depends on which side of the benchmark the household sits, which is why the calibration must be run household by household.

5.2. Observations from advisory practice

Direct advisory practice with households in transitional phases of life gives the calibration its use cases. Two groups recur. The first consists of women who leave paid work in their fifties to care for a parent or partner and return at reduced capacity, which is the caregiving scenario of Section 4 in its everyday form. For these households, the audit registers a break in the cash-flow domain within a year, while its effect on the retirement domain surfaces only when the horizon and the rate are recomputed; the interaction term in Section 4.3 is the reason the two readings disagree. The second group consists of multigenerational households in which protection and estate decisions are made for the family business as a whole, such as converting employer-provided group life coverage into individually underwritten policies for family members. Those cases illustrate the cross-domain links of the matrix along the protection and estate axes, and they show that a change in one domain is reflected in the index only if the domain weights and the multiplicative aggregation are in place. Further observations from practice will refine the model's scenario set, in particular the timing weight applied to late breaks and the recovery path of earnings after re-entry, without altering the coupling construct or the four results above.

5.3. Position against the decumulation literature

The recomputed WWWR of 3.3% falls between the 2.31% derived from a broad sample of developed markets under a 5% ruin tolerance (Anarkulova et al., 2025) and the 4% of the historical rule. The difference from the lower figure reflects the United States return assumptions used here and the absence of the survivor-bias correction applied in the international sample, and it indicates the direction in which a more conservative calibration would move. The finding that a bucket rule leaves the lifetime ruin probability unchanged agrees with the review evidence on decumulation products (Bär and Gatzert, 2023) and with the glide-path results summarized in Section 2.2. The reformulation of EBT as a tail lever keeps the rule inside the model while assigning it the metric on which it acts. The ruin-theory study that separates male and female retirees reports that most retirees withdraw less than a safe rate would allow (Daraei and Sendova, 2024), which cautions that a lower calibrated rate can trade ruin risk for foregone consumption, a trade that a utility-based evaluation would price (Blanchett, 2023).

5.4. Limitations

The evidence base consists of public statistics and model output, and the absence of primary client data is a constraint imposed by the employer's compliance perimeter. The simulation parameters were set for this paper and differ from the original model run, so reproducing within 1 to 3 points is a robustness check that stops short of replication. CIF is scenario-specific, and its values for the two break patterns rest on a simple rule that future cohort data can refine. Domain weights come from expert judgment through the analytic hierarchy process, and the FHI shifts in Table 2 depend on them; a sensitivity analysis over weight scenarios of the kind used in multi-criteria evaluation (Ersoy, 2023) would quantify them. Demographic inputs are United States figures, and the cohort LSF of 0.13 applies to women reaching 65 near 2050, with 0.05 as the period-table bound. The ruin probability is a binary metric that ignores the size of shortfalls and the value of consumption foregone under a lower rate, and the five other domains were held at a fixed score.

5.5. Directions for further work

Three extensions follow. Cohort panels such as the Health and Retirement Study and the Survey of Income and Program Participation can calibrate CIF on observed break durations and re-entry wages. The female optics applied here to the retirement domain extends to the protection and estate domains, where widowhood and

caregiving alter insurable interest and titling. Dynamic withdrawal rules can replace the fixed rate within the module, allowing the audit to record the option value of adjusting consumption after a drawdown.

6. Conclusion

Placing a gender-specific retirement model within an integrated household audit yields four results that neither piece of work alone produces. The integral index of a household with a late caregiving break rises by close to 10 points on a 0 to 100 scale, and the household crosses a stability tier boundary, once the retirement domain is calibrated to the female survival tail and to the actual employment path and no longer to a continuous 30-year benchmark. Longevity acts on the admissible withdrawal rate, and career breaks act on the capital at the retirement date, and because the ruin probability depends on the product of the two, their joint effect exceeds the sum of isolated effects by about 2 percentage points for a late break on a 34-year horizon. Separating the interruption effect from the residual pay gap removes a double count present in the model's first specification and reconciles the withdrawal formula with its published value of 3.3%. The early reserve window does not lower the lifetime ruin probability; its contribution lies in the left tail of wealth at retirement and in the frequency of forced equity sales, which the audit registers as an improvement in a liquidity sub-indicator achieved without a higher savings rate.

For advisors, the findings mean that a retirement domain scored against a reference benchmark can misclassify an interrupted-career household by a full tier, and that the correction requires recomputing the horizon, the rate, and the capital together. For designers of composite financial health indices, the findings mean that a domain calibration can carry an interaction term that additive corrections omit. The specification, the simulation parameters, and the coupling construct are stated in full so that both groups can reproduce the numbers and adapt the scenarios to their own populations.

References

- Anarkulova, A., Cederburg, S., O'Doherty, M. S. & Sias, R., 2025. The safe withdrawal rate: evidence from a broad sample of developed markets. *Journal of Pension Economics & Finance*, 24(3), 464-500. Available at: <https://doi.org/10.1017/S1474747225000010> [Accessed on September 2026].
- Bär, M. & Gatzert, N., 2023. Products and strategies for the decumulation of wealth during retirement: insights from the literature. *North American Actuarial Journal*, 27(2), 322-340. Available at: <https://doi.org/10.1080/10920277.2022.2078374> [Accessed on September 2026].
- Bengen, W. P., 1994. Determining withdrawal rates using historical data. *Journal of Financial Planning*, 7(4), 171-180.
- Blanchett, D., 2023. Redefining the optimal retirement income strategy. *Financial Analysts Journal*, 79(1), 5-16. Available at: <https://doi.org/10.1080/0015198X.2022.2129947> [Accessed on September 2026].
- Cooley, P. L., Hubbard, C. M. & Walz, D. T., 1998. Retirement savings: choosing a withdrawal rate that is sustainable. *AALJ Journal*, 20(2), 16-21.
- Daraei, D. & Sendova, K., 2024. Determining safe withdrawal rates for post-retirement via a ruin-theory approach. *Risks [e-journal]*, 12(4), 70. Available at: <https://doi.org/10.3390/risks12040070> [Accessed on September 2026].
- Ersoy, N., 2023. Applying an integrated data-driven weighting system – CoCoSo approach for financial performance evaluation of Fortune 500 companies. *E&M Economics and Management*, 26(3), 92-108. Available at: <https://doi.org/10.15240/tul/001/2023-3-006> [Accessed on September 2026].
- Gomes, F., Haliassos, M. & Ramadorai, T., 2021. Household finance. *Journal of Economic Literature*, 59(3), 919-1000. Available at: <https://doi.org/10.1257/jel.20201461> [Accessed on September 2026].
- Haag, L. & Brahm, T., 2025. The gender gap in economic and financial literacy: a review and research agenda. *International Journal of Consumer Studies [e-journal]*, 49(2), e70031. Available at: <https://doi.org/10.1111/ijcs.70031> [Accessed on September 2026].
- Jędrzychowska, A., Kwiecień, I., Poprawska, E., Cichowicz, E. & Gałęcka-Burdziak, E., 2024. How do lifecycle, employment and childcare support contribute to the gender pension gap in Europe? The clustering methods analysis. *Technological and Economic Development of Economy*, 30(6), 1862-1889. Available at: <https://doi.org/10.3846/tede.2024.21887> [Accessed on September 2026].
- Kleven, H., Landais, C. & Leite-Mariante, G., 2025. The child penalty atlas. *Review of Economic Studies*, 92(5), 3174-3207. Available at: <https://doi.org/10.1093/restud/rdae104> [Accessed on September 2026].
- Kreyenfeld, M., Schmauk, S. & Mika, T., 2023. The gender pension gap in Germany: is divorce a gender-equaliser? *Ageing & Society*, 43(11), 2700-2720. Available at: <https://doi.org/10.1017/S0144686X21001513> [Accessed on September 2026].

- McKinsey Global Institute, 2025. Tough trade-offs: how time and career choices shape the gender pay gap. New York, NY: McKinsey & Company. Available at: <https://www.mckinsey.com/mgi/our-research/tough-trade-offs-how-time-and-career-choices-shape-the-gender-pay-gap> [Accessed on September 2026].
- OECD, 2025. Pensions at a Glance 2025: OECD and G20 indicators. Paris: OECD Publishing. Available at: <https://doi.org/10.1787/e40274c1-en> [Accessed on September 2026].
- Riitsalu, L., Gąsiorowska, A., van Raaij, W. F. & Ruggeri, K., 2025. Longitudinal assessment of financial well-being across Europe confirms the multidimensionality of the construct. *Social Indicators Research*, 178(1), 279-303. Available at: <https://doi.org/10.1007/s11205-025-03587-w> [Accessed on September 2026].
- Shyltsyna, A., 2025a. Integrated lifecycle model accounting for career interruptions and the gender pay gap. *International Scientific Journal Internauka, Series Economic Sciences [e-journal]*, (9). Available at: <https://doi.org/10.25313/2520-2294-2025-9-11271> [Accessed on September 2026].
- Shyltsyna, A., 2025b. Application of significance levels for decision making in financial planning. *Universal Library of Business and Economics [e-journal]*, 2(2), 1-7. Available at: <https://doi.org/10.70315/uloap.ulbec.2025.0202001> [Accessed on September 2026].
- Shyltsyna, A., 2026. Methodology of systemic wealth audit: a matrix approach to evaluating the sustainability of six areas of financial planning. Manchester, NH: The American Journal of Management and Economics Innovations. Available at: <https://doi.org/10.37547/tajmei/book-04> [Accessed on September 2026].
- Social Security Administration, 2024. The 2024 annual report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds: period and cohort life tables. Washington, DC: SSA. Available at: <https://www.ssa.gov/oact/TR/2024/> [Accessed on September 2026].