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Divorce Insurance: A Concept Ahead of Its Time or Doomed to Fail?

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Abstract: Despite the significant economic impact associated with marital dissolution, divorce insurance remains conspicuously absent from contemporary risk management portfolios. This paper addresses this paradox by developing a multi-state, simulation-based actuarial framework that calculates risk-adjusted premiums incorporating critical demographic, economic, and behavioral variables—such as age at marriage, previous divorce history, and income disparities. Unlike previous failed attempts (notably WedLock in the USA), our model dynamically adjusts premiums to account explicitly for evolving marital and mortality risks, effectively mitigating adverse selection and moral hazard through mechanisms such as waiting periods and return-of-premium clauses. Simulation results indicate actuarially sound and market-viable premiums, highlighting divorce insurance's potential as a financial tool complementary to existing legal arrangements like prenuptial agreements. Our findings underscore the practical feasibility and invite further exploration into overcoming market acceptance barriers and regulatory challenges.

Keywords: actuarial modeling, divorce insurance, financial protection, marital risk, multi-state model, premium pricing, risk assessment

JEL: C15, D81, G22, G28, J12

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Seguro de divorcio: ¿un concepto adelantado a su tiempo o condenado al fracaso?

Resumen

A pesar del considerable impacto económico que conlleva la disolución matrimonial, el seguro de divorcio sigue estando notoriamente ausente de las carteras actuales de gestión de riesgos. Este estudio aborda dicha paradoja mediante el desarrollo de un modelo actuarial multiestado basado en simulaciones, diseñado para calcular primas ajustadas al riesgo e incorporar variables demográficas, económicas y conductuales fundamentales, como la edad al contraer matrimonio, el historial previo de divorcios y las disparidades de ingresos entre cónyuges entre otros factores. A diferencia de intentos anteriores fallidos (particularmente el producto WedLock en Estados Unidos), nuestro modelo ajusta dinámicamente las primas para reflejar explícitamente la evolución de los riesgos matrimoniales y de mortalidad, mitigando eficazmente problemas como la selección adversa y el riesgo moral mediante mecanismos como periodos de carencia y cláusulas de reembolsos (parciales) de primas. Los resultados de las simulaciones arrojan primas actuarialmente sólidas y potencialmente viables en el mercado, subrayando la capacidad del seguro de divorcio para complementar instrumentos legales ya existentes, como los acuerdos prenupciales. Nuestros hallazgos destacan su viabilidad práctica e invitan a profundizar en futuras investigaciones orientadas a superar las barreras regulatorias y los desafíos asociados a su aceptación en el mercado.

Keywords: actuarial modeling, divorce insurance, financial protection, marital risk, multi-state model, premium pricing, risk assessment.

JEL Classification: C15 (Statistical Simulation Methods; Monte Carlo Methods; Bootstrap Methods), D81 (Criteria for Decision-Making under Risk and Uncertainty), G22 (Insurance; Insurance Companies), G28 (Government Policy and Regulation), J12 (Marriage; Marital Dissolution; Family Structure)

1.-Introduction

Divorce remains one of the most disruptive life events, generating not only substantial emotional distress but also a significant economic burden that disproportionately affects women, older adults, and other vulnerable groups (Killewald, 2016; Bourreau-Dubois & Doriat-Duban, 2016). Beyond the emotional toll, the financial consequences of divorce are particularly severe. Legal fees, relocation costs, child support disputes, and the potential loss of household income underscore the urgent need for financial instruments tailored to the economic risks of marital dissolution. Research indicates that single mothers and divorced individuals experience heightened financial instability, often depleting their savings and facing prolonged economic hardship (Lansford, 2009; Kothakota & Lynn, 2022). In the specific case of "gray divorce"—divorce among older adults—financial recovery is even more challenging due to limited labor reintegration and the inherent fragility of pension schemes (Brown & Wright, 2017).

While there is a wealth of insurance products designed to address health, disability, and property risks, there remains a conspicuous absence of a comprehensive financial product that pools and distributes the economic risks associated with divorce. Although overall divorce rates have declined—largely attributed to rising marriage ages and higher educational attainment (Rotz, 2016)—legal and policy changes continue to shape marital stability, as evidenced by Wolfers' (2006) study on unilateral divorce laws. An early and notable attempt to address this gap was WedLock Divorce Insurance, launched in 2010 by SafeGuard Guaranty Corporation in the United States. This product offered "units" of coverage at a monthly premium of USD 15.99, with an initial benefit of USD 1,250 that increased by USD 250 annually after a four-year vesting period (NDTV, n.d.). However, WedLock was ultimately criticized for its simplistic, flat-premium model that failed to incorporate actuarial differentiation based on key risk factors—such as age at marriage, premarital cohabitation, and previous divorces—which are essential in underwriting to prevent adverse selection and insolvency (Short Law Firm,2025; Schulz & Siuda, 2023; Shavell, 1979). Despite existing research that identifies critical risk factors—including age at marriage, premarital cohabitation, and education level (Lehrer, 2008; Kuperberg, 2014; Guzzo, 2014)—WedLock did not account for these variables. Even though SafeGuard Guaranty Corporation secured USD 215,000 in seed funding in 2014 (Tracxn Technologies, n.d.), it ceased operations by 2022 (PitchBook, 2025.), underscoring the pitfalls of a model lacking proper risk segmentation.

From an actuarial perspective, WedLock's shortcomings highlight the necessity of implementing a rigorous underwriting process with dynamic, risk-based pricing. While other insurance markets adjust premiums according to variables such as age, medical history, and lifestyle choices, the development of a similarly robust framework for divorce insurance remains in its infancy despite clear evidence of growing financial vulnerability among divorcing couples (Brown & Lin, 2012). Furthermore, studies such as that by Kessler et al. (2023), which linked reductions in unemployment benefits in Switzerland to a 25% increase in divorce rates among low-income households, suggest that well-designed financial instruments can significantly influence family stability. Similarly, Cavapozzi et al. (2020) examine the interplay between financial hardship and well-being post-divorce, finding that while individuals experience heightened economic distress immediately after divorce, their long-term well-being often improves as financial instability diminishes. Balestrino et al. (2013) further suggest that individuals may misjudge their divorce risk due to cognitive biases, which could impact both marriage decisions and the perceived need for financial protection. These findings underscore the potential benefits of financial instruments that provide short-term liquidity, thereby alleviating immediate financial pressures and facilitating long-term stability.

Notably, divorce disproportionately affects women and older adults, who often face wage disparities, caregiving responsibilities, and inadequate retirement savings (Bourreau-Dubois & Doriat-Duban, 2016). This concern is magnified in cases of "gray divorce," where the limited income-earning years and fragile pension schemes exacerbate the financial fallout (Brown & Wright, 2017). Additionally, broader sociological shifts, including the deinstitutionalization of marriage, have resulted in greater individualization in relationships and heightened financial risks following divorce (Cherlin, 2004). Although prenuptial agreements provide a measure of asset protection, they do not offer immediate liquidity nor do they dynamically adjust to changes in risk throughout the course of a marriage (Gonzalez & Viitanen, 2009). Elisetty and Datti (2025) emphasize that financial instability remains one of the most pressing post-divorce concerns, with many women experiencing income loss, job market difficulties, and inadequate support structures. This lack of a structured, risk-pooling mechanism for divorce represents a significant gap in contemporary financial planning.

By integrating actuarial rigor with demographic, economic, and behavioral insights, this study aims to fill a critical gap in personal risk management: evaluating the feasibility of divorce insurance through dynamic, risk-based premium pricing. Unlike the simplistic and ultimately unsuccessful WedLock model, our approach incorporates rigorous underwriting criteria, adjustable premium structures, and practical mechanisms to mitigate adverse selection and moral hazard. We demonstrate that divorce insurance, structured through robust actuarial principles and innovative product features, can effectively provide financial protection against divorce-related economic disruptions, thus significantly enhancing personal financial planning. This paper not only addresses a notable gap in the academic literature but also provides a practical roadmap for overcoming market skepticism and regulatory hurdles associated with this novel financial instrument.

The remainder of this paper is structured as follows: Section 2 details the operational mechanics and critical shortcomings of the WedLock Divorce Insurance model, highlighting the pitfalls of flat-premium pricing, and provides a brief overview of international experiences with divorce-related insurance products. Section 3 provides an extensive review of key demographic, economic, and behavioral factors affecting marital stability from an international perspective. Section 4 analyzes divorce statistics and clarifies the methodologies used for measuring marital dissolution probabilities. In Section 5, we propose a probabilistic actuarial model that dynamically adjusts divorce probabilities based on identified risk factors. Section 6 illustrates, through simulation, how these risk-based premiums could realistically be implemented across different policy designs, including return-of-premium mechanisms. Section 7 critically discusses broader considerations such as moral hazard, adverse selection, regulatory issues, and cultural acceptance challenges. Finally, Section 8 offers concluding insights and outlines potential directions for future research on divorce insurance.

2. How Divorce Insurance Worked (in the USA) and the international experience

Divorce insurance (DI) was introduced in 2010 by SafeGuard Guaranty Corporation under the name 'WedLock Divorce Insurance'. It aimed to provide financial protection for divorce-related expenses but failed to gain market acceptance and was ultimately discontinued. This section outlines its structure and function.

Policy Acquisition & Maturation Divorce insurance policies were structured in flexible units, each corresponding to a payout amount (e.g., $1,250). Premiums were based on the number of units purchased and the maturation period, typically 4-5 years. During this period, policyholders paid premiums but could not claim full benefits, reducing short-term claims. Once matured, insured individuals could receive a lump-sum payout in the event of divorce (Money Task Force, 2025).

Claims Process Policy holders needed to provide documented proof of marriage and divorce (e.g., marriage certificates, divorce decrees). Upon approval, payouts were meant to cover legal fees, court expenses, and relocation costs, offering financial relief during a difficult transition (Paul, 2025).

Actuarial Considerations & Limitations Unlike traditional insurance, WedLock Divorce Insurance lacked actuarial adjustments for key risk factors such as age, marital duration, or income disparities. Premiums were fixed at $15.99 per unit, failing to differentiate between high- and low-risk policyholders. This pricing model increased the likelihood of adverse selection, as higher-risk couples could obtain coverage at the same cost as stable marriages (Money Task Force, 2025.). The absence of refund mechanisms or loyalty incentives further reduced its long-term appeal. Actuarial science typically incorporates demographic and situational factors to ensure premiums reflect the insured's risk profile, which this product overlooked.

What Happened If Divorce Never Occurred? Policyholders who remained married received no financial return on their premiums. While each unit’s value increased annually by $250, this accumulation was only accessible if a divorce claim was filed. Unlike other insurance products, WedLock Divorce Insurance did not offer refunds, transferable benefits, or conversion options, limiting its attractiveness for long-term financial planning.

Market Challenges & DiscontinuationCultural stigmas, unpredictable divorce rates, and a lack of actuarial sustainability hindered the product’s success. The product's failure to incorporate standard insurance features, such as risk-based pricing and non-claim incentives, reduced its appeal among consumers (Money Task Force, 2025.). Despite its failure, divorce insurance sparked discussions on innovative financial products that address life's unexpected events.

Outside of the United States, divorce-related financial products have emerged primarily through specialized legal expense coverage. In the United Kingdom, insurers approached divorce costs through products like Pre-nuptial Legal Solutions and Divorce Legal Solutions, launched by ARAG in partnership with a London law firm in 2011. These policies function as "before-the-event" legal expense insurance, covering future divorce-related legal expenses such as mediation and court proceedings. Influenced by government reductions in legal aid and the increasing legal recognition of prenuptial agreements after the landmark Radmacher case (2010), these products were strategically positioned as prudent legal planning tools rather than speculative financial instruments betting on marital failure (Insurance Journal, 2011).

Elsewhere in Europe, direct divorce insurance has remained uncommon, though specialized products briefly appeared. Spain introduced a notable example in 2007 through Óptima Servicios Financieros, offering an insurance policy explicitly designed to guarantee child support or alimony payments if the paying parent died, became disabled, or unemployed. This policy did not cover general divorce costs but rather aimed to protect dependents financially post-divorce. Despite initial attention due to high rates of non-payment of support following Spain's 2005 divorce reforms, market demand proved insufficient. Currently, this Spanish divorce-related insurance product is no longer available on the market (García, 2017).

Germany provides another illustrative European example. ARAG, a major German insurer, introduced a specialized legal expense insurance add-on (Ehe-Rechtsschutz) covering divorce-related legal costs up to €30,000. This product aligns with Germany's established tradition of insuring against legal disputes, embedding divorce coverage within broader legal insurance frameworks rather than offering standalone divorce policies. These policies require advance purchase to avoid adverse selection, thereby genuinely insuring against unforeseen marital conflicts rather than predictable separations. This approach reflects a practical orientation toward treating divorce similarly to other legally insurable events.

In the UK, ARAG launched its "Divorce Legal Solutions" policy, explicitly addressing comprehensive divorce-related legal expenses, including solicitor fees, court costs, mediation, and financial settlement negotiations. Developed in partnership with specialized law firms, the policy targeted affluent clients, offering security against high and uncertain divorce litigation expenses. By explicitly covering both prenuptial agreement enforcement and general divorce-related costs, ARAG's initiative sought to provide financial stability during costly marital dissolutions, particularly appealing in a context of reduced legal aid for family law disputes (Insurance Journal, 2011).

Philosophically, the U.S. model treats the end of a marriage primarily as a personal, insurable loss event—akin to other adverse life events. Conversely, international models typically acknowledge the broader implications of divorce involving multiple parties, especially children, emphasizing processes that ensure fair and equitable outcomes, such as legal fee coverage or guaranteed child support. European products, particularly those from the UK and Germany, focus more explicitly on safeguarding legal rights or dependents rather than providing a cash payout to an individual upon divorce. A revealing industry commentary characterized divorce insurance cynically as an "infidelity bond" (Insurance Journal, 2011), highlighting potential consumer resistance due to the perception of betting against marital success. In contrast, European products generally attempt to mitigate such negative perceptions by embedding divorce coverage into comprehensive family or legal insurance policies, framing the protection as prudent legal planning rather than speculative financial betting.

3.-Literature review: risk Factors Across Countries Affecting Divorce

Divorce rates vary significantly across countries due to cultural, economic, legal, and social influences. Understanding these risk factors requires an analysis of global trends and local nuances. This section reviews key determinants of divorce rates based on academic literature.

1. Cultural and Religious Influences

Cultural norms and religious beliefs play a crucial role in shaping marriage and divorce outcomes. In predominantly Catholic or Muslim societies, divorce rates tend to be lower due to cultural stigma and religious prohibitions (Mo, 2017). Active religious participation—such as regular attendance at services or prayer—can reinforce marital bonds (Homer, 2015), and even non-practicing individuals in highly religious regions often adopt traditional marriage attitudes (Liefbroer & Rijken, 2019). Marrying someone who shares one's religious beliefs has also traditionally fostered stability by reinforcing shared values and reducing conflict (Schwartz & Mare, 2003).

Rapid modernization and secularization have altered the influence of traditional religious norms. For example, in the UAE, a decline in religious influence on marital decisions has coincided with rising divorce rates as cultural norms shift toward individualism (Rehim et al., 2020; Al Gharaibeh & Bromfield, 2012). Similarly, in secular Western societies, the protective effect of religious homogamy appears diminished (Wang et al., 2022). In Nordic countries—where gender equality and secular values are prominent—higher divorce rates are observed, likely linked to increased individual autonomy and economic independence (Schwartz & Han, 2014; Goldscheider et al., 2015). Nonetheless, conservative religious communities within secular contexts continue to maintain lower divorce rates (Schwartz & Mare, 2003), though localized factors—such as media portrayals in certain U.S. counties with high concentrations of conservative Protestants—can elevate divorce risk (Skafi Noghani et al., 2021). In India, persistent family expectations and social norms continue to discourage divorce even among urban, educated populations (Wang et al., 2022).

2. Economic Factors and Divorce

Economic stability is a critical determinant of marital stability. While earlier research linked women’s financial independence with higher divorce rates, more recent studies reveal a more nuanced relationship. Marrying later—often associated with higher educational attainment and stable employment—tends to reduce divorce risk (Rotz, 2016; Musick & Michelmore, 2018). Conversely, significant income disparities within a marriage can intensify marital stress. For instance, the availability of alternative partners in the marriage market may increase divorce risk (South & Lloyd, 1995), and in some contexts, higher income and education have been associated with both increased and decreased divorce rates depending on prevailing economic conditions (Härkönen et al., 2006). Large income gaps—especially when the wife earns more than the husband—are linked to an elevated risk of divorce (Bertrand et al., 2015; Maslauskaite et al., 2015). Additionally, economic mobility and intergenerational income persistence have been shown to significantly shape marriage and divorce patterns (Bloome et al., 2018).

Economic downturns add further complexity to marital stability. Recessions often heighten marital strain; however, financial insecurity during such periods may also deter divorce (Aassve et al., 2020). For example, the COVID-19 pandemic increased work-related stress and contributed to higher divorce risks among Japanese workers (Fujino et al., 2022). In the Netherlands, the financial crisis of 2008–2013 was associated with a 31% rise in divorces, a phenomenon attributed to underwater mortgages triggering strategic separation decisions (Bos et al., 2023). Additionally, reductions in unemployment insurance benefits in Switzerland have been linked to a 25% increase in divorce rates among low-income couples (Kessler et al., 2023).

3. Legal Frameworks and Divorce Accessibility

Legal structures and the ease of obtaining a divorce significantly influence divorce rates. The deinstitutionalization of marriage—where traditional norms are weakened—facilitates divorce (Cherlin, 2004). Countries with liberal divorce laws, particularly those permitting no-fault divorces, generally exhibit higher divorce rates compared to nations with more restrictive policies (Wolfers, 2006). In Europe, the introduction of unilateral divorce laws initially spurred an increase in divorces, although this effect diminished over time as social and economic conditions adapted (Gonzalez et al., 2009). Collaborative divorce processes, such as mediation, can lead to more equitable settlements and shorter conflict periods (Högnäs & Carlson, 2012). Moreover, Bourreau-Dubois and Doriat-Duban (2016) emphasize that economic factors also shape the financial consequences of divorce. Enhanced legal protections for women, which increase their autonomy, have been associated with higher divorce rates, although in some cohorts, higher female educational attainment appears to reduce divorce likelihood (Van Bavel et al., 2018; Mortelmans, 2020).

4. Gender Roles and Expectations

Traditional gender roles have historically placed the burden of family responsibilities on women, often contributing to marital dissatisfaction (Cherlin, 2004). Egalitarian marriages—where household and childcare duties are shared—tend to have lower divorce rates and higher marital satisfaction (Esping-Andersen, 2009). During transitions toward gender equality, temporary increases in divorce rates can occur due to conflicts between entrenched traditional roles and modern expectations (Goldscheider et al., 2015). In societies with rigid masculinity norms, women who out-earn their male partners may experience heightened marital strain (Bertrand et al., 2015). Recent policies promoting shared parental leave and other egalitarian measures have helped mitigate divorce risks by fostering a more balanced distribution of domestic responsibilities (Killewald & Gough, 2021). Labor market policies—such as unemployment insurance reforms in Germany—also contribute to increased marital stability (Schulz & Siuda, 2023).

5. Age-Related Factors

Significant age differences between spouses are correlated with higher divorce risks, likely due to differences in life goals, interests, and expectations (Lehrer, 2008). Age disparities also interact with factors like emotional maturity and financial stability to influence divorce probability (Wolfinger, 2015). Socioeconomic conditions, such as lower education and unstable employment, can further exacerbate divorce risks in couples with notable age gaps (Maslauskaite et al., 2015). Legal protections for women may mitigate some of the financial disparities following a divorce in such relationships (Van Bavel et al., 2018), and recent research suggests these effects may be even more pronounced in societies with divergent generational expectations (Corti et al., 2024).

The timing of marriage is a significant predictor of marital stability. Marrying later in life—often associated with higher educational attainment and economic stability—tends to reduce the risk of divorce (Jalovaara, 2002). Early marriages, which can reflect emotional immaturity and limited life experience, are linked to higher divorce rates (Martin, 2006; Amato & James, 2010). Delaying marriage until the late twenties or early thirties allows individuals to achieve greater financial and emotional preparedness, thereby significantly lowering divorce risk (Rotz, 2016; Lundberg et al., 2020).

6. Premarital Cohabitation

Early studies suggested that premarital cohabitation increased divorce risk due to selection effects, wherein individuals more open to divorce were also more likely to cohabit (Axinn & Barber, 1997). More recent research, however, indicates that cohabitation can serve as a compatibility test, potentially improving marital outcomes in certain cultural contexts (Manning & Cohen, 2012). In fact, the age at which couples begin cohabiting may be a stronger predictor of divorce risk than cohabitation itself (Kuperberg, 2014). In egalitarian societies, cohabitation appears to yield relationship satisfaction levels comparable to traditional marriages (Schwartz & Han, 2014), and among older adults, cohabitation is increasingly preferred over remarriage as social norms evolve (Brown & Wright, 2017). When accounting for childhood background, both cohabitation and marriage seem to offer similar mental well-being benefits (Perelli-Harris & Styrc, 2018).

7. Professional Factors and Marital Stability

Occupational factors significantly influence marital stability through work-related stress, financial pressures, and social dynamics. For instance, work environments that involve frequent interactions with opposite-sex colleagues may increase marital instability by reinforcing the availability of alternative partners (South & Lloyd, 1995). High-stress occupations—particularly in the healthcare sector—are linked to varying divorce rates: while nurses and healthcare executives tend to experience higher divorce rates, physicians generally show lower rates. However, female physicians are significantly more likely to divorce than their male counterparts, possibly due to heightened work–family conflicts (Bertrand et al., 2015). Moreover, reliance on employer-provided health insurance can affect marital stability, as spouses dependent on their partner's insurance may be less inclined to initiate divorce (Sohn, 2015). Recent studies further emphasize that robust financial planning and asset management strategies can mitigate the negative economic impact of divorce in dual-earner households (Kothakota & Lynn, 2022; Schulz & Siuda, 2023).

8. Previous Divorce as a Risk Factor for Subsequent Divorce

Individuals with a history of divorce face a higher likelihood of subsequent marital dissolution. Early research suggested that those who carefully reassess past marital challenges before remarrying might achieve greater stability (Bramlett & Mosher, 2002). However, structural challenges—including financial complications, co-parenting conflicts, and stepfamily dynamics—continue to increase instability in subsequent unions. Studies have shown that marriages involving stepchildren have a higher risk of dissolution (Amato, 2012). Research from 2012 documented the rise of "gray divorce" among older adults, noting that second marriages exhibit divorce rates between 60–67%, while third marriages exceed 70% (Brown & Lin, 2012; Copen et al., 2012). Furthermore, individuals who initiate divorce often enter new relationships more quickly, although these subsequent unions are not necessarily stable (Ganong & Coleman, 2017). Recent data also indicate that the underlying factors in second marriages may vary based on family composition and post-divorce economic conditions (Mortelmans, 2020).

9. Educational Differences Between Spouses and Divorce Probability

Educational disparities between spouses have long been linked to divorce risk. Early studies found that socioeconomic differences related to educational attainment affect divorce likelihood, particularly in shorter-duration marriages (Jalovaara, 2002). Subsequent research demonstrated that higher educational attainment could enhance conflict-resolution skills and facilitate the selection of partners with compatible values (Schwartz & Mare, 2003). In the United States, more recent evidence shows that highly educated women now tend to have lower divorce rates compared to their less-educated counterparts—a shift from earlier trends where a higher level of education in women was associated with increased divorce risk (Härkönen & Dronkers, 2006). Evolving gender roles appear to have further diminished the traditional risks linked to educational imbalances (Schwartz & Han, 2014). Additionally, higher education tends to promote marital stability by delaying marriage and ensuring greater financial security (Musick & Michelmore, 2018).

10. Intergenerational Transmission of Divorce

Children of divorced parents are 30–50% more likely to experience divorce themselves, likely due to learned attitudes regarding marital commitment and increased relationship anxiety (Amato & DeBoer, 2001; Wolfinger, 2005). Early studies also highlighted those deficits in interpersonal skills—such as poor communication and conflict resolution—can perpetuate divorce across generations (Lansford, 2009). Later research confirmed that children born to unmarried parents are more prone to nonmarital childbearing, further reinforcing cycles of instability (Högnäs & Carlson, 2012). Subsequent work has demonstrated that resilience factors—such as strong parental support, effective conflict-resolution skills, and positive marital role models—can help mitigate these risks (Lansford, 2016). Finally, recent evidence suggests that exposure to parental divorce can shape individuals' expectations of marital stability, making them more likely to view divorce as a viable option when facing marital difficulties (Li & Wu, 2021).

In summary, divorce is shaped by a complex interplay of factors. Cultural and religious norms, along with rapid secularization and modernization, influence traditional marital expectations. Economic factors—ranging from overall stability and income disparities to the impacts of downturns—play a critical role in marital success. Legal frameworks and the accessibility of divorce further condition how marital dissolution unfolds, while evolving gender roles and expectations contribute to both stability and tension within relationships. Additionally, age-related factors, including differences between spouses and the timing of marriage, impact marital longevity. Premarital cohabitation, professional stressors, a history of previous divorces, educational differences between partners, and the intergenerational transmission of divorce tendencies all add layers of complexity. Together, these ten dimensions underscore that while trends such as delayed marriage and greater gender equality tend to promote stability, challenges like financial stress and prior divorces elevate the risk of marital dissolution. Future policies must address this multifaceted reality to foster enduring marital stability and resilient family structures.

4.-Divorce Statistics: Probabilities and Trends

To quantify divorce statistics effectively, demographers and social scientists rely on several key formulas and measures. This report outlines the primary formulas used in divorce demography and their applications:

The Crude Divorce Rate (CDR) is a basic measure representing the number of divorces per 1,000 individuals in a population over a given period. The CDR provides a general sense of how common divorce is within a population, but it does not account for the proportion of married individuals, leading to potential over- or under-estimation in populations with high proportions of unmarried individuals.

The Refined Divorce Rate (RDR) calculates the number of divorces per 1,000 married women (or married individuals) in a population:

$$RDR = \frac{Number\ of\ Divorces\ in\ a\ Year}{Number\ of\ married\ individuals} \cdot 1{,}000 \qquad [1.]$$

This rate is more accurate than the CDR, as it focuses on the at-risk population (married individuals), but it requires detailed demographic data on marital status, which may not always be available (van Vleet & Bodman, 2016).

The Divorce-to-Marriage Ratio (DMR) compares the number of divorces to marriages within a specific timeframe, serving as a proxy for marital stability but failing to account for marriage duration or previous unions. The Cohort Divorce Rate (CDR*) tracks the percentage of a marriage cohort that ends in divorce, offering insight into long-term marital trends but requiring extensive longitudinal data.

The Median Duration of Marriage Before Divorce (MD) captures how long marriages typically last before dissolution but exclude marriages that remain intact. These measures provide insight into marital stability and demographic changes. However, for evaluating the annual risk of divorce, the Refined Divorce Rate (RDR) is the preferred statistic. It effectively relates the number of divorces ("claims") to the number of married individuals ("exposed population"), making it a superior demographic measure (Ruggles, 2012). The crude divorce rate is unreliable due to fluctuations in the married population (Chen et al., 2020).

Divorce rates vary significantly due to cultural, legal, and economic factors. The Maldives has the highest divorce rate at 5.52 divorces per 1,000 people (World Population Review, 2025), influenced by cultural norms and simplified legal procedures. Other high-divorce countries include Kazakhstan (4.6), Russia (3.9), and Belgium (3.7). Meanwhile, Sri Lanka (0.15) and Vietnam (0.2) have some of the lowest rates, often reflecting legal or societal barriers rather than marital satisfaction. The COVID-19 pandemic impacted divorce rates, with some countries experiencing temporary declines due to lockdowns, as seen in Slovenia (from 1.2 in 2019 to 0.8 in 2020) and Hungary (1.8 to 1.5) (World Population Review, 2025).

Accurate RDR data is difficult to obtain due to inconsistencies in data collection. Some countries rely on centralized registration, while others use surveys, creating discrepancies. Variability in defining the "married population" further complicates cross-national comparisons. Despite these challenges, reliable data is available for countries like the United States, the UK, Canada, Slovakia, Slovenia, and China, offering valuable insights into long-term divorce trends.

In the United States, the RDR peaked at 22.6 per 1,000 married women in 1980, declining steadily to 14.0 by 2020 and fluctuating slightly in recent years (Westrick-Payne, 2024). England and Wales have also seen declines, with the divorce rate in 2022 at 6.7 for men and 6.6 for women per 1,000 married individuals, the lowest since 1971 (Office for National Statistics, 2023).

China's RDR increased from 2.96 in 1990 to over 17.0 in certain provinces by 2015. By 2019, it was still 26.85% lower than in the United States, suggesting that despite rising divorce rates, China lags behind Western nations (Wang et al., 2022; Chen et al., 2020; Mo, 2017). In Canada, the RDR has declined steadily from 12.7 in 1991 to 5.6 in 2020, reflecting shifts in societal attitudes (Statistics Canada, 2025).

In Slovakia and the Czech Republic, the RDR has fluctuated, with the Czech Republic historically showing higher rates. In 1992, the Czech RDR was 3.1 per 1,000 married individuals, nearly twice Slovakia's 1.6. By 2020, the Czech rate declined to 2.2, and Slovakia's to 1.5, reflecting improved marital stability (Garajová & Bleha, 2024).

The RDR provides critical insights into global divorce trends, though variations in data collection pose challenges. While the U.S. and Canada show long-term declines in divorce rates, China's continues to rise. England and Wales have experienced recent fluctuations, while Slovakia and the Czech Republic exhibit a gradual decline. These trends underscore the importance of demographic, legal, and cultural factors in shaping divorce patterns.

5.-A Primer Model for Quantifying Divorce Insurance

Divorce is inherently uncertain, influenced by complex personal and social dynamics. A probability function quantifies this uncertainty, allowing insurers to set appropriate risk margins and perform scenario analysis, simulating how changes in personal or societal factors might impact divorce probabilities.

Without a structured probability function, insurers might rely on broad averages or simplistic rules to price divorce insurance. This can lead to:

Unfair pricing: Low-risk couples might pay disproportionately high premiums, while high-risk couples could be underpriced.

Market inefficiency: Inaccurate pricing could make the product less attractive to potential customers or expose the insurer to unsustainable risks.

A well-designed probability function ensures that pricing reflects actual risk, balancing fairness for policyholders with profitability for insurers.

Probability Function for Divorce Risk

After developing the literature review on risk factors across countries affecting divorce (Section 3) and examining divorce statistics, probabilities, and trends (Section 4), the following probability function is proposed to determine the annual risk of divorce over time:

$$P\left(D_t^j\right) = min\left\{\max\left(P_0 \cdot \prod_{i=1}^{n} F_i , l\right), u\right\} \qquad [2.]$$

where:

$P\left(D_t^j\right)$: is the probability of divorce at time t for couple j.

P_0 : is the base divorce probability (her, 0.0144 or 1.44%), which reflects a baseline risk based on a refined divorce rate for a reference year. This value is based on the most recent U.S. statistics as reported by Westrick-Payne (2024).

For each $(i = 1 \ldots 10)$:, the term F_i is a multiplicative adjustment factor that modifies the base probability according to a specific characteristic of the couple, j

l: is the lower bound (minimum) of the divorce probability (in our application, 0.001, or 0.1%).

u: is the upper bound (maximum) of the divorce probability (in our application, 0.1, or 10%).

In our case, we use ten factors

The factors are defined as follows:

1.- Marriage Duration Factor, $F_1(d)$:

$$F_1(d) = (1 + \frac{d}{12})^{-0.35} \quad [3.]$$

where d (in years) is the duration of the marriage. This formulation, based on a power-law decay, ensures that the full base risk applies at $\mathrm{d} = 0$ (i.e., $F_1(0) = 1$) and then decreases gradually as the marriage duration increases.

2.-Premarital Cohabitation Factor, $F_2(c)$:

$$F_2(c) = 1 - 0.015 \cdot \min(c, 25) \quad [4.]$$

where c is the number of years of cohabitation before marriage. In our implementation, each year of cohabitation reduces the risk by 0.015, up to a maximum of 25 years, reflecting a relatively strong protective effect

3.-Age Difference Factor, $F_3(\Delta_a)$:

$$F_3(\Delta_a) = \begin{cases} 1, & if\ |\Delta_a| \leq 3 \\ 1 + 0.27\left(1 - e^{-(|\Delta_a| - 3)/5}\right), & if |\Delta_a| > 3 \end{cases} \quad [5.]$$

Where $|\Delta_a|$ is the absolute age difference between the spouses. This formulation implies no adjustment for differences of 3 years or less, whereas for larger age differences the risk gradually increases—reaching about a 20% increase when there is a 10-year gap.

4.-Children Factor, $F_4(Ch)$:

$$F_4(Ch) = \begin{cases} 1.1; \ If\ Ch = 0 \\ 0.95; \ If\ Ch = 1 \leq \ Ch \leq 2 \\ 0.9; \ If\ Ch\ \geq 3 \end{cases} \quad [6.]$$

Where Ch is the number of children. The absence of children increases the divorce risk (a multiplier of 1.1), while having children reduces the risk.

5.- Age at Marriage Factor, $F_5(a_h, a_w)$:

$$F_5(a_h, a_w), = \begin{cases} 1.15; \text{ If either spouse married before 22} \\ 0.9; \text{If both married between 22 and 32} \\ 1; \text{ Otherwise} \end{cases} \quad [7.]$$

Where a_h and a_w are the ages at marriage of the husband and wife, respectively. Early marriage (before 22) is associated with higher risk, while marriage in the 22–32 range reduces risk.

6.-Divorce History Factor, $F_6(D_h, D_w)$:

$$F_6(D_h, D_w) = 1 + 0.40\ (D_h + \ D_w) + 0.05\ (D_h \cdot \ D_w) \quad [8.]$$

D_h and D_w are the number of previous divorces of husband and wife respectively, capped at 3. In our implementation, each previous divorce increases the risk by 35%, with an additional 5% if both have divorced.

7.-Professional Risk Factor, $F_7(O_h, O_w)$:

For professional risk, each spouse is assigned a multiplier based on their occupation. The overall factor is computed as:

$$F_7(O_h, O_w) = O_h \cdot \ O_w \quad [9.]$$

Where O_h and O_w are occupation-based risk multipliers for the husband and wife. The risk multipliers take on values 1.20 (high risk), 1.10 (moderate risk), 1.00 (average risk), 0.90 (low risk), or 0.80 (very low risk)."

8.-Income ratio factor, $F_8(R)$:

$$F_8(R) = 1 + 0.2 \cdot \left(e^{-|1-R|} - 1\right) \quad [10.]$$

$R = \frac{I_h}{I_w}$ is the husband's income divided by wife's income, $|1 - R|$ represents deviation from perfect income equality . The maximum risk adjustment (~20%) occurs when R=0.25 or R=4.

9.- Parental Divorce Factor, $F_9(Pd_h, Pd_w)$

We define the following adjustment factor:

$$F_9(Pd_h, Pd_w) = 1 + 0.4 \cdot I(Pd_h + Pd_w = 1) + 0.6 \cdot I(Pd_h + Pd_w = 2) \qquad [11.]$$

where:

Pd_h = 1 if the husband's parents divorced, 0 otherwise.

Pd_w= 1 if the wife's parents divorced, 0 otherwise.

$I(\cdot)$ is an indicator function that takes the value 1 if the condition is met and 0 otherwise.

This implies: If neither spouse's parents were divorced: F_9=1 (no adjustment). If one spouse's parents were divorced: F_9=1.4 (40% increased risk).If both spouses' parents were divorced: F_9=1.6 (60% increased risk)

10.- Educational Difference Factor, $F_{10}(E_d, E_h, E_{dw})$

To simplify the model while preserving its predictive power, the educational levels for both spouses have been consolidated into five categories:

Table 1: The educational levels

Adjusted Level	Description	Model Value
0	No formal education or primary education	0
1	Secondary education (High School)	1
2	Technical education or incomplete university	2
3	Bachelor's Degree	3
4	Master's Degree, Postgraduate, or Doctorate	4

With this classification, the educational difference is calculated as: $E_d = E_h - E_w$, where: E_h is the husband's education level, and E_w is the wife's education level.

The function adjusts divorce risk based on the absolute educational difference between spouses:

$$F_{10}(E_d, E_h, E_{dw}) = \begin{cases} 0.85; \ \text{if } E_d = 0 \text{ and} \min(E_h, E_{dw}) \geq 3 \\ 0.95; \ \text{if } E_d = 0 \text{ and} \min(E_h, E_{dw}) < 3 \\ 1 + 0.3\left(1 - e^{-\frac{|E_d|}{2}}\right); \ if\, E_d > 0 \\ 1 + 0.3\left(1 - e^{-\frac{|E_d|}{2}}\right); \ if\, E_d < 0 \end{cases} \qquad [12.]$$

The function enhances the protective effect when both partners have a high level of education, and increases the penalty for extreme disparities.

Simulation Process of Couples

Building on the multiplicative formulation of divorce risk, we simulate individual-level data for couples to generate annual estimates of divorce risk as well as other demographic outcomes. The simulation process proceeds as follows:

The simulation begins by setting a fixed number of couples (e.g., 10,000 couples) and establishing key demographic parameters. These include the allowable ranges for the husband's and wife's ages, the legal minimum age for marriage, and the probability distributions for premarital cohabitation duration, number of children, prior divorce history, occupational risk (expressed as risk multipliers), and income ratio. A fixed random seed is set to ensure reproducibility.

For each couple, individual characteristics are generated using random sampling methods:

- Ages: The husband's age is sampled uniformly from a predefined range (e.g., 30–60 years with 75% probability, and from 20–29 or 61–85 years otherwise). The wife's age is determined by subtracting an age difference from the husband's age.
- Age Difference: A custom function is used to sample the age difference. This function predominantly produces a positive difference (with the husband older) but also allows for cases where the wife is older, with varying probabilities for small and large differences.
- Marriage Duration and Age at Marriage: The number of years married is randomly chosen based on the current ages of the spouses and the minimum marriage age. The ages at marriage for both partners are computed by subtracting the duration of marriage from their current ages.
- Premarital Cohabitation: For each couple, there is a specified probability (e.g., 50%) that they have cohabited before marriage. If cohabitation occurs, the number of cohabitation years is sampled (ensuring that it does not start before age 18) and capped (e.g., at a maximum of 30 years as implemented in the code) for risk adjustment purposes.
- Number of Children: The number of children is sampled from a discrete probability distribution (e.g., with higher probability for one or two children and lower for zero or three).

  Divorce History: for each spouse we draw a value $D \in \{0,1,2,3\}$ (where 3 represents "three or more divorces") from a distribution reflecting realistic demographic assumptions.
- Profession Risk: Each partner is assigned an occupational risk multiplier by sampling from a predefined distribution (with typical values such as 1.20, 1.10, 1.00, 0.90, and 0.80), which reflects the risk associated with their professional field.
- Income Ratio: The ratio of the husband's income to the wife's income is drawn from a uniform distribution (e.g., between 0.25 and 4). The income ratio is drawn from a uniform distribution.
- Education Level: Each spouse's education level is sampled from discrete categories {0,1,2,3,4} with predefined probabilities that reflect a realistic distribution of educational attainment. The assignment is not uniform; instead, there is a 10% probability of having education level 0 (the lowest), 25% probability of level 1, 30% probability of level 2 (the most common), 25% probability of level 3, and 10% probability of level 4 (the highest). This structured distribution ensures that mid-range education levels are more prevalent, while extreme levels (both low and high) are less common.

- Parental Divorce: Each spouse has a probability (e.g., 40%) of coming from divorced parents. This factor later affects the couple's divorce probability in the model.

Calculation of Divorce Probability and Annual Simulation:

Once the characteristics for each couple are generated, the annual divorce probability is computed using a multiplicative risk model. The model starts with a base probability $P_0 = 0.0144$ and adjusts it by multiplying it by eight factors corresponding to the risk dimensions (marriage duration, premarital cohabitation, age difference, number of children, age at marriage, divorce history, professional risk, and income ratio). The product is then bounded by a lower limit $l = 0.001$and an upper limit $u = 0.1$ to ensure realistic probabilities.

Although the simulation computes a divorce probability for each year (denoted $P(D_t^j)$ for couple j at year t), the actual divorce event is simulated by drawing a binary outcome (modeled as a Bernoulli variable) using the divorce probability for the first year. This procedure yields an individual-level dataset that includes, for each couple, both the simulated characteristics and the corresponding annual divorce probabilities.

Summary of results

To evaluate the robustness of our simulation framework and its ability to replicate realistic divorce dynamics, we present summary statistics for the simulated couples in Tables 2 and 3. Table 1 details the demographic characteristics of the simulated population, including age distributions, marriage durations, cohabitation years, and family size. These statistics illustrate the heterogeneity in our simulated couples and provide a basis for understanding the subsequent risk calculations. Table 3 summarizes the key risk factors underlying our divorce probability model—such as prior divorce history, professional risk, and income ratio—and the computed annual divorce probability.

Table 2: Demographic Characteristics of Simulated Couples

Variable	Min	Q1	Median	Mean	Q3	Max	SD
Husband_Age_Current	20	39	48	49.94	58	85	14.35
Wife_Age_Current	20	37	46	47.82	56	85	14.26
Husband_Age_Married	18	25	32	34.74	41	83	12.03
Wife_Age_Married	18	23	30	32.62	39	83	11.89
Age_Difference_Current	-10	1	2	2.12	4	20	2.95
Years_Married	1	6	12	15.20	21	65	11.85
Cohabitation_Years	0	0	0	2.96	3	57	6.17
Children	0	1	1	1.20	2	3	0.87

Note: All numeric values are as obtained from the simulation output.

Table 1 presents the demographic characteristics of simulated couples, capturing diversity in ages, marriage durations, and family structures. The median ages are 48 for husbands and 46 for wives, with a mean of 49.94 and 47.82, respectively.

The wide range (20–85 years) reflects the inclusion of both young and long-term marriages.

The median marriage age is 32 for husbands and 30 for wives, slightly higher than real-world first-marriage statistics due to the inclusion of remarriages. The standard deviations (12.03 for husbands, 11.89 for wives) indicate significant variation, covering both early and late marriages.

The median spousal age difference is 2 years, with a range from -10 to 20, meaning some wives are older than their husbands. The mean difference of 2.12 years aligns with sociological trends of husbands being slightly older.

Marriage durations range from 1 to 65 years, with a median of 12 and a mean of 15.2 years. The standard deviation (11.85 years) reflects a mix of short and long-term unions. Premarital cohabitation varies widely, with a median of 0 years and a mean of 2.96, indicating that while some couples did not cohabit, others did for extended periods (up to 57 years).

Family size follows expected trends, with a median of 1 child and a mean of 1.20, suggesting most couples have one or two children, while some remain childless or have larger families. The standard deviation (0.87) reinforces realistic variation.

Overall, the simulation effectively captures demographic diversity, aligning with empirical data while allowing for a broad range of marital trajectories.

Figure 1 presents a histogram of the annual divorce probabilities derived from the simulation. These probabilities extend from around 0.004 (0.4%) up to 0.065 (6.5%), with most couples falling within the 0.01–0.02 range. The distribution is right-skewed, indicating that while the bulk of the sample exhibits relatively low probabilities, a smaller subset reaches higher levels of marital risk.

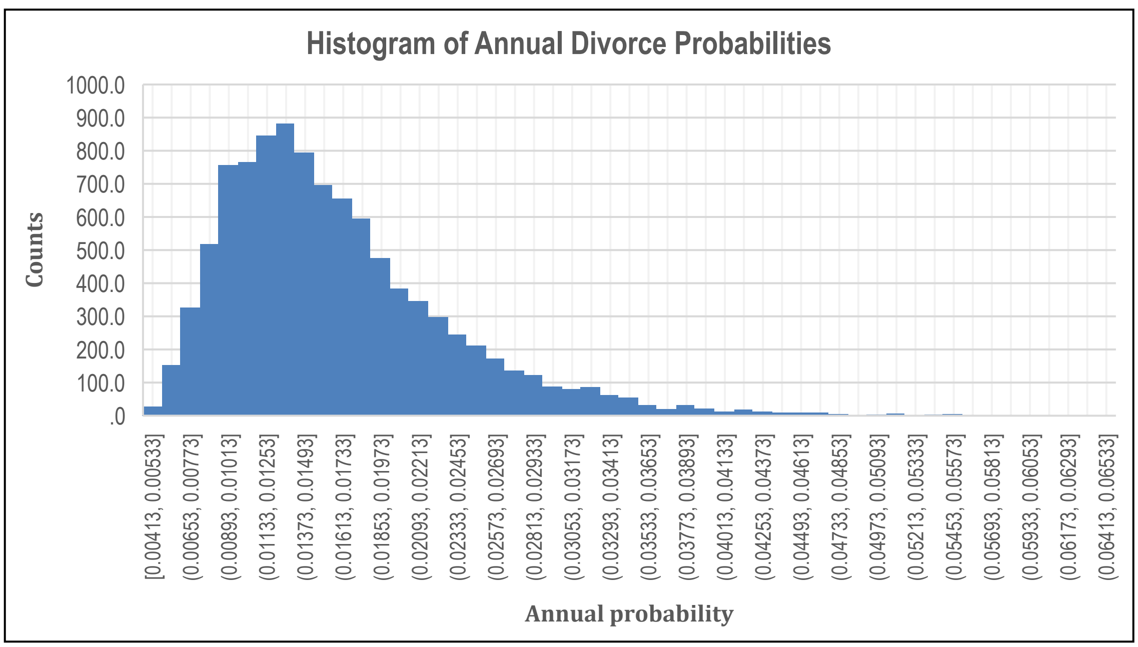

Figure 1. Histogram of Annual Divorce Probabilities

Figure 2 complements the histogram by displaying each couple's divorce probability in ascending order. The curve starts near 0.004 and gradually increases, remaining below 0.02 for the majority of couples before rising more sharply toward the extreme right tail—around 0.05–0.07. This visualization highlights the heterogeneity within the simulated population: most couples have moderate divorce probabilities, whereas a smaller fraction faces notably higher risks.

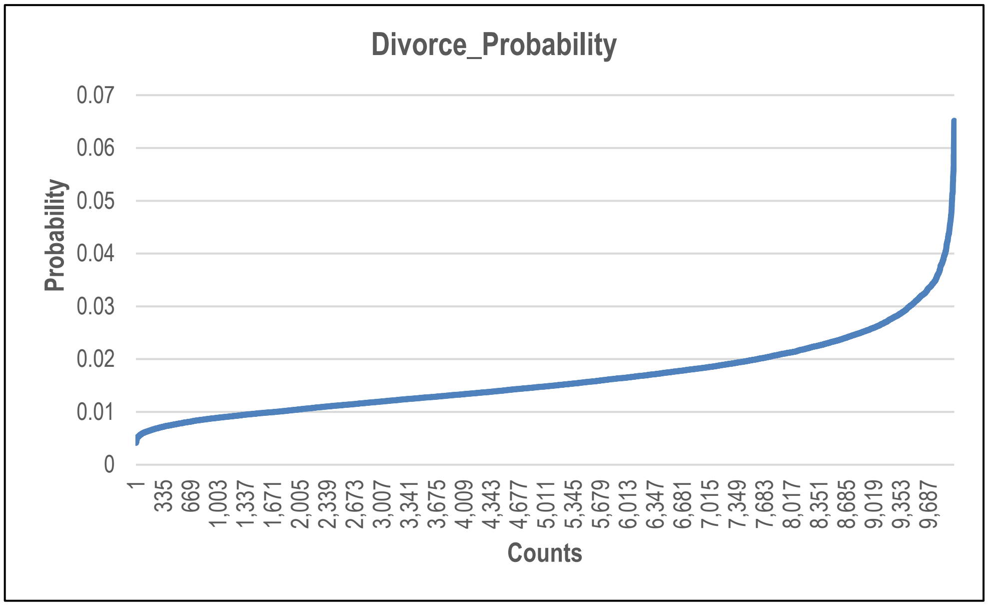

Figure 2. Ordered Plot of Annual Divorce Probabilities

Table 3 presents key divorce risk factors, including prior divorce history, occupational risk, income ratio, parental divorce, education level, and computed annual divorce probability.

On average, individuals have 0.36 prior divorces, with a maximum of 3. The median value of 0 indicates most have never divorced, but a Q3 of 1 suggests at least 25% have experienced one. Given its strong predictive value in the model, prior divorce history significantly shapes overall risk.

Occupational risk multipliers range from 0.8 to 1.2, with a mean of 0.96. The median and Q3 values of 1 imply that most individuals fall into a neutral category, while a smaller fraction work in high- or low-risk professions, contributing to moderate variation in divorce probability.

The income ratio spans from 0.25 to 4.00, with a median of 2.14 and mean of 2.13. In at least 75% of cases, husbands earn more than their wives, yet the lower bound suggests some wives earn up to four times more. The standard deviation of 1.09 reflects significant economic diversity among couples.

Table 3: Divorce Risk Factors and Related Measures							
Variable	**Min**	**Q1**	**Median**	**Mean**	**Q3**	**Max**	**SD**
Divorce_History_Husband	0	0	0	0.37	1	3	0.67
Divorce_History_Wife	0	0	0	0.35	1	3	0.65
Husband_Profession	0.8	0.9	1	0.96	1	1.2	0.10
Wife_Profession	0.8	0.9	1	0.96	1	1.2	0.10
Income_Ratio	0.25	1.18	2.14	2.13	3.09	4.00	1.09
Pd_h	0	0	0	0.40	1	1	0.49
Pd_w	0	0	0	0.40	1	1	0.49
Husband_Education	0	1	2	1.99	3	4	1.15
Wife_Education	0	1	2	1.99	3	4	1.13
Divorce_Probability	0.0041	0.0113	0.0148	0.0164	0.0197	0.0652	0.01
Divorced	0	0	0	0.0145	0	1	0.12
Divorce_Count (95% CI)			145 (122-170)				
Divorce% (95% CI)			1.45% (1.22-1.70)%				
Note: All numeric values are as obtained from the simulation output.							

Approximately 40% of both husbands and wives come from divorced families. Given its binary nature, around 16% of couples have both spouses from divorced backgrounds, reinforcing the F9 factor's role in risk variation.

Education levels average around 2.0 for both spouses, with values ranging from 0 to 4. The median of 2 and Q3 of 3 suggest that most have moderate to high education, aligning with modern demographic trends. Since educational disparity affects marital stability through the F10 factor, this distribution helps ensure realistic divorce risk modeling.

The annual divorce probability per couple ranges from 0.0041 (0.41%) to 0.0652 (6.52%), with a median of 1.48% and a mean of 1.64%. The relatively low standard deviation (0.01) indicates that most couples have divorce probabilities close to the median, with fewer extreme cases.

The actual divorce rate observed in the simulation is 1.45% per year, meaning that out of 10,000 simulated couples, approximately 145 divorced within the simulated year. The 95% confidence interval (CI) for the number of divorces is 122 to 170, indicating that statistical fluctuations in the simulation would likely result in observed divorce counts within this range.

The computed divorce proportion (1.45%) closely aligns with the expected base probability of 1.44% in the multiplicative risk model. This suggests that the combined effects of the risk adjustment factors—both aggravating factors (e.g., prior divorce history, parental divorce, high-risk professions, large age differences) and mitigating factors (e.g., premarital cohabitation, children, similar education levels)—are well-balanced.

Furthermore, the narrow confidence interval for the divorce proportion (1.22%–1.70%) reinforces that the model is well-calibrated. The fact that the simulated proportion remains close to the baseline while still allowing for individual variation demonstrates that the divorce probability formula accurately captures risk differentiation across couples.

To ensure the reliability of our simulation framework, we evaluated the model across various sample sizes (N = 1,000; 2,000; 5,000; 10,000; 15,000; and 20,000). Our analysis revealed that the key demographic statistics and divorce risk estimates converge and stabilize starting at N = 10,000. In particular, the annual divorce probability and the computed divorce proportion remain consistent across simulations, with only marginal differences observed when increasing the sample size beyond 10,000. The narrow confidence intervals associated with the divorce proportion further confirm that N = 10,000 provides sufficient robustness, balancing precision and computational efficiency. Based on these findings, we propose that a simulation with 10,000 couples is more than adequate to capture the realistic dynamics of divorce risk, making it the optimal choice for subsequent analyses.

Clustering-Based Risk Segmentation[1]

To enhance the interpretability of the simulation results and facilitate a structured risk assessment, a clustering analysis with k=6 was applied to segment the simulated population into distinct groups based on key demographic and behavioral characteristics. This classification allows for a clearer identification of different risk profiles within the dataset, offering a practical perspective for risk management in divorce insurance. Instead of analyzing divorce probabilities as a continuous distribution, clustering provides well-defined categories that clarify how different combinations of variables contribute to marital stability or instability.

The clustering results indicate that the simulated population can be divided into six distinct groups, each representing a specific level of divorce risk:

Very Low Risk (24.81%): This group consists of couples with long-standing marriages, small age differences, and minimal prior divorces. Their divorce probability is exceptionally low (0.009), making them the most stable segment.

Low Risk (30.17%): While still largely stable, these couples tend to have shorter marriage durations than the "Very Low" group, with a slightly increased divorce probability of 0.013.

Medium-Low Risk (23.68%): These couples exhibit shorter marriage durations and larger age gaps, leading to a moderate increase in divorce probability (0.018).

Medium-High Risk (13.19%): Defined by greater age differences and a higher incidence of prior divorces, this segment faces a significantly higher probability of divorce (0.024).

High Risk (6.75%): These couples have the largest age disparities and a substantial history of previous divorces, resulting in a divorce probability of 0.032.

[1] The clustering results serve as a high-level summary of risk segmentation within the simulated population. A more detailed breakdown of each group's characteristics, including additional statistical measures and subgroup analysis, is available upon request for readers interested in a deeper exploration of the results.

Very High Risk (1.40%): Representing the smallest but most vulnerable segment, these couples have the shortest marriage durations, multiple prior divorces, and the highest likelihood of marital dissolution (0.046).

This segmentation highlights the heterogeneity in divorce risk within the simulated population, making it easier to analyze the structural differences between lower-risk and higher-risk couples.

From a risk management perspective, clustering-based segmentation enhances the clarity of the simulation results by: Providing a structured interpretation of risk

The classification into discrete risk groups simplifies the analysis of divorce probability distributions.

It allows for a more intuitive understanding of how demographic and behavioral factors interact to shape different marital stability profiles.

Identifying high-risk segments for targeted strategies

The "High" and "Very High" risk groups, which together represent approximately 8% of the population, concentrate most of the divorce risk.

Their distinct characteristics, such as short marriage durations and multiple prior divorces, suggest that they could be subject to differentiated risk management approaches in actuarial modeling.

Enhancing transparency in risk evaluation

By organizing the simulated data into clearly defined risk categories, clustering provides a coherent framework for future actuarial assessments.

This segmentation can serve as a reference for refining future iterations of divorce insurance models and validating assumptions used in risk-based pricing strategies.

Survival Functions

In our simulation framework, survival functions serve two key roles: (1) quantifying the biological longevity of each partner, and (2) capturing the persistence of the marital relationship over time. These functions are critical for actuarial evaluations in divorce insurance, as they allow us to integrate both mortality risk and the risk of marital dissolution into a joint survival probability.

The biological survival function for an individual is derived from age-specific mortality probabilities. For an individual currently aged a, the survival probability for the next $\boldsymbol{t}$ years is computed as:

$$S_b(t/a) = \prod_{s=0}^{t-1}(1 - q_{(a+s,b+s}) \qquad [13.]$$

where $q_{(a+s,b+s}$represents the mortality probability at age $a+s$ in the year $b+s$, being b the base calendar year. In our simulation, these probabilities are sourced from mortality data tables—one for men and one for women. This dynamic update ensures that the mortality rates used in the survival calculation reflect the evolution of mortality over time.

The joint biological survival for a couple is then calculated as the product of the individual survival functions:

$$S_B^{b,j}(t) = S_b^{h,j}(t/a_h) \cdot S_b^{w,j}(t/a_w) \qquad [14.]$$

where $S_b^{h,j}$ and $S_b^{w,j}$ denote the biological survival functions for the husband and wife, in couple j, respectively.

While biological survival captures the risk of mortality, the relationship survival function accounts for the risk of divorce. In our framework, the annual probability of divorce for a couple, $P(D_t^j)$, is recalculated dynamically each year based on updated characteristics (such as the couple's ages and years married).

Assuming that divorce events in different years are independent, the probability that the couple does not divorce in year t is $1 - P(D_t^j)$. The cumulative relationship survival probability over t years is then given by:

$$S_r^j(t) = \prod_{s=1}^{t}(1 - P(D_t^j)) \qquad [15.]$$

The final measure of risk integrates both dimensions—biological survival and relationship survival—to yield the joint survival function for a couple. This function represents the probability that, after $\boldsymbol{t}$ years, both partners are alive, and the marriage remains intact:

$$S_J^j(t) = S_b^{h,j}(t/a_h) \cdot S_b^{w,j}(t/a_w) \cdot S_r^j(t) \qquad [16.]$$

An important methodological feature of our actuarial approach is that it can be viewed as a multi-state model, wherein a couple transitions among distinct states: (1) both spouses alive and married, (2) divorce, and (3) death of one or both spouses (absorption). While the paper presents these transitions in terms of "biological survival" and "relationship survival," the underlying logic is the same as in classical multi-state life insurance modeling.

Specifically, each year we track two dimensions: the probability that both spouses remain alive (the biological survival function) and the probability that the marriage remains intact (the relationship survival function). The couple's hazard of divorce (state (2)) is multiplied by the probability that they remain in state (1)—i.e., both alive and not yet divorced. Similarly, if one spouse dies (transition to state (3)), no further risk of divorce applies. This ensures that our simulation reflects both the likelihood of surviving to future years and the evolving marital status.

From an insurance standpoint, this multi-state perspective is crucial. It captures the fact that once a couple transitions to "divorced" or "one spouse deceased," they no longer pose the same divorce risk. In practice, this is implemented by multiplying the divorce probability each year by the joint survival probability of both spouses, as well as by the relationship survival probability. Hence, although the paper presents these components separately, the model in effect uses a multi-state actuarial framework to combine mortality and divorce risk for premium calculations.

This comprehensive framework—spanning the formulation of a probability function for divorce risk, its dynamic updating through simulation, and the integration of biological and relationship survival functions—provides a robust basis for the actuarial evaluation of divorce insurance. It ensures that risk is quantified in a manner that reflects both individual heterogeneity and the evolving nature of marital relationships.

Some results for the survival functions

To demonstrate the breadth of outcomes generated by our simulation and to provide concrete illustrations for the subsequent insurance analysis, we have chosen a set of five "special" couples whose divorce probabilities lie at key points in the simulated distribution. The couples are ordered from lowest to highest probability of divorce:

C.1 – Min Risk (Couple #356, 0.41%): This couple exhibits the lowest divorce probability at 0.41%, significantly below the baseline. The husband (78) and wife (76) have been married for 28 years, having tied the knot at 50 and 48. Their low-risk profile includes a small age gap (2 years), 27 years of cohabitation, 2 children, no prior divorces, and moderate professional risk multipliers (1 and 0.9). Their income ratio (3.42) is relatively high, but their strong protective factors help maintain stability.

C.2 – Upper Bound Q1 (Couple #180, 1.13%): At the upper quartile boundary, this couple's divorce probability is 1.13%. The husband (45) and wife (44) married at 29 and 28, respectively, and have been together for 16 years. With no children, no prior divorces, professional risk multipliers of 1, and an income ratio of 2.75, their moderate profile keeps them at a relatively low risk level despite the absence of cohabitation.

C.3 – Median (Couple #7195, 1.48%): This couple represents the median divorce probability (1.48%). The husband (42) and wife (37) married at 39 and 34 and have been together for 3 years. Their risk profile includes a notable age gap (5 years), 3 children, no prior divorces, professional risk multipliers of 1 and 0.9, and a relatively high-income ratio (3.75). The presence of multiple protective factors counterbalances their shorter marriage duration.

C.4 – Upper Bound Q3 (Couple #3778, 1.97%): At the upper quartile boundary, this couple has a divorce probability of 1.97%. The husband (61) and wife (59) married at 43 and 41 and have been together for 18 years. Their profile includes a moderate age gap (2 years), 1 child, no prior divorces, professional risk multipliers of 1.2 and 0.9, and an income ratio of 0.97. The relatively lower income ratio and presence of both parental divorce factors ($Pd_h = 1, Pd_w = 1$) slightly increase their risk.

C.5 – Max Risk (Couple #1586, 6.52%): This couple exhibits the highest divorce probability (6.52%), well above the baseline. The husband (40) and wife (38) married at 33 and 31 and have been together for only 7 years. Their high-risk profile includes a history of 3 prior divorces for the husband and 2 for the wife, 3 children, professional risk multipliers of 1 and 1.2, and an income ratio of 1.81. The accumulation of risk factors, including short marital duration and high divorce history, significantly elevates their probability of marital dissolution.

These cases highlight the diversity of marital outcomes in the model, reinforcing the interaction between protective and risk-enhancing factors in shaping divorce probabilities.

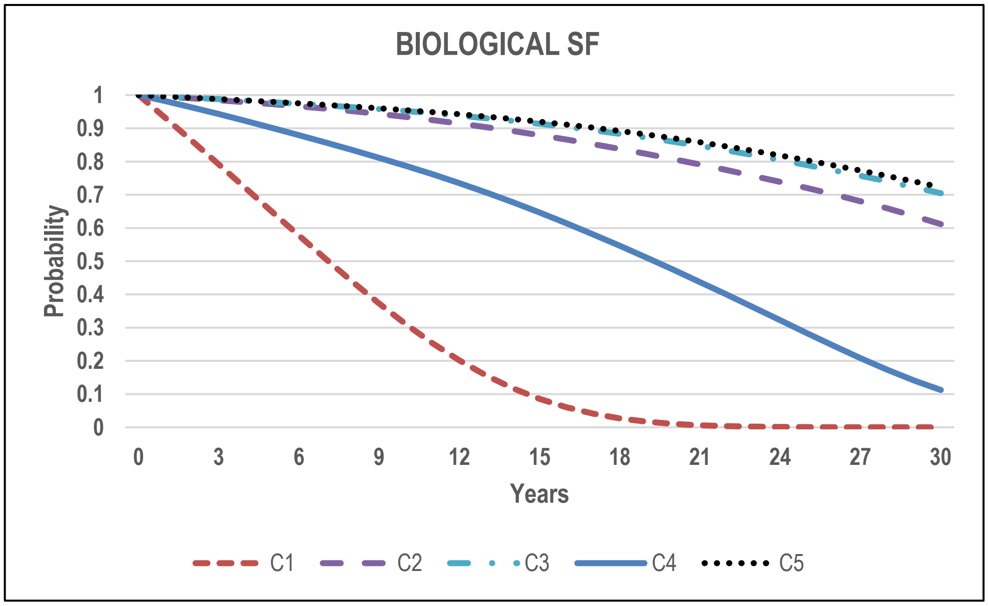

Figure 3. Biological survival functions

In this analysis, we use mortality data from the Social Security Administration (2024), starting from the year 2025 and employing the projected tables.

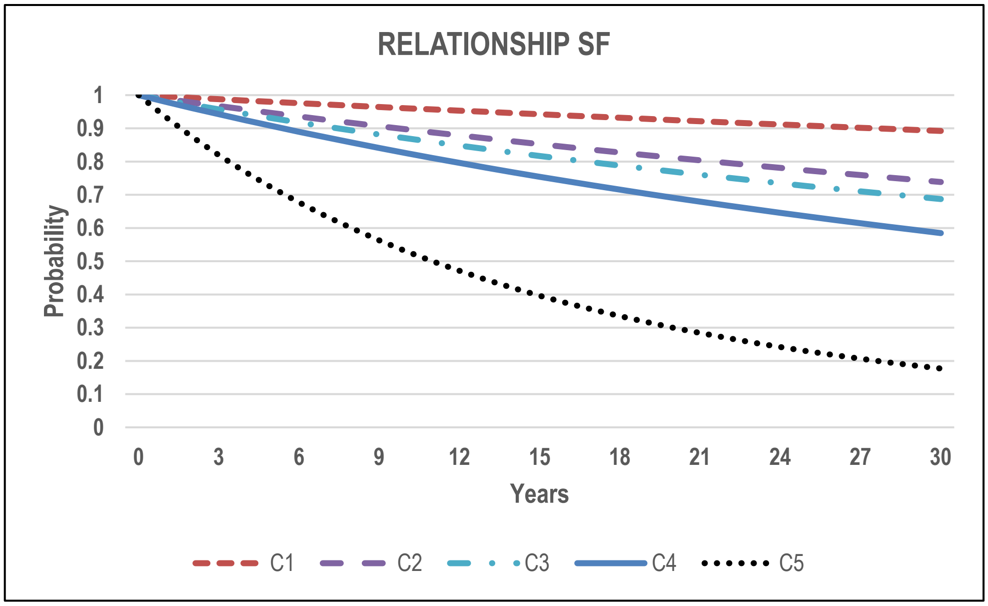

Figure 4. Relationship survival functions

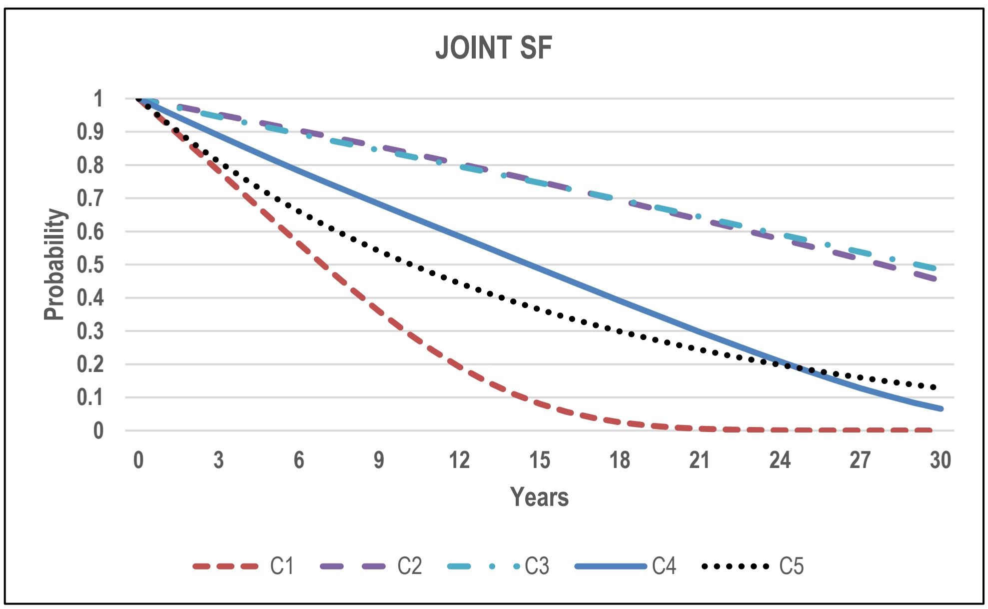

Figure 5. Joint survival functions

The accompanying figures (3-5) for each of the five "special" couples vividly illustrate the interplay between biological and relationship survival. Each graph plots three curves: the biological survival function (reflecting age-dependent mortality with annually updated rates), the relationship survival function (capturing the cumulative probability of remaining married), and the joint survival function (the product of the two). Below, we discuss how these curves appear for each couple:

C.1 – Min Risk (Couple #356, 0.41%): Despite their advanced ages, joint survival remains high due to a near-flat relationship survival curve. Long marriage duration and protective factors ensure marital stability, minimizing the impact of biological decline.

C.2 – Upper Bound Q1 (Couple #180, 1.13%): The biological survival curve declines gradually, while the relationship survival remains stable, reflecting a long marriage and absence of major risk factors. Their joint survival closely follows biological longevity.

C.3 – Median (Couple #7195, 1.48%): Relationship survival declines slightly more than in lower-risk couples due to a short marriage duration, but protective elements (children, no prior divorces) moderate the risk. Joint survival remains relatively strong.

C.4 – Upper Bound Q3 (Couple #3778, 1.97%): While biological survival is solid, relationship survival declines faster, influenced by moderate risk factors such as parental divorce and lower income ratio. This leads to a more pronounced joint survival dip.

C.5 – Max Risk (Couple #1586, 6.52%): The relationship survival curve drops sharply, showing the cumulative effect of high-risk factors. Despite decent biological longevity, joint survival is dominated by early marital dissolution.

The figures confirm that marital stability plays a decisive role in long-term joint survival. Low-risk couples maintain strong relationship survival, while high-risk cases experience steep declines, validating the model's risk differentiation.

6. Divorce Insurance: an illustrative example

The product is structured over a finite policy term of n years and incorporates a maturation period of m years. During this maturation period, if a divorce occurs, no benefit capital is paid. Consequently, the effective insurance coverage for a divorce event is limited to the interval from year $m + 1$ to year n. This structure ensures that early divorces occurring within the first *m* years do not trigger a benefit payout, while divorces that occur after the maturation period are eligible for compensation.

Two primary modalities of divorce insurance are considered in the model:

Non-Accumulating Modality:

In this modality, the divorce insurance premium is calculated solely as the present value of the expected costs associated with a divorce event occurring during the coverage period (i.e., from year $m + 1 \text{ to } n$). The premium calculation involves discounting future expected payouts that are triggered by a divorce event occurring after the maturation period. Importantly, if the couple remains married or if a divorce occurs during the initial maturation period, no capital benefit is paid. The premium reflects only the risk of a divorce occurring during the period when the coverage is active.

Non-Claim Bonus Modality:

The second modality enhances the base product by incorporating a non-claim bonus. Under this arrangement, if both spouses remain alive and married at the end of the policy term (year *n*), a bonus is paid—this bonus may take the form of a return-of-premiums or be proportional to a revalued insured capital. Similar to the non-accumulating modality, the policy stipulates that if a divorce occurs during the maturation period (the first m years), no benefit is payable. Thus, the insured benefit is only applicable either if a divorce occurs in the coverage period (years $m + 1$ to n) or, in the absence of a divorce, as a final bonus at policy maturity.

Premium Calculation

For each year t in the coverage period ($t = m + 1, \dots, n$) for couple j valued at the inception of the contract (i.e., expressed in present value terms)— the expected cost for the insurer is calculated as follows:

$$\Pi^j(t) = S_J^j(t-1) \cdot \left[S_r^j(t-1) - S_r^j(t)\right] \cdot C^j(t) \cdot DF(t) \qquad [17.]$$

Being,

$S_J^j(t-1)$: the probability that both spouses in couple j are alive and married at the beginning of year t,

$S_r^j(t-1) - S_r^j(t) = P\left(D_t^j\right)$: the probability that couple j divorces during year t,

$C^j(t) = C^j(0) \cdot (1+\lambda)^{t-m-1}$: the revalued insured capital, being $C^j(0)$ the initial insured capital for couple j and λ the annual revaluation rate.

$DF(t) = (1+r)^{-t}$: the discount factor for a given interest rate "r".

Then, the lump sum pure premium for couple j is determined as:

$$\Pi_P^j(0) = \sum_{t=m+1}^{n} \pi^j(t) \qquad [18.]$$

which aggregates the present value of the expected future losses due to divorce events over the period during which coverage is effective.

Since

Then, the lump sum pure premium for couple j with the return of the premium in case both spouses remain alive, and the marriage persists until time n is:

$$\Pi_{PR}^j(0) = \frac{\Pi_P^j(0)}{1 - \underbrace{\left(S_J^j(n) \cdot (1+r)^{-n}\right)}_{Refund\ Adjustment}} \qquad [19.]$$

If the final benefit option is a benefit percentage γ, on the revalued guaranteed capital:

$$FB^j(n) = \gamma \cdot C^j(0) \cdot (1+\lambda)^{n-m-1} \quad [20.]$$

Then, the pure lump sum premium for couple j with final benefit option in case both spouses remain alive, and the marriage persists until time n is:

$$\Pi_{PB}^j(0) = \Pi_P^j(0) + FB^j(n) \quad [21.]$$

If premiums are collected as prepaid monthly installments over the maturation period (i.e., the first m years, corresponding to $12 \cdot m$ months). For month $\boldsymbol{t}$ (with $t = 0,1,2,\dots,(12\cdot m)-1$), the monthly discount factor is defined as: $DFm(t) = (1+r)^{-t/12}$

And we denote the probability that both spouses in couple j are alive and married at month t as $P_{AM}^j(t)$, this probability is approximated by interpolation from the annual joint survival probabilities ($S_J^j(.)$).

For $t = 0$; $P_{AM}^j(0) = 1$

For $t > 0$, It is defined that: $k = \frac{t}{12} + 1 \; and \; j_m = t - 12 \cdot (k-1)$; where k represents the current year on the monthly scale and j_m is the number of months that elapsed in that year. Then:

$$if\ k = 1;\ P_{AM}^j(t) = \left[S_J^j(1)\right]^{t/12} \quad [22.]$$

$$if\ k \geq 2;\ P_{AM}^j(t) = S_J^j(k-1) \cdot \left[\frac{S_J^j(k)}{S_J^j(k-1)}\right]^{j_m/12} \quad [23.]$$

Then, it is easy to calculate the prepaid monthly premium for couple j, which is determined by allocating the total pure premium over the present value of a temporary unit annuity payable monthly for couple j over the maturation period (i.e., for $12 \cdot m$ months), contingent upon both spouses remaining alive and married:

$$\pi_{P:12\cdot m}^j = \frac{\overbrace{\Pi_P^j(0)}^{Lump-sum\ pure\ premium}}{\underbrace{\sum_{t=0}^{(12\cdot m)-1} P_{AM}^j(t) \cdot (1+r)^{-t/12}}_{Monthly\ Annuity\ Factor}} \quad [24.]$$

For the case of premium returns, if the couple survives the entire policy term, the insurer fully refunds all premiums that were collected:

$$\pi^{j}_{PR:12\cdot m} = \frac{\overbrace{C^{j}(0)\cdot\sum_{t=m+1}^{n} S^{j}_{J}(t-1)\cdot P\left(D^{j}_{t}\right)\cdot(1+\lambda)^{t-1}\cdot(1+r)^{-t}}^{\Pi^{j}_{P}(0)}}{\underbrace{\left(\sum_{t=0}^{(12\cdot m)-1} P^{j}_{AM}(t)\cdot(1+r)^{-\frac{t}{12}}\right)}_{Monthly\ Annuity\ Factor} - \underbrace{\left(12\cdot m\cdot S^{j}_{J}(n)\cdot(1+r)^{-n}\right)}_{Refund\ Adjustment}} \quad [25.]$$

The subtraction of $\left(12\cdot m\cdot S^{j}_{J}(n)\cdot(1+r)^{-n}\right)$ in the denominator adjusts the annuity factor to reflect the refund feature of the contract. This term represents the actuarial present value (at inception) of the refund benefit (expressed as a lump sum equal to the total premiums paid, which, when spread over the entire maturation period, reduces the effective cost).

If the final benefit option is a benefit percentage γ, on the revalued guaranteed capital:

$$\pi^{j}_{PB:12\cdot m} = \frac{\overbrace{\Pi^{j}_{P}(0) + FB^{j}(n)}^{\Pi^{j}_{PB}(0)}}{\sum_{t=0}^{(12\cdot m)-1} P^{j}_{AM}(t)\cdot(1+r)^{-t/12}} \quad [26.]$$

The results in Table 4 summarize the key premium metrics for a set of selected couples, each representing different risk profiles. The calculations are based on the following parameters: a policy duration of 10 years, a maturation period of 4 years, an annual interest rate of 3%, an initial insured capital of 20,000$, a revaluation rate of 3%, and a benefit percentage of 5%. The table presents six columns (labeled 1 through 6) that capture various aspects of the premium structure under two distinct modalities: The Return-of-Premiums (ROP) modality and the Final Benefit Option modality.

The columns are as follows:

1.-Pure_Premium: This column represents the lump-sum pure premium. It is the present value of the insurer's expected loss from divorce events occurring during the effective coverage period (i.e., from year 5 through year 10). Lower values indicate lower risk exposure, as observed for the "Min Risk" couple, while higher values are indicative of higher risk, as seen with the "Max Risk" couple.

2.-Monthly_Premium: This column shows the monthly premium that corresponds to the lump-sum pure premium. In other words, it is the pure premium amortized over the 48 months of the maturation period. This monthly installment reflects the cost if the insurer were to collect the pure premium evenly over time.

3.-Pure_Premium with return of premium: Here, the pure premium is adjusted to reflect the product's return-of-premiums feature. This adjusted premium is higher than the pure premium alone because it is increased to cover the eventual refund if the couple survives (i.e., if both spouses remain alive and married until the end of the policy term). This column indicates the total lump sum amount that would be financed under the ROP modality.

4.-Monthly_Premium_ROP: This column provides the monthly premium under the Return-of-Premiums modality. It is derived by distributing the adjusted lump-sum premium (accounting for the refund feature) over the maturation period. The monthly premium in this modality is significantly higher than the basic monthly premium, reflecting the cost of ensuring a full refund if no divorce occurs.

5.-Lump_Sum_Premium_Final: This column reports the lump-sum premium for the Final Benefit Option modality. It is obtained by adding a final benefit—calculated as a percentage of the revalued insured capital—to the pure premium. This additional benefit represents an extra amount that the insured receives if no divorce occurs, thereby increasing the overall premium required.

6.-Monthly_Premium_Final: This column displays the monthly premium under the Final Benefit Option modality. It represents the lump-sum premium (pure premium plus final benefit) spread evenly over the maturation period. Compared to the ROP modality, this monthly premium is typically lower, reflecting a different approach to providing a benefit at the policy's maturity.

In light of the combined information from Table 4 (premiums) and each couple's demographic characteristics, it becomes clearer how age, divorce history, years of marriage, the presence of children, and financial situation jointly influence divorce insurance costs. Actuarial risk is determined not only by an abstract probability of divorce but also by the likelihood that both spouses will survive to the coverage phase (years 5 to 10 of the policy), which explains the variations observed in Table 4.

Min Risk (ID 356): This couple, aged 78 and 76, has been married for 28 years with no prior divorces, resulting in the lowest divorce probability (0.41%) and the lowest Pure Premium (217.73 $). Their advanced age reduces the likelihood of both spouses surviving to the coverage period, thereby limiting the insurer's exposure. A high Income Ratio (3.42) and no divorce history suggest a stable marital profile. Even though adding the Return-of-Premiums (ROP) feature raises the total cost to 283.00 $, it remains the lowest among all couples, reflecting the minimal chance of completing the term without divorcing.

Table 4: Pure premiums for selected couples ($)

Id	Criteria	1	2	3	4	5	6
		$\Pi_P^j(0)$	$\pi_{P:12\cdot m}^j$	$\Pi_{PR}^j(0)$	$\pi_{PR:12\cdot m}^j$	Π_{PB}^j	$\pi_{PB:12\cdot m}^j$
1	Min Risk	217.73	5.55	283.00	7.72	1,377.01	35.07
2	Upper Bound Q1	983.88	21.92	3,229.02	85.49	2,143.16	47.75
3	Median	1,193.45	26.99	3,204.15	84.62	2,352.72	53.20
4	Upper Bound Q3	1,481.12	33.91	3,573.07	95.10	2,640.40	60.45
5	Max Risk	3,997.62	88.88	13,802.96	367.37	5,156.89	114.65

Source: Own

Max Risk (ID 1586): In contrast, this younger couple, aged 40 and 38, has been married for only seven years and has multiple prior divorces (three on the husband's side and two on the wife's). They face the highest divorce probability (6.52%), which translates into the highest Pure Premium (3,997.62 $) and a substantial increase under ROP (13,802.96 $). Because they are younger, the likelihood of surviving to the coverage phase is greater, increasing the insurer's potential liability for both divorce payouts and refunds. Three children and an Income Ratio of 1.81 indicate dual-income support but also reflect considerable marital instability.

Intermediate Couples (Upper Bound Q1, Median, Upper Bound Q3): These three profiles occupy a middle ground between Min Risk and Max Risk. Upper Bound Q1 (ID 180), ages 45 and 44, has been married for 16 years with no children or divorces and a 1.13% divorce probability, yielding a Pure Premium of 983.88 $ and a monthly premium of 21.92 $. The Median couple (ID 7734), ages 57 and 52, includes one prior divorce (husband), 16 years of marriage, and one child, with a 1.48% divorce probability. Their premiums (1,193.45 $ pure, 3,204.15 $ ROP) indicate a moderate divorce risk and a reasonable chance of surviving to the policy's end. Meanwhile, Upper Bound Q3 (ID 3778), ages 61 and 59, has been married for 18 years, has one child, and faces a 1.97% divorce probability. Their Pure Premium of 1,481.12 $ rises to 3,573.07 $ under ROP, reflecting a higher—but still tempered—risk level, given somewhat reduced joint survival at older ages.

ROP and Final Benefit Modalities: In all cases, the ROP modality substantially raises premium costs, particularly for younger couples or those likely to remain married throughout the term, since the insurer must refund premiums if no divorce occurs. By contrast, the Final Benefit Option—calculated as a fixed percentage of the revalued capital—produces more moderate and predictable increases (e.g., from 1,377.01 $ for Min Risk to 5,156.89 $ for Max Risk). This structure is often more appealing to policyholders seeking a final payout without incurring the higher cost associated with a full refund guarantee.

Overall, these findings are illustrative: the actual premium values would depend on refined divorce rates, detailed mortality assumptions, underwriting practices, and a myriad of personal factors (e.g., economic stability, health status, marital history). In practice, this multidimensional approach explains why premiums can be significantly higher for couples with a high survival probability (younger age, fewer health concerns) plus multiple prior divorces, while older couples at lower risk might pay much less.

Importantly, the return-of-premium (ROP) feature or any partial capital refund if the couple remains married can act as a powerful incentive for future renewal of the policy at the end of the n-year term. For instance, after 10 years, a couple might see that their circumstances, the prevailing divorce rates, or their own relationship stability have evolved, and they could decide to renew under new terms or choose a different coverage structure. This renewal aspect underscores that real-world divorce insurance pricing would require ongoing monitoring of refined divorce rates and risk factors over time, rather than relying on static probabilities established at inception.

From a practical standpoint, combining demographic and actuarial variables (joint survival probabilities, marital history, prior divorces, presence of children, and income ratios) is critical for setting fair and viable premiums. The incentive of partial or full refunds for couples who remain together underscores that such products are not just about insuring against divorce but also about rewarding marital stability. Ultimately, whether via pure coverage, ROP, or a final benefit option, insurers and policyholders alike must balance risk protection against affordability and long-term incentives when considering the design of divorce insurance products.

The premium figures reported here correspond to pure premiums—the theoretical amounts needed to cover divorce-related claims. However, the actual premiums paid by policyholders would be higher, as insurers must factor in administrative and overhead costs (e.g., general management, claims-handling, commercial expenses, premium collection, acquisition costs, profit margins, and safety loadings). Additionally, if there are any applicable taxes or legal surcharges, they would increase the final price further.

7.-Discussion

The central question posed in the introduction of this study was whether divorce insurance can function as a feasible and effective financial instrument for mitigating the economic consequences of marital dissolution. Based on a probabilistic simulation framework, this research provides affirmative evidence that an actuarially sound divorce insurance model can be developed under specific structural conditions. These conditions involve dynamic premium adjustments reflecting relevant risk factors (for example, age at marriage, prior divorces, and presence of children) as well as structured return-of-premium (ROP) mechanisms that reduce moral hazard by rewarding policyholders who remain married. Additionally, robust regulatory frameworks are needed to mitigate adverse selection and maintain both market appeal and financial viability.

The simulation results not only corroborate previous studies that highlight key demographic and socioeconomic drivers of divorce but also advance current knowledge by illustrating how actuarial methods can be applied to an area lacking established underwriting standards. For instance, premium differentiation emerged as critical to dissuade disproportionately high enrollment by higher-risk individuals, thereby averting claim surges that could undermine long-term sustainability. This finding underscores the need for insurers to adopt dynamic pricing models akin to those used in life or health insurance, rather than relying on static premium structures.

7.1 Comparison with Prenuptial Agreements and Divorce Settlements

Existing financial instruments such as prenuptial agreements and divorce settlements partially address the economic ramifications of marital breakdown but remain limited in scope. Prenuptial agreements usually focus on delineating asset division before marriage, offering minimal coverage for immediate liquidity demands triggered by divorce. Likewise, divorce settlements may specify asset allocation and support obligations but often exclude urgent expenses such as legal fees, relocation costs, or gaps in income.

Divorce insurance, in contrast, is not intended to replace these legal mechanisms; rather, it can supplement them by offering direct, predictable payouts independent of protracted legal proceedings. Unlike prenuptial agreements, which may be contested in court or deemed unenforceable, divorce insurance ensures financial relief once policy conditions are met. For individuals who lack robust savings or face considerable income disparities, such coverage could help stabilize the post-divorce economic landscape.

7.2 Practical Implications

Positioning divorce insurance as a supplementary financial product analogous to life or disability insurance appears promising. Individuals who belong to high-risk demographic segments—such as those entering second marriages or experiencing significant income imbalances—might find the product particularly beneficial. Employers and financial institutions could consider including divorce insurance within broader benefits packages, offering a safety net against unforeseen divorce-related expenses.

However, the demand for such products is likely to be influenced by legislative environments. As Friedberg (1998) and Wolfers (2006) highlight, legal changes that facilitate unilateral divorce initially increase divorce rates but stabilize over time. This suggests that in jurisdictions with more accessible divorce procedures, the perceived need for financial protection could be higher, shaping market demand for divorce insurance.

Despite these potential advantages, real-world adoption would depend on regulatory considerations and public acceptance. Insurers must communicate the product's value as a prudent element of financial planning rather than as a tacit endorsement of marital dissolution. In jurisdictions with extensive legal protections for spouses, consumer demand for divorce insurance may be lower. Hence, careful framing and market analysis will be necessary to integrate divorce insurance into existing financial services.

7.3 Moral Hazard and Adverse Selection Risks

Divorce insurance offers valuable security for those who might otherwise be unprepared for the financial risks associated with legal separation. Nevertheless, it faces significant challenges related to moral hazard and adverse selection. Moral hazard arises if insured individuals, knowing they are protected, exert less effort to preserve marriage or engage in opportunistic behavior. In extreme scenarios, an insured party might view divorce as a strategy to secure a lump-sum payout. These concerns align with Chiappori et al. (2009), who emphasize that information asymmetry in marriage markets leads to selection adverse and opportunistic behavior. Thus, structured return-of-premium (ROP) mechanisms and dynamic premium adjustments play a crucial role in mitigating moral hazard.

Adverse selection, on the other hand, arises when only high-risk individuals choose to purchase coverage, potentially driving up claims to unsustainable levels. To mitigate these issues, insurers could implement waiting periods before coverage becomes fully effective, adopt co-insurance requirements that share the financial burden with policyholders, or establish graduated benefit schedules that phase in payouts over time. Such measures would help control opportunistic claims and maintain the broader viability of divorce insurance.

7.4 Methodological Evaluation and Limitations

The study adopted a simulation-based approach that confers multiple advantages, including transparency, replicability, and avoidance of personal data handling. However, several limitations should be acknowledged:

Data Calibration: Although the model integrates empirical trends in divorce rates, calibrating it against real-world claims data would improve predictive accuracy. Many insurance sectors lack extensive historical data specific to divorce claims, constraining model refinement.

Behavioral Factors: Psychological and emotional variables integral to marital decision-making are not comprehensively represented. Integrating behavioral economics could yield deeper insights into drivers of divorce risk.

Legal and Cultural Variations: The model assumes relatively uniform cultural and legal conditions yet divorce laws and societal norms differ markedly across regions, potentially influencing both divorce likelihood and insurance uptake.

Market Acceptance Uncertainty: While theoretical feasibility is apparent, demand and social attitudes toward this product remain untested. Further empirical investigation is necessary to assess actual consumer responses.

These limitations highlight the potential value of pilot programs or field studies that could validate key assumptions with real-world data and explore how consumer perceptions evolve over time.

7.5 Replicability and Broader Applications

The structured probability model presented here provides a replicable framework for divorce insurance pricing that can be adapted to diverse legal and cultural contexts through modifications to underlying probability distributions and factor weightings. From a risk management perspective, divorce insurance represents a proactive approach, distributing the financial impact of marital dissolution over time rather than relying solely on post hoc legal remedies.

Policymakers might also find the model useful in developing subsidized or partially funded schemes to alleviate strain on social support systems—particularly in settings where single-parent families or low-income households bear a disproportionate share of divorce-related financial burdens. Moreover, the same methodology could inform other life-event products such as cohabitation or separation insurance. Marriage stability bonds, which combine elements of insurance and contractual incentives for marital longevity, may further benefit from the factor-based adjustments proposed here. By leveraging actuarial science for non-traditional risk domains, the model can help stakeholders innovate financial tools that align with evolving family structures and social norms.

7.6 Research Validity and Implications

Overall, these findings demonstrate that divorce insurance can be designed to be actuarially feasible through dynamic underwriting, risk-adjusted premiums, and appropriately configured ROP features. The research objectives—examining product viability, proposing a probabilistic pricing structure, and evaluating policy design strategies—were met in a theoretical context that now requires empirical follow-up. While the simulations strongly suggest the potential benefits of divorce insurance, social acceptance and regulatory constraints must also be addressed for widespread implementation.

By clarifying how moral hazard and adverse selection can be mitigated with structured policy options, this study extends the broader discourse on innovative risk-transfer mechanisms. Ultimately, divorce insurance stands at an intersection of actuarial science, family economics, and social policy, offering a proactive means of financial protection for individuals navigating one of life's most challenging transitions. This investigation lays the groundwork for future initiatives that can further refine premium calculation, explore alternative benefit designs, and assess consumer behavior under real market conditions.

7.7 Incorporating Psychological Evaluations as Factor 11

A promising enhancement to our actuarial model is the introduction of a new risk factor—"Factor 11"—which would be derived from a standardized psychological evaluation conducted by a divorce-specialized psychologist. This evaluation would assess key behavioral and emotional indicators, such as conflict resolution skills, communication patterns, and overall relationship dynamics, thereby providing a qualitative measure to adjust the calculated divorce probability. One major advantage of this approach is that it captures nuances often overlooked by traditional demographic or socioeconomic metrics, potentially leading to more accurate premium calculations and a fairer distribution of risk. Moreover, by identifying couples with strong psychological resilience, insurers might better reward lower-risk profiles, thus reducing moral hazard and adverse selection. However, there are also significant challenges to consider: the implementation of such evaluations requires standardized protocols, rigorous validation to ensure predictive accuracy, and careful handling of sensitive personal data to maintain ethical standards and privacy. Additionally, the potential variability in psychologist assessments could introduce subjectivity, necessitating robust training and quality control measures. Despite these challenges, incorporating Factor 11 could represent a valuable step forward in aligning actuarial practices with the complex realities of marital behavior, as supported by research emphasizing the predictive power of psychological factors on marital outcomes (Gottman, 2023).

7.8 Acquisition Costs and Market Penetration:

In addition to robust actuarial pricing, the commercial viability of divorce insurance would be critically influenced by high acquisition costs. Recent literature suggests that niche insurance products might face acquisition expenses ranging from 50% to 100% of the gross premium. These elevated costs would arise from extensive consumer education requirements, regulatory compliance, and the challenge of overcoming the social stigma associated with purchasing divorce insurance. Research further suggests that framing the product as a financial planning tool rather than strictly a divorce-related policy could increase consumer acceptance. Consequently, insurers would need to invest in targeted digital marketing, direct-to-consumer sales channels, and strategic bundling with complementary financial products (e.g., prenuptial agreements or comprehensive financial planning services) to achieve cost efficiency and broaden market reach. Incorporating acquisition cost sensitivity analyses into the premium modeling framework would further enhance the assessment of product sustainability by bridging the gap between actuarial precision and market realities.

8.-Conclusions and direction for future research

This study sets out to evaluate the actuarial viability and market potential of divorce insurance as a means of mitigating the economic consequences of marital dissolution. The results confirm that such a product can be both feasible and sustainable when built on dynamic, risk-based premiums, appropriate return-of-premium mechanisms, and supportive regulatory structures. In applying a probabilistic modeling approach—drawing on demographic and financial variables like age, prior marriages, and income ratio—this research contributes a novel framework to an emerging domain that has been largely unexplored in academic literature.

From a practical standpoint, our findings suggest that divorce insurance has the capacity to complement existing legal tools (e.g., prenuptial agreements, divorce settlements) by offering predictable payouts that can defray immediate costs. However, insurers and policymakers must address critical issues of moral hazard and adverse selection. Introducing co-insurance, waiting periods, and vesting schedules are among the strategies that could reduce opportunistic behaviors and foster product longevity.

The implications extend beyond divorce insurance itself, laying the groundwork for other life-event-related products such as cohabitation or separation agreements backed by insurance clauses. Employers, financial institutions, and policymakers seeking to enhance risk management strategies could incorporate these findings into their broader portfolio of financial planning services.

Several avenues for future research emerge from this study:

Empirical Validation: Implementing pilot programs or collaborating with insurers to collect real-world claims data would refine the model's predictive accuracy and reveal how policyholders respond under actual market conditions. Such empirical studies would also help in calibrating risk-based premiums and validating assumptions on demographic and financial variables, ensuring that the product design is robust and responsive to market dynamics.

Behavioral Economics: An in-depth analysis of the psychological and cultural factors influencing divorce decisions could inform more nuanced actuarial models and underwriting practices. Research in this area would involve studying how couples perceive risk, the impact of financial incentives on marital stability, and potential unintended behavioral responses. Understanding these factors can lead to better-designed incentives that align both financial interests and emotional well-being.

Regulatory and Legal Frameworks: Comparative studies across jurisdictions with varying levels of spousal protection and divorce legislation could clarify how local norms and regulations affect the demand for divorce insurance. Future research should explore how legal structures and government policies interact with innovative insurance products, potentially identifying regulatory adjustments that could facilitate product adoption while protecting consumer interests.

Expansion to Other Domains: The methodological underpinnings presented here could be adapted for similar family or relationship insurance products, further exploring how probabilistic modeling can mitigate diverse risks. This expansion might include products such as cohabitation or separation agreements with integrated insurance clauses, which would address the financial implications of non-traditional relationship arrangements.

Marital Longevity Incentives: Beyond mitigating the costs of divorce, a promising direction for future research is the development of standalone products that reward marital longevity. For example, a "marital longevity bonus" could be structured as an additional benefit that accrues over time and is paid out as a lump sum upon reaching predetermined milestones (e.g., every 'n' years of marriage) or at the end of the contract if no divorce occurs. This approach not only incentivizes couples to sustain their union by offering a celebratory financial reward but also shifts the focus from merely preventing negative outcomes to actively promoting long-term stability. Investigating the actuarial feasibility, consumer acceptance, and optimal structuring of such benefits would contribute valuable insights to the broader discussion of using financial instruments to reinforce positive family dynamics.

By pursuing these lines of inquiry, future research can significantly deepen our understanding of divorce insurance and its potential to become a mainstream tool in personal finance and risk management. Continued refinement of actuarial models, combined with empirical insights into consumer behavior and regulatory impacts, will pave the way for evidence-based policy design and ultimately enhance financial resilience for individuals navigating marital transitions.

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