Intermediation, Choice Frictions, and Adverse Selection: Evidence from the Chilean Pension Market

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August 12, 2025

Abstract

Intermediaries help individuals improve decisions when products are costly to understand, but may introduce distortions due to agency problems. In an insurance market, intermediary effects on choices can impact adverse selection and, through it, prices. I analyze the consumer-welfare effect of intermediation in the Chilean pension and annuity market, where products are complex and advisors have a financial incentive to sell annuities. I develop and estimate a dynamic demand model that includes life-cycle decisions, product, and intermediation choices. I use the model to study intermediary regulation. Despite advisors steering a majority of their customers into annuities, a ban on intermediation is approximately consumer-welfare neutral. Intermediaries eliminate large choice frictions and dampen adverse selection into annuities, while the variety of annuities limits the harm from their biased recommendations.

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*Department of Economics, London School of Economics and Political Science. e.boehm2@lse.ac.uk. I thank my advisors, Kate Ho and Alessandro Lizzeri, for their invaluable advice, patience, and encouragement throughout this project. I also thank Jakub Kastl for numerous helpful comments that substantially improved the paper, as well as Peter Achim, Juan Pablo Atal, Mark Egan, Erica Jiang, and Amit Seru for insightful discussions. This paper benefited from conversations and comments from Vivek Bhattacharya, Nick Buchholz, Zach Brown, Amy Finkelstein, Alessandro Gavazza, Ben Handel, Gastón Illanes, Adam Kapor, Pierre-Carl Michaud, Eduardo Morales, Eric Richert, and Claudia Robles-García, seminar and conference participants at the Bank of Spain, Berkeley, Bocconi, Chicago IO in Retrospect, Cornell, EARIE, FCA, HEC Montréal, IIOC, LSE, Michigan, NBER Insurance Working Group, NBER SI Household Finance, Princeton, SED, SITE and UT Austin McCombs, and the IO Workshop and SPIA Prize Fellowship at Princeton University. I also thank María Elisa Alonso and Carolina del Campo at the *Comisión para el Mercado Financiero*, and Vicente Céspedes and Paulina Granados at the *Superintendencia de Pensiones* for valuable discussions and help with the data. This paper uses information from the Social Protection Survey (SPS). The author thanks the Department of Social Security (*Subsecretaría de Previsión Social*) of Chile, intellectual owner of the SPS, for the authorization to use the anonymous database and the linked administrative data on social security and pension history. All results from this investigation are of exclusive responsibility of the author and do not represent any commitment from said department. The author is pleased to acknowledge that the work reported on in this paper was substantially performed using the Princeton Research Computing resources at Princeton University which is consortium of groups led by the Princeton Institute for Computational Science and Engineering (PICSciE) and Office of Information Technology's Research Computing. All errors are my own.

1 Introduction

Annuities are common retirement and insurance products, with the U.S. annuity market generating 400 billion USD revenue in 2023.[1] However, annuities are also complex financial products and their associated benefits and costs are difficult to understand. Retirees making choices about these products therefore face a trade-off: they can either incur the costs of gathering information to ensure they choose the most suitable product, or else risk making a "mistake."

In financial markets, individuals often have an alternative: pay an intermediary to provide expert advice. In theory, hiring an intermediary allows the consumer to avoid decision-making costs. In practice, intermediaries have been a cause of policy concern. The financial incentives of intermediaries and consumers are often misaligned, which can lead intermediaries to steer consumers toward suboptimal but high-commission products.[2] In insurance markets, intermediaries' advice may increase the ability of individuals to select into coverages based on their private information, while steering may reduce this selection. Intermediation can therefore impact *adverse selection*—and through it, insurance costs and equilibrium prices.

In this paper, I assess the consumer welfare effects of intermediaries in the Chilean pension and annuity market, where retirees choose among complex products and advisors have financial incentives to recommend annuities. I estimate a dynamic model of life-cycle consumption and savings decisions, product choice, and demand for intermediation. The central piece of the model is a choice friction that captures the complexity of retirement decisions. Retirees can learn about the value of pension products on their own by incurring an information cost. Alternatively, individuals can hire an intermediary who eliminates these costs but steers choices toward high-commission products (annuities). I use the model to evaluate the heterogeneous consequences of regulating intermediaries by quantifying choice frictions, intermediary distortions, and adverse selection into annuities based on life expectancy.

In my main counterfactual, I explore the impact of banning intermediaries. Although intermediaries steer most of their clients toward annuities, the ban is approximately consumer-welfare neutral. The variety of annuity types allows intermediaries to distort consumers to an annuity that approximates their best option closely, mitigating the harm from misaligned incentives. At the same time, a ban imposes new costs: retirees must decide without advice, and annuity prices rise as adverse selection worsens. These costs balance out the losses from distortions induced by intermediaries in the benchmark, leaving consumer welfare largely unchanged.

[1] IBISWorld (Maldonado, 2023).

[2] See, for example, Egan (2019), Egan, Ge, and Tang (2022), and Bhattacharya, Illanes, and Padi (2025). The Biden administration proposed regulation that would extend fiduciary duty standards, see `https://news.bloomberglaw.com/daily-labor-report/biden-fiduciary-rule-redo-has-gone-to-white-house-for-review`.

To motivate the model, I begin by documenting three key facts on the Chilean setting. Using detailed, individual-level administrative and survey data, I show (i) retirees face a difficult decision that leads to choice frictions, (ii) retirees demand advice from intermediaries, who are strongly predictive of consumers' pension product choices, and (iii) intermediaries reduce adverse selection into annuities.

I first highlight the complexity of choices in the Chilean pension market. At retirement, individuals must convert their accumulated savings into a flow of payments to be paid over time. The outside option—called Phased Withdrawal—provides no insurance coverage but allows retirees to bequeath their outstanding pension wealth in case of an early death. Retirees can also choose among a wide variety of annuities that insure against *longevity*, the risk of living too long and running out of savings. Annuities provide payments that continue until the retiree's death, but generally eliminate any incidental inheritance of the pension savings. Within annuities, retirees can choose to contract guarantee periods, which allow for a partial bequest of savings while still insuring against longevity. The decision is complex, stressful, and high stakes. Choosing the "right" product requires understanding the characteristics of each option and how these interact with the individuals' survival expectations, taste for bequests, and risk aversion.

I document that intermediation plays a key role in the data. Over 60% of retirees hire intermediaries, who receive commissions paid by the retiree and capped by the regulator. Because the cap is higher for annuities, intermediaries have a financial incentive to recommend them. Among retirees who use an intermediary, more than 95% annuitize at least part of their savings, compared with only 45% of those who choose alone. Observable characteristics—such as geographic location and pension wealth—explain part of the variation in the demand for intermediation. Nevertheless, survey data and anecdotal evidence suggest the main driver for intermediation is retirees' demand for information and advice. Intermediaries help retirees identify the optimal product given their individual preferences and financial situation.

Finally, I show that intermediation also interacts with selection based on survival expectations, a relevant force in annuity markets. Retirees who die within two years of retirement are nearly 5 percentage points less likely to purchase annuities than those who survive longer. This difference is driven entirely by self-reliant retirees, suggesting that intermediaries respond to their financial incentives by steering some shorter-lived retirees into buying annuities. However, the data also show intermediaries lead retirees who die early into contracting guarantees, a "better" product within the space of annuities. This effect is consistent with advice enabling individuals to use private information to choose among annuities.

Assessing the impact of intermediation on consumer welfare requires understanding the demand for advice, the size of frictions and their impact on choices, and the degree of substitutability across high- and low-commission products. To incorporate these channels, I develop a model of complex product choice and demand for intermediation that builds on the rational-inattention and life-cycle-consumption frameworks. Retirees choose between different pension products, which are characterized by streams of payments and incidental inheritance paths. The value of these products depends on retirees' optimal consumption and savings choices given their survival expectations, taste for bequests, risk aversion, and financial situation.

The core mechanism in the model is the complexity and cost of evaluating product values. Retirees weigh the effort of learning against the risk of making a poor choice. As an alternative, retirees can hire an intermediary for advice. Intermediaries eliminate the cost of learning about product values, but charge a fee and have an incentive to steer consumers into annuities. With advice, choices reflect a weighted average of retiree and intermediary utilities, leading to distortions away from the consumer's preferred product. Whether a retiree seeks help depends on their expected utility from (not) receiving advice and the availability of intermediaries.

I estimate the model on the Chilean data. I recover parameters governing choice frictions, preferences, and intermediary distortions, using variation in choices across and within intermediation channels. Identification relies on assuming that choice frictions are orthogonal to other unobserved characteristics, and on specifying retirees' prior beliefs about the optimal product. The model can accommodate different assumptions on these beliefs or inform them through survey data. In my primary specification, I assume a flat prior: retirees expect all products to be equally suitable for them. This assumption limits selection based on unobservables, making the model more likely to attribute choice differences between intermediated and self-reliant retirees to agency problems. As such, it is adversarial toward the value of intermediaries.

My estimates suggest that, on average, retirees would give up nearly 4% of their wealth—around 3,000 USD—to eliminate all uncertainty from their decisions. I find wide heterogeneity in retirees' life expectancy, along with a strong taste for bequests. Given these preferences, the model predicts sizable distortions from intermediation. For more than 70% of retirees using intermediaries, the optimal choice would have been the Phased Withdrawal, but they are instead steered into buying annuities. On average, the cost of these distortions is 5% of retirees' wealth, with large variation across the distributions of life expectancy and savings.

Motivated by these findings and by policy concerns about biased advice, I explore the effects of regulating intermediation. I first consider a ban on intermediaries. Such a ban would significantly reduce Chile's high annuitization rate from over 60% to around 40%. The ban also worsens adverse selection into annuities. Without intermediary distortions, retirees with shorter life expectanty shift from annuities to the outside option. This change in pool composition increases the average longevity of annuitants, raising annuity costs by up to 4% relative to the benchmark.

On average, however, banning intermediaries has little effect on consumer welfare. While intermediaries steer retirees away from the outside option, the annuities they recommend are often similar in value to the optimal product, largely due to the option to contract guarantee periods. As a result, the gains from removing these distortions are small and are offset by two factors: higher decision costs without intermediaries and increased annuity prices.

Second, I consider de-biasing intermediaries, giving them an effective fiduciary duty. This policy leads to a sizeable welfare gain for those who use intermediaries, as they are now guided to the optimal product in their choice set. However, it does little to increase the share of retirees who seek advice, due to limits on intermediary availability. The policy further exacerbates adverse selection, increasing annuities' costs by up to 6% and eroding about a fourth of the welfare gains.

My results also predict heterogeneous effects across consumers. Regulation tends to benefit shorter-lived retirees more than those with longer lifespans, who are more likely to prefer annuities. Similarly, wealthier retirees gain less from both policies, as they face smaller stakes on average and are more likely to find annuitization optimal.

The consumer-welfare results are robust—both quantitatively and qualitatively—to alternative assumptions about retirees' beliefs and their demand for intermediation. In light of policy concerns about biased advice, my findings highlight the importance of product complexity, adverse selection, and the substitutability between high- and low-commission products when designing regulation for intermediaries in insurance markets. Using the Chilean pension market as a case study, I show that the magnitude and interaction of these channels with intermediary incentives are key in shaping policy outcomes. More broadly, I shed light on the key trade-offs policymakers face when regulating biased advice in complex financial settings.

Related literature I contribute to an active empirical literature exploring the role of intermediaries (Gavazza and Lizzeri, 2021). A series of papers document the steering induced by intermediaries whose incentives are not aligned with their customers', raising policy concerns about their role and regulation (Anagol, Cole, and Sarkar, 2017; Barwick, Pathak, and Wong, 2017; Egan, 2019; Egan, Ge, and Tang, 2022; Bhattacharya, Illanes, and Padi, 2025). A number of papers also emphasize the impact of intermediaries on broader market outcomes, especially through price competition (Hastings, Hortaçsu, and Syverson, 2017; Robles-Garcia, 2020; Salz, 2022; Grunewald et al., 2023; Allen et al., 2024). I contribute by quantifying the value of intermediaries in *helping consumers learn about product match utilities* when making complex choices, even with imperfectly aligned incentives. This service provided by advisors is arguably individual-specific and therefore hard to replace or automatize.

The study of the consumer-welfare effects of intermediaries through their impact on adverse selection is also, to the best of my knowledge, novel in this literature. Adverse selection is a common feature of insurance markets that arises from private information that cannot be priced upon, such as life expectancy in the case of annuities and longevity insurance (Brugiavini, 1993; Finkelstein and Poterba, 2004; Einav, Finkelstein, and Schrimpf, 2010). Riskier individuals select into insurance coverage, increasing the average cost of providing insurance and leading to higher prices and even market unravelling. However, a necessary condition for selection is for consumers to be able to make choices based on this private information (Finkelstein and McGarry, 2006). Information frictions, switching costs and even advertising can therefore lessen selection (Handel, 2013; Handel, Kolstad, and Spinnewijn, 2019; Aizawa and Kim, 2018); advisors could exacerbate it if they allow consumers to better use their private information (Gruber et al., 2021). Intermediaries may also lessen selection if they have incentives to steer consumers into insurance regardless of their risk. I show evidence of both channels in retirees' choices of annuities and guarantee length in Chile, and my model quantifies their effect on prices in counterfactuals.

This paper also relates to a wide literature on frictions in consumer choices. Ample evidence shows systematic deviations from the predictions of the standard economic framework in insurance choices and financial decisions (Handel and Schwartzstein, 2018; Beshears et al., 2018). In annuity markets, consumers are sensitive to salient characteristics and can have difficulties evaluating and comparing options (Benartzi, Previtero, and Thaler, 2011; Brown, Kapteyn, Luttmer, and Mitchell, 2017; Brown, Kapteyn, Luttmer, Mitchell, and Samek, 2021; Boyer, Box-Couillard, and Michaud, 2020; Luttmer, Oliveira, and Taubinsky, 2023).[3] I link these choice frictions to the high demand for intermediation in the Chilean pension market. In my model, consumers are rationally inattentive (Sims, 2003; Matejka and McKay, 2015; Brown and Jeon, 2024): they are unable to observe their value of a product, but can pay to become informed about it. I show how the rational-inattention framework can be used to tractably model both intermediation by experts who eliminate attention costs, as well as demand for advice.[4]

Finally, this paper also relates to other work in the same setting—the Chilean pension and annuity market—that focuses on the value of annuity characteristics (Alcalde and Vial, 2022),

[3]The difficulty in valuing annuities has also been explicitly recognized by policy-makers: in the UK, it was highlighted by the FCA as a significant threat to the proposal of creating a secondary annuity market (Authority, 2016), which was ultimately abandoned (Thurley, 2018)

[4]The complex interaction between endogenous information acquisition and adverse selection has also been highlighted in Thereze (2023). Maccuish (2023) explores consumption decisions after retirement in a model with rational inattention about retirement policies.

the "annuity puzzle" (Illanes and Padi, 2021), the effect of transparency on adverse selection (Fajnzylber, Gabrielli, and Willington, 2023), competition of insurance companies (Aryal et al., 2021) and the effect of simplifying information on retirees' choices (Duch et al., 2021). Closest to this paper is Alcalde and Vial (2021), who explore the effects of a change in intermediaries' incentives on their product recommendations, and through them, on firms' pricing strategies. I complement these studies by emphasizing the role of choice frictions, intermediaries' influence across the full product menu, and their interaction with adverse selection.[5]

The paper proceeds as follows. Section 2 introduces the setting of the Chilean pension market and the data. Section 3 presents descriptive evidence on choice frictions, intermediation, and their interaction with adverse selection. Section 4 presents the model, and Section 5 discusses the estimation procedure. Section 6 discusses the results and Section 7 presents the welfare impacts of regulating intermediaries, either banning or de-biasing them. Section 8 concludes.

2 Setting and data

Chile has a fully-funded, defined-contribution pension market. Chileans contribute a mandatory 10% of their wages to a retirement savings account throughout their active working life. Savings accounts are managed by a private Pension Fund Administrator (PFA), who invests in stocks, mutual funds, and bonds. Upon reaching the legal retirement age, individuals are required to transform their accumulated savings into a flow by choosing a pension product. Retirees are generally not entitled to lump-sum withdrawals.

Pension products In a Phased Withdrawal (PW), retirees retain their PFA-managed savings account and withdraw from it gradually according to an actuarial formula set by the government. Payments are updated annually based on a mortality table for the Chilean population, the forecasted rate of return on savings, and the retiree's dependent status (i.e. whether they have a spouse or children with disabilities or under the age of 24). Under this arrangement, retirees retain ownership of the savings, which may be passed on as an incidental inheritance in case of an early death. However, they are also exposed to longevity risk: as they age, payments decline until the account is depleted. Retirees also face interest-rate risk, which can induce volatility in their pension savings. Figure 1 (a) and (b) show an example of the path of Phased Withdrawal pension payments and implied incidental bequests for a 65-year-old man without dependents.

[5] In recent work, Larraín, Previtero, and Severino (2025) examine the effect of annuities on longevity in the Chilean setting.

As an alternative to the Phased Withdrawal, retirees can purchase an annuity from an insurance company (panels c and d). This option involves the individual giving up ownership of their savings in exchange for longevity insurance: the insurer contracts an obligation to pay a fixed, inflation-adjusted amount for the rest of the retiree's life. In doing so, the retiree transfers their longevity risk to the insurance company but forfeits the possibility of leaving any remaining pension savings as a bequest.

Retirees can customize annuity contracts, in particular by choosing *guarantee* and *deferral* periods. A guarantee period sets a minimum number of months or years during which the annuity will pay out, even if the retiree dies early. This arrangement therefore provides a way to insure against longevity risk while still generating a bequest in case of an early death (Figure 1 e and f).[6] A retiree can also use part of their savings to purchase a deferred annuity (g and h), which begins payments after a set delay. This contract allows the remaining funds to be used for higher payments in the early years of retirement. Deferral and guarantee periods can also be combined within the same contract.

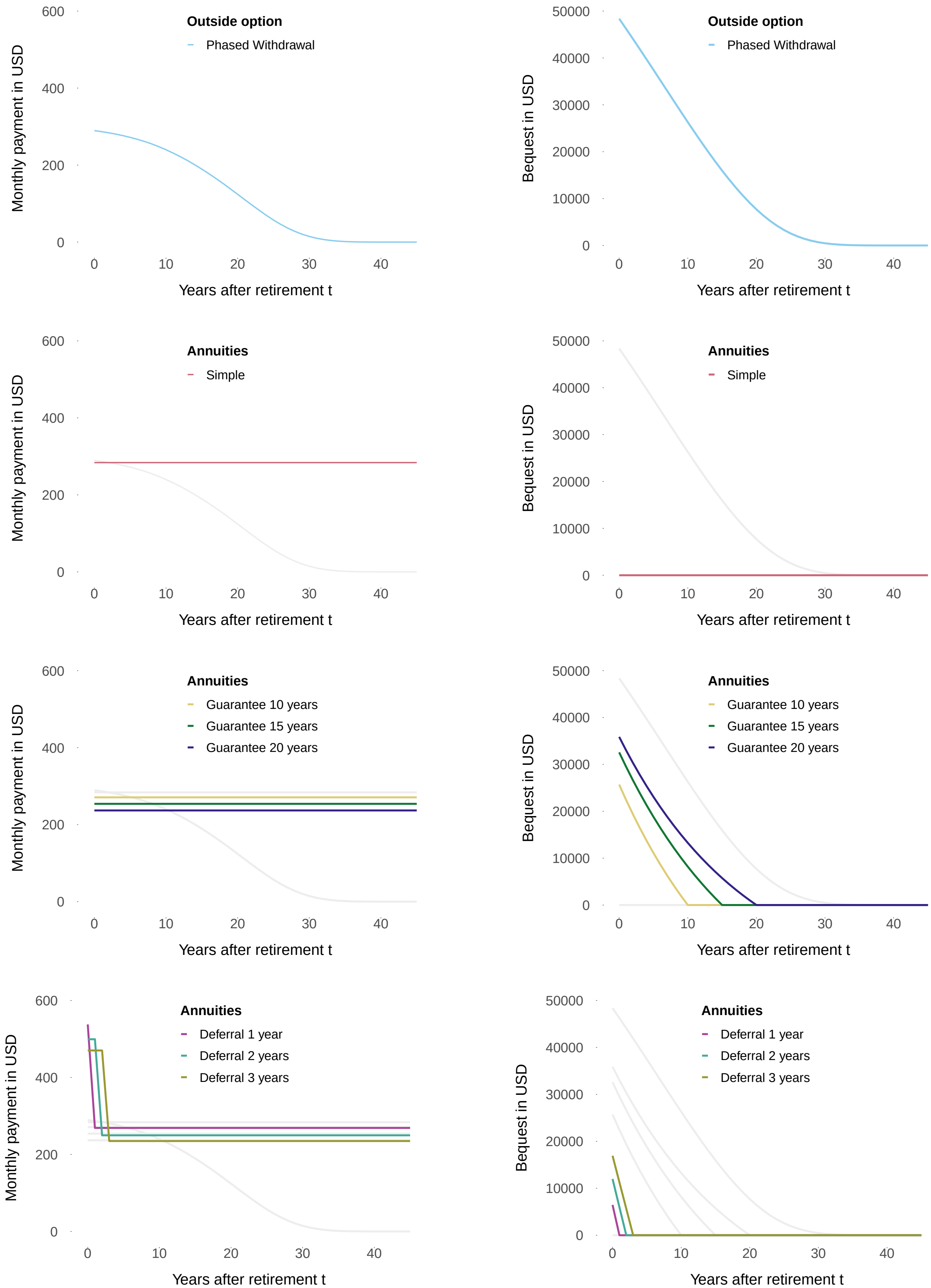
Retirees request and receive quotes for different products from providers through a centralized exchange, and make their decision by selecting a product from a document called *Offers Certificate* (Figure A.7). The median retiree requests quotes for 10 product types and receives over 100 quotes for pension products. Annuity pricing takes place in two steps. First, insurance companies make annuity offers through the centralized exchange, based solely on the retiree's age, sex, legal dependents, and pension savings. Second, retirees can directly bargain with individual insurers to decrease the price. I describe the exchange in detail in Appendix B.

The available products in this market pose a trade-off between higher initial payments, insurance against longevity, and wealth left to heirs. The optimal choice depends on how product characteristics interact with an individual's life expectancy, desire to leave an inheritance, risk aversion, and impatience. Identifying the "right" product requires not only understanding the terms and implications of each option, but also reflecting on one's preferences, expected lifespan, and overall economic circumstances. The variety and complexity of these factors—combined with evidence of limited knowledge about the pension system (SPS, 2016; FNE, 2018a)—make the decision process cognitively demanding for retirees.

Intermediaries Two types of intermediaries operate in this market. The first is the *independent advisor*: a certified expert who assists individuals during the retirement process. Advisors guide

[6] If the retiree has a spouse or any legal dependents, annuities are always "joint:" they continue to pay out a defined fraction of the payments to the dependents after the death of the retiree (e.g., 60% for a spouse). In this case, a guarantee implies the dependents will be paid out 100% of the value of the annuity until the end of the guaranteed period, and the corresponding fraction after.

Figure 1: Pension products for a single man, age 65 with USD 68,000 in pension savings



Notes: These figures show payments (left) and incidental bequests (right) from different pension products in the Chilean market. See main text for details.

retirees through the centralized offer exchange and the bargaining with insurance companies, ensuring their clients receive all eligible benefits and select the pension product that best aligns with their needs and preferences. Independent advisors must register with the regulatory agency and pass a certification exam on pension and financial knowledge.

Advisors are compensated through a commission paid by the retiree, calculated as a *percentage of total retirement savings*. Commissions are capped at 2% of savings for any type of annuity and 1.2% for a Phased Withdrawal, with maximum values of approximately 2,400 USD and 1,500 USD, respectively. For a retiree near the median of the savings distribution (∼70,000 USD), the commission is roughly equivalent to three monthly pension payments. The commission is paid as a lump sum from the retiree's savings, reducing the value of all future pension payments. Although retirees can negotiate lower commissions, this is uncommon (Figure A.8).[7]

The second type of intermediary is a *sales agent*: an employee of an insurance company who guides retirees through the pension process and promotes the annuities sold by their employer. If the retiree purchases an annuity from that insurer, they pay the agent a commission of up to 2% of the annuity premium, subject to the same cap as for advisors. Sales agents are required to have completed a 40-hour course on pension products and the pension system.[8]

In 2018, around 600 pension advisors and 1250 sales agents were registered with the regulatory agency (Figure A.9). Intermediation of pension products is a lucrative profession: the median intermediary earns nearly twice the median income in Chile from commissions (Figure A.10). Concerns have been raised about large commission payments and a lack of competition in commission fees (FNE, 2018b). Statements from intermediaries highlight intense competition to be the first to approach and successfully guide clients through the pension process.

Data The data are publicly available and come from three different sources. The primary source is the centralized offer exchange database, which contains all retirees using the centralized exchange between August 2004 and July 2020. This database includes basic demographic information about retirees (age, gender, and legal dependents), total pension savings, and geographic location at the city/precinct level. The data also record every pension product quote received by each potential retiree, information about intermediation, pension product accepted, and commission paid, along with the date of death if it occurs before July 2021. I complement this

[7]Unlike annuities, Phased Withdrawals are reversible. Retirees can later choose to annuitize remaining savings, while annuity contracts are final once signed. The regulator sets the commission caps to ensure a retiree can still compensate an advisor for switching from a PW to an annuity, while never paying more than 2%. About 25% of retirees have switched by 15 years after retirement.

[8]According to conversations with market participants, some agents operate under an internal commission structure that allows them to reduce their fee to offer a more competitive quote, while still receiving compensation from the insurer. As shown in Figure A.8, however, most retirees still pay the maximum commission.

information with publicly available reports on insurance companies' risk ratings, information about the number of intermediaries, and their registered locations. For the analysis, I restrict the sample to individuals retiring between 2010 and 2018, at or after reaching the legal retirement age, and who had no legal dependents other than a spouse. This selection yields a sample of approximately 150,000 retirees.

I also use data from two surveys. The first is the Social Protection Survey, a nationally representative panel survey conducted by Chile's Department of Social Protection. Respondents are periodically interviewed about their work history, education, health, income, wealth, and their knowledge and perceptions of the social security system. The second survey comes from the replication package of the choice-architecture experiment by Duch et al. (2021) and includes data on soon-to-be retirees' income, education, financial literacy, risk preferences, and retirement plans. The survey also elicits preferences over different pension products before and after providing information about their features.

3 Descriptive evidence

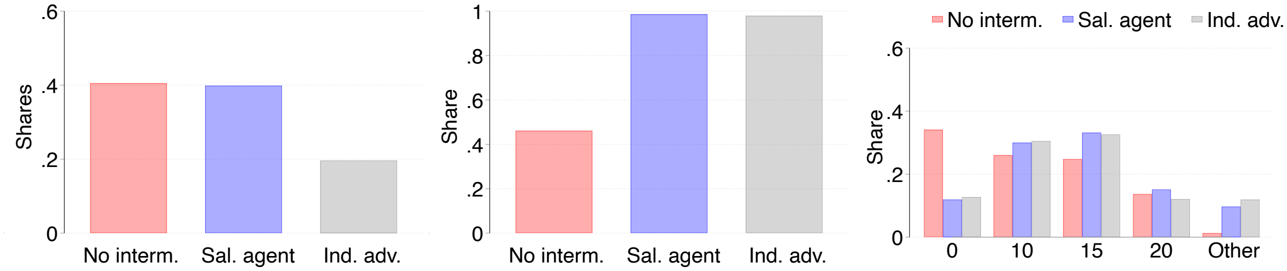
The aim of this section is to document key empirical patterns that shed light on the relationship between choice frictions, intermediation, and adverse selection in the Chilean context.

I begin by highlighting the central role of intermediation in this setting: it is both widespread and closely linked to retirees' product choices. I then examine the drivers of demand for intermediation, focusing on two main factors. First, intermediary availability plays a role. Individuals are more likely to choose intermediaries in locations with high intermediation rates in recent quarters. Wealthier retirees pay higher commissions, giving agents and advisors stronger incentives to approach them.

Second, I argue that information frictions are a key driver of intermediation. Both pension advisors and sales agents provide guidance throughout the retirement process, helping individuals navigate complex choices and advising on the product that best fits their needs. Evidence from both survey and choice data supports this informational channel.

Finally, I highlight the interaction between intermediation and adverse selection. Individuals who die within two years of retirement are less likely to buy an annuity, but just as likely to hire an intermediary. However, intermediated retirees who die early choose guarantees more frequently than those who survive longer. These patterns are suggestive of intermediaries steering some customers into annuities, but helping them choose correctly *within* the space of annuities.

Figure 2: Intermediary channel and pension-product shares



(a) Intermediation channel (b) Annuitization (c) Guarantee period (years)

Notes: These figures illustrate the link between pension product choices and the characteristics of annuities purchased via each intermediation channel. Panel (a) shows intermediation shares, (b) the share of retirees choosing an annuity, and (c) the annuity guarantee period (in years). "Other" includes all guarantee lengths not explicitly shown.

Intermediation and product choices Figure 2a shows the share of retirees using each intermediation channel: about 60% hire an intermediary over the sample period. Figure 2b underscores the importance of intermediation in shaping product choices. Intermediated individuals select annuities over Phased Withdrawals in more than 95% of cases. In contrast, self-reliant retirees choose annuities much less often, with rates ranging between 20% and 60% across the sample.

Among those who choose annuities, Figure 2c also shows that intermediation is linked to the type of annuity selected. Around 65% of non-intermediated annuitants choose a guaranteed annuity, compared to nearly 90% of intermediated ones.

These patterns have a number of implications. The variation in choices emphasizes unobserved preference heterogeneity across retirees. The high overall take-up of Phased Withdrawals and guaranteed annuities suggests that many retirees value money after their death, likely reflecting a desire to leave bequests. Intermediated retirees tend to favor guaranteed annuities, a compromise between longevity protection and the option to leave a bequest. In contrast, self-reliant retirees make more "extreme" choices. They are more likely to either select simple annuities that maximize longevity insurance, or to opt for no insurance at all.

The large gap in annuitization rates between intermediated and self-reliant retirees could be a cause of concern. Differences in choices across intermediation channels may reflect preference-based selection: retirees who prefer annuities are more likely to seek intermediaries. However, the patterns are also consistent with distortions. While recommending annuitization is financially optimal for intermediaries given their commission structure, it may not always reflect the retirees' best interests. A key step in evaluating this concern is to understand what drives retirees to seek intermediation. I turn to this question in the next subsection.

Demand for intermediaries In Appendix A, I explore the correlation between intermediary use and observable retiree characteristics. Retirees who claim their pension at the legal retirement age are more likely to use intermediaries, as are those who are single or have higher savings. Time variation in relative and absolute annuity prices also suggests some selection into intermediation based on this margin (Table A.11, Figures A.12 through A.15). The survey data reveal only weak correlations between intermediation and health status, number of children, or educational attainment (Table A.12).

Conversations with regulators, agents, and advisors suggest intermediary outreach and personal networks play a key role in shaping demand for intermediation. Each month, the regulator publishes a list of retirees reaching legal retirement age, which is accessible to insurance companies, agents, and advisors. Intermediaries are therefore often the ones to initiate contact with the retirees—by email, mail, phone, or even in person. Given the structure of commissions, agents and advisors tend to target wealthier individuals who generate higher fees (Figure A.16).

Intermediaries also highlighted the role of *referrals* and word-of-mouth from former clients in reaching new customers. Consistent with this, Figure 3 shows that geography significantly influences demand for intermediation. Controlling for observable characteristics, the lagged share of intermediated retirees in a province predicts both the likelihood of hiring an intermediary and the type of intermediary used.

These patterns point to the importance of both intermediary outreach and social diffusion in determining demand for advice.[9] The model will therefore allow the probability of accessing intermediation to vary across individuals based on their geographic exposure to intermediaries.

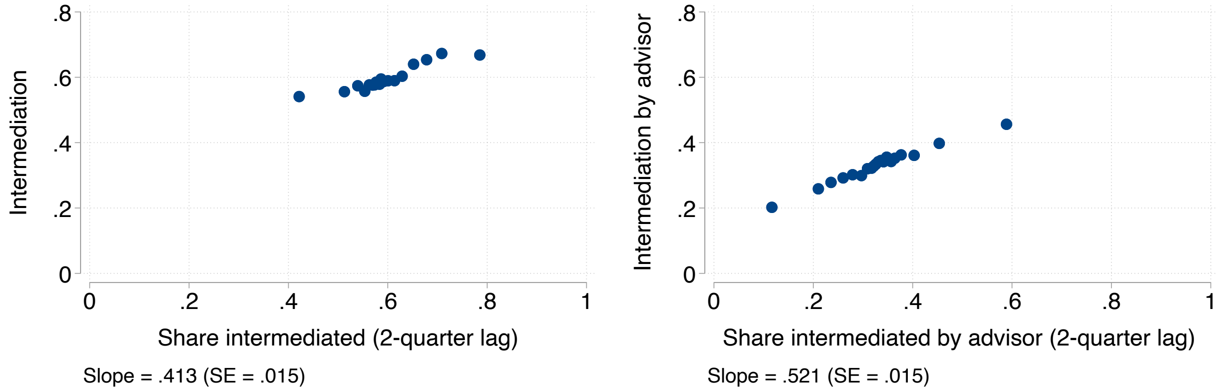
Role for intermediaries Anecdotal evidence suggests that choosing a pension product is a difficult task, due to both the complexity of the pension system and low levels of financial literacy. Surveys indicate that only about 10% of the population can answer basic questions about the pension system or its products (SPS, 2016), and a majority of retirees struggles with basic and advanced financial literacy questions (Behrman et al., 2012). The stakes are high: for more than half of retirees, pension savings account for over 50% of their total wealth (Figure A.17).

The presence of intermediaries in this market is therefore closely linked to these information frictions. Selecting the "right" pension product requires assessing how product features interact with individual preferences—an inherently complex and cognitively demanding task. Because this is a one-time decision, scope for learning about it over time is minimal.[10] Independent advisors emphasize that consumers arrive with limited knowledge of their options and uncertainty

[9] These patterns are related to the location of the intermediaries themselves, see Appendix Tables A.15 and A.16.

[10] Except for retirees who choose a PW and later opt to annuitize; these individuals are excluded from the sample.

Figure 3: Geography and intermediation



(a) Probability of intermediation

(b) Intermediary type

Notes: These figures illustrate how geography influences the likelihood of using each intermediation channel. Panel (a) plots the conditional correlation between a retiree's probability of using an intermediary (y-axis) and the share of the population in their province that used an intermediary two quarters prior. Panel (b) shows the conditional correlation between an intermediated retiree choosing an independent advisor (y-axis) and the share of intermediated retirees in their province who hired advisors (versus agents) two quarters prior. Provinces are Chile's second-largest geographical divisions, varying in population and area. See Tables A.13 and A.14 for regression details.

about how their retirement will unfold. Advisors describe their role as helping clients identify the product that best matches their needs. In practice, this involves compiling documents that compare pension products in terms of expected payments and bequests (Figure A.18). According to the advisors, this task is what justifies their commission: "the pensions obtained by the retirees [using an advisor] are the result of a complete analysis of their own particular situation, who must pay to have their personal requirements fulfilled" (FNE, 2018a, p.92).

Insurance companies make a similar case for their sales force: "The agent accompanies their customer during the entire retirement process, explaining the menu of options and suggesting which one it is that best fits their personal needs and preferences" (p.140). These justifications emphasize both the informational value of guidance and the emotional complexity of the decision, which "is surrounded by a strong lack of knowledge, uncertainty and anxiety by the customer (p.153). This anxiety is also consistent with the role of life expectancy in the decision and individuals' discomfort with contemplating their own death (Dor-Ziderman, Lutz, and Goldstein, 2019) or engaging with financial planning (Gennaioli, Shleifer, and Vishny, 2015).

Assessing the informational role of intermediaries in the data is challenging. Absent data on retirees' beliefs prior to retirement and random assignment of intermediaries to consumers, it is difficult to isolate the value of advice. Nevertheless, the data provide suggestive evidence supporting the information channel. As part of their choice-architecture experiment, Duch et

Table 1: Intention to seek advice

	(1)	(2)	(3)
Pension knowledge	−0.077	−0.077	−0.076
	(0.019)	(0.019)	(0.019)
Ex-ante pension plan			
Phased Withdrawal		0.0	0.0
		(–)	(–)
Annuity		0.063	0.036
		(0.048)	(0.048)
Mix Phased Withdrawal-Annuity		0.197	0.176
		(0.047)	(0.05)
Ex-post pension plan			
Phased Withdrawal			0.0
			(–)
Annuity			0.053
			(0.055)
Deferred Ann (2Y)			0.135
			(0.067)
Deferred Ann (4Y)			0.025
			(0.05)
Demographic controls	✓	✓	✓
R^2	0.046	0.089	0.094
Observations	706	706	706

Notes: This table presents selected coefficients from a linear probability model analyzing responses to the question, "*Do you plan on requesting advice on pension matters?*" from the Duch et al. (2021) choice architecture experiment. Standard errors are in parentheses. “Ex-ante” and “ex-post” refer to responses before and after exposure to information about pension products. Demographic controls include age, gender, financial literacy, risk aversion, and income and education categories. Respondents who reported already having received advice are excluded.

al. (2021) asked individuals nearing retirement age about their knowledge of pension products, along with whether they intended to seek advice to make their decision. Column 1 in Table 1 shows that those who report being more knowledgeable about pension products are less likely to intend to seek advice for their pension decision.[11]

The data also rule out that demand for intermediation is driven entirely by preferences. In the same experiment, the researchers first asked respondents which product they planned to choose. Next, they provided information about each option and introduced a set of fictional retirees who explained their own decisions. Respondents were then asked to select the fictional retiree whose

[11]The friction at play seems to be specific to the context and the pension-product decision: the intention to seek advice is not significantly related either to the individual’s education level, nor to their financial literacy as elicited in the survey.

Table 2: Annuities' Money's Worth Ratio

	(1)	(2)	(3)	(4)	(5)
Sales agent	-0.0236	-0.0224	-0.0229	-0.0237	-0.0241
	(0.000132)	(0.000339)	(0.000318)	(0.000202)	(0.000401)
Ind. advisor	-0.0146	-0.0148	-0.0146	-0.0148	-0.0162
	(0.000156)	(0.000399)	(0.000372)	(0.000235)	(0.000474)
Demographic controls	✓	✓	✓	✓	✓
Year-Month FE	✓	✓	✓	✓	✓
Savings ventile FE	✓	✓	✓	✓	✓
Cost ventile FE	✓	✓	✓	✓	✓
Annuity type FE	✓			✓	✓
Insurance company FE	✓	✓	✓	✓	✓
Province FE	✓	✓	✓	✓	✓
R^2	0.881	0.899	0.909	0.894	0.876
N	120020	15357	15098	41330	9505

Notes: This table shows selected coefficients from a regression of accepted annuities' Money's Worth Ratio (MWR)—the ratio of the actuarial net present value (NPV) of annuity payments to the annuity premium—on intermediary type and controls in the centralized exchange data. Columns (2) and (3) present results for the most popular annuity types (10- and 15-year guarantee periods). Columns (4) and (5) restrict the sample to men aged 65 with and without a partner, respectively. Demographic controls include a quadratic polynomial in retirees' and partners' age and sex.

situation most closely matched their own. Columns 2 and 3 in Table 1 show that individuals initially preferring an annuity were no more likely to report plans to get advice than those leaning toward a Phased Withdrawal. By contrast, those who favored a mix of both products were nearly 20 percentage points more likely to do so. This pattern suggests that annuity preferences alone do not explain the decision to consult an intermediary. Rather, uncertainty or interest in more complex, hybrid options appears to be a stronger motivator. Table 1 also shows that the ex-post preference for products only weakly correlates with the intention to seek advice.

The choice data reinforce the idea that preferences cannot fully account for the role of intermediaries. Table 2 reports differences in annuity prices by intermediation channel. Controlling for a range of individual and product characteristics, retirees who use an intermediary pay on average 1.2-2% more for the same annuity product than those who do not. This price difference is largely driven by commissions. The pattern highlights why a taste for annuities alone does not explain demand for intermediation. For retirees who already know which product to purchase, hiring an intermediary leads to strictly *higher* prices. The value of intermediation must therefore lie elsewhere—for example, in helping retirees identify the optimal product given their needs and preferences.

Consistent with the empirical evidence, the model will allow demand for intermediaries to depend on observable individual characteristics, unobservable preferences, exposure to intermediaries, and product prices. However, the model will also incorporate a *choice friction*: a cost to selecting the optimal pension product. This friction justifies the value of advice: without it, retirees would always prefer to make decisions independently.

The informational role of intermediaries in a market with private information—for example, regarding expected longevity—suggests that advice may interact with adverse selection into annuities. I explore this mechanism in the next subsection.

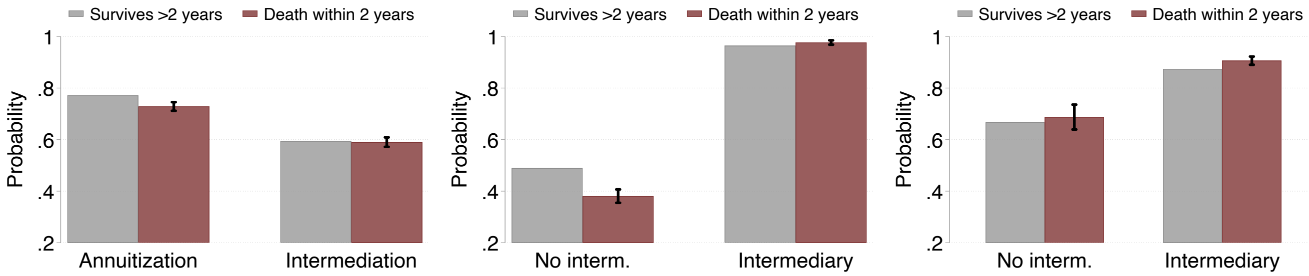
Private information and intermediation Annuities serve as insurance against longevity risk. The survival-contingent stream of payments protects individuals from the financial risk of outliving their savings. Adverse selection can arise if insurers cannot price annuities based on longevity, leading those who expect to live longer to be more likely to purchase them (Brugiavini, 1993). Selection may also occur across product features, such as guarantees (Finkelstein and Poterba, 2004; Einav, Finkelstein, and Schrimpf, 2010), which are more appealing to those who anticipate dying earlier.

Illanes and Padi (2021) and Fajnzylber, Gabrielli, and Willington (2023) document adverse selection in Chile's annuity market. As described in Section 2, private information arises due to limitations on the characteristics insurers can use to price annuities. Figure 4a shows differences in annuity purchases and intermediary use for individuals who die within two years of retirement. Short-lived retirees are 4.3 percentage points less likely to buy an annuity than those who live longer. However, they are not significantly less likely to use an intermediary. These results suggest that adverse selection is driven by retirees who are not intermediated, rather than by selection into advisors and agents. This finding is once again consistent with the idea that demand for intermediation is not solely driven by preferences for annuities.

Figure 4b sharpens this point by splitting choices by intermediary use. Among retirees who make the retirement decision themselves, those who die early are 11 percentage points less likely to purchase an annuity than those who live longer. By contrast, among those who use intermediaries, early-death retirees are marginally *more likely* (1.3 pp.) to do so. This contrast suggests that intermediaries may actively steer individuals toward annuities. More broadly, the patterns are consistent with intermediaries *reducing* adverse selection by guiding both short- and long-lived individuals into annuities.[12]

[12] One concern is that price "bargaining" between retirees and insurers may reveal private information. However, based on conversations with market participants, this effect appears unlikely. In the data, early mortality does not predict average price improvements in the bargaining stage (Table A.17).

Figure 4: Intermediary channel and pension-product shares



(a) Adverse selection (b) Annuitization (by intermediary) (c) Guarantee (by intermediary)

Notes: These figures show adverse selection into annuities and intermediaries. Panel (a) shows probabilities of annuitization (left) and intermediation for retirees surviving more than two years after retirement (light gray bars) versus those who die within two years (dark red bars). The difference between bars is the coefficient on a two-year death dummy in a linear probability model. Panel (b) shows adverse selection into annuities separately for non-intermediated (left) and intermediated retirees; the difference between bars represents the interaction between the two-year death dummy and intermediation status. Panel (c) presents adverse selection into guarantees among annuitants. In (b) and (c), error bars represent standard errors relative to the mean within each intermediation group. About 1.6% of the sample dies within two years of retirement. Controls include average annuity prices, demographics, savings, actuarial costs, and year- and province-fixed effects.

Turning to the choices of guarantees among annuitants, the data again point toward the informative role of intermediaries. Figure 4c shows that on this margin, selection extends to both intermediated and non-intermediated individuals. Retirees who die early are more likely to choose a guarantee than those who live longer. The difference is 2.2 percentage points among self-reliant individuals, and 3.2 percentage points among those who use intermediaries.[13]

These correlations suggest that intermediaries enable the use of private information in product selection—particularly where their incentives are aligned with those of retirees. The adverse selection observed within annuity types is crucial. The pattern not only supports the view that intermediaries help retirees find suitable products, but also suggests that the potential harm from steering individuals into annuities may be limited by the variety of available options. In particular, if guaranteed annuities serve as close substitutes for Phased Withdrawals, the financial consequences of steering may be relatively small.

The model will account for adverse selection by explicitly incorporating retirees' unobservable survival expectations and how these influence the value of pension products. The model will also capture both the distortions introduced by intermediaries' biases toward annuities and their value in guiding retirees toward choices that are optimal within the set of annuities. These mechanisms allow me to quantify the effective costs and benefits of using an intermediary and to assess the consumer-welfare implications of adverse selection in counterfactuals.

[13] I explore heterogeneity by type of intermediary in Figure A.20, see also Appendix B.2.

Need for a model The descriptive exercises highlight the central role of intermediation in shaping pension-product choices. Differences between intermediated and self-reliant retirees are stark. The prevalence of intermediaries appears justified by choice frictions that make advice valuable. Demand for advice varies with individual characteristics and location, likely reflecting word-of-mouth dynamics and intermediary outreach. Selection patterns by survival suggest that intermediaries steer consumers toward annuities, but help them choose within that set.

However, the descriptive evidence does not disentangle whether observed differences across intermediation channels reflect retiree preferences, choice frictions, informative advice, or steering. This distinction is essential for evaluating regulatory interventions, such as a ban on intermediaries. The key challenge is to understand how retirees' choices and welfare would change in the absence of intermediation. Addressing this question requires quantifying product substitutability, the friction driving demand for advice, and the extent of intermediary steering. A second challenge is to account for the effect of intermediary regulation on adverse selection, and thereby prices. In the next section, I develop a model that can flexibly address these challenges while remaining tractable for empirical application.

4 Empirical framework

Overview This section presents an empirical model of pension product and intermediary choice. At and after retirement, individuals derive consumption utility while alive and bequest utility upon death. Pension products provide streams of payments and incidental bequests over time. Given these streams, retirees optimally decide how much to consume and save throughout retirement. These decisions depend on survival beliefs, preferences for bequests, risk aversion, and non-pension wealth. The resulting consumption and savings paths determine the value of the pension product.

The key force in the model is a *choice friction*: individuals cannot perfectly observe their idiosyncratic value from each product. This friction reflects the difficulty of understanding the products' financial characteristics, or how they interact with a retiree's type and preferences. Retirees are rationally inattentive: they may "pay" a cost to learn about product values. Before acquiring information, individuals hold prior beliefs reflecting both ex-ante knowledge and perceived uncertainty about product values. Together, beliefs and information costs shape optimal information acquisition and, ultimately, choices.

As an alternative to choosing on their own, a consumer can hire an intermediary—sales agent or independent advisor—to choose on their behalf. The intermediary perfectly observes the value of products in the retiree's choice set. However, intermediaries charge commissions, which reduce the retiree's value from some products. Agents and advisors also introduce *distortions* by steering retirees toward commission-paying products, namely annuities. The consumer is aware of these potential distortions ex-ante but cannot undo the delegated choice ex-post.[14]

Consumers choose whether to hire an intermediary by comparing the expected value of deciding alone to that of using an intermediary. The trade-off is between incurring information costs and the risk of mistakes when choosing independently, or paying a commission and potentially being steered toward a suboptimal product when intermediated. Resolving this trade-off determines the optimal intermediation channel. Retirees also face barriers to accessing intermediaries, shaped by personal networks and the outreach of agents and advisors. The probability of being intermediated therefore depends on retirees' savings and geographic location.

I first describe the consumption-savings model that represents the value of a pension product. I then outline the pension-product choice, first for self-reliant, and then for intermediated retirees. Next, I turn to the choice of intermediary, and discuss identification.

Pension product value I model the value of a pension product k for individual i as

$$\xi_{ik} = \zeta_{ik} + \varepsilon_{ik}, \tag{1}$$

where ζ_{ik} denotes the financial value of the product and ε_{ik} is an idiosyncratic taste shock.

To define ζ_{ik}, let d_{it} be a random variable equal to 1 if the retiree dies in period t. Let $s_{it} \in \{0, 1\}$ indicate whether the retiree is dead or alive at period t. Survival uncertainty is captured by a vector of period-specific mortality hazards, $\mu_i := \{\mu_{it}\}_{t=0}^{T}$, with $\mu_{it} = 1$ for some finite T. Then,

$$d_{it} = \begin{cases} 1 & \text{with prob. } \mu_{it}, \\ 0 & \text{otherwise,} \end{cases} \qquad s_{it} = \begin{cases} 1 & \text{if } s_{i,t-1} = 1 \text{ and } d_{it} = 0, \\ 0 & \text{otherwise.} \end{cases}$$

As shown in Figure 1, a pension product is characterized by a stream of payments p_{ik}^t when the retiree is alive in period t, and bequests b_{ik}^t when they die in period t. For instance, annuities without guarantee or deferral periods provide constant payments ($p_{ik}^t = \bar{p}$) and no bequests ($b_{ik}^t = 0$) for all t. In contrast, a Phased Withdrawal offers a decreasing stream of both payments and bequests over time.[15]

[14]Anecdotally, retirees find it difficult to, for example, not buy from the insurance company recommended by a sales agent. Doing so would deny the agent compensation after having helped them make a decision.

[15]During the sample period, the government supplemented pensions through means-tested subsidies, top-ups, and

Let c_{it} denote consumption in period t, and a_{it} denote savings. Define m_{it} as the total funds available at the start of period t, including savings and pension payments. Let f_{it} be the total bequeathed wealth if the retiree dies in period t, combining savings and pension bequests. Denoting R as the risk-free interest rate,

$$\begin{aligned} m_{it} &= a_{i,t-1} \cdot R + p_{ik}^t, \\ f_{it} &= a_{i,t-1} \cdot R + b_{ik}^t. \end{aligned}$$

Following Einav, Finkelstein, and Schrimpf (2010) and Illanes and Padi (2021), I assume retirees have constant relative risk aversion (CRRA) utility, conditional on survival or death:

$$u(c_{it}, f_{it} | s_{it}, d_{it}) = \begin{cases} \dfrac{c_{it}^{1-\gamma}}{1-\gamma} & \text{if } s_{it} = 1 \quad \text{(alive at period } t\text{)}, \\ \delta_i^{\text{beq}} \cdot \dfrac{f_{it}^{1-\gamma}}{1-\gamma} & \text{if } d_{it} = 1 \quad \text{(death in period } t\text{)}, \\ 0 & \text{otherwise (death before period } t\text{)}. \end{cases}$$

The value of a product is given the maximum attainable utility from the consumption-savings problem, subject to a borrowing constraint,

$$\begin{aligned} \zeta_{ik} = \max_{\{c_{it}, a_{it}\}_{t=0}^T} \mathbb{E}_{\mu_i} &\left[\sum_{t=0}^T \beta^t u(c_{it}, f_{it} | s_{it}, d_{it}) \right] \\ \text{s.t.} \quad a_{it} = m_{it} - c_{it}, &\qquad m_{i,t+1} = a_{it} R + p_{ik}^{t+1}, \\ f_{i,t+1} = a_{it} R + b_{ik}^{t+1}, &\qquad a_{it} \geq 0 \quad \forall t, \\ m_{i0} = w_{i0}. & \end{aligned} \tag{2}$$

Idiosyncratic preferences and survival beliefs determine the solution to the consumption-savings problem, and therefore the value of product k. Risk aversion γ and bequest motives δ_i^{beq} enter through the utility function $u(\cdot)$. Non-pension wealth is captured by initial assets at retirement, $m_{i0} = w_{i0}$. Life expectancy is summarized by the mortality profile μ_i, which introduces the potential for adverse selection.[16]

The consumption-savings problem flexibly captures the value of different pension streams by

minimum pension guarantees. I incorporate these into p_{ik}^t and b_{ik}^t; see Appendix B.1 for details.

[16]Implicit in this formulation is both the assumption that these beliefs are "correct"—they correspond to the actual probabilities of the outcomes—and that the value ζ_{ik} is computed assuming that a retiree's information set at the time of the decision contains exactly the vector of mortality hazards μ_i. This assumption rules out perfect foresight about the time of death.

allowing retirees to adjust their behavior in response to product features. This adaptation will determine relative values and substitutability across products, which is key in assessing benefits and losses from intermediation and the stakes involved in the decision.

The life-cycle model may still not fully capture all the factors that shape preferences for different pension products—such as prior financial commitments (e.g., a mortgage), liquidity needs, or anticipated financial shocks. To account for this, I include an unobserved shock ε_{ik} to the product's value. While this shock need not represent financial considerations, I assume it enters utility and is costly for the retiree to observe, as described in the next section.

Theoretical foundations of product choice I model pension product choice using rational inattention. Individuals cannot directly observe the full vector of product values, $\boldsymbol{\xi}_i := (\xi_{ik})_{k=1}^N$. Instead, they hold a prior belief G over the distribution of $\boldsymbol{\xi}_i$ and can choose to acquire information about its true realization. Concretely, they can choose a signal structure: a mapping from values of $\boldsymbol{\xi}_i$ to signals. The rational-inattention framework makes two assumptions on this problem. First, it allows individuals to freely design a signal structure: it imposes no restrictions on *what* and *how* exactly the individual will learn about each product. Second, it assumes the cost of acquiring information is proportional to the expected reduction in entropy $H(\cdot)$ from the devised strategy.[17]

Matejka and McKay (2015) show that, for choices between discrete alternatives, the rational-inattention problem can be written in terms of the probability of choosing each option given a realization of the values $\boldsymbol{\xi}_i$, $\mathcal{P}_{ik}(\boldsymbol{\xi}_i)$. The problem of the individual then reads

$$\max_{\{\mathcal{P}_{ik}(\boldsymbol{\xi}_i)\}_{k=1}^N} \left(\sum_{k=1}^N \int_{\boldsymbol{\xi}_i} \xi_{ik} \mathcal{P}_{ik}(\boldsymbol{\xi}_i) G(\mathrm{d}\boldsymbol{\xi}_i) \right) - \lambda_i \kappa(\mathcal{P}_i, G), \tag{3}$$
$$\text{s.t.} \quad \mathcal{P}_{ik}(\boldsymbol{\xi}_i) \geq 0 \text{ } a.s., \qquad \sum_{k=1}^N \mathcal{P}_{ik}(\boldsymbol{\xi}_i) = 1 \text{ } a.s.,$$

where $\kappa(\cdot)$ is the mutual information cost written in terms of the discrete actions,

$$\kappa(\mathcal{P}_i) = \left[-\sum_{k=1}^N \mathcal{P}_{ik}^0 \log \mathcal{P}_{ik}^0 + \int_{\boldsymbol{\xi}_i} \left(\sum_{k=1}^N \mathcal{P}_{ik}(\boldsymbol{\xi}_i) \log \mathcal{P}_{ik}(\boldsymbol{\xi}_i) \right) G(\mathrm{d}\boldsymbol{\xi}_i) \right], \tag{4}$$

[17] I do not specify the source or underlying randomness that gives rise to the ex-ante beliefs G. In the rational-inattention literature, the prior is often interpreted as representing the distribution of state-dependent realizations of utility. The interpretation in my setting is closer to the *subjective* prior of Joo (2023) or Brown and Jeon (2024).

and $\mathcal{P}^0_{ik}$ is the unconditional or ex-ante probability of choosing option k,

$$\mathcal{P}^0_{ik} = \int_{\boldsymbol{\xi}_i} \mathcal{P}_{ik}(\boldsymbol{\xi}_i) G(\mathrm{d}\boldsymbol{\xi}_i).$$

λ_i plays a central role in the model: it reflects the individual's marginal cost of acquiring information. This cost can capture the cognitive effort of understanding product features, the emotional burden of making a high-stakes financial decision, or the discomfort of contemplating sensitive topics such as life expectancy. A key output of the model estimation will be the distribution of λ_i across individuals, which captures unobserved heterogeneity in retirees' ability to engage with the decision.

This framework has an intuitive interpretation: the individual chooses *how close to the optimal choice to get*. If $\lambda_i = 0$, information is free, and the retiree always picks the product k with the highest value ξ_{ik}. If acquiring information has a positive cost, the retiree instead chooses the probability of selecting each product—including the best one—for any given realization of $\boldsymbol{\xi}_i$.

Product choice without intermediary Following Brown and Jeon (2024), I assume the prior is independent across all products and follows the conjugate to the EV(I) distribution G_{λ_i} with mean ξ^0_{ik} and constant variance σ^2_i. This assumption yields the optimal choice probabilities

$$\mathcal{P}^*_{ik}(\boldsymbol{\xi}_i) = \frac{\exp\left(\dfrac{\xi^0_{ik}}{\lambda_i(\ell_{\lambda_i,\sigma^2_i} - 1)} + \dfrac{\xi_{ik}}{\lambda_i}\right)}{\sum_{n=1}^N \exp\left(\dfrac{\xi^0_{in}}{\lambda_i(\ell_{\lambda_i,\sigma^2_i} - 1)} + \dfrac{\xi_{in}}{\lambda_i}\right)}, \quad \ell_{\lambda_i,\sigma^2_i} := \ell(\lambda_i, \sigma^2_i) = \sqrt{\frac{6\sigma^2_i}{\lambda^2_i \pi^2} + 1}. \tag{5}$$

The shape of the prior guarantees a tractable formulation. The decision is based on a weighted average of the product's prior mean value ξ^0_{ik} and its true value ξ_{ik}. These weights depend on both the cost of information λ_i and the prior variance σ^2_i, which captures the stakes involved in the choice (Brown and Jeon, 2024).[18]

The limiting cases help build intuition. As λ_i approaches zero, the consumer selects the best product with probability one, disregarding the prior. Conversely, as λ_i becomes very large, the consumer always chooses the product with the highest prior mean. If σ^2_i increases, $\ell_{\lambda_i,\sigma^2_i}$ rises and the consumer places more weight on the true product value; higher variance makes learning more valuable. In contrast, as σ^2_i goes to zero, choices depend solely on the prior, since the

[18]The required assumption is that $\frac{\xi_{ik}}{\lambda_i}$ has the unique distribution such that if $\epsilon \sim$ EV(I), then $\frac{\xi_{ik}}{\lambda_i} + \epsilon \sim$ EV(I). The required prior distribution changes as λ_i increases or decreases, even while holding its mean and variance fixed. This assumption implies a friction *structure* for each individual which is described by both λ and G_λ. In Appendix C.2 I characterize and discuss the implications of this assumption.

expected benefit from learning is minimal.

I further assume that the idiosyncratic shock ε_{ik} follows the same conjugate, marginally independent distribution, with mean zero and variance ν_i^2.[19] This assumption allows me to integrate over ε_{ik} and write choice probabilities in terms of the vector of life-cycle product values $\boldsymbol{\zeta}_i$,

$$\mathcal{P}_{ik}^*(\boldsymbol{\zeta}_i) = \frac{\exp\left(\dfrac{\xi_{ik}^0}{\lambda_i(\ell_{\lambda_i,\sigma_i^2}-1)\ell_{\lambda_i,\nu_i^2}} + \dfrac{\zeta_{ik}}{\lambda_i \ell_{\lambda_i,\nu_i^2}}\right)}{\sum_{n=1}^N \exp\left(\dfrac{\xi_{in}^0}{\lambda_i(\ell_{\lambda_i,\sigma_i^2}-1)\ell_{\lambda_i,\nu_i^2}} + \dfrac{\zeta_{in}}{\lambda_i \ell_{\lambda_i,\nu_i^2}}\right)}.$$

At first glance, applying the rational-inattention framework to pension-product choice may seem unintuitive, as it is often used for repeated decisions (Mackowiak, Matejka, and Wiederholt, 2023). However, the framework captures the key mechanisms in this setting. Retirees face complex choices even when all products are available, and optimal decisions depend on information costs and beliefs about the stakes. Individuals adjust information acquisition in response to their environment, which shapes welfare outcomes in counterfactuals. While the prior assumption is rigid, it keeps the model tractable and allows for unobservable heterogeneity across retirees.

Product choice with intermediary Under an independent advisor or sales agent, the retiree delegates the decision to the intermediary. The intermediary maximizes a weighted average of their own financial utility and the retiree's product value.[20] I summarize the intermediary's bias toward annuities with a value shifter c^I. Because commissions are deducted from retirees' savings, annuity payouts and their value are reduced, captured by ζ_{ik}^I and ξ_{ik}^I. The value of hiring an intermediary is that they perfectly learn the pension product values. Up to the bias c^I, the advisor can direct the retiree to the optimal product in their choice set,

$$\mathcal{P}_{ik}^{*,I}(\boldsymbol{\xi}_i) = \mathbb{1}\big(\arg\max_k \xi_{ik}^I + c^I \mathbb{1}_{k \text{ is annuity}}\big). \tag{6}$$

The distortion in choices from intermediation arises from the agency problem. The product that maximizes joint utility $\xi_{ik}^I + c^I \mathbb{1}_{k \text{ is annuity}}$ may differ from the one that maximizes the consumer's utility ξ_{ik}^I. If financial incentives are not perfectly aligned, the intermediary's choice can be suboptimal for the consumer. In estimation, I allow both the commission and bias to vary by

[19]See Appendix C.4 for derivations and a discussion of this assumption. The assumption implies that higher-order moments of the distribution vary across retirees with different λ_i and intermediation channels.

[20]As in Robles-Garcia (2020), this objective function could reflect altruistic or reputational concerns of the intermediary, or bargaining between the consumer and the advisor. The theoretical literature (Dessein, 2002) shows that full delegation can be optimal even when strategic communication is possible.

intermediary type, captured by $\{\xi_{ik}^{SA}, c^{SA}\}$ and $\{\xi_{ik}^{IA}, c^{IA}\}$.

Intermediary choice The choice of intermediation depends on the expected utility from each channel, given the retiree's information cost λ_i and their prior G_{λ_i} over product values $\boldsymbol{\xi}_i$. The value of the intermediary reflects their bias toward annuities: the retiree recognizes that the utility maximized when delegating the decision is not their own, but the weighted average described in (6). The value of each intermediation channel is therefore given by

$$U_i^{NI} = \mathbb{E}[U_{\text{No intermediary}}] = \sum_{k=1}^{N} \int_{\boldsymbol{\xi}_i} \xi_{ik} \mathcal{P}_{ik}^{*}(\boldsymbol{\xi}_i)\ G_{\lambda_i}(\mathrm{d}\boldsymbol{\xi}_i) - \lambda_i \kappa\left(\mathcal{P}_i, G_{\lambda_i}\right),$$

$$U_i^{I} = \mathbb{E}[U_{\text{Intermediary}}] = \sum_{k=1}^{N} \int_{\boldsymbol{\xi}_i} \xi_{ik}^{I} \mathcal{P}_{ik}^{*,I}(\boldsymbol{\xi}_i)\ G_{\lambda_i}(\mathrm{d}\boldsymbol{\xi}_i), \qquad \text{for } I \in \{SA, IA\}.$$

The prior G_{λ_i} yields a closed-form solution for the expected value without an intermediary (Appendix C.1.2),

$$U_i^{NI} = \lambda(\ell_{\lambda_i,\sigma_i^2} - 1)\log\left(\sum_{k=1}^{N} \exp\left(\frac{\xi_{ik}^{0}}{\lambda_i(\ell_{\lambda_i,\sigma_i^2} - 1)}\right)\right).$$

No closed-form expression exists for the expected utility of using an intermediary. For tractability in estimation, I approximate the value of intermediation by integrating over an EV(I) prior for $\boldsymbol{\xi}_i$ to compute the expected value. This approach changes only the *shape* of the distribution, while keeping the mean $\xi_{ik}^{0,SA}$, $\xi_{ik}^{0,IA}$ and variance σ_i^2 constant. The expression above then reduces to (Train, 2015)

$$U_i^{I} = \sqrt{\frac{6\sigma_i^2}{\pi^2}} \log \sum_{k=1}^{N} \exp\left(\frac{\xi_{ik}^{0,I} + c^I \mathbb{1}_{k \text{ is annuity}}}{\sqrt{6\sigma_i^2/\pi^2}}\right) - \sum_{k=1}^{N} \mathcal{P}_{ik}^{0,*,I} \cdot c^I \mathbb{1}_{k \text{ is annuity}},$$

where

$$\mathcal{P}_{ik}^{0,*,I} = \frac{\exp\left(\frac{\xi_{ik}^{0,I} + c^I \mathbb{1}_{k \text{ is annuity}}}{\sqrt{6\sigma_i^2/\pi^2}}\right)}{\sum_{j=1}^{N} \exp\left(\frac{\xi_{ij}^{0,I} + c^I \mathbb{1}_{j \text{ is annuity}}}{\sqrt{6\sigma_i^2/\pi^2}}\right)}, \qquad \text{for } I \in \{SA, IA\}.$$

In Appendix C.2, I show the approximation performs well relative to numerical alternatives.

The expected value of using both intermediaries U_i^{SA} and U_i^{IA} is constant across individuals with different information costs λ_i. In contrast, the expected value of deciding alone U_i^{NI} decreases as λ_i increases. Thus, retirees facing higher information costs value intermediation more.

Since retirees are ex-ante aware of each intermediary's bias, larger values of c^I reduce the value of intermediation. The comparative statics with respect to the prior are nuanced. Demand for intermediation is non-monotonic in the prior variance: higher σ_i^2 makes learning both more valuable and more costly, but also increases the cost of the distortion from the intermediary. Similarly, the value of intermediation is non-monotonic in the prior mean value of distorted products, ξ_{ik}^0. I derive and discuss these comparative statics in Appendix C.3.

The data and anecdotal evidence indicate that intermediary outreach, networks, and word of mouth influence demand for intermediaries. I capture these factors by assuming retirees can always choose products themselves but must "find" an agent or advisor to use one. As observed in the data, the probability of finding an intermediary (p_i^{SA}, p_i^{IA}) depends on retirees' savings and geographic location, which anecdotally reflects both differences in outreach based on expected commission fees and varying exposure to intermediaries across regions.

These assumptions yield probabilities of using each channel that depend on both expected utilities and the likelihood of finding intermediaries. Assuming without loss of generality that $U_i^{IA} < U_i^{SA}$,

$$s_i^{NI} = \begin{cases} 1 & \text{if } U_i^{NI} > U_i^{SA}, \\ 1 - p_i^{SA} & \text{if } U_i^{SA} > U_i^{NI} > U_i^{IA}, \\ 1 - p_i^{SA} - p_i^{IA} & \text{if } U_i^{IA} > U_i^{NI}, \end{cases} \qquad s_i^I = \begin{cases} 0 & \text{if } U_i^{NI} > U_i^I, \\ p_i^I & \text{if } U_i^I > U_i^{NI}, \end{cases} \quad \text{for } I \in \{SA, IA\}.$$

Identification The fundamental challenge for the model is to distinguish between three forces: (i) preferences, (ii) distortions induced by intermediaries, and (iii) information costs. In this subsection, I provide intuition for how each mechanism is identified.

The main identification assumptions concern (1) unobservable individual characteristics and (2) the structure of individuals' ex-ante beliefs—the prior means ξ_{ik}^0 and variance σ_i^2. For (1), I assume the information cost λ_i is *uncorrelated* with other unobservable retiree characteristics.[21] For (2), I discuss benchmark prior assumptions below; the identification arguments are conditional on a given restriction on the beliefs.

The identification of latent mortality risks and preferences for bequests in life-cycle models has been established in the literature (Einav, Finkelstein, and Schrimpf, 2010; Illanes and Padi, 2021). Generally, annuities appeal to retirees expecting longer lifespans, while those with stronger bequest motives value guarantees and the Phased Withdrawal. The presence of information

[21] This assumption is supported by anecdotal and survey evidence suggesting that the complexity of understanding product values is widespread and not directly linked to factors like education or financial literacy. See, for example, Table A.12. The assumption does not rule out demand for intermediation driven by product or annuity preferences, as the prior can accommodate this mechanism.

costs, mistakes, and distortions only partially modifies these arguments. Identification relies on comparisons *within* each intermediation channel. For instance, intermediated individuals choose optimally among undistorted products, such as annuities. The data provide variation in individual choice sets and annuity prices, driven by financial market conditions, interest rates, and regulations like official mortality tables. Thus, observably similar individuals may face different optimal choices, given the same distribution of preferences. Changes in aggregate choice probabilities reveal information about the joint distribution of survival expectations and bequest motives. Figure A.22 in the Appendix illustrates this intuition.

A further source of identification comes from the correlation between choices and realized survival outcomes, as in Einav, Finkelstein, and Schrimpf (2010). The variance of the idiosyncratic taste shock is identified as the residual variation needed to rationalize intermediated choices, given the units and structure of ζ_i. Since these choices are optimal within annuities, the argument is similar to those used for standard mixed logit models (Fox et al., 2012).

Once preferences are identified using within-intermediary comparisons, the model can examine choices *across* intermediation channels to identify distortions c^I and the distribution of information costs λ_i. For any prior beliefs, the model compares ex-ante identical individuals who differ only in information costs, leading to varying demand for intermediation. Retirees will pay for an intermediary and accept steering only if they face some friction in making choices. Thus, demand for intermediation informs the magnitude of both information costs and distortions.

The model also compares choice probabilities of self-reliant and intermediated individuals. For a given retiree, the intuition is similar to the "experts" approach in Bronnenberg et al. (2015): absent choice frictions and intermediary distortions, choice probabilities should be identical across channels. Information costs introduce noise, centering choices around products with high true or expected value. Intermediary bias reduces the share of the distorted product, the Phased Withdrawal. The model can reconstruct the optimal intermediary's choice based on assumed distortions and use this to compare intermediated and non-intermediated choices, measuring both information costs and biases. Figure A.23 shows an example.[22]

In the data, each individual appears only once, and may differ from other retirees in their unobservable characteristics. The assumptions on information costs and prior beliefs—which jointly govern demand for intermediaries—imply that the model can still compare individuals across intermediation channels. The model uses both demand for intermediation and realized choice probabilities to infer the magnitude of information frictions and intermediary-induced

[22]The model also uses demand for intermediation to infer preferences: the stakes must be high enough for retirees to value intermediation despite commission payments.

biases.

Geography provides an additional source of identification. Variation in exposure to intermediaries helps identify distortions and informational gains. The sampling probabilities of each channel capture this geographic variation as a shifter in the likelihood of accessing intermediation. At the same time, the model requires this mechanism to rationalize why geography impacts demand for intermediation.[23]

Choice of prior My benchmark results assume a *flat* prior, with equal prior means across all products. This assumption implies retirees are ex-ante agnostic about which product is better or worse for them, departing from rational expectations.

Two reasons guide this prior. First, anecdotal evidence suggests it is a reasonable starting point: conversations with intermediaries indicate that people are often unaware of their options when they first engage with them. Second, a flat prior provides a natural benchmark for assessing the distortions created by intermediaries, because it restricts demand based on preferences. As a result, the model is more likely to attribute differences in choices across intermediation channels to steering, amplifying the role of distortions. Intuitively, this increases the chances that removing intermediaries will appear welfare-improving. By contrast, under rational expectations, banning intermediation would always reduce retiree welfare, absent any price effects from adverse selection.

In robustness exercises, I relax this assumption to estimate the informativeness of retirees' priors. I discuss alternative specifications and their identification in Section 7 and Appendix F.

For the prior variance, I set it equal to the variance of the true product values in the retiree's choice set. This assumption implies retirees have a sense of the stakes involved in the decision, which can change with prices in counterfactuals.[24]

5 Estimation

The goal of estimation is to recover the parameters that govern life-cycle utility: the distributions of preferences over bequests δ_i^{beq}, mortality hazards μ_i, and outside wealth w_{i0}; the distribution of information costs λ_i; the intermediary biases c^{SA} and c^{IA}; and the parameters that determine

[23]A concern is that exposure to intermediaries is correlated with taste for annuity products across provinces. Table A.13 shows the relationship persists after controlling for observable characteristics, province- and quarter fixed effects, as well as the lagged share of annuitization in the province. Table A.15 shows these effects are partly driven by the location of intermediaries.

[24]Brown and Jeon (2024) make a similar assumption, resembling individuals' awareness of price or value distributions in search models.

intermediary sampling probabilities.

Estimation involves solving both the consumption-savings problem and the choice of intermediary and pension product under frictions.

Estimation sample I focus on men retiring at age 65 or older without a spouse. This selection is made for tractability and identification. The life-cycle problem for a single agent is computationally more tractable than that for a couple. Men also face higher mortality risk than women, so I observe more deaths in the sample, which helps estimate life expectancies. This procedure yields a sample of 13,420 individuals, who differ in age, wealth, survival, choice sets, and prices faced at retirement.

Life-cycle model I allow for unobserved heterogeneity in three dimensions: mortality hazards μ_i, taste for bequests δ_i^{beq} and non-pension wealth at retirement w_{i0}. I follow Illanes and Padi (2021) in modelling heterogeneity in mortality hazards using "shifters" applied to the official Chilean mortality tables. For example, an individual aged 65 with a mortality shifter m faces the mortality risk of a $65 + m$-year-old according to the table in effect at retirement. I fix the discount factor at $\beta = 0.97$ and the real risk-free interest rate at $R = 1.03$.[25] I model other individual wealth w_{i0} as proportional to pension savings. Since the focus is on product choice rather than insurer-specific offers, I average annuity payments p^t and implied bequests b^t across providers to define the streams associated with each pension product. This averaging also implies that the "effective" commission charged by sales agents is lower than that of independent advisors, as it applies only to a subset of annuity products. See Appendix B for details.

The borrowing constraint plausibly binds for certain pension products—such as the Phased Withdrawal—across relevant parts of the state space. To account for this, I solve the life-cycle model by backward induction using the Endogenous Gridpoint Method (Carroll, 2006). However, this method is computationally infeasible within the choice-model estimation routine. I therefore follow Einav, Finkelstein, and Schrimpf (2010) in solving the life-cycle problem offline over a fixed grid, and interpolate across this grid to evaluate values during estimation. To enable comparison across individuals with heterogeneous preferences, I express all product utilities in wealth-equivalent units. Appendix D provides full details.[26]

[25] The model is expressed in real terms, since pension payments are inflation-indexed.

[26] I do not estimate a separate coefficient or distribution for risk aversion, as jointly identifying risk preferences, survival probabilities, bequest motives, idiosyncratic shocks, and choice frictions is empirically and computationally challenging. I instead set the risk aversion parameter γ to 1.7—the average value estimated for women in the same context by Illanes and Padi (2021).

Choice model I use Simulated Maximum Likelihood to jointly estimate the choice of intermediary and pension product. I impose parametric restrictions on the distributions of unobservables. For information costs λ_i, I estimate an Exponential distribution. For mortality shifters m, I assume a Normal distribution and estimate its variance σ_m^2, along with a separate mean μ_m^q for each quartile q of the pension savings distribution. For each quartile, I set μ_m^q such that the expected 2-year mortality in the sample matches the share of realized deaths in the data.

I use the realized survival outcome of each individual by the end of the sample period, $D_i^q \in \{0, 1\}$, to update the probability of each mortality shifter m for a quartile q via Bayes' rule,

$$\mathbb{P}(m|\mu_m^q, \sigma_m^2, D_i^q) = \frac{\mathbb{P}(D_i^q|\mu_m^q, \sigma_m^2, m)}{\sum_{m' \in M} \mathbb{P}(D_i^q|\mu_m^q, \sigma_m^2, m')}.$$

I estimate a two-point bequest motive distribution, placing a mass Z_{beq} at zero and the remainder at μ_{beq}.[27] I also compute the distribution of other wealth using the Social Protection Survey (see Figure A.17) and sample directly from it in estimation.

For the idiosyncratic shock, I estimate its variance ν_i^2 as proportional to the variance of life-cycle product values in each individual's choice set. Combined with the benchmark prior assumptions from Section 4, this yields

$$\xi_{ik}^0 = \frac{1}{N} \sum_{k=1}^{N} \zeta_{ik} =: \bar{\zeta}_i, \qquad \nu_i^2 = \alpha_{\nu^2} \text{var}(\zeta_{ik}) = \alpha_{\nu^2} \frac{1}{N} \sum_{k=1}^{N} \left(\zeta_{ik} - \bar{\zeta}_i\right)^2, \qquad \sigma_i^2 = (1 + \alpha_{\nu^2}) \text{var}(\zeta_{ik}).$$

I estimate α_{ν^2}. Finally, I parameterize intermediary sampling probabilities as a quadratic function of log savings, the lagged share of intermediated retirees, and the share of independent advisors among all intermediaries in the retiree's province. Appendix E provides additional details.

Prices I do not model the supply side explicitly. To account for adverse selection in counterfactuals, I use the demand model to recover the distribution of longevity risk among those selecting each pension product. This distribution determines the markup over the average actuarial cost of annuities. In counterfactuals, I assume insurers know the average cost for each annuity type but cannot observe individual longevity risk. I impose that insurers set prices by keeping relative markups over average costs constant, as in Handel (2013). Because the Phased Withdrawal offers no insurance and is set by the regulator based on population survival rates and market interest rates, I keep its price fixed across counterfactuals.

[27] Allowing for a Normal distribution instead resulted in negligible bequest variance estimates across specifications.

Table 3: Parameter estimates

Parameter	Value	SE	Description
Choice model			
$\bar{\lambda}$	0.043	0.001	Mean information cost
c^{SA}	0.277	0.010	Bias of sales agent
c^{IA}	0.204	0.008	Bias of independent advisor
Intermediary sampling			
ϕ	2.619	0.189	Past intermediation in province
η_1	-1.375	0.053	Log savings
η_2	0.134	0.006	Log savings squared
θ	1.590	0.054	Share of ind. adv. in province
Preferences			
σ_m^2	24.268	2.720	Variance of mortality shifters
μ_m^1	2.861	–	
μ_m^2	2.117	–	Implied mean of mortality shifters
μ_m^3	0.379	–	(by savings quartile)
μ_m^4	-1.558	–	
μ_{beq}	575.898	36.084	Bequest motive
Z_{beq}	0.072	0.006	Mass at 0 for bequest motive
α_{ν^2}	0.297	0.013	Variance of idiosyncratic shock (multiplier)

Notes: This table reports results from the Simulated Maximum Likelihood estimation described in Section 5. Standard errors are calculated using the "sandwich" estimator $\hat{H}^{-1}\hat{G}\hat{H}^{-1}$, where $\hat{H}$ is the estimated Hessian and $\hat{G}$ is the estimated outer product of the scores.

6 Results

Parameter estimates Table 3 shows the estimated parameters. I estimate significant heterogeneity in retirees' mortality expectations (Figure A.25). Consistent with Aryal et al. (2021) and Illanes and Padi (2021), a share of retirees appear to have no bequest motives, while others display large ones. As expected, both types of intermediaries are biased toward selling annuities.

The distribution of information costs can only be interpreted relative to individuals' beliefs. In particular, the prior's mean and variance determine both the optimal information-acquisition strategy and the expected value of choosing without an intermediary. To gauge the size of these frictions, I compute individuals' willingness to pay for a "perfect" intermediary—one who is unbiased, faces no information costs, and charges no commissions. On average, retirees would forgo 3.7% of their wealth to access such an intermediary, which is about 3,000 USD.

Table 4 shows the model fit. The model matches the high rate of annuitization in the Chilean market, as well as the broad characteristics of the annuities purchased. In particular, the model predicts a large difference in the probability of choosing a guarantee across intermediation chan-

Table 4: Model fit

	Data	Model
Share of intermediated	0.49	0.45
Share of pension advisors	0.16	0.14
Share annuities	0.66	0.65
Simple	0.078	0.075
Guaranteed	0.25	0.24
Deferred	0.060	0.087
Guaranteed and deferred	0.28	0.24
2-year mortality	0.028	0.030
Phased Withdrawal	0.036	0.035
Annuities	0.024	0.027

Notes: This table presents selected summary statistics for individuals retiring at age 65 in both the data and the model. Model statistics are generated by sampling each individual in the estimation sample 100 times, re-drawing information costs λ_i, mortality hazards μ_i, taste for bequests δ_i^{beq}, and outside wealth w_{i0} from the estimated distributions.

nels (Figure A.24). The model also captures the adverse selection patterns in the data.

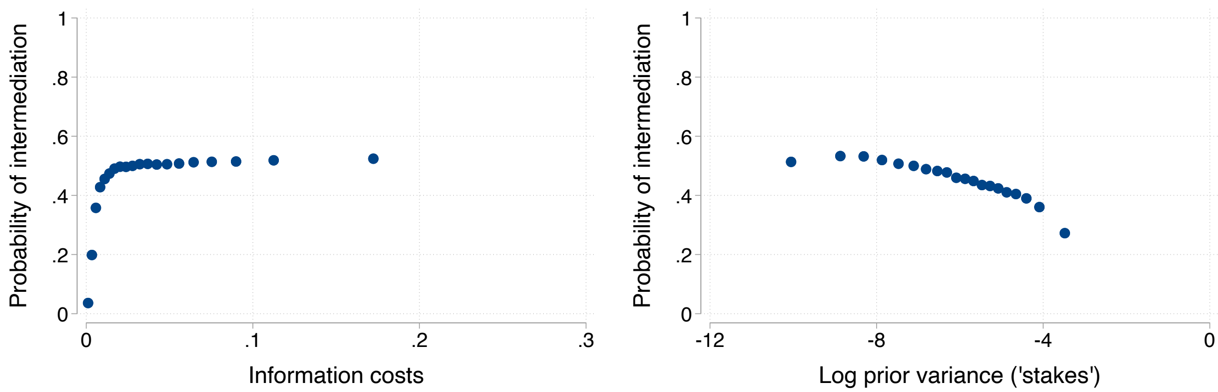
Demand for intermediation The value of advice across individuals depends jointly on the information costs and the variance of individuals' priors. Figure 5 illustrates how these forces shape demand for intermediaries in the model. As expected, demand increases with information costs and is non-monotonic in decision stakes. Higher stakes make information more valuable, but also raise the cost of being steered by an intermediary.[28]

Given the assumptions on the prior, preference-driven demand for intermediation arises only to the extent that preferences correlate with the prior's variance. Individuals with short life expectancies face high stakes, as annuities without guarantees or deferrals are clearly dominated. Long-lived retirees prefer simple annuities, but their ability to smooth consumption over many years reduces differences across products. Those with average life expectancies derive similar value from all options and therefore face the lowest stakes. Intermediated individuals therefore tend to live slightly longer and have similar bequest motives to those who decide on their own.

Demand for advice is also shaped by the likelihood of finding an intermediary. In the model, nearly 85% of retirees would find it ex-ante optimal to be intermediated, but only about 50% find advice. This pattern implies the model places substantial weight on intermediary availability as a function of both geography and pension savings (Figure A.26).

[28]For tractability, the model does not endogenize the product requests that form each retiree's choice set, even though these are a decision variable in practice. The model predicts that retirees with larger choice sets will value intermediation more. In the data, the average number of requested products is similar across intermediation channels, though retirees who decide on their own show greater variance. Lower-saving retirees are sometimes unable to afford guarantees or deferral annuities, which limits their choice set. In general, I observe a positive relationship between savings and choice set size (see Figures A.27 and A.28 in Appendix A).

Figure 5: Demand for intermediaries



Notes: These figures show key determinants of demand for intermediation in the model. The y-axis shows the probability of using an intermediary; the x-axis shows marginal information costs λ_i in panel (a) and the log of prior variance σ_i^2—a measure of decision stakes—in (b).

Welfare costs of frictions Choice frictions affect only self-reliant retirees and reduce welfare through two channels. First, individuals may make suboptimal choices and fail to select the product that delivers the highest utility within their choice set. These mistakes arise from optimal strategies that involve only partial information acquisition. Second, acquiring information is itself costly and lowers consumer welfare. Table 5 reports the magnitudes of these channels, which account for 1.8% and 2.1% of wealth, respectively. Mistakes are more costly for individuals with short life expectancies and large savings. The model predicts that retirees facing higher stakes optimally acquire more information—typically, short-lived, low-savings individuals.[29]

Intermediaries induce choice mistakes when their incentives are misaligned with those of their clients. In such cases, retirees are steered toward a suboptimal annuity instead of a Phased Withdrawal. Under the flat prior assumption, the model predicts that over 70% of retirees are steered into annuities, resulting in an average welfare loss of 5.2%. The cost is highest for short-lived and low-savings individuals, for whom annuities are strongly dominated. By contrast, long-lived retirees are more likely to prefer annuities and therefore tend to benefit from intermediation.[30]

The model assumes that intermediaries steer retirees into the best annuity in their choice set. This mechanism provides a specific interpretation of the annuity choices observed among intermediated retirees, particularly regarding guarantees (Figure 2c). Figure 6 compares the

[29]The gap between the ex-ante value of eliminating the friction and its realized welfare cost reflects the fact that the prior does not correspond to rational expectations.

[30]As discussed in Section 4, the flat prior is likely to find a large share of retirees being steered into annuities—I therefore interpret the 70% figure as an upper bound.

Table 5: Costs of mistakes and distortions

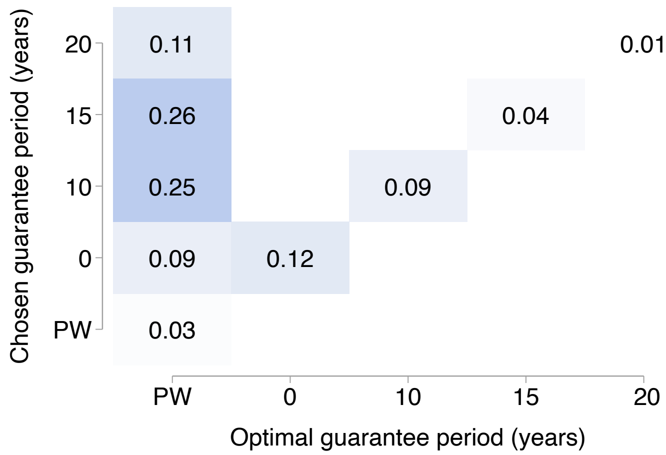
	Benchmark	Ban	Ban (prices)	De-bias	De-bias (prices)
Share of right choices	0.52	0.66	0.69	0.85	0.87
Not interm. (in benchmark)	0.72	0.72	0.74	0.73	0.76
Intermediated (in benchmark)	0.28	0.59	0.62	1.0	1.0
Average cost of mistakes (in %)	3.3	2.1	2.2	1.0	1.0
Not interm. (in benchmark)	1.8	1.8	1.8	1.7	1.8
Low survival	1.8	1.8	1.8	1.8	1.8
High survival	1.7	1.7	1.8	1.6	1.8
Low savings	1.6	1.6	1.6	1.5	1.6
High savings	2.0	2.0	2.1	2.0	2.1
Intermediated (in benchmark)	5.2	2.5	2.6	0.	0.
Low survival	7.6	2.8	2.8	0.	0.
High survival	2.7	2.2	2.4	0.	0.
Low savings	6.8	2.5	2.5	0.	0.
High savings	4.1	2.5	2.6	0.	0.
Information costs (in %)	2.1	2.1	2.3	2.0	2.2
Not interm. (in benchmark)	2.1	2.1	2.3	2.0	2.2
Low survival	2.7	2.7	2.9	2.5	2.7
High survival	1.3	1.3	1.5	1.2	1.5
Low savings	2.3	2.3	2.4	2.1	2.2
High savings	1.9	1.9	2.1	1.9	2.2
Intermediated (in benchmark)	–	2.6	2.8	–	–
Low survival	–	3.6	3.8	–	–
High survival	–	1.5	1.7	–	–
Low savings	–	3.0	3.2	–	–
High savings	–	2.2	2.5	–	–

Notes: This table reports choice mistakes, intermediary distortions, and realized information costs for simulated 65-year-olds under different counterfactual policies. All values are expressed as a percentage of wealth. "Low survival" refers to individuals with below-median life expectancy based on the mortality shifter m. "Low savings" denotes those with pension savings below the sample median.

optimal and realized guarantee lengths for these individuals. In the model, guaranteed annuities emerge as a "second-best:" a result of distortions rather than preferences. For instance, nearly all retirees who choose a 20-year guarantee do so due to suboptimal steering by intermediaries.

A key determinant of the welfare cost of distortions is the degree of substitutability between annuity types and the Phased Withdrawal. On average, the value gap between the best and worst annuity in a retiree's choice set is 11.5%—more than twice the average cost of intermediary distortions. This gap highlights the potential for intermediaries to create value, even when their incentives are biased: choosing correctly among annuities has large welfare consequences. The life-cycle model is crucial to measuring the size of these effects. Retirees' ability to adjust consumption and savings to each product mitigates the losses from suboptimal choices.

Figure 6: Optimal and chosen guarantee length under intermediaries



Notes: This figure shows model-implied choice and distortion patterns for intermediated 65-year-olds in simulated data. The x-axis shows the "optimal" (highest-value) ξ^{I}_{ik} pension product, while the y-axis shows the product actually chosen. Each cell's value represents the share of retirees with that product combination in the simulation.

7 Counterfactuals

I analyze the effects of two policy interventions that target intermediary behavior. The first bans all intermediaries, forcing retirees to make decisions independently. The second removes the bias toward annuities in intermediary advice, effectively imposing a fiduciary duty. Given I do not the model the supply side, I focus on the impact of these policies on consumer welfare.

I analyze both policies in two steps. I first consider a "naïve" counterfactual (Handel, 2013) in which I allow for changes in retirees' decisions while keeping annuity prices fixed. I then allow the prices of different annuity types to adjust to the changes in adverse selection as outlined in Section 5. For any annuity type k and observably similar group of retirees, the model predicts a distribution of mortality hazards μ selecting into buying that product at a given set of prices. Assuming an insurer discount rate R_0, I compute the average cost of providing a unit of annuity payments to this group. I then adjust the prices of each annuity type by the change in these costs relative to the benchmark, and let retirees re-optimize. Iterating this procedure yields a counterfactual in which annuity prices are consistent with the selection patterns they generate.

In practice, I focus on retirees aged 65 and split them into four savings quartiles. The appropriate level of annuity aggregation at which to compute average costs and markups is not obvious: it depends on insurers' competitive and pricing behavior, which is beyond the scope of this paper. To balance allowing for heterogeneity across annuity types while keeping sample sizes large, I group annuities into four categories based on whether they include a guarantee

Table 6: Counterfactuals: Choices and 2-year mortality (age 65)

	Benchmark	Ban	Ban (prices)	De-bias	De-bias (prices)
Share of intermediated	0.45	0.	0.	0.52	0.52
Share of pension advisors	0.14	–	–	0.16	0.16
Share annuities	0.65	0.44	0.40	0.32	0.26
Simple	0.075	0.069	0.078	0.062	0.076
Guaranteed	0.24	0.16	0.14	0.11	0.081
Deferred	0.087	0.081	0.081	0.062	0.054
Guaranteed and deferred	0.24	0.13	0.10	0.090	0.054
2-year mortality	0.030	0.030	0.030	0.030	0.030
Phased Withdrawal	0.035	0.034	0.033	0.033	0.032
Annuities	0.027	0.024	0.024	0.023	0.023

Notes: This table shows aggregate model statistics across counterfactual scenarios. Statistics are generated by simulating each individual in the estimation sample 100 times, drawing information costs, mortality hazards, taste for bequests, and non-pension wealth from the estimated distributions. Columns 2 and 4 present counterfactuals of banning and de-biasing intermediaries while holding prices fixed. Columns 3 and 5 incorporate price adjustments reflecting cost changes due to selection, as described in Section 7 of the main text. The sample is restricted to individuals aged 65 for comparability.

and/or a deferral period.

"Naïve" counterfactual Column 2 in Table 7 shows that banning intermediaries leads to an average consumer welfare gain of 0.3%. Two mechanisms drive this gain. First, the ban eliminates commission payments. Second, retirees avoid being distorted by intermediaries, which results in nearly 60% of them choosing the utility-maximizing product in their choice set (Table 5). The annuitization rate falls from over 60% to around 40%, largely due to a sharp decline in the share of guaranteed annuities (Table 6). This pattern is consistent with the interpretation that intermediary distortions drive demand for these products. On average, the value of these improved choices is equivalent to a $\sim$3% increase in wealth.

However, these gains are almost entirely offset by choice frictions. Intermediated retirees tend to have high information costs λ_i: without advice, they spend the equivalent of 2.6% of their wealth acquiring information. As a result, their net gain from the ban is of only 0.7%. This gain contrasts with the ex-ante perception of the policy. Because retirees self-select into intermediation based on expected value, banning it is perceived as an 3.4% reduction in wealth. This gap reflects the difference between beliefs and outcomes given the benchmark prior assumption. Over 70% of retirees would benefit from choosing a Phased Withdrawal, but they begin with flat priors and therefore overestimate the value of advice.

Despite the model's adversarial stance toward intermediaries, it predicts only modest welfare gains from a ban. Three related factors explain this result. First, the estimated information costs are substantial. Without intermediaries, retirees make costly mistakes—leaving about 2.5%

Table 7: Counterfactuals: Consumer welfare

	Ban	Ban (prices)	De-bias	De-bias (prices)
Consumer welfare changes (in %)	0.3	-0.2	2.4	1.8
Not intermediated in benchmark	–	-0.4	0.2	-0.5
Information costs	–	-0.1	0.1	-0.1
Choices	–	0.1	0.0	0.2
Commissions	–	0.0	-0.0	-0.0
Taste shock	–	0.0	-0.0	0.0
Price changes	–	-0.4	0.0	-0.6
Intermediated in benchmark	0.7	0.1	5.2	4.7
Information costs	-2.6	-2.8	0.0	-0.0
Choices	2.8	2.9	5.2	5.1
Commissions	0.3	0.3	-0.0	-0.0
Taste shock	0.1	0.1	0.0	-0.0
Price changes	0.0	-0.6	0.0	-0.4

Notes: This table shows the welfare impact of counterfactual policies for retirees aged 65 in the estimation sample. Values are expressed as a percentage of wealth. The first and third columns present counterfactuals of banning and de-biasing intermediaries while holding annuity prices fixed. The second and fourth columns account for cost changes passed through to prices due to selection, as described in Section 7 of the main text. "Taste shock" captures the consumer welfare effect resulting from changes in the distribution of the taste shock; see Appendices C.2 and C.4 for details.

of wealth on the table (Table 5). Second, guaranteed annuities offer a close substitute to the Phased Withdrawal, which limits the welfare loss from being steered by intermediaries. Third, as discussed in Section 6, choosing the right annuity has large welfare implications. The welfare outcome is shaped by the interaction of choice frictions, product substitutability, and the decisions' stakes.

Turning to the second counterfactual, the model always predicts welfare gains from de-biasing intermediaries in the absence of price adjustments. The policy increases consumer welfare by the equivalent to 2.5% of wealth, driven primarily by a 5.2% gain for retirees who are intermediated in the benchmark. With aligned incentives, intermediaries eliminate all money left on the table: retirees now make optimal choices, paying only the commission. An additional 7% of retirees opt into intermediation. The de-biasing policy produces similar shifts in product choices as the ban, including a reduction in the share of guaranteed annuities.[31]

As previously emphasized, the model assigns large weight to intermediary availability, which prevents nearly 35% of retirees from obtaining it. In the benchmark, the consumer welfare impact of the lack of access is small, given the gap between ex-ante willingess to pay and ex-post

[31] In this counterfactual, I hold fixed the commission on Phased Withdrawals to isolate the effect of aligned incentives. Allowing the commission to adjust—making intermediaries indifferent across products—reduces intermediation by 2% and lowers welfare gains by 0.4-0.5%.

Table 8: Counterfactuals: Annuity cost changes

	Ban	Ban (prices)	De-bias	De-bias (prices)
Lowest quartile				
Simple	1.0	0.9	0.6	0.7
Guaranteed	1.8	1.7	2.4	1.8
Deferred	2.0	1.9	1.9	1.7
Guaranteed and deferred	2.7	2.4	3.5	2.5
Highest quartile				
Simple	-0.3	0.6	1.3	3.0
Guaranteed	2.4	2.6	4.4	4.4
Deferred	0.9	1.7	3.8	4.9
Guaranteed and deferred	4.1	3.7	6.2	5.8

Notes: This table shows cost changes of different annuity products due to shifts in adverse selection across counterfactuals. Costs are expressed as percentages relative to the benchmark. The upper (lower) section reports effects for 65-year-old retirees in the lowest (highest) savings quartile. The first and third columns show cost changes assuming choices adjust but prices remain fixed. The second and fourth columns show cost changes consistent with equilibrium selection patterns, as detailed in Section 7 of the main text.

outcomes. However, when intermediaries are de-biased and their availability is held fixed, many retirees who would ex-post benefit from unbiased advice still fail to access it. In fact, those who stand to gain the most from better advice are often already trying to find intermediaries in the baseline. As a result, successful "switchers" in the de-biasing counterfactual face lower effective frictions and benefit only modestly from advice.

Price adjustment In the benchmark, intermediary distortions act to reduce adverse selection into annuities. As a result, banning intermediaries slightly worsens selection: annuitants become 1 percentage point less likely than non-annuitants to die within the first two years—a 0.2 percentage point increase in differential mortality relative to the baseline. However, selection across annuity types becomes less pronounced, especially for guaranteed annuities (Table A.18). The mechanism aligns with the intuition from Figure 4a and 4c: in the benchmark, intermediaries steer short-lived retirees into guaranteed annuities. After the ban, these retirees shift toward Phased Withdrawals. As a result, survival differences between retirees choosing guaranteed annuities and those choosing other annuity types shrink in the counterfactual.

Columns 1 and 3 in Table 8 illustrate how annuity costs adjust to changes in adverse selection under the naïve counterfactual. Cost changes range from -0.3% to over 6% across savings quartiles and products, with the largest increases concentrated among annuities featuring both guarantees and deferrals. The risk pool deteriorates more for guaranteed annuities than for deferred ones (Table A.18). However, guaranteed products are less sensitive to such changes since their payments are not life-contingent during the guarantee period. Simple annuities experience the smallest shifts, consistent with their limited substitutability with the Phased Withdrawal.

Columns 2 and 4 reflect the cost adjustments from the iteration procedure. As prices for annuity contract features rise, more retirees shift toward the Phased Withdrawal option and switch from deferred or guaranteed products to simple annuities. This substitution dampens the initial cost increases: prices of simple annuities tend to rise, while guaranteed annuities become slightly cheaper. These changes further reduce annuitization—by 5 percentage points under a ban and by 6 under de-biasing, as seen in Table 6. Price adjustments also raise the stakes of the decision: choosing the wrong annuity becomes more costly. This effect leads to larger average losses from mistakes and higher realized information costs.

The consumer welfare effects from adverse selection are quantitatively small, but qualitatively meaningful. As seen in Table 7, price adjustments nearly fully offset any gains from banning intermediaries for previously intermediated retirees. Meanwhile, self-reliant retirees lose the equivalent of 0.4% of wealth: intuitively, they receive no benefit from the policy but bear the cost of more expensive annuities. In response, retirees endogenously acquire more information, a reaction to the higher stakes of the decision. A similar pattern arises under the de-biasing policy. Although consumer-welfare gains for those receiving advice remain large at 4.7%, non-intermediated retirees again suffer losses from rising prices. The result is a net average welfare loss of 0.5% for that group, and a reduced overall gain of 1.8% for the full population.

Heterogeneity Table 9 reports policy effects by retiree longevity. Short-lived retirees tend to benefit more under either policy: they are disproportionately harmed by intermediary distortions in the benchmark and are less exposed to annuity price increases due to their limited annuitization. In contrast, long-lived retirees lose the equivalent of -1% of wealth under a ban. They are more likely to prefer annuities and therefore benefit from both access to advice and favorable annuity pricing. The ban removes access to a cost-effective information technology and eliminates implicit subsidies. Longer-lived retirees' gains from de-biasing are also modest: while they benefit from better advice, those improvements are nearly offset by price increases.

The policy consequences also vary across the savings distribution, as shown in Table 10. A ban on intermediaries marginally benefits low-savings retirees. In contrast, high-savings retirees—who are more likely to be intermediated—lose around 0.8% of wealth under the policy. This pattern reflects both their value for annuities and the relatively close substitutability between their preferred annuity and the Phased Withdrawal, which limit the impact of distortions. Gains from de-biasing intermediaries are positive for both groups, highlighting the role of unobserved

Table 9: Counterfactuals: Consumer welfare (by life expectancy)

	Ban	Ban (prices)	De-bias	De-bias (prices)
Consumer welfare changes (in %)	0.3	-0.2	2.4	1.8
Low survival	0.8	0.5	3.3	3.0
Information costs	-1.5	-1.7	0.1	-0.0
Choices	2.1	2.2	3.3	3.3
Commissions	0.1	0.1	-0.0	-0.0
Taste shock	0.1	0.1	-0.0	0.0
Price changes	0.0	-0.3	0.0	-0.3
High survival	-0.3	-1.0	1.3	0.3
Information costs	-0.7	-0.9	0.1	-0.1
Choices	0.2	0.3	1.3	1.3
Commissions	0.2	0.2	-0.0	-0.0
Taste shock	0.1	0.0	-0.0	-0.0
Price changes	0.0	-0.7	0.0	-0.8

Notes: This table shows the welfare impact of counterfactual policies for long- and short-lived retirees. See Table 7 for details. "Low survival" is defined as below-median life expectancy given the realized mortality shifter m.

Table 10: Counterfactuals: Consumer welfare (by savings)

	Ban	Ban (prices)	De-bias	De-bias (prices)
Consumer welfare changes (in %)	0.3	-0.2	2.4	1.8
High savings	-0.0	-0.8	2.2	1.2
Information costs	-1.2	-1.4	0.0	-0.1
Choices	0.9	1.0	2.2	2.2
Commissions	0.2	0.2	-0.0	-0.0
Taste shock	0.1	0.1	-0.0	-0.0
Price changes	0.0	-0.7	0.0	-0.8
Low savings	0.6	0.4	2.6	2.4
Information costs	-1.1	-1.2	0.1	0.1
Choices	1.6	1.7	2.5	2.6
Commissions	0.1	0.1	-0.0	-0.0
Taste shock	0.0	0.1	-0.0	0.0
Price changes	0.0	-0.3	0.0	-0.2

Notes: This table shows the welfare impact of counterfactual policies for retirees with high and low pension savings. See Table 7 for details. "Low savings" are defined as below-median pension savings in the sample.

heterogeneity in shaping welfare effects.

Robustness checks To assess the robustness of the results, I re-estimate the model under different assumptions. I first relax the assumption on retirees' prior beliefs by estimating a mixed prior, where individuals are partially informed about the values of the different products in their choice set. I identify the informativeness of the prior by using the demand for annuities among self-reliant retirees across regions with differential exposure to intermediaries. I also use the correlation between mortality and demand for intermediation as shown in Figure 4a.

Next, I detach demand for intermediaries from the cost of information acquisition, imposing it be purely driven by sampling probabilities. Finally, I allow retirees to choose intermediation based on their decision-making costs, but reverse the default option to be intermediation as opposed to self-reliance.

The objective of these alternative specifications is to assess the sensitivity of the welfare estimates to the assumptions that determine retirees' demand for intermediaries, in particular selection based on preferences over products, and awareness of the benefits and costs of intermediation. Reassuringly, I find quantitatively and qualitatively similar welfare estimates for the counterfactual policies across all of these specifications. Appendix F discusses these alternative models, their identification assumptions and results in detail.

8 Conclusion

This paper presents a tractable framework to assess the role of biased intermediaries in markets shaped by choice frictions and adverse selection. Using the Chilean pension market as a laboratory, I illustrate how the interaction of these forces drives policy outcomes. Banning intermediaries in this context turns out to be essentially welfare-neutral: the distortions they introduce are offset by an increase in retirees' mistakes, cognitive effort, and price effects from worsened adverse selection. In contrast, the effectiveness of de-biasing intermediaries is limited by frictions in finding or accessing them.

This paper provides a first step toward understanding the equilibrium effects of intermediaries in markets with adverse selection. Several important mechanisms could alter the results. First, insurers may respond not only to changes in adverse selection, but also to shifts in demand elasticity. My model suggests that eliminating or de-biasing intermediaries increases retirees' price sensitivity, potentially putting downward pressure on annuity prices. This effect may vary across intermediary types: the data suggest that sales agents reduce retirees' responsiveness to price, while advisors have the opposite effect.

Second, insurers appear to compete in part by how they deploy sales agents across geographic locations. Removing intermediaries—especially sales agents—could disrupt core strategic dynamics in the market and amplify consumer welfare effects. Third, given the importance of choice frictions, a supply-side response in product design is also a concern. The current product menu may reflect constraints imposed by informed intermediaries and self-reliant consumers who are sufficiently sophisticated to avoid predatory contracts. Without intermediaries, insurers might attempt to exploit retirees facing greater choice frictions.

Finally, the model takes as given a key institutional constraint: retirees are not allowed to freely withdraw their pension savings—a policy explored in Illanes and Padi (2021). This restriction is likely motivated by moral hazard concerns: if retirees could fully liquidate their savings, they might overspend early on, expecting government support later in life. Alternatively, the government may evaluate welfare using a lower discount rate than individuals, making smoother income paths and higher annuitization rates more desirable from a policy perspective.

An interesting question is whether the current design of the system and of intermediaries' incentives represents a second-best solution. If the government prefers higher annuitization rates to shift longevity risk onto insurers, then intermediaries with incentives to promote annuities may help achieve that goal while preserving individual choice. My results suggest that even if retirees dislike annuities due to bequest motives, the "right" annuity captures most of the gains from the optimal product, thus advancing both social and individual objectives.

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Online Appendix

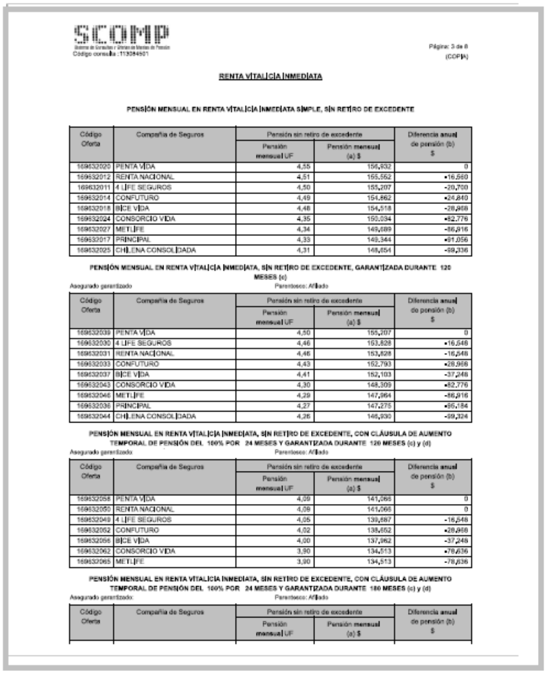
for

Intermediation, Choice Frictions, and Adverse Selection:
Evidence from the Chilean Pension Market

Eduard Boehm

A Additional tables and figures

Figure A.7: Sample *Offers Certificate*



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(COPIA)

RENTA VITALICIA INMEDIATA

PENSIÓN MENSUAL EN RENTA VITALICIA INMEDIATA SIMPLE, SIN RETIRO DE EXCEDENTE

Código Oferta	Compañía de Seguros	Pensión sin retiro de excedente		Diferencia anual de pensión (b) $
		Pensión mensual UF	Pensión mensual (a) $	
169632020	PENTA VIDA	4,55	156,932	0
169632012	RENTA NACIONAL	4,51	155,552	-16,560
169632011	4 LIFE SEGUROS	4,50	155,207	-20,700
169632014	CONFUTURO	4,49	154,862	-24,840
169632018	BICE VIDA	4,48	154,518	-28,968
169632024	CONSORCIO VIDA	4,35	150,034	-82,776
169632027	METLIFE	4,34	149,689	-86,916
169632017	PRINCIPAL	4,33	149,344	-91,056
169632025	CHILENA CONSOLIDADA	4,31	148,654	-99,336

PENSIÓN MENSUAL EN RENTA VITALICIA INMEDIATA, SIN RETIRO DE EXCEDENTE, GARANTIZADA DURANTE 120 MESES (c)

Asegurado garantizado Parentesco: Afiliado

Código Oferta	Compañía de Seguros	Pensión sin retiro de excedente		Diferencia anual de pensión (b) $
		Pensión mensual UF	Pensión mensual (a) $	
169632039	PENTA VIDA	4,50	155,207	0
169632030	4 LIFE SEGUROS	4,46	153,828	-16,548
169632031	RENTA NACIONAL	4,46	153,828	-16,548
169632033	CONFUTURO	4,43	152,793	-28,968
169632037	BICE VIDA	4,41	152,103	-37,248
169632043	CONSORCIO VIDA	4,30	148,309	-82,776
169632046	METLIFE	4,29	147,964	-86,916
169632036	PRINCIPAL	4,27	147,275	-95,184
169632044	CHILENA CONSOLIDADA	4,26	146,930	-99,324

PENSIÓN MENSUAL EN RENTA VITALICIA INMEDIATA, SIN RETIRO DE EXCEDENTE, CON CLÁUSULA DE AUMENTO TEMPORAL DE PENSIÓN DEL 100% POR 24 MESES Y GARANTIZADA DURANTE 120 MESES (c) y (d)

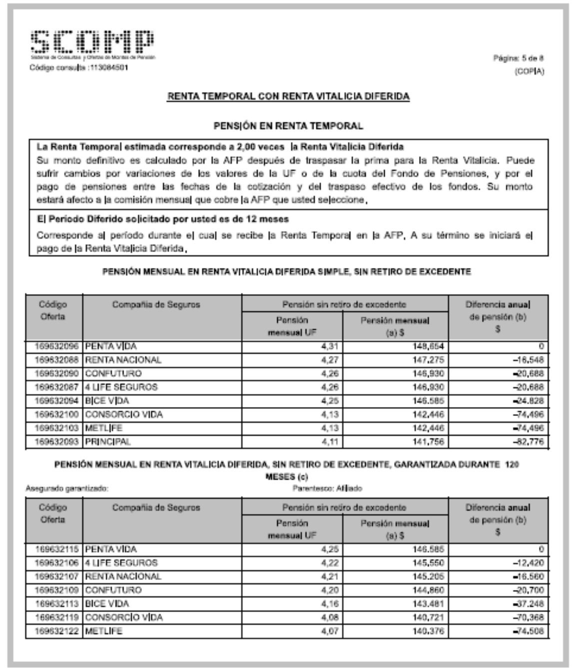
Asegurado garantizado: Parentesco: Afiliado

Código Oferta	Compañía de Seguros	Pensión sin retiro de excedente		Diferencia anual de pensión (b) $
		Pensión mensual UF	Pensión mensual (a) $	
169632058	PENTA VIDA	4,09	141,066	0
169632050	RENTA NACIONAL	4,09	141,066	0
169632049	4 LIFE SEGUROS	4,05	139,687	-16,548
169632052	CONFUTURO	4,02	138,652	-28,968
169632056	BICE VIDA	4,00	137,962	-37,248
169632062	CONSORCIO VIDA	3,90	134,513	-78,636
169632065	METLIFE	3,90	134,513	-78,636

PENSIÓN MENSUAL EN RENTA VITALICIA INMEDIATA, SIN RETIRO DE EXCEDENTE, CON CLÁUSULA DE AUMENTO TEMPORAL DE PENSIÓN DEL 100% POR 24 MESES Y GARANTIZADA DURANTE 180 MESES (c) y (d)

Asegurado garantizado: Parentesco: Afiliado

Código Oferta	Compañía de Seguros	Pensión sin retiro de excedente		Diferencia anual de pensión (b) $
		Pensión mensual UF	Pensión mensual (a) $	



SCOMP

Sistema de Consultas y Ofertas de Montos de Pensión

Código consulta :113084501

Página: 5 de 8

(COPIA)

RENTA TEMPORAL CON RENTA VITALICIA DIFERIDA

PENSIÓN EN RENTA TEMPORAL

La Renta Temporal estimada corresponde a 2,00 veces la Renta Vitalicia Diferida

Su monto definitivo es calculado por la AFP después de traspasar la prima para la Renta Vitalicia. Puede sufrir cambios por variaciones de los valores de la UF o de la cuota del Fondo de Pensiones, y por el pago de pensiones entre las fechas de la cotización y del traspaso efectivo de los fondos. Su monto estará afecto a la comisión mensual que cobre la AFP que usted seleccione.

El Periodo Diferido solicitado por usted es de 12 meses

Corresponde al período durante el cual se recibe la Renta Temporal en la AFP. A su término se iniciará el pago de la Renta Vitalicia Diferida.

PENSIÓN MENSUAL EN RENTA VITALICIA DIFERIDA SIMPLE, SIN RETIRO DE EXCEDENTE

Código Oferta	Compañía de Seguros	Pensión sin retiro de excedente		Diferencia anual de pensión (b) $
		Pensión mensual UF	Pensión mensual (a) $	
169632096	PENTA VIDA	4,31	148,654	0
169632088	RENTA NACIONAL	4,27	147,275	-16,548
169632090	CONFUTURO	4,26	146,930	-20,688
169632087	4 LIFE SEGUROS	4,26	146,930	-20,688
169632094	BICE VIDA	4,25	146.585	-24.828
169632100	CONSORCIO VIDA	4,13	142,446	-74,496
169632103	METLIFE	4,13	142,446	-74,496
169632093	PRINCIPAL	4,11	141,756	-82,776

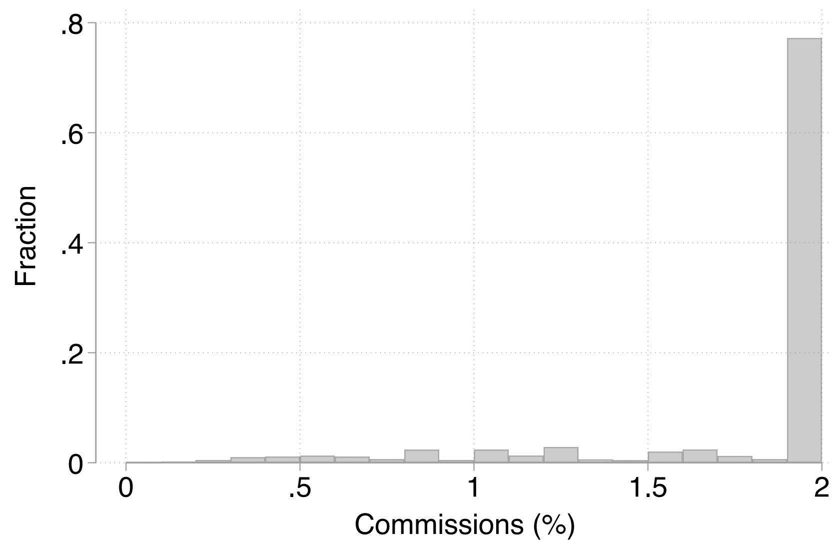
PENSIÓN MENSUAL EN RENTA VITALICIA DIFERIDA, SIN RETIRO DE EXCEDENTE, GARANTIZADA DURANTE 120 MESES (c)

Asegurado garantizado: Parentesco: Afiliado

Código Oferta	Compañía de Seguros	Pensión sin retiro de excedente		Diferencia anual de pensión (b) $
		Pensión mensual UF	Pensión mensual (a) $	
169632115	PENTA VIDA	4,25	146.585	0
169632106	4 LIFE SEGUROS	4,22	145,550	-12,420
169632107	RENTA NACIONAL	4,21	145.205	-16.560
169632109	CONFUTURO	4,20	144,860	-20,700
169632113	BICE VIDA	4,16	143.481	-37.248
169632119	CONSORCIO VIDA	4,08	140,721	-70,368
169632122	METLIFE	4,07	140.376	-74,508

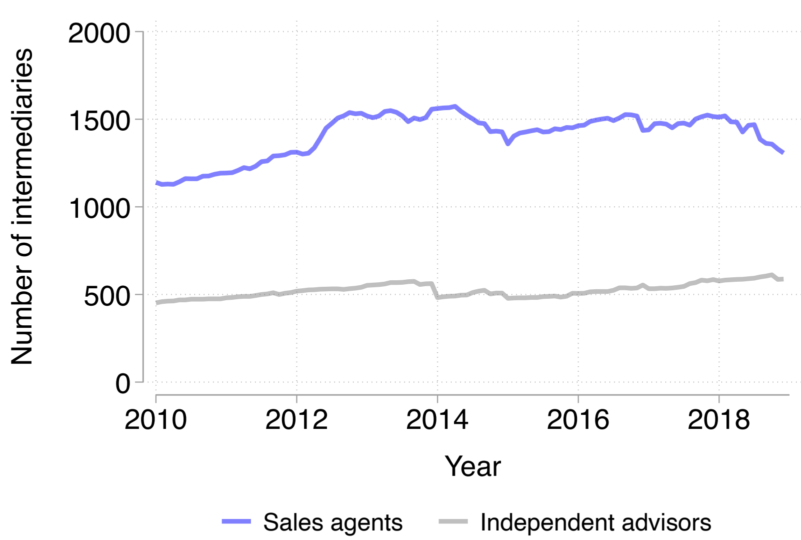
Notes: The figure shows a sample document for pension product decisions. Each pension product is represented by a table containing all offers from PFAs for the Phased Withdrawal, and of bidding insurance companies for annuities. Tables are ordered, showing higher pension offers first.

Figure A.8: Commissions paid



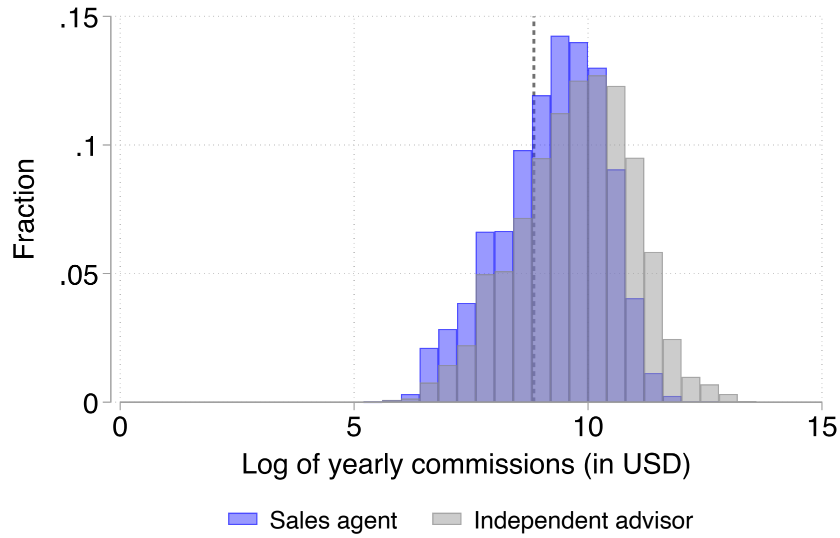
Notes: This figure shows the commissions (in %) paid by retirees to intermediaries in the data. The sample includes all retirees between 2010 and 2018.

Figure A.9: Number of intermediaries



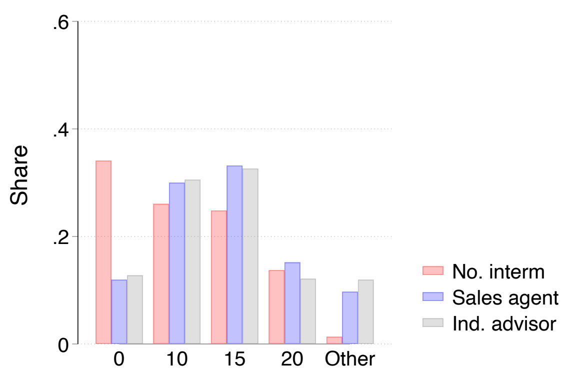
Notes: This figure shows the number of registered sales agents and independent advisors in every month between 2010 and 2018.

Figure A.10: Intermediary income from commissions

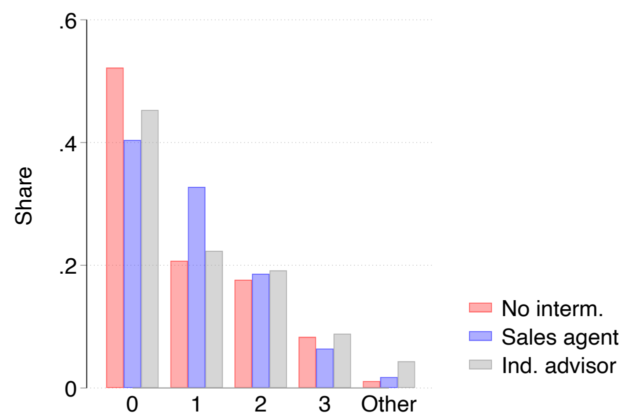


Notes: This figure shows yearly commissions earnings from sales agents and independent advisors between 2010 and 2018. The figure omits zeroes: registered agents or advisors who do not intermediate any retirees during the year. The median for sales agent is 12000 USD (10th percentile 2100, 90th percentile 39000), that for independent advisors is 19000 (3100, 75000). The dotted line shows the median wage income in Chile in 2018, 6900 USD (INE, 2019).

Figure A.11: Characteristics of chosen annuities across intermediation channels



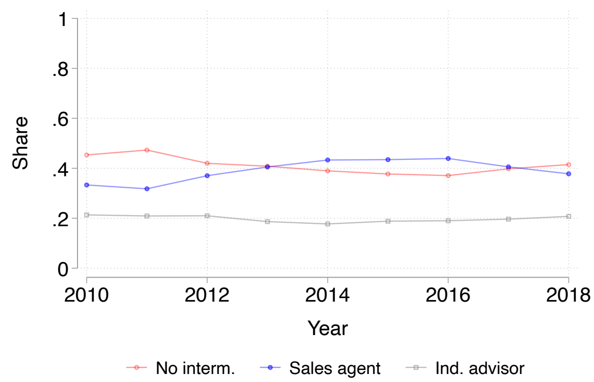
(a) Guarantee period



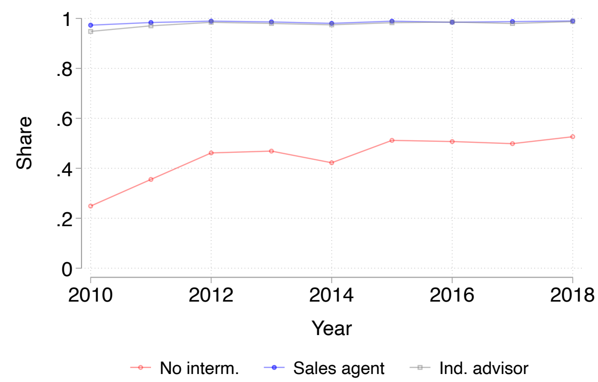
(b) Deferral period

Notes: These figures show characteristics of annuities purchased by retirees using each intermediation channel. (a) shows the choice of guaranteed periods, (b) the choice of deferral length. "Other" includes all other lengths not explicitly shown.

Figure A.12: Intermediation and annuitization shares across sample period



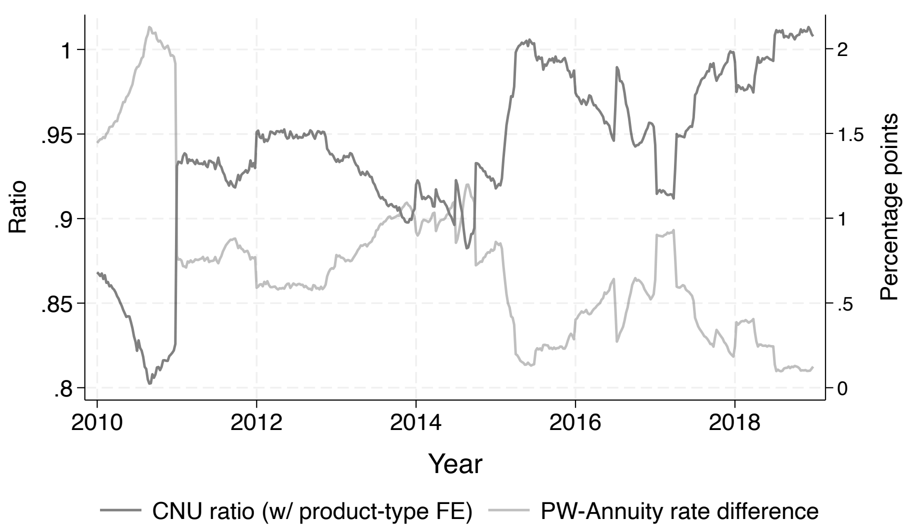
(a) Intermediation shares



(b) Annuitization shares (by intermediary)

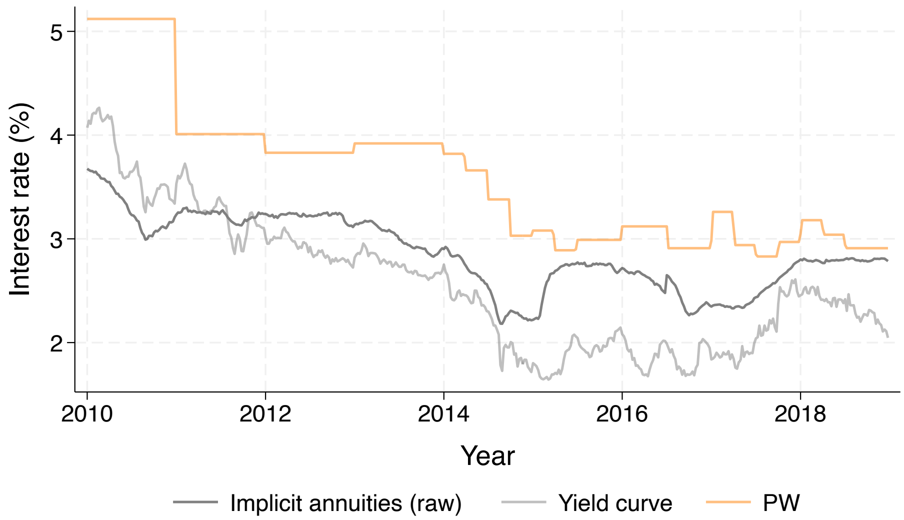
Notes: These figures show the evolution of intermediation and annuitization shares between 2010 and 2018. Figure (a) shows the share of each intermediation channel, (b) shows the share of retirees using each channel that purchase any annuity.

Figure A.13: Annuity prices (I) – Price relative to Phased Withdrawal



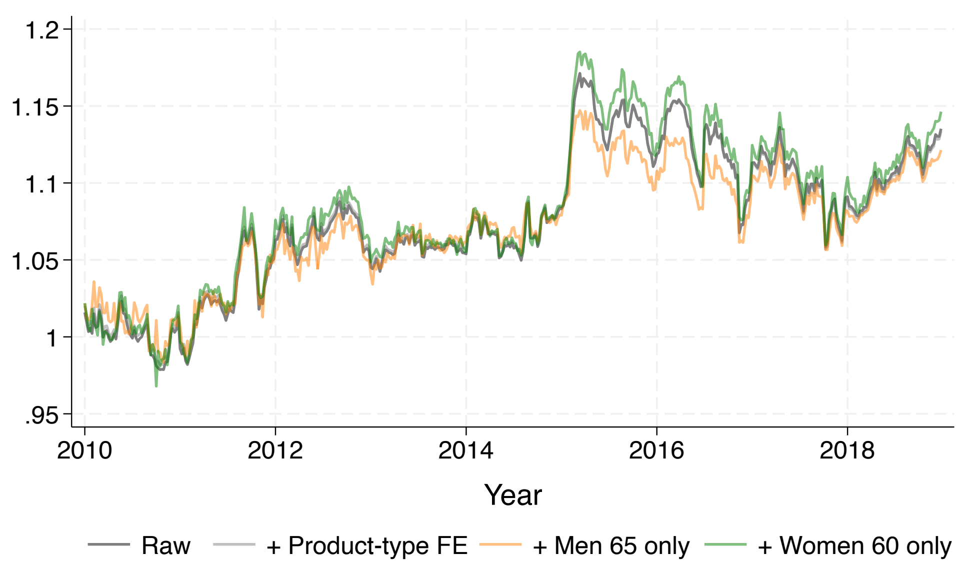
Notes: This figure shows the evolution of two metrics of annuity prices relative to the outside option (Phased Withdrawal) between 2010 and 2018. The dark gray line (left y-axis) shows the ratio of the average ratio of the actuarial cost used to calculate the Phased Withdrawal payouts over the actuarial cost of annuity offers (computed as $AC_{Ann} = \frac{\text{Premium}}{\text{Annuity payout}}$). Annuity-type fixed effects are removed to account for the different products' financial characteristics. The light gray line (right y-axis) shows the difference between the mean implicit return rate of annuity offers—computed by solving for the rate corresponding to the annuity's actuarial cost given the official mortality table—and the rate used to calculate the Phased Withdrawal payouts.

Figure A.14: Annuity prices (II) – Evolution of interest rates



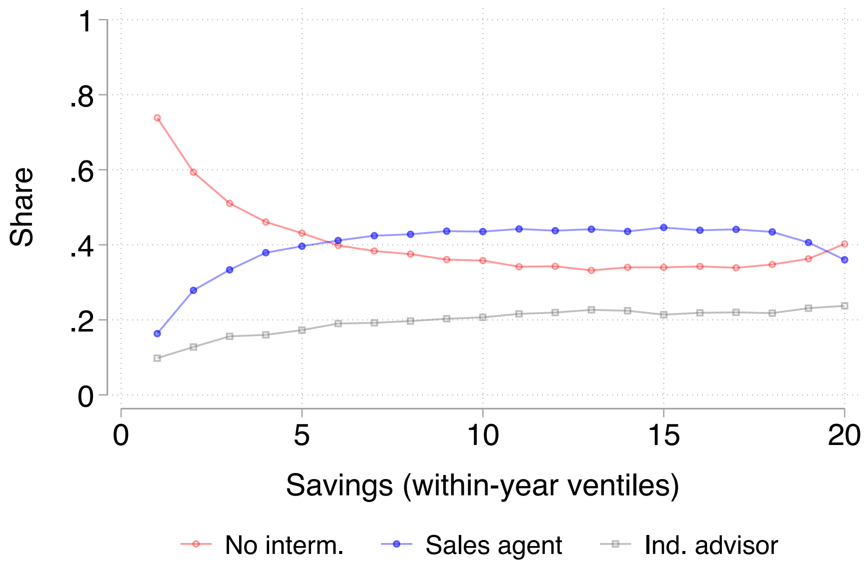
Notes: This figure shows the evolution of three different discount/interest rates related to annuity prices. The dark gray line shows the average implicit annuity rate in the data (see also Figure A.13). The light gray line shows the risk-free rate as per an interpolated yield curve (see also Figure A.14). The orange line shows the discount rate used to calculate the Phased Withdrawal payouts. This rate is set by the regulator and obtained from adding past excess returns of risky over safe assets to the yield curve. The rate was updated once a year until 2013. Starting in 2014, the rate is only updated if it varies by more than 10 basis point, which is evaluated on a quarterly basis.

Figure A.15: Annuity prices (III) – Evolution of Money's Worth Ratio



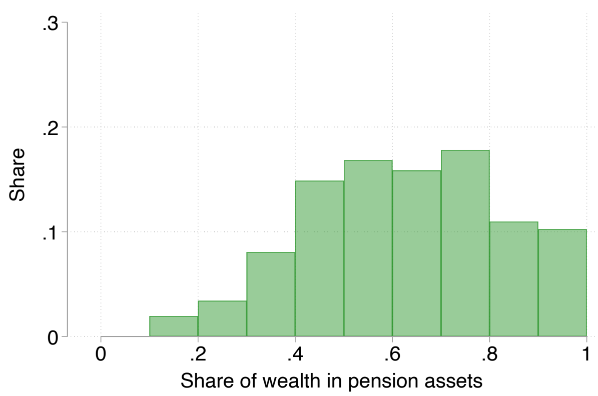
Notes: This figure shows the evolution of gross annuity prices as measured by their Money's Worth Ratio: the ratio of the actuarial net present value of the payments over the premium. The actuarial value is calculated using an interpolated yield curve of CPI-indexed Chilean treasury bonds as the discount rate. The dark gray line absorbs annuity-type-specific fixed effects, while the orange (green) line further limit the sample to men (women) that retire at the legal retirement age.

Figure A.16: Intermediation shares by yearly pension savings ventile

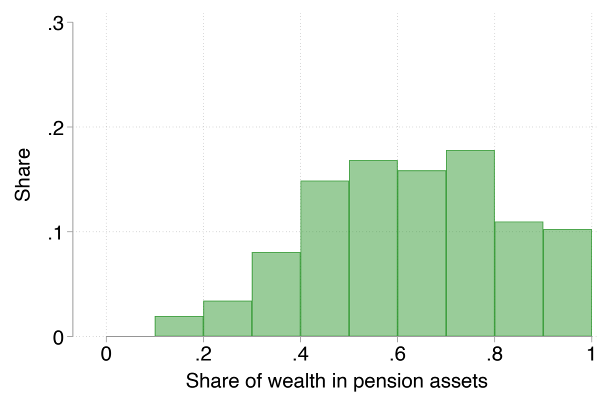


Notes: This figure shows the share of retirees using each intermediation channel by their pension savings. For each year, I group retirees by constructing the quantiles of the distribution of pensions savings in that year. Anecdotally, this pattern partly reflects the outreach of intermediaries to wealthier retirees, who pay higher commission fees.

Figure A.17: Wealth in pension savings (Social Protection Survey)



(a) Wealth only



(b) Wealth minus debt

Notes: These figures show the share of an individual's wealth held in pension assets, as reported in the Social Protection Survey (SPS). To preserve comparability, wealth of individuals with a partner is divided by 2. Wealth includes housing, durable goods, and financial savings. Panel (a) excludes measures of debt, (b) includes them.

Table A.11: Selection on observables – choice data

	(1) Intermediation	(2) Annuitization
Annuity price (rel. to PW)	0.00914	-0.496
	(0.0634)	(0.0539)
Age	-0.151	-0.0689
	(0.0211)	(0.0198)
Age squared	0.000958	0.000388
	(0.000149)	(0.000141)
Female	-2.621	-0.564
	(0.847)	(0.807)
Female × Age	0.0645	0.00922
	(0.0247)	(0.0237)
Female × Age squared	-0.000393	-0.0000212
	(0.000180)	(0.000174)
Has partner	0.368	0.154
	(0.150)	(0.127)
Has partner × Male partner × Age of partner	-0.0104	-0.00426
	(0.00446)	(0.00380)
Has partner × Female partner × Age of partner	-0.0105	-0.00340
	(0.00454)	(0.00387)
Has partner × Male partner × Age of partner squared	0.0000677	0.0000304
	(0.0000338)	(0.0000288)
Has partner × Female partner × Age of partner squared	0.0000757	0.0000173
	(0.0000351)	(0.0000301)
Medium-high risk PFA fund	-0.0947	0.0565
	(0.141)	(0.138)
Medium risk PFA fund	-0.102	0.0556
	(0.141)	(0.138)
Medium-low risk PFA fund	-0.128	0.0326
	(0.141)	(0.138)
Low risk PFA fund	-0.0821	0.0814
	(0.141)	(0.138)
Constant	6.224	2.706
	(0.758)	(0.708)
Year FE	✓	✓
Saving ventile FE	✓	✓
Cost ventile FE	✓	✓
R^2	0.063	0.127
N	159982	159982

Notes: This table shows coefficients from a regression of intermediation and annuitization onto a set of observables in the SCOMP data. Price control is the CNU ratio observed for annuities vs PW. PFA risk to the investment strategy for retirement savings chosen by the individual until before retirement.

Table A.12: Selection on observables – Survey data

	(1) Intermediation	(2) Intermediation	(3) Intermediation	(4) Annuitization	(5) Annuitization	(6) Annuitization
Bad health	-0.0196			-0.0118		
	(0.0286)			(0.0249)		
No children		0			0	
		(.)			(.)	
Has children		-0.204			-0.375	
		(0.180)			(0.0568)	
Primary ed.			0			0
			(.)			(.)
Secondary ed.			0.0661			0.110
			(0.0615)			(0.0550)
Tertiary ed.			0.0388			0.138
			(0.0789)			(0.0647)
Price control	✓	✓	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
R^2	0.074	0.077	0.077	0.122	0.137	0.137
N	408	409	407	408	409	407

Notes: This table shows selected coefficients and standard errors from a regression of intermediation and annuitization onto a set of observables in the SPS data. Price control is the CNU ratio observed for annuities vs PW. Demographic controls include age, sex, age at survey, a quadratic polynomial in pension savings, total wealth, and age of partner (if any).

Table A.13: Geography and intermediation (I) – Prevalence of intermediation

	(1)	(2)	(3)	(4)	(5)	(6)
Share intermediated, sample (2-quarter lag)	0.413	0.110				
	(0.0155)	(0.0186)				
Share intermediated, other retirees			0.446	0.166		
			(0.0190)	(0.0235)		
Share intermediated, other retirees (2-quarter lag)					0.438	0.161
					(0.0189)	(0.0234)
Share annuitizing (3-quarter lag)	0.151	0.0367	0.193	0.0467	0.185	0.0394
	(0.0161)	(0.0205)	(0.0159)	(0.0207)	(0.0160)	(0.0206)
Demographic controls	✓	✓	✓	✓	✓	✓
Price control	✓	✓	✓	✓	✓	✓
Province FE		✓		✓		✓
Year-Quarter FE	✓	✓	✓	✓	✓	✓
Savings ventile FE	✓	✓	✓	✓	✓	✓
Cost ventile FE	✓	✓	✓	✓	✓	✓
R^2	0.059	0.064	0.058	0.064	0.058	0.064
N	159967	159967	159914	159914	159909	159909

Notes: This table shows coefficients from a regression of intermediation (dummy) on different measures of prevalence of intermediation at the province, the share of non-intermediated retirees annuiziting in the province, and other controls in the SCOMP data. Columns (1) and (2) use the share of retirees in the sample that used an intermediary in the province, two quarters before the observation. Columns (3) and (4) use the share of retirees *not* in the sample—those with other legal dependents, retiring early, due to disability, or selecting a survival benefit—that choose intermediation in the province in the same quarter. Columns (5) and (6) use the same metric as columns (3) and (4), but again two quarters before the observation. Demographic controls include a quadratic polynomial in retirees' and partners' age and sex. Price control is the CNU ratio observed for annuities vs PW.

Table A.14: Geography and independent advisors (I) – Prevalence of advisors

	(1)	(2)	(3)	(4)	(5)	(6)
Share intermediated by advisor, sample (2-quarter lag)	0.521	0.155				
	(0.0154)	(0.0206)				
Share intermediated by advisor, other retirees			0.567	0.215		
			(0.0165)	(0.0238)		
Share intermediated by advisor, other retirees (2-quarter lag)					0.560	0.201
					(0.0162)	(0.0236)
Share of ’agent companies’ (3-quarter lag)	-0.258	-0.0854	-0.213	-0.0838	-0.221	-0.0887
	(0.0118)	(0.0212)	(0.0128)	(0.0212)	(0.0126)	(0.0211)
Demographic controls	✓	✓	✓	✓	✓	✓
Price control	✓	✓	✓	✓	✓	✓
Province FE		✓		✓		✓
Year-Quarter FE	✓	✓	✓	✓	✓	✓
Savings ventile FE	✓	✓	✓	✓	✓	✓
Cost ventile FE	✓	✓	✓	✓	✓	✓
R^2	0.055	0.063	0.056	0.063	0.056	0.063
N	94961	94961	94977	94977	94963	94963

Notes: This table shows coefficients from a regression of intermediation (dummy) on different measures of prevalence of intermediation by independent advisors at the province, along with controls, in the SCOMP data. Columns (1) and (2) use the share of intermediated retirees in the sample that used an independent advisor in the province, two quarters before the observation. Columns (3) and (4) use the share of intermediated retirees *not* in the sample—those with other legal dependents, retiring early, due to disability, or selecting a survival benefit—that choose an independent advisor in the province in the same quarter. Columns (5) and (6) use the same metric as columns (3) and (4), but again two quarters before the observation. The control for ’agent companies’ is the share of non-intermediated annuitants in the province who buy from one of the insurance companies that are most commonly (90%+) selected by intermediated retirees in that province, three quarters before the observation. Demographic controls include a quadratic polynomial in retirees’ and partners’ age and sex. Price control is the CNU ratio observed for annuities vs PW.

Table A.15: Geography and intermediation (II) – Intermediary presence

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Registered intermediaries	-0.0000416	0.00000877						
	(0.00000376)	(0.0000384)						
’Effective’ registered intermediaries			-0.00302	0.0988				
			(0.0167)	(0.0395)				
’Effective’ registered intermediaries (2-quarter lag)					0.0107	0.163		
					(0.0158)	(0.0371)		
Effective active intermediaries (2-quarter lag)							0.118	0.0873
							(0.0123)	(0.0334)
Share annuitizing (3-quarter lag)	0.348	0.0508	0.301	0.0500	0.296	0.0512	0.320	0.0483
	(0.0158)	(0.0204)	(0.0161)	(0.0204)	(0.0159)	(0.0204)	(0.0153)	(0.0204)
Demographic controls	✓	✓	✓	✓	✓	✓	✓	✓
Price control	✓	✓	✓	✓	✓	✓	✓	✓
Province FE		✓		✓		✓		✓
Year-Quarter FE	✓	✓	✓	✓	✓	✓	✓	✓
Savings ventile FE	✓	✓	✓	✓	✓	✓	✓	✓
Cost ventile FE	✓	✓	✓	✓	✓	✓	✓	✓
R^2	0.056	0.064	0.055	0.064	0.055	0.064	0.056	0.064
N	159967	159967	159961	159961	159960	159960	159960	159960

Notes: This table shows coefficients from a regression of intermediation (dummy) on different measures of presence of intermediation at the province, the share of non-intermediated retirees annuitizing in the province, and other controls in the SCOMP data. The sample consists of annuitants making a decision at or after the legal retirement age, between 2010 and 2018, with no legal dependents or only with a partner. Columns (1) and (2) use the number of intermediaries registered in that province. Columns (3) and (4) use the "effective" number of registered intermediaries retirees (number of intermediaries divided by total number of retirements) in that province. Columns (5) and (6) use the same metric as columns (3) and (4), but again two quarters before the observation. Columns (7) and (8) use the "effective" number of *active* intermediaries —those intermediating at least one retiree in that quarter-province—,two quarters before the observation. Demographic controls include a quadratic polynomial in retirees’ and partners’ age and sex. Price control is the CNU ratio observed for annuities vs PW.

Table A.16: Geography and independent advisors (II) – Independent advisor presence

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Registered advisors	0.0000640	0.000661						
	(0.0000171)	(0.000165)						
Share of advisors registered			0.271	0.138				
			(0.0131)	(0.0276)				
Share of advisors registered (2-quarter lag)					0.265	0.0915		
					(0.0133)	(0.0282)		
Share of advisors active (2-quarter lag)							0.493	0.182
							(0.0223)	(0.0308)
Share of 'agent companies' (3-quarter lag)	-0.514	-0.0823	-0.410	-0.111	-0.416	-0.109	-0.403	-0.0955
	(0.00955)	(0.0215)	(0.0102)	(0.0218)	(0.0102)	(0.0219)	(0.0104)	(0.0210)
Demographic controls	✓	✓	✓	✓	✓	✓		
Price control	✓	✓	✓	✓	✓	✓		
Province FE		✓		✓		✓		
Year-Quarter FE	✓	✓	✓	✓	✓	✓		
Savings ventile FE	✓	✓	✓	✓	✓	✓		
Cost ventile FE	✓	✓	✓	✓	✓	✓		
R^2	0.044	0.063	0.049	0.062	0.049	0.062	0.049	0.063
N	95043	95043	94280	94280	94264	94264	95024	95024

Notes: This table shows coefficients from a regression of intermediation (dummy) on different measures of prevalence of intermediation by independent advisors at the province, along with controls, in the SCOMP data. Columns (1) and (2) use the number of independent advisors registered in that province. Columns (3) and (4) use the share of registered advisors among intermediaries (number of advisors divided by total number of intermediaries) in that province. Columns (5) and (6) use the same metric as columns (3) and (4), but again two quarters before the observation. Columns (7) and (8) use the share of advisors among *active* intermediaries—those intermediating at least one retiree in that quarter-province—, two quarters before the observation. The control for 'agent companies' is the share of non-intermediated annuitants in the province who buy from one of the insurance companies that are most commonly (90%+) selected by intermediated retirees in that province, three quarters before the observation. Demographic controls include a quadratic polynomial in retirees' and partners' age and sex. Price control is the CNU ratio observed for annuities vs PW.

Figure A.18: Sample pension advisor document (CMF, 2019)

R E S U M E N P E N S I O N E S L I Q U I D A S (Descontado 7% salud)
Puede optar:

CIA. SEGUROS PENSION RENTA VITALICIA
INMEDIATA - SIN PERIODO GAR. ***U.F.12,45 = $ 312.548***

CIA. SEGUROS PENSION RENTA VITALICIA
INMEDIATA - P. GAR. 10 AÑOS (120 MESES) ***U.F. 12,35 = $ 310.037***
(GARANTIA AÑO 2018 A AÑO 2028) Desde mayo de por vida *

CIA. SEGUROS PENSION RENTA VITALICIA
INMEDIATA - P. GAR. 14 AÑOS (168 MESES) ***U.F. 12,25 = $ 307.527***
(GARANTIA AÑO 2018 A AÑO 2032 Desde mayo de por vida *

CIA. SEGUROS PENSION RENTA VITALICIA
INMEDIATA - P. GAR. 192 AÑOS (16 MESES) ***U.F. 12,19 = $ 306.021***
(GARANTIA AÑO 2018 A AÑO 2034 Desde mayo de por vida *

*Significa que una vez que traspasen los fondos previsionales desde la A.F.P. a la Compañía de Seguros quedará pactada la pensión de por vida y se reajustará mensualmente según valor U.F.

Rentas vitalicias inmediatas sin E.L.D.
Capital $ 81.402.845- U.F. 3.015,61

Período garantizado	Pensión U.F. - $(líquida)	Porcentaje	Monto a recupera U.F. - $	Diferencia capital/recuperación
Sin período garantizado o simple	U.F. 12,45 $ 312.548	0	0	0
En 120 meses (10 años) garantiza un capital de U.F.	U.F. 12,35 $ 310.037	49,14 %	U.F. 1.482 $ 40.004.870	<U.F. 1.533,61 < $ 41.398.022
En 168 meses (14 años) garantiza un capital de U.F.	U.F. 12,25 $ 307.527	68,80 %	U.F. 2.074,8 $ 56.006.819	<U.F. 940,81 <$ 25.396.074
En 192 meses (16 años) garantiza un capital de U.F.	U.F. 12,19 $ 306.021	77,61 %	U.F. 2.340,48 $ 63.178.542	<U.F. 675,13 <$ 18.224.351

Notes: Example of document prepared by an independent advisor to help their customers, as shown in FNE (2018a). The bottom table compares annuities with different guarantee lengths, showing how much of the initial capital is "recovered" in case of an early death.

Table A.17: Gains from offer bargaining and early mortality

	(1) Average gain	(2) Accepted offer gain
No interm., No death in 2Y	0.00984	0.0101
	(0.0000613)	(0.0000635)
No interm., Death in 2Y	0.0101	0.0104
	(0.000456)	(0.000505)
Interm., No death in 2Y	0.0115	0.0122
	(0.0000322)	(0.0000342)
Interm, Death in 2Y	0.0112	0.0118
	(0.000246)	(0.000256)
Demographic controls	✓	✓
Year FE	✓	✓
Savings ventile FE	✓	✓
Cost ventile FE	✓	✓
Annuity type FE	✓	✓
Insurance company FE	✓	✓
Province FE	✓	✓
N	101163	100670

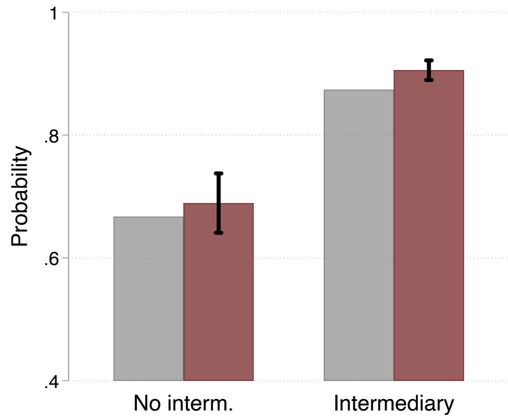
Notes: This table reports selected average marginal effects from regressions of annuity bargaining gains on intermediation and early death indicators. The sample includes only annuitizers who accepted a bargained offer. Column 1 uses the average gain across all bargained offers as the dependent variable; Column 2 uses the gain from the accepted offer. Gains are defined as the reduction in annuity price relative to the insurer's initial quote via the centralized exchange. Demographic controls include quadratic polynomials in the ages and sex of retirees and their partners. None of the within-intermediation-channel differences are significant at the 5% level.

Table A.18: Life expectancies (age 65)

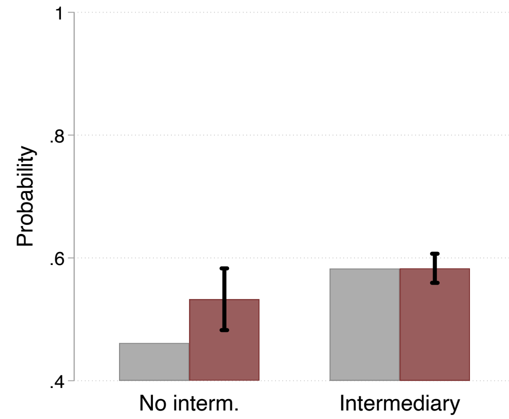
	Benchmark	Ban	Ban (prices)	De-bias	De-bias (prices)
Life expectancy	83.9	83.9	83.9	83.9	83.9
Not interm.	83.7	83.9	83.9	83.8	83.8
Intermediated	84.3	–	–	84.1	84.1
Phased Withdrawal	82.3	82.5	82.7	82.7	83.0
Annuities	84.8	85.8	85.9	86.5	86.4
Simple	85.8	85.8	86.0	86.2	86.6
Deferred	86.0	86.3	86.5	86.8	86.8
Guaranteed	84.6	85.8	85.7	86.6	86.3
Deferred and guaranteed	84.4	85.7	85.5	86.5	85.8

Notes: This table shows model-implied average life expectancies of retirees selecting into different products in the benchmark and the counterfactuals. The sample is restricted to retirees aged 65.

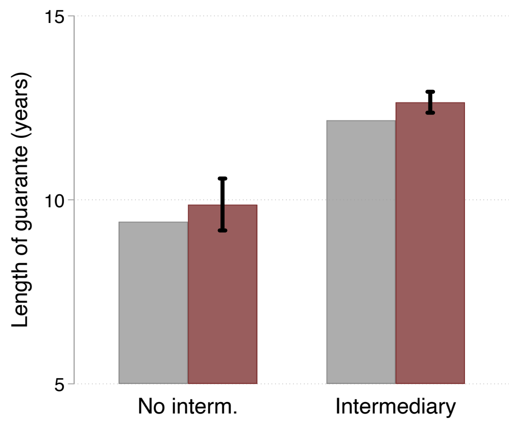
Figure A.19: Selection into annuity characteristics



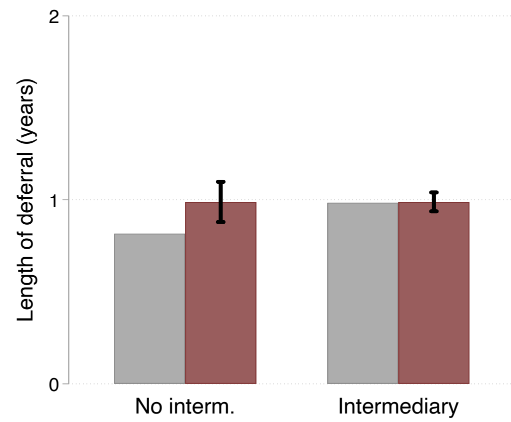
(a) Guarantee (probability)



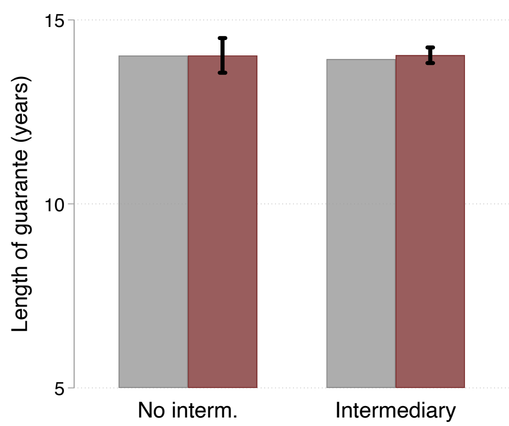
(b) Deferral (probability)



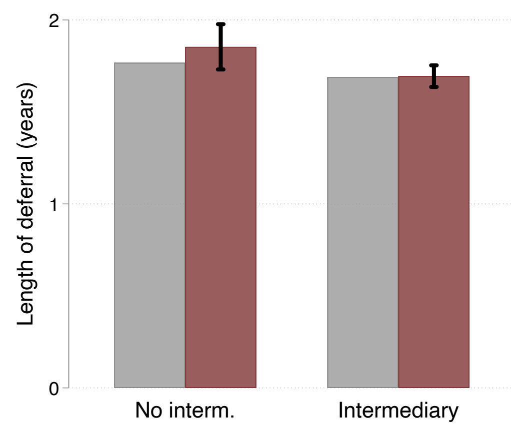
(c) Guarantee length (unconditional)



(d) Deferral length (unconditional)



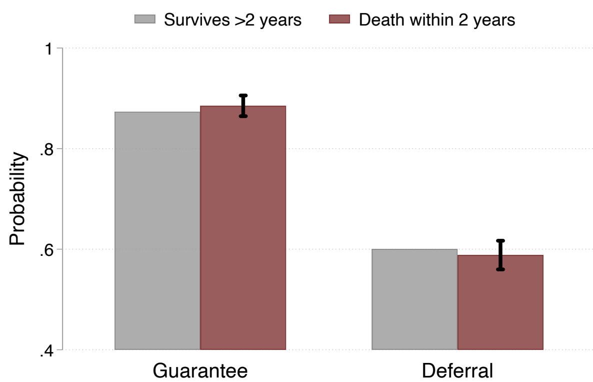
(e) Guarantee length (conditional)



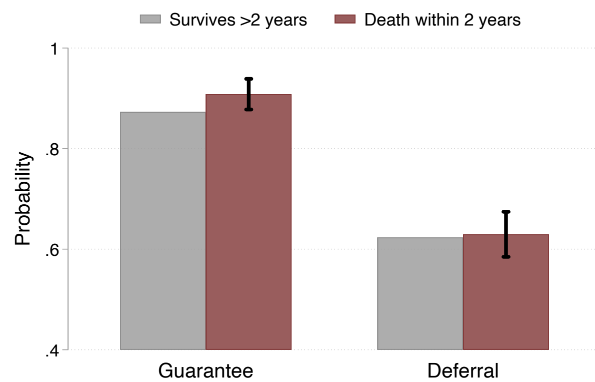
(f) Deferral length (conditional)

These figures show selection into annuity characteristics by intermediary. (a) and (b) show the probability of contracting a guarantee and deferral across intermediary channel (left and right) and survival after retirement (light gray and dark red bars). (c) and (d) show the unconditional mean guarantee and deferral length. (e) and (f) show the mean guarantee and deferral length conditional on contracting a positive length. Standard errors reflect comparison within an intermediation channel. 1.6% of sample dies within 2 years of retirement.

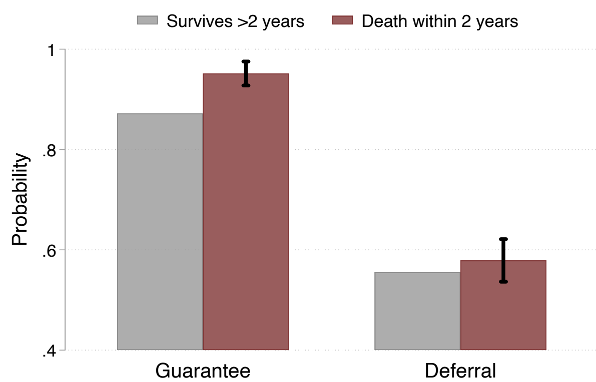
Figure A.20: Adverse selection into annuity characteristics – by intermediary type



(a) Sales agents



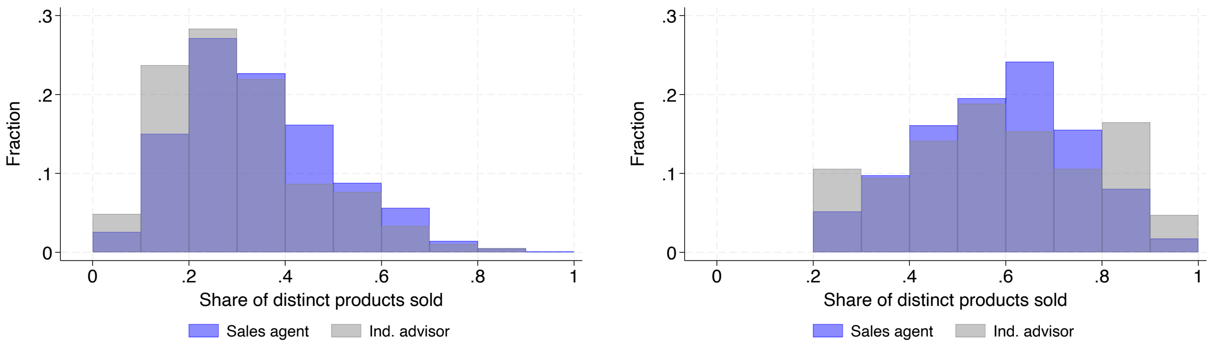
(b) Sales agents with 100+ customers



(c) Independent advisors

Notes: These figures show adverse selection into annuity characteristics, by the type of intermediary (sales agent or independent advisor) used. See Figures 4 and A.19 in the main text for further details, and Appendix B.2 for a discussion.

Figure A.21: Distinct products sold – by intermediary type

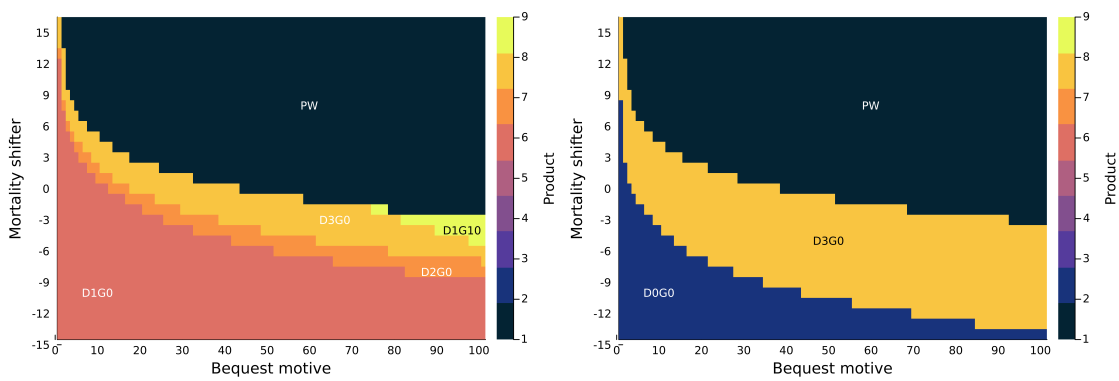


(a) Full sample

(b) Men age 65, no partner

Notes: These figures show the number of distinct products sold by both types of intermediaries in the data. The measure is computed as the number of distinct pension products chosen by the intermediary's customers, divided by the total number of customers. The sample is restricted to individual intermediaries with at least 7 customers in the data. See Appendix B.2 for a discussion.

Figure A.22: Identification of preferences

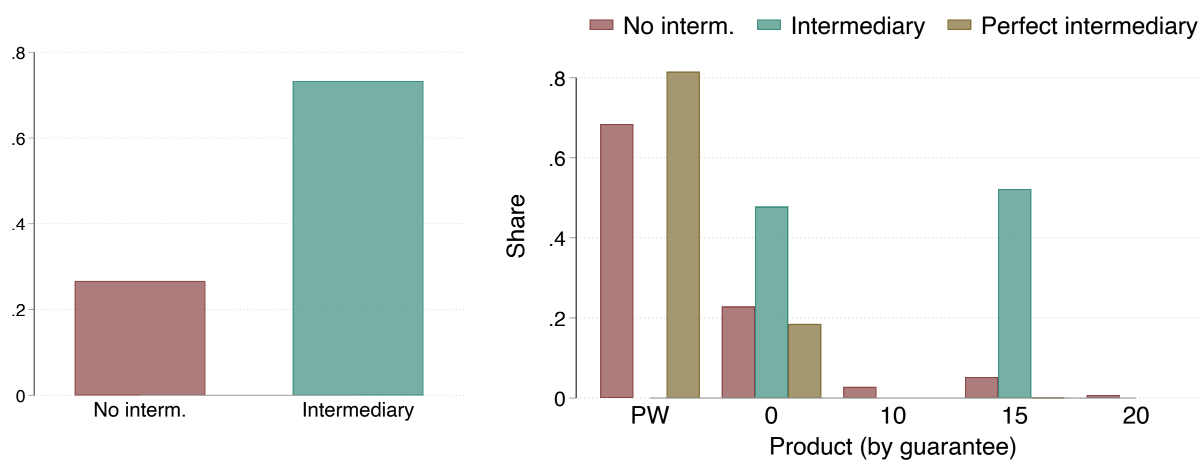


(a) Individual 1

(b) Individual 2

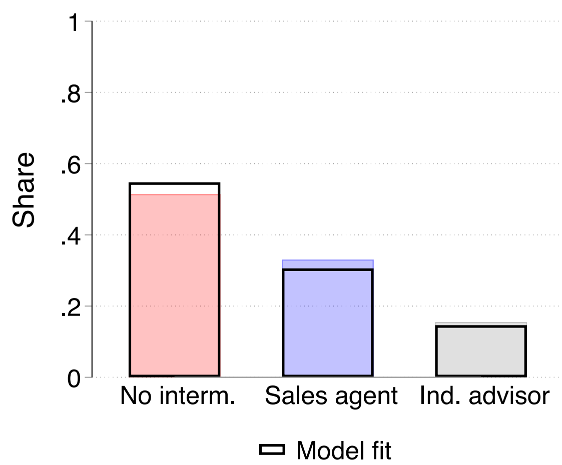
Notes: The heatmaps represent the optimal product choice—according to the life-cycle model—at different values of life expectancy (captured as deviations from the official mortality table, see 5) and bequest motives. The colors and labels describe a pension product: for example, "D1G10" is an annuity deferred by 1 year and with a guarantee length of 10 years. Variation in prices and choice sets across time induces variation in optimal choices for retirees with identical preferences. The substitution patterns are therefore informative about the joint distribution of mortality shifters and bequest motives.

Figure A.23: Identification of distortions and information costs

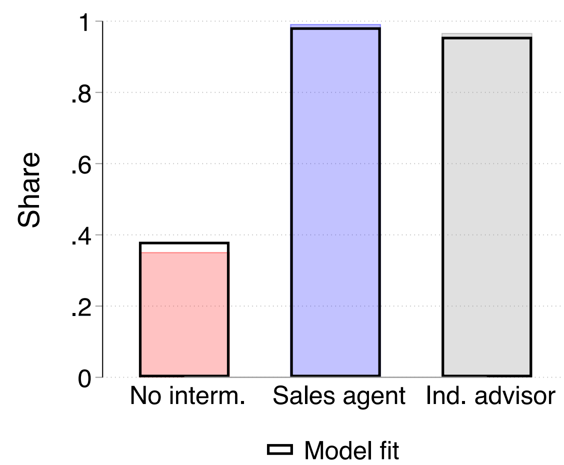


Notes: The bar graphs show the demand for intermediation and choice probabilities of intermediated and non-intermediated retirees for a given distribution of decision costs λ_i and preferences, and intermediary biases c^I. Intuitively, the model informs the size and distribution of the information costs λ_i from the share of retirees selecting into an intermediary, as well as from the differences in the choice probabilities, knowing intermediaries choose perfectly except for their bias toward annuities. Choice probabilities of self-reliant retirees are concentrated around products that are ex-ante (beliefs) or ex-post (actual values) high-value.

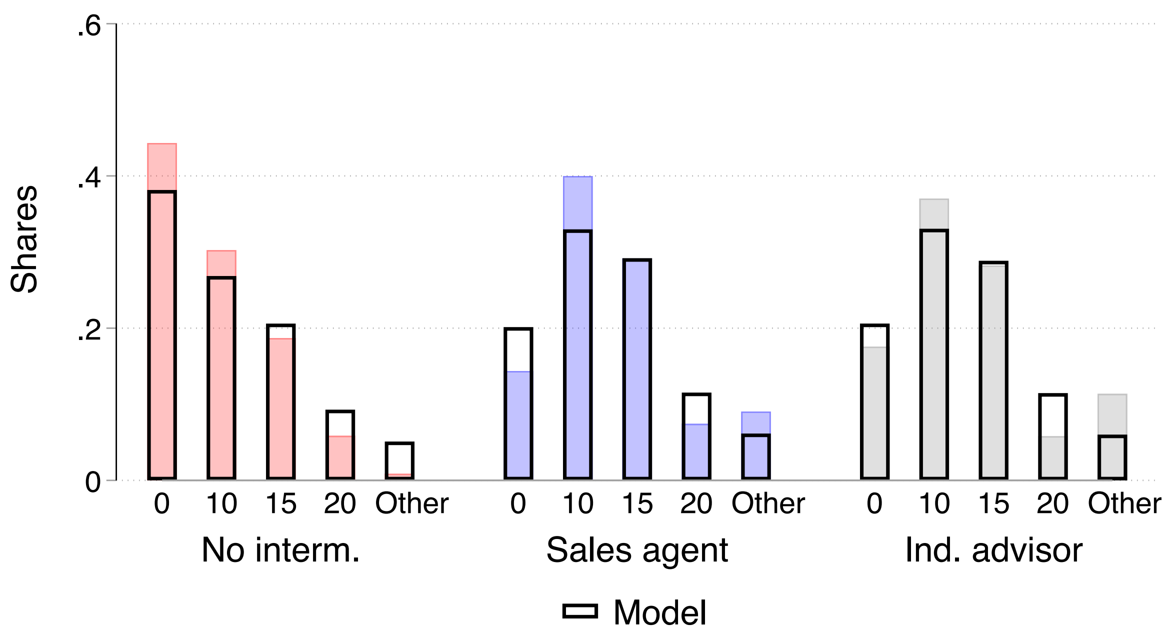
Figure A.24: Model fit



(a) Intermediary shares



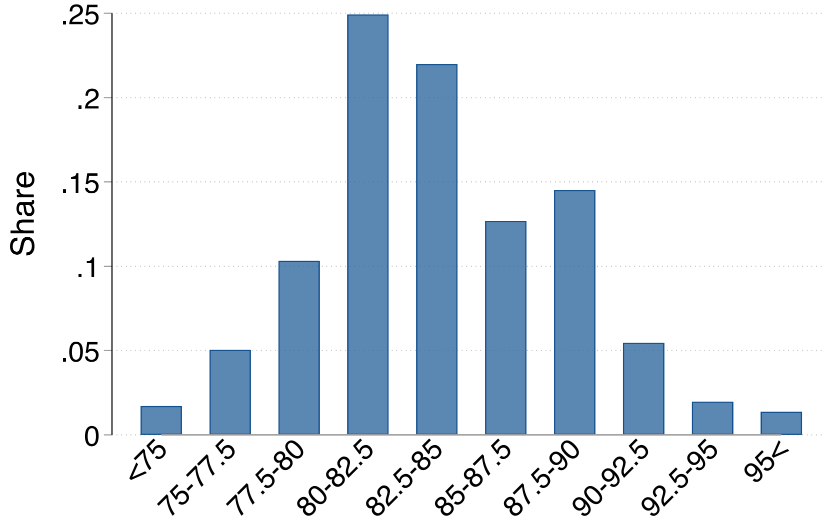
(b) Annuitization rates



(c) Annuity guarantee length (years)

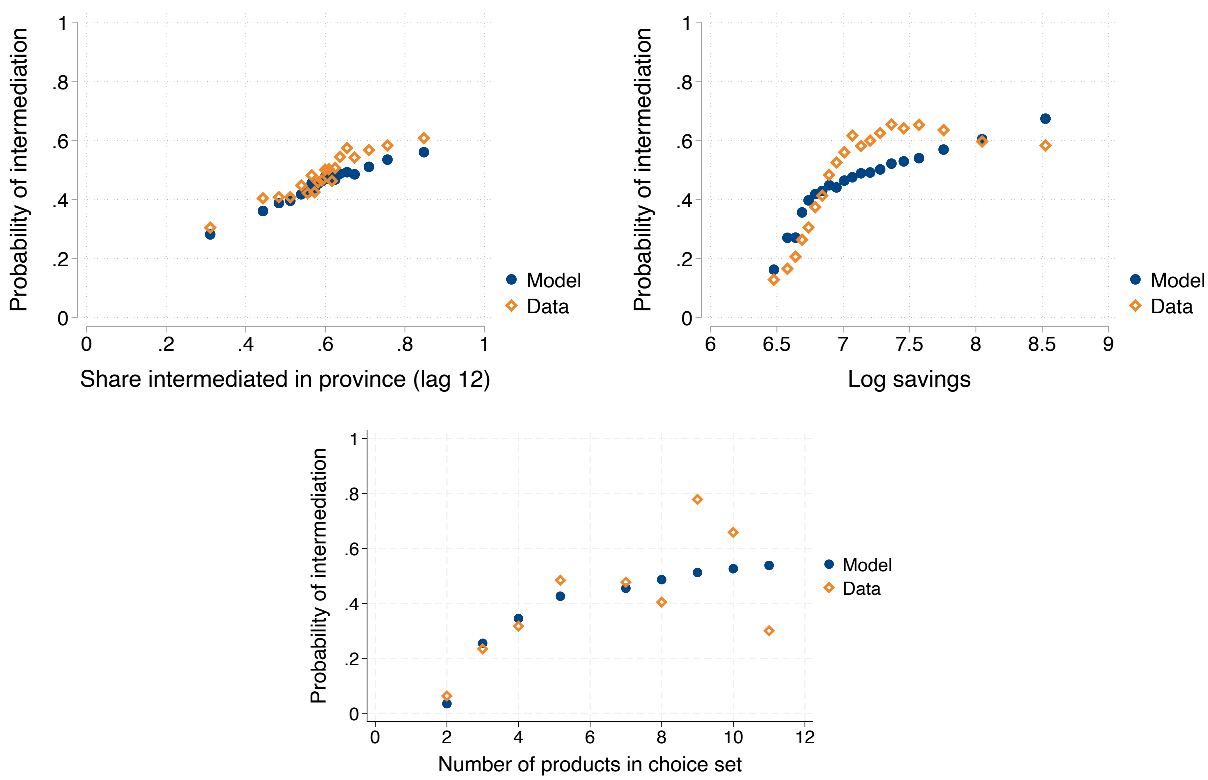
Notes: These figures show the model fit under the benchmark specification. Figure (a) shows demand for intermediaries, (b) the share of annuitiziers in each channel, and (c) the choices of guarantee lengths in each channel. The sample is restricted to individuals aged 65 in the estimation sample.

Figure A.25: Estimated mortality distribution



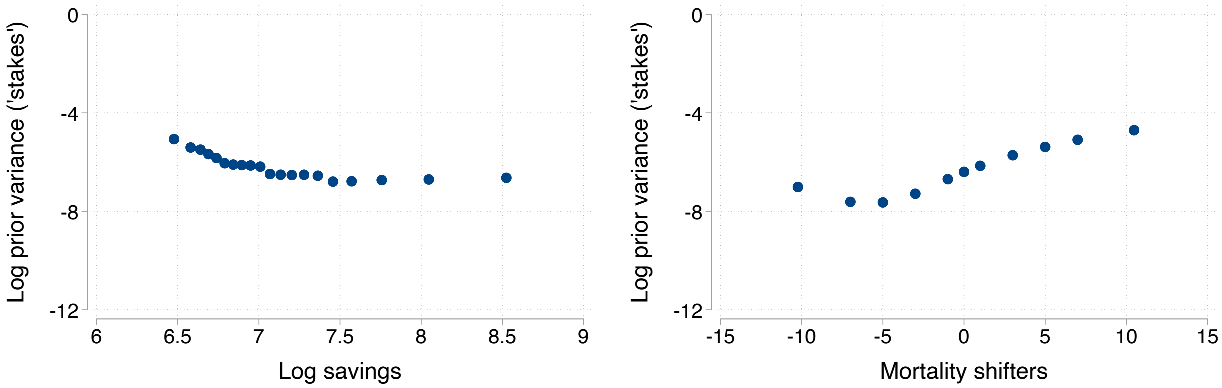
Notes: This figure shows the life expectancies implied by the distribution of mortality shifters estimated by the model. The sample is restricted to retirees aged 65.

Figure A.26: Demand for intermediaries (model and data)



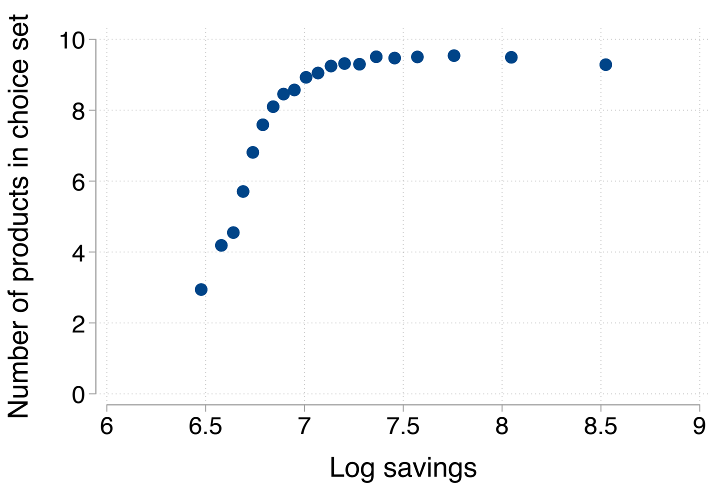
Notes: These figures show the relationship between observables and demand for intermediation in the model and data. (a) shows the share of intermediate retirees in the province one year prior to the observations, (b) the pension savings, and (c) the number of products in the retiree's choice set.

Figure A.27: Predictors of decision "stakes" (model)



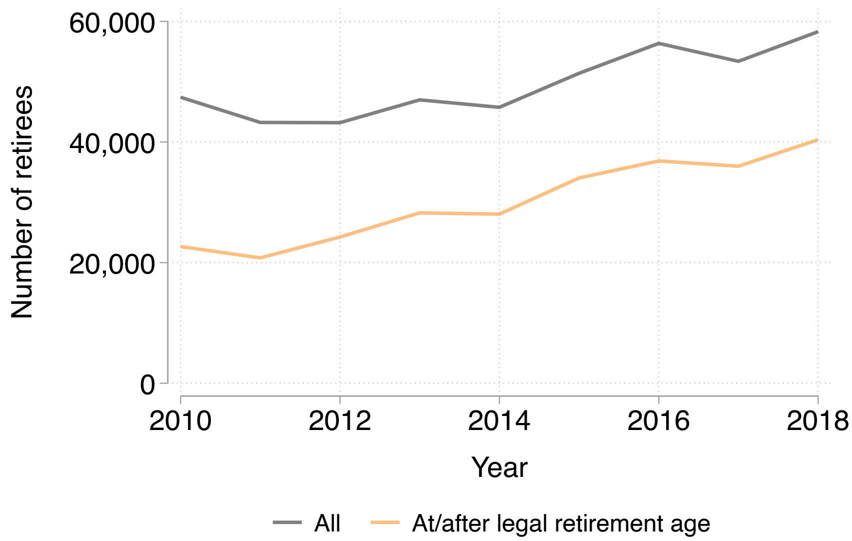
Notes: This figure shows the relationship between decision "stakes" and other variables in the model. Decision stakes are measured as the variance of the prior beliefs. (a) shows the correlation with retirees' savings, (b) that with mortality hazards/shifters. See the main text for a description of the intuition behind the patterns.

Figure A.28: Number of products and savings



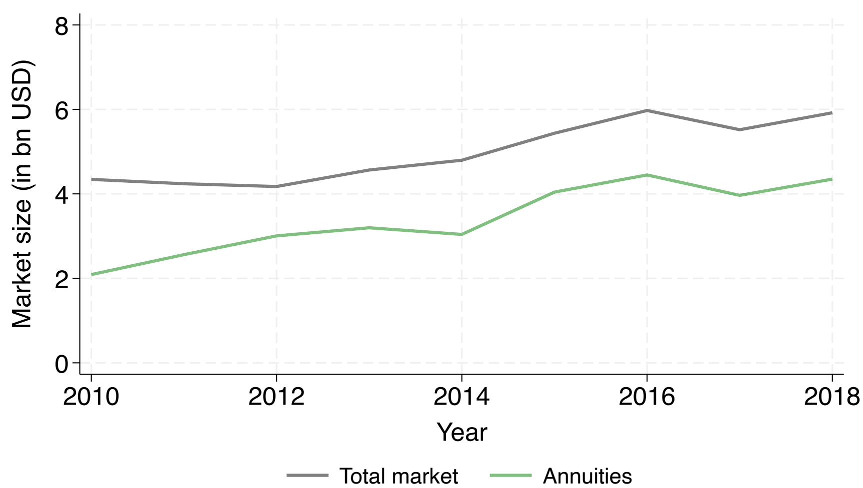
Notes: This figure shows the relationship between the number of pension products in choice set— the number of products for which the retiree requested offers—and pension savings in the estimation sample.

Figure A.29: Number of retirees



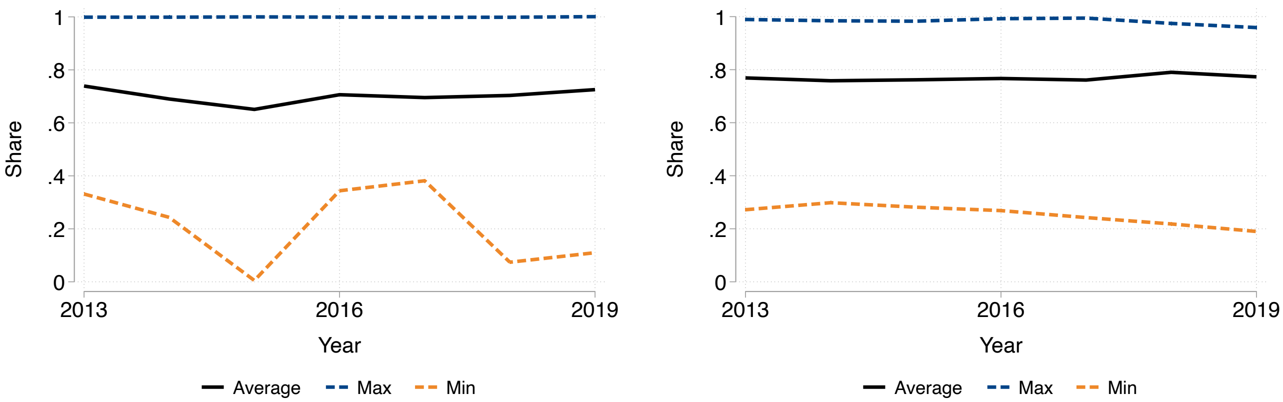
Notes: This figure shows the number of retirees using SCOMP between 2010 and 2018. Only retirees who have enough savings to finance an annuity above the minimum pension amount guaranteed by the government use SCOMP for their retirement decision; all others are defaulted into a Phased Withdrawal.

Figure A.30: Market size



Notes: This figure shows the Chilean pension market size between 2010 and 2018. Only includes retirees that make their decision through SCOMP, see Figure A.29. The gray line shows the sum of all pension savings of retirees per year. The green line shows the sum of all annuity premiums each year.

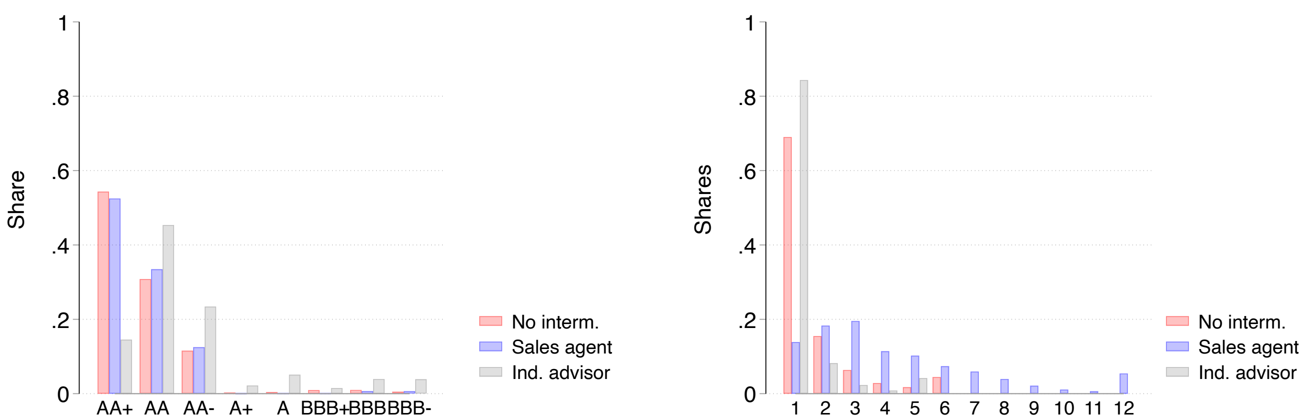
Figure A.31: Share of annuities in life insurer's balance sheets



(a) Premiums (b) Annuity reserves

Notes: These figures show the importance of the annuity business for life insurance companies in Chile between 2013 and 2019. The sample consists of 14 life insurance companies who report any annuity-related premiums or liabilities in their balance sheets. (a) shows the share of all yearly premiums that are related to annuities, (b) shows annuity reserves as a share of total firm liabilities.

Figure A.32: Choice of insurance company by intermediation channel (annuitizers)



(a) Risk rating (b) Rank

Notes: These figures show the characteristics of the annuity offers purchased by retirees in each intermediation channel. (a) shows the risk rating of the insurance company selected. (b) shows the rank of the offer selected, where the rank is among all offers with equal or higher risk rating.

B Setting

B.1 Context details

Centralized exchange Pension products in Chile are sold through a centralized exchange called SCOMP.[32]. The exchange was introduced in 2004 to improve the information available to retirees about their options, as well as to streamline the process of acquiring and comparing offers from different insurance companies and PFAs[33] (CMF, 2019). An individual will request offers or quotes for annuities with varying deferral and guaranteed periods.[34] These requests are then sent to all insurance companies in the market, along only with the information to be priced on. This information includes the retiree's age, sex, and total savings, along with the age and gender of all legal dependents. Each insurance company then decides whether to offer a quote for each of the pension products requested. All offers—from the PFAs for the Phased Withdrawal, and from all insurance companies for annuities—are summarized in a document called *Offers Certificate*, which is mailed to the retiree. They can then either accept any of the offers, desist and postpone the decision to a later stage, or bargain with insurance companies individually to obtain an improvement upon an existing offer. The median retiree requests quotes for 10 product types and receives over 100 quotes for pension products. Figure A.7 shows sample documents: the language is technical and the description of the offer characteristics sparse.

The number of retirees using SCOMP has increased through time, reaching over $50,000$ in 2018, at which point the annual value of the pension market was over 6 billion dollars (see Figure A.29 and A.30). From 2004 onwards, 19 insurance companies have participated in the annuity market. For a majority of them, annuities constitute an important business line, making up over 60% of both revenues and liabilities (Figure A.31). Insurance companies are differentiated by their risk rating, an evaluation of their creditworthiness assessed periodically by two independent agencies. The regulator explicitly forbids the bundling of pension products with other types of insurance. Over 97% of annuitizers do not hold any other insurance product from their selected annuity provider (FNE, 2018b). Nevertheless, insurance companies are potentially differentiated in terms of their customer service, office locations and brand appeal.

Government subsidies During my sample, the government provided subsidies through minimum pension guarantees and top-ups. These benefits were means-tested and depended on the retiree's frequency of pension contributions during their working life, their pension savings, as well as socio-economic situation as measured through a composite index. The subsidies alter, but do not eliminate the fundamental

[32]*Sistema de Consulta y Oferta de Montos de Pensión*. The centralized exchange is only relevant for the fraction (around 30-40%) of retirees that have enough savings to purchase an annuity which is at least as large as the minimum government subsidy. All other retirees face no true choice and are defaulted into a Phased Withdrawal

[33]The policy was further motivated by the desire to address conflicts of interest in the acquisition of the quotes by intermediaries.

[34]When deciding for a Phased Withdrawal, the only choice to be made is which Pension Fund Administrator to select, all of which are automatically included in the offers presented to the retiree. PFAs differ in terms of the commission charged to manage funds, as well as in their returns. Evidence shows that individuals might be subject to significant switching costs in this decision (Illanes, 2017; Luco, 2019).

trade-off between Phased Withdrawal and annuities. For retirees qualifying for subsidies, the longevity risk under the Phased Withdrawal is limited by the minimum pension guarantee. The model accounts for these differences by incorporating the impact of subsidies on the pension payments and bequests. See Appendix B in Illanes and Padi (2021) for an in-depth description of the subsidies.

B.2 Implementation in model

Commissions I reduce annuity payments by 1% for all products in the case of an independent advisor. For the sales agent, I apply this reduction only for products offered by the insurance company employing them. These choices reflects the fact that most retirees pay a 2% commission (Figure A.8) but bargaining with an insurance company for a better offer usually leads to about a 1% increase in the generosity of the annuity. The choice therefore constitutes a lower bound on commissions paid, assuming that self-reliant retirees would not bargain for better offers absent advice. For the independent advisor, I also apply a 1.2% commission to the Phased Withdrawal.

Choice of insurer I abstract from the choice of insurance company for annuities and focus instead solely on the choice among pension products. Three reasons guide this choice. First, it makes the model theoretically and computationally more tractable. Second, anecdotal evidence and conversations with intermediaries suggests that the pension product choice is the primary dimension along which both agents and advisors can provide value to their customers. Sales agents' advice leads to them selling products provided by their insurance company in more than 80% of cases, but the choice among different pension products remains relevant. This mechanism can also be seen in the documents that independent advisors prepare to aid their customers (Figure A.18). In conversations, advisors also highlighted the hierarchy in the decision, thinking first about the pension product to buy, and only then about the provider to buy it from.

Third, the choice of provider is plausibly affected by characteristics such as risk rating, customer service and office locations, and brand appeal, for which preferences are likely heterogeneous.[35] I therefore avoid a normative stand on each retirees' value of these attributes, and focus instead on the financial value of the streams given heterogeneous life-cycle preferences.

I aggregate offers at the pension-product level by first grouping insurance companies according to their sales agents' presence, then averaging across these groups. This procedure yields an effective commission for the sales agent of about 0.3%. This choice is again motivated by abstracting from non-financial attributes of annuity values.[36]

[35] The model can nonetheless accommodate non-financial utility as long as it enters additively to the life-cycle value ζ_{ik}—see the derivation in Appendix C.1.1

[36] In particular, an alternative would be to impose that the annuity purchased by someone using an agent is that of their insurance company, paying a full commission. This choice would implicitly assume that there is no other value to the chosen insurer over other offers. In the data, retirees prefer higher risk ratings and better payouts, with heterogeneity within and across intermediation channels (Figure A.32).

Intermediaries I model both sales agents and independent advisors as perfectly informed agents with a bias toward selling annuities. In the model, intermediary types therefore differ in their commissions, their estimated bias toward annuities, and their availability across regions. Anecdotally, there are differences between both intermediary types: for example, advisors' knowledge certification requirements are more demanding. In the data, individual advisors tend to be more experienced than individual agents: the median advisor has 18 customers while agents have 12. Advisors also induce most of the adverse selection into guaranteed annuities; for agents, the effect is only significant for those who have a lot of experience/have had a large number of customers (Figure A.20). This difference may suggest differences in "skill" across and within intermediary types. However, both agents and advisors appear similar in terms of the diversity of pension products sold (Figure A.21). Anecdotally, both types of intermediaries provide the same type of service in accompanying and advising retirees on their choices, which ultimately guides the modeling choice.

Subsidies I do not observe whether a retiree qualifies for a subsidy, since I do not observe the composite index required for this. I do observe subsidy *take-up* for about 56% of my estimation sample. For these retirees, I compute both minimum pension guarantees and top-ups using the formulas given by the regulator and the subsidy values at the time of retirement. I then adjust the pension payments p_t and implied bequests b_t accordingly. When adjusting annuity prices in counterfactuals, I keep the subsidies fixed.

C Choice model

C.1 Derivations

C.1.1 Optimal choice probabilities

This subsection is based on Brown and Jeon (2024). In line with it, I consider a more general model where the utility derived from a product in the rational inattention problem is determined, in addition to the value ξ_{ik}, by observable characteristics V_{ik}.

From Lemma 2 in Matejka and McKay (2015), we know that the solution to the rational inattention choice among products in choice set $\mathcal{J}$ (indexed from 1 to N) under the prior G is given by the solution to

$$U_i^{NI} := \max_{\mathcal{P}_{i1}^0,\dots,\mathcal{P}_{iN}^0} \int_{\boldsymbol{\xi}_i} \lambda_i \log\left(\sum_{k=1}^N \mathcal{P}_{ik}^0 \exp\left(\frac{V_{ik}+\xi_{ik}}{\lambda_i}\right)\right) \mathrm{d}G(\mathrm{d}\boldsymbol{\xi}_i), \tag{MM}$$
$$\text{s.t. } \forall k \quad \mathcal{P}_{ik}^0 \geq 0, \qquad \sum_{k=1}^N \mathcal{P}_{ik}^0 = 1,$$

where $\mathcal{P}_{ik}^0$ denotes the prior/unconditional probability of choosing product k, fulfilling

$$\mathcal{P}_{ik}^0 = \int_{\boldsymbol{\xi}_i} \mathcal{P}_{ik}(\boldsymbol{\xi}_i) G(\mathrm{d}\boldsymbol{\xi}_i) = \int_{\boldsymbol{\xi}_i} \frac{\mathcal{P}_{ik}^0 \exp\left(\frac{V_{ik}+\xi_{ik}}{\lambda_i}\right)}{\sum_{j\in\mathcal{J}} \mathcal{P}_{ij}^0 \exp\left(\frac{V_{ij}+\xi_{ij}}{\lambda_i}\right)} G(\mathrm{d}\boldsymbol{\xi}_i).$$

Assume first that the optimal solution for $\mathcal{P}_{i1}^0,\dots,\mathcal{P}_{iN}^0$ is interior, such that $\mathcal{P}_{ik}^0 > 0\ \forall k$. We can then write

$$\begin{aligned}
&\int_{\boldsymbol{\xi}_i} \lambda_i \log\left(\sum_{k=1}^N \mathcal{P}_{ik}^0 \exp\left(\frac{V_{ik}+\xi_{ik}}{\lambda_i}\right)\right) G(\mathrm{d}\boldsymbol{\xi}_i) \\
&\quad = \int_{\boldsymbol{\xi}_i} \lambda_i \log\left(\sum_{k=1}^N \exp\left(\frac{V_{ik}+\xi_{ik}}{\lambda_i} + \log \mathcal{P}_{ik}^0\right)\right) G(\mathrm{d}\boldsymbol{\xi}_i)
\end{aligned}$$

Define $\varepsilon \sim \mathcal{G}(m,\beta)$ to be a Gumbel random variable with location m and scale β. We have that

$$\mathbb{E}[\varepsilon] = m + \beta\gamma^{EM}, \quad \mathbb{E}[(\varepsilon - \mathbb{E}[\varepsilon])^2] = \frac{\pi^2}{6}\beta^2,$$

where γ^{EM} is the Euler-Mascheroni constant. By properties of the Gumbel distribution (Small and Rosen, 1981), we have that

$$\begin{aligned}
&\lambda_i \log\left(\sum_{k=1}^N \exp\left(\frac{V_{ik}+\xi_{ik}}{\lambda} + \log \mathcal{P}_{ik}^0\right)\right) G(\mathrm{d}\boldsymbol{\xi}_i) \\
&\quad = \lambda_i \mathbb{E}_{\boldsymbol{\xi}_i,\varepsilon}\left[\max_{k\in\mathcal{J}} \frac{V_{ik}+\xi_{ik}}{\lambda_i} + \log \mathcal{P}_{ik}^0 + \varepsilon_{ik}\right] - \lambda_i \gamma^{EM},
\end{aligned}$$

where $\varepsilon_{ik} \overset{\text{i.i.d}}{\sim} \mathcal{G}(0,1)$.

We assume that the distribution of ξ_{ik} is independent across dimensions, has mean ξ_{ik}^0 and variance σ_i^2 across all dimensions and follows—up to a shifter—the distribution of a scaled log positive/one-sided stable distribution with parameter $\rho_{\lambda,\sigma_i^2} = \frac{1}{\ell_{\lambda,\sigma_i^2}} \in (0,1)$ (Cardell, 1997; Galichon, 2021),

$$\xi_{ik} \sim \lambda_i \log X(\rho_{\lambda_i,\sigma_i^2}).$$

Decomposing ξ_{ik} into

$$\xi_{ik} = \xi_{ik}^0 - \lambda_i \gamma^{EM}(\ell_{\lambda_i,\sigma_i^2} - 1) + \xi_{ik}^s,$$

this yields (Galichon, 2021, see also Appendix C.2)

$$\frac{\xi_{ik}^s}{\lambda} + \varepsilon_{ik} = \ell_{\lambda_i,\sigma_i^2} e_{ik} \sim \mathcal{G}(0, \ell_{\lambda_i,\sigma_i^2}),$$

where we have

$$\begin{aligned}
\mathbb{E}\left[\ell_{\lambda_i,\sigma_i^2} e_{ik}\right] &= \gamma^{EM}(\ell_{\lambda_i,\sigma_i^2} - 1) + \gamma^{EM} = \gamma^{EM}\ell_{\lambda_i,\sigma_i^2}, \\
\mathrm{Var}\left(\ell_{\lambda_i,\sigma_i^2} e_{ik}\right) &= \frac{\sigma^2}{\lambda_i^2} + \frac{\pi^2}{6} \overset{!}{=} \frac{\pi^2}{6}\ell_{\lambda_i,\sigma_i^2}^2.
\end{aligned}$$

The first line shows precisely the mean of a $\mathcal{G}(0, \ell_{\lambda_i,\sigma_i^2})$ random variable. For the variance of the second one to be as desired, we set

$$\ell_{\lambda_i,\sigma_i^2} = \sqrt{\frac{6\sigma_i^2}{\lambda_i^2\pi^2} + 1},$$

which pins down the parameter $\rho_{\lambda_i,\sigma_i^2}$ of the scaled log positive stable distribution.

Hence, we write

$$\begin{aligned}
&\lambda_i \mathbb{E}_{\xi_i,\varepsilon}\left[\max_{k\in\mathcal{J}} \frac{V_{ik} + \xi_{ik}}{\lambda_i} + \log \mathcal{P}_{ik}^0 + \varepsilon_k\right] - \lambda_i\gamma^{EM} \\
&= \lambda_i \mathbb{E}_{\xi_i,\varepsilon}\left[\max_{k\in\mathcal{J}} \frac{V_{ik} + \xi_{ik}^0 - \lambda_i\gamma^{EM}(\ell_{\lambda_i,\sigma_i^2} - 1)}{\lambda_i} + \log \mathcal{P}_{ik}^0 + \ell_{\lambda_i,\sigma_i^2} e_{ik}\right] - \lambda_i\gamma^{EM} \\
&= \lambda_i \ell_{\lambda_i,\sigma_i^2} \mathbb{E}_{\xi_i,\varepsilon}\left[\max_{k\in\mathcal{J}} \frac{V_{ik} + \xi_{ik}^0 - \lambda_i\gamma^{EM}(\ell_{\lambda_i,\sigma_i^2} - 1)}{\ell_{\lambda_i,\sigma_i^2}\lambda_i} + \frac{\log \mathcal{P}_{ik}^0}{\ell_{\lambda_i,\sigma_i^2}} + e_{ik}\right] - \lambda_i\gamma^{EM}.
\end{aligned}$$

Finally, using the Small and Rosen (1981) transformation one more time, we obtain

$$
\begin{aligned}
&\lambda_i \ell_{\lambda_i,\sigma_i^2} \log \sum_{j \in \mathcal{J}} \exp\left(\frac{V_{ik} + \xi_{ik}^0 - \lambda_i \gamma^{EM}(\ell_{\lambda_i,\sigma_i^2} - 1)}{\ell_{\lambda_i,\sigma_i^2}\lambda_i} + \frac{\log \mathcal{P}_{ik}^0}{\ell_{\lambda_i,\sigma_i^2}}\right) + \lambda_i \gamma^{EM}(\ell_{\lambda_i,\sigma_i^2} - 1) \\
&= \lambda_i \ell_{\lambda_i,\sigma_i^2} \log \sum_{j \in \mathcal{J}} \exp\left(\frac{V_{ik} + \xi_{ik}^0}{\ell_{\lambda_i,\sigma_i^2}\lambda_i} + \frac{\log \mathcal{P}_{ik}^0}{\ell_{\lambda_i,\sigma_i^2}}\right).
\end{aligned}
$$

The original problem therefore simplifies to—taking a monotone transformation of the objective function—

$$
\begin{aligned}
&\max_{\mathcal{P}_{i1}^0,\ldots,\mathcal{P}_{iN}^0} \sum_{j \in \mathcal{J}} \exp\left(\frac{V_{ik} + \xi_{ik}^0}{\ell_{\lambda_i,\sigma_i^2}\lambda_i} + \frac{\log \mathcal{P}_{ik}^0}{\ell_{\lambda_i,\sigma_i^2}}\right) \\
&\text{s.t. } \sum_{k=1}^{N} \mathcal{P}_{ik}^0 = 1.
\end{aligned}
$$

Since we have assumed that the solution is interior, the FOCs with respect to $\mathcal{P}_{ik}^0 \ \forall k$ are necessary and sufficient. Denoting the Lagrange multiplier as η and writing $\ell := \ell_{\lambda_i,\sigma_i^2}$ for ease of notation, we have

$$
\begin{aligned}
\frac{\partial}{\partial \mathcal{P}_{ik}^0} &= \frac{1}{\ell}\left(\mathcal{P}_{ik}^0\right)^{\frac{1}{\ell}} \exp\left(\frac{V_{ik} + \xi_{ik}^0}{\lambda_i \ell}\right) - \eta \overset{!}{=} 0, \\
\implies \quad \mathcal{P}_{ik}^0 &= (\eta\ell)^{\frac{\ell}{1-\ell}} \exp\left(\frac{V_{ik} + \xi_{ik}^0}{\lambda_i(\ell - 1)}\right).
\end{aligned}
$$

Using the constraint, we obtain an expression for $\eta^{\frac{\ell}{1-\ell}}$,

$$
\begin{aligned}
\sum_{j \in \mathcal{J}} \mathcal{P}_{ik}^0 &= \sum_{j \in \mathcal{J}} (\eta\ell)^{\frac{\ell}{1-\ell}} \exp\left(\frac{V_{ij} + \xi_{ij}^0}{\lambda_i(\ell - 1)}\right), \\
\implies \quad \eta^{\frac{\ell}{1-\ell}} &= \frac{1}{\sum_{j \in \mathcal{J}} \ell^{\frac{\ell}{1-\ell}} \exp\left(\frac{V_{ij} + \xi_{ij}^0}{\lambda_i(\ell-1)}\right)}.
\end{aligned}
$$

Hence, we obtain an expression for $\mathcal{P}_{ik}^0$,

$$
\mathcal{P}_{ik}^0 = \frac{\exp\left(\frac{V_{ik} + \xi_{ik}^0}{\lambda_i(\ell-1)}\right)}{\sum_{j \in \mathcal{J}} \ell^{\frac{\ell}{1-\ell}} \exp\left(\frac{V_{ij} + \xi_{ij}^0}{\lambda_i(\ell-1)}\right)},
$$

and optimal choice probabilities

$$\mathcal{P}_{ik}(\boldsymbol{\xi}_i) = \frac{\exp\left(\frac{V_{ik}+\xi^0_{ik}}{\lambda_i(\ell_{\lambda_i,\sigma_i^2}-1)} + \frac{V_{ik}+\xi_{ik}}{\lambda_i}\right)}{\sum_{j\in\mathcal{J}} \exp\left(\frac{V_{ij}+\xi^0_{ij}}{\lambda_i(\ell_{\lambda_i,\sigma_i^2}-1)} + \frac{V_{ij}+\xi_{ij}}{\lambda_i}\right)}.$$

Ruling out corner solutions It remains to be shown that the optimal solution is indeed interior under the assumption on the prior.[37] From Proposition 1 in Caplin, Dean, and Leahy (2019), a necessary and sufficient condition for the optimal policy is given by

$$\int_{\boldsymbol{\xi}_i} \frac{\exp\left[\frac{V_{ik}+\xi_{ik}}{\lambda_i}\right]}{\sum_{j\in\mathcal{J}} P^0_{ij}\exp\left[\frac{V_{ij}+\xi_{ij}}{\lambda_i}\right]} G(\mathrm{d}\boldsymbol{\xi}_i) \leq 1 \quad \forall k, \tag{C}$$

with equality for all k such that $\mathcal{P}^0_{ik} > 0$. Let us show that assuming a corner solution leads to a contradiction under the assumed prior. Wlog, assume the corner is attained for product 1. We then must have

$$\int_{\boldsymbol{\xi}_i} \frac{\exp\left[\frac{V_{i1}+\xi_{i1}}{\lambda_i}\right]}{\sum_{j\in\mathcal{J}\setminus\{1\}} P^0_{ij}\exp\left[\frac{V_{ij}+\xi_{ij}}{\lambda_i}\right]} G(\mathrm{d}\boldsymbol{\xi}_i) \leq 1.$$

The assumption on the prior is that $\xi_{in} = \lambda_i \log X(\rho) + C$, where C is some constant. Hence,

$$\int_{\mathbf{x}} \frac{\exp\left[\frac{V_{i1}}{\lambda_i}\right]\cdot x_1(\rho)}{\sum_{j\in\mathcal{J}\setminus\{1\}} P^0_{ij}\exp\left[\frac{V_{ij}}{\lambda_i}\right]\cdot x_j(\rho)} F(\mathrm{d}x),$$

where the support of the integral is now the positive real line.

Notice that $\frac{V_{ik}}{\lambda_i}, \mathcal{P}^0_{ik}$ are constants, with $\mathcal{P}^0_{ik} > 0$ for all k. From Feller (1966), we know the positive/one-sided stable distribution does not have any finite moments.[38] Given the $x_i(\rho)$ are i.i.d. one-sided stable

[37] I thank Giovanni Montanari for helpful discussions on this point. A different proof is provided by Bertoli, Moraga, and Guichard (2020).

[38] VI.1, p.169. The statement is that all absolute moments less than α exist, where $\alpha \in (0,1)$ is the parameter of the distribution. Here is a proof using a statement from the same page. We have that for $\{X_i\}_{i=1}^n$ i.i.d. positive stable with parameter $\alpha < 1$,

$$\mathbb{E}[X_1] = \mathbb{E}\left[\frac{X_1+\cdots+X_N}{n}\right] = \mathbb{E}\left[X_1 n^{-1+1/\alpha}\right] = \mathbb{E}[X_1]n^{-1+1/\alpha},$$

by the defining property of the positive stable distribution, as quoted in Galichon (2021). But since the mean cannot be zero – the distribution takes positive values with positive probability and its support is $[0,\infty)$ –, we see that the last expression diverges with n. Therefore, the mean is unbounded.

distributions, we can split the integral into two parts at some constant $C_0 \in \mathbb{R}_+$,

$$\int_{(x_1, x_j \in [0, C_0] \forall j \setminus i)} \frac{\exp\left[\frac{V_{i1}}{\lambda_i}\right] \cdot x_1(\rho)}{\sum_{j \in \mathcal{J} \setminus \{1\}} P^0_{ij} \exp\left[\frac{V_{ij}}{\lambda_i}\right] \cdot x_j(\rho)} F(\mathrm{d}\mathbf{x}) + \int_{(x_1, x_j \in [C_0, \infty) \forall j \setminus i)} \frac{\exp\left[\frac{V_{i1}}{\lambda_i}\right] \cdot x_1(\rho)}{\sum_{j \in \mathcal{J} \setminus \{1\}} P^0_{ij} \exp\left[\frac{V_{ij}}{\lambda_i}\right] \cdot x_j(\rho)} F(\mathrm{d}\mathbf{x})$$

$$> \int_{(x_1, x_j \in [0, C_0] \forall j \setminus i)} \frac{\exp\left[\frac{V_{i1}}{\lambda_i}\right] \cdot x_1(\rho)}{\sum_{j \in \mathcal{J} \setminus \{1\}} P^0_{ij} \exp\left[\frac{V_{ij}}{\lambda_i}\right] \cdot C_0} F(\mathrm{d}\mathbf{x}),$$

as the second integral is bounded below by zero. The last term diverges due to the unboundedness of the mean of $x_1(\rho)$. This is a contradiction—the optimal solution is therefore interior.

C.1.2 Expected value

To obtain the closed form for the expected value from making a choice without an intermediary, we plug in the optimal solution for $\mathcal{P}^0_{ik}$ into the original problem in (MM). We obtain

$$\begin{aligned}
&\lambda_i \ell_{\lambda_i, \sigma_i^2} \log \sum_{j \in \mathcal{J}} \exp\left(\frac{V_{ik} + \xi^0_{ik}}{\lambda_i \ell_{\lambda, \sigma_i^2}} + \frac{\log \mathcal{P}^0_{ik}}{\ell_{\lambda_i, \sigma_i^2}} \right) \\
&= \lambda_i \ell_{\lambda_i, \sigma_i^2} \log \sum_{j \in \mathcal{J}} \exp\left(\frac{V_{ik} + \xi^0_{ik}}{\lambda_i \ell_{\lambda_i, \sigma_i^2}} + \frac{1}{\ell_{\lambda_i, \sigma_i^2}} \left(\frac{V_{ik} + \xi^0_{ik}}{\lambda_i (\ell_{\lambda_i, \sigma_i^2} - 1)} - \log \sum_{j \in \mathcal{J}} \exp\left(\frac{V_{ij} + \xi^0_{ij}}{\lambda_i (\ell_{\lambda_i, \sigma_i^2} - 1)} \right) \right) \right) \\
&= \lambda_i \ell_{\lambda_i, \sigma_i^2} \log \frac{\sum_{j \in \mathcal{J}} \exp\left((\ell_{\lambda_i, \sigma_i^2} - 1) \frac{V_{ik} + \xi^0_{ik}}{\lambda_i \ell_{\lambda_i, \sigma_i^2} (\ell_{\lambda_i, \sigma_i^2} - 1)} + \left(\frac{V_{ik} + \xi^0_{ik}}{\lambda_i \ell_{\lambda_i, \sigma_i^2} (\ell_{\lambda_i, \sigma_i^2} - 1)} \right) \right)}{\exp\left(\frac{V_{ij} + \xi^0_{ij}}{\lambda_i (\ell_{\lambda_i, \sigma_i^2} - 1)} \right)} \\
&= \lambda_i (\ell_{\lambda_i, \sigma_i^2} - 1) \log \sum_{j \in \mathcal{J}} \exp\left(\frac{V_{ij} + \xi^0_{ij}}{\lambda_i (\ell_{\lambda_i, \sigma_i^2} - 1)} \right).
\end{aligned}$$

C.2 Prior distribution assumption

Preliminaries The assumption on the distribution of the prior G for an individual with marginal cost of information λ with arbitrary mean ξ_k^0 and variance σ^2 is that ξ_k follows the unique distribution such that (Cardell, 1997)

$$\frac{\xi}{\lambda} + \varepsilon_k$$

is also distributed Gumbel with some location and scale. Galichon (2021) shows that this distribution is a scaled log positive (or one-sided) stable distribution,

$$\xi \sim \lambda \log X(\rho), \qquad \rho = \sqrt{\frac{\lambda^2 \pi^2}{6\sigma^2 + \lambda^2 \pi^2}} \in (0, 1),$$

where $X(\rho)$ is defined by the Laplace transform

$$\mathbb{E}_X[\exp(-tX)] = \exp\left(-t^\rho\right),$$

and the property that for $X_1, \ldots, X_N$ i.i.d. draws of the distribution and positive reals $\alpha_1, \ldots, \alpha_N$

$$\frac{\alpha_1 Z_1 + \ldots \alpha_N Z_N}{(\alpha_1^\rho + \cdots + \alpha_N^\rho)^{\frac{1}{\rho}}} \sim X(\rho).$$

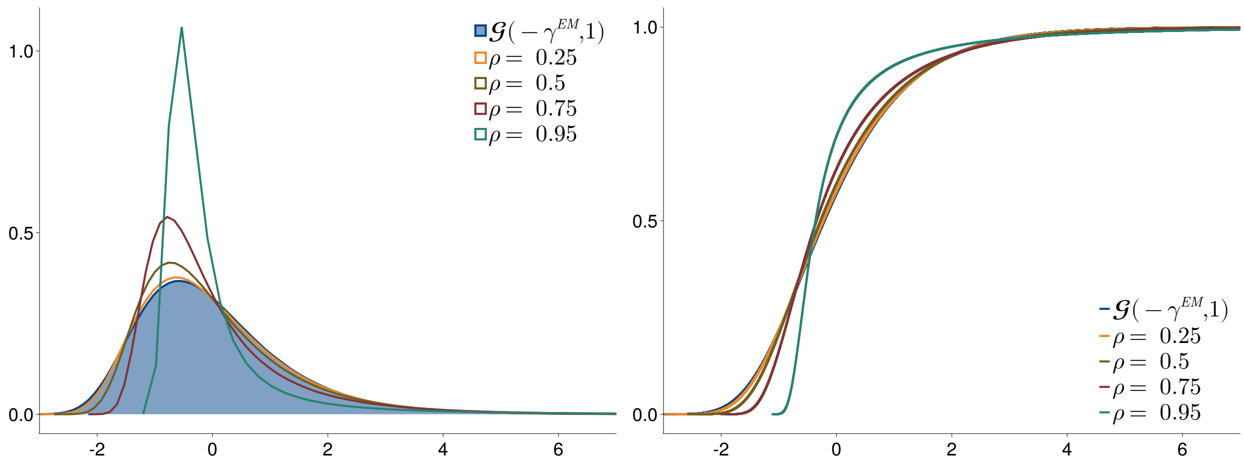
However, the log one-sided stable distribution is *not* part of a location-scale family. In particular, for some constant c and $\lambda_2 = c\lambda_1$, the distribution required to keep the variance of the prior fixed at σ^2 will not be the same,

$$\lambda_1 \log X(\rho_1) \not\sim \lambda_2 \log X(\rho_2).$$

The change in the shape of the distribution G_λ with λ can be assessed by simulation. Kanter (1975) shows the density of G_λ is unimodal. He also shows that a one-sided stable distribution $X(\rho)$ can be simulated using the following algorithm

1. Sample an exponential variable $L \sim \text{Exp}(1)$ and a uniform variable $U \sim [0, \pi]$.
2. Compute
$$a(U) = \left(\frac{\sin \rho U}{\sin U}\right)^{\frac{1}{1-\rho}} \left(\frac{\sin(1-\rho)U}{\sin \rho U}\right).$$
3. Set
$$X = \left(\frac{a(U)}{L}\right)^{\frac{1-\rho}{\rho}} \sim X(\rho).$$

Figure C.33: Prior G_λ



(a) PDF (b) CDF

Notes: This figure shows the assumption on the prior distribution for different values of $\rho = \sqrt{\frac{\lambda^2\pi^2}{6\sigma^2+\lambda^2\pi^2}}$. For a given variance σ^2, the required shape of the prior—here centered around zero—concentrates around the mode and increases the right tail as the cost of acquiring information λ_i increases. For relatively low values of ρ the distribution is practically indistinguishable from an EV(I) (Gumbel) distribution with variance σ^2 $\left(\text{scale } \sqrt{\frac{6\sigma^2}{\pi^2}}\right)$.

Since the one-sided stable distribution does not have any finite moments, the direct simulation of X often leads to overflow. It is therefore convenient to simulate the log positive stable distribution directly

1. Sample an exponential variable $L \sim \text{Exp}(1)$ and a uniform variable $U \sim [0, \pi]$.
2. Compute

$$\begin{aligned} l_a(U) &= \frac{1}{1-\rho}\log\left(\frac{\sin\rho U}{\sin U}\right) + \log\left(\frac{\sin(1-\rho)U}{\sin\rho U}\right) \\ &= \frac{1}{1-\rho}\log\left(\frac{\sin\rho U}{\sin U}\right) + \log\left(\frac{\sin(1-\rho)U}{\sin\rho U}\right). \end{aligned}$$

3. Set

$$\log X = \frac{1-\rho}{\rho}\left(l_a(U) - \log L\right) \sim \log X(\rho).$$

Simulations Figure C.33 shows the shapes of a mean zero prior with variance $\frac{\pi^2}{6}$. The limiting case with $\lambda \to 0$ corresponds to the "standard" Gumbel distribution $\mathcal{G}(-\gamma^{EM}, 1)$. As λ increases, so does ρ and the shape of the prior changes: the right tail becomes heavier and more of the mass is concentrated around the mode.

The assumption that yields the closed-form, "logit"-like choice probabilities therefore links together the *shape of the prior* and the cost of information λ_i. Individuals who face larger marginal costs of information are assumed to also have priors that are more concentrated, but with more significant outliers. Taken at face-value, this assumption implies a degree of "confidence" by retirees with high λ_i, for whom becoming informed is more costly. These retirees face a relatively more certain choice, but with the potential for realizations that are so extreme they justify some information acquisition, even when the cost is very large.

Assumption and choice probabilities To assess how the assumption impacts choice probabilities, we can examine how these compare to the optimal choice probabilities for a decision-maker facing information costs λ under a different prior, for example, the Gumbel benchmark above. Note that the shape assumption **does not** impact choice probabilities under the benchmark beliefs, as the independence across dimensions combined with equal means makes the prior dimensions *interchangeable*. Optimal choice probabilities are then independent of the prior as described in Matejka and McKay (2015).

Figure C.34 shows how the prior assumption impacts choice probabilities relative to an EV(I) prior in a two product case. The decision-maker faces two choices with identical and independent marginal distributions, but different means. I show the choices for four different values of ρ, representing increasing values of the information cost λ. The solid blue line plots the theoretically derived choice probability under the prior G_λ from the closed form expression in equation (5). The dashed orange line shows the optimal choice for an EV(I) prior, obtained using the Blahut-Arimoto algorithm as described in Caplin, Dean, and Leahy (2019).

For moderate values of ρ choice probabilities under both priors are nearly identical. For large values of ρ, the assumption on the prior smooths out the choice probabilities and prevents the attaining of a corner. This pattern is in line with the result in Appendix C.1.1: G_λ is "engineered" to prevent the decision-maker from optimally choosing a corner solution even when facing large information costs. The increasingly heavy tail as λ diverges ensures this will be the case.

Assumption and intermediary choices As outlined in Section 4, I approximate the expected value of the decision under an intermediary by replacing the prior G_λ by a Gumbel distribution when evaluating the integral. That is, to compute

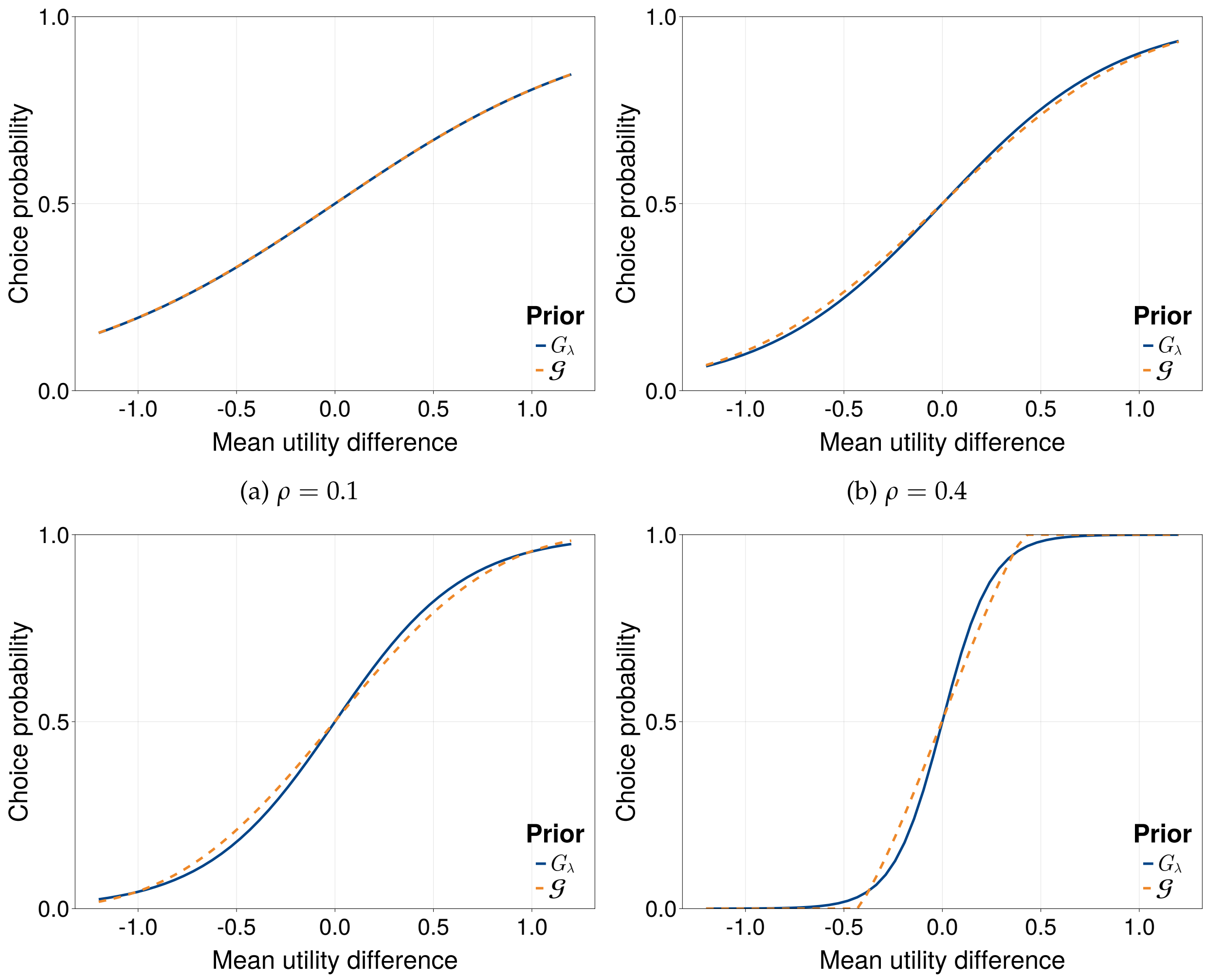
$$\begin{aligned} U_i^I &= \mathbb{E}[U_{\text{Intermediary}}] = \int_{\boldsymbol{\xi}_i} \xi_{ik}^I \mathcal{P}_{ik}^{*,I}(\boldsymbol{\xi}_i)\ G_{\lambda_i}(\mathrm{d}\boldsymbol{\xi}_i), \\ \mathcal{P}_{ik}^{*,I}(\boldsymbol{\xi}_i) &= \mathbb{1}(\arg\max_k \xi_{ik}^I + c_k^I), \qquad \text{for } I \in \{SA, IA\}, \end{aligned}$$

I replace G_{λ_i} by a Gumbel distribution with the same variance, see Figure C.33. This change then yields a closed form expression for the expected utility using an intermediary,

$$U_i^I = \sqrt{\frac{6\sigma_i^2}{\pi^2}} \log \sum_{k=1}^N \exp\left(\frac{\xi_{ik}^I + c_k^I}{\sqrt{6\sigma_i^2/\pi^2}}\right) - \sum_{k=1}^N \mathcal{P}_{ik}^{0,*,I} c_k^I.$$

This choice is guided by convenience in estimation, as it circumvents evaluating a multi-dimensional integral.

Figure C.34: Choice probabilities with two products



(a) $\rho = 0.1$

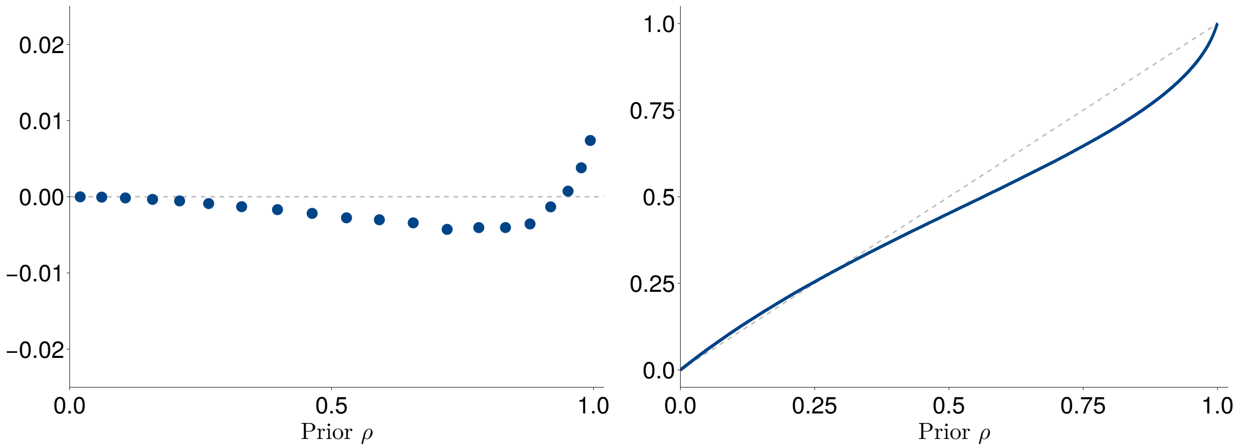
(b) $\rho = 0.4$

(c) $\rho = 0.7$

(d) $\rho = 0.95$

Notes: This figure shows a comparison of optimal choice probabilities under an EV(I) (Gumbel) and the log positive stable prior G_λ that yields a closed form for a given cost of information λ. The x-axis shows the difference in mean expected utilities between product 1 and product 2, the y-axis shows the optimal probability of choosing product 1.

Figure C.35: Approximation of U_i^{SA}



(a) Approximation error

(b) CDF of ρ_i

Notes: Figure (a) shows the relative error introduced by the approximation to U_i^I for a sample of 10,000 individuals simulated using the benchmark model specification at the estimated parameters. The magnitude of the error varies with the parameter $\rho_i = \sqrt{\frac{\lambda_i^2 \pi^2}{6\sigma_i^2 + \lambda_i^2 \pi^2}}$. The error is relative to a numerical approximation using 10,000,000 samples of G_{λ_i}, with a total runtime of 1 hour. Figure (b) shows the estimated distribution of ρ_i in the benchmark.

As shown in Figure C.35, the approximation has a quantitatively small effect at the estimated parameters for the benchmark specification, introducing an error of on average about 0.1% in the value of U_i^{SA}. From a sample of 10,000 simulated individuals, the errors affect the relative ordering of U_i^{NI} and U_i^{SA} only for 0.35%.

C.3 Comparative statics

In this section, I outline some of the comparative statics of the intermediation model.

Comparative Static 1 *The expected value of a decision without intermediation is weakly decreasing in the cost of information λ_i*

In RI model This result is intuitive from the formulation of the rational-inattention problem. λ_i is a multiplier on the entropy cost: as it decreases, the individual must be weakly better off making decisions without intermediation. Formally, define $\mathcal{U}_i^{NI}$ as

$$U_i^{NI} = \max_{\{\mathcal{P}_{ik}(\boldsymbol{\xi}_i)\}_{k=1}^N} \left(\sum_{k=1}^N \int_{\boldsymbol{\xi}_i} (V_{ik} + \xi_{ik}) \mathcal{P}_{ik}(\boldsymbol{\xi}_i) G(\mathrm{d}\boldsymbol{\xi}_i) \right) - \lambda_i \kappa(\mathcal{P}_i, G),$$
$$\text{s.t.} \quad \mathcal{P}_{ik}(\boldsymbol{\xi}_i) \geq 0 \; a.s., \qquad \sum_{k=1}^N \mathcal{P}_{ik}(\boldsymbol{\xi}_i) = 1 \; a.s..$$

Suppose the value of U_i^{NI} is higher for $\lambda' > \lambda$. Then we could take the strategy that is optimal for λ' and use it when the information cost is λ: this must yield a higher value given the first term (utility gained) is identical, and the information cost lower. But this is a contradiction to the maximization behavior.

Given prior assumption G_λ Given the prior changes with λ, this is not immediate. Notice first that

$$\lambda(\ell_{\lambda,\sigma^2} - 1) = \lambda\left(\sqrt{\frac{6\sigma^2}{\pi^2\lambda^2} + 1} - 1\right) = \sqrt{\frac{6\sigma^2\lambda^2}{\pi^2\lambda^2} + \lambda^2} - \lambda = \sqrt{\frac{6\sigma^2}{\pi^2} + \lambda^2} - \lambda.$$

Taking derivatives, we find

$$\begin{aligned}\frac{\mathrm{d}\lambda(\ell_{\lambda,\sigma^2} - 1)}{\mathrm{d}\lambda} &= \frac{2\lambda}{2\sqrt{\frac{6\sigma^2}{\pi^2} + \lambda^2}} - 1 = \frac{\sqrt{\lambda^2}}{\sqrt{\frac{6\sigma^2}{\pi^2} + \lambda^2}} - 1 \\ &= \sqrt{\frac{\lambda^2\pi^2}{6\sigma^2 + \lambda^2\pi^2}} - 1 = \sqrt{\frac{6\sigma^2}{\pi^2\lambda^2} + 1}^{\,-1} - 1 \\ &= \frac{1}{\sqrt{\ell_{\lambda,\sigma^2}}} - 1 < 0,\end{aligned}$$

since $\ell_{\lambda,\sigma^2} > 1$.

Now compute the change in this expected value with λ. We have that

$$\begin{aligned}&\frac{\partial\lambda(\ell_{\lambda,\sigma^2} - 1)\log\sum_{k=1}^N \exp\left(\frac{V_{ik}+\xi_{ik}^0}{\lambda(\ell_{\lambda,\sigma^2}-1)}\right)}{\partial\lambda} \\ &= \frac{\partial\lambda(\ell_{\lambda,\sigma^2} - 1)}{\partial\lambda}\log\sum_{k=1}^N \exp\left(\frac{V_{ik}+\xi_{ik}^0}{\lambda(\ell_{\lambda,\sigma^2}-1)}\right) \\ &+ \lambda(\ell_{\lambda,\sigma^2} - 1)\frac{1}{\sum_{k=1}^N \exp\left(\frac{V_{ik}+\xi_{ik}^0}{\lambda(\ell_{\lambda,\sigma^2}-1)}\right)}\sum_{n=1}^N \exp\left(\frac{V_{in}+\xi_{in}^0}{\lambda(\ell_{\lambda,\sigma^2}-1)}\right)\left(\frac{\partial\lambda(\ell_{\lambda,\sigma^2} - 1)}{\partial\lambda}\right)\left(-\frac{V_{in}+\xi_{in}^0}{(\lambda(\ell_{\lambda,\sigma^2}-1))^2}\right) \\ &= \frac{\partial\lambda(\ell_{\lambda,\sigma^2} - 1)}{\partial\lambda}\left(\log\sum_{k=1}^N \exp\left(\frac{V_{ik}+\xi_{ik}^0}{\lambda(\ell_{\lambda,\sigma^2}-1)}\right) - \frac{\sum_{n=1}^N \exp\left(\frac{V_{in}+\xi_{in}^0}{\lambda(\ell_{\lambda,\sigma^2}-1)}\right)\left(\frac{V_{in}+\xi_{in}^0}{\lambda(\ell_{\lambda,\sigma^2}-1)}\right)}{\sum_{k=1}^N \exp\left(\frac{V_{ik}+\xi_{ik}^0}{\lambda(\ell_{\lambda,\sigma^2}-1)}\right)}\right) \\ &= \frac{\partial\lambda(\ell_{\lambda,\sigma^2} - 1)}{\partial\lambda}\left(\log\sum_{k=1}^N \exp\left(\frac{V_{ik}+\xi_{ik}^0}{\lambda(\ell_{\lambda,\sigma^2}-1)}\right) - \sum_{n=1}^N \frac{\exp\left(\frac{V_{in}+\xi_{in}^0}{\lambda(\ell_{\lambda,\sigma^2}-1)}\right)}{\sum_{k=1}^N \exp\left(\frac{V_{ik}+\xi_{ik}^0}{\lambda(\ell_{\lambda,\sigma^2}-1)}\right)}\left(\frac{V_{in}+\xi_{in}^0}{\lambda(\ell_{\lambda,\sigma^2}-1)}\right)\right).\end{aligned}$$

We can interpret the first term in the bracket as the LogSumExp, a smooth approximation to the maximum of the terms. The second term is a weighted average of the terms. Given that the LogSumExp is always weakly larger than the maximum, the term in the brackets must be positive. Since the first term is negative, the entire derivative is negative. We have

$$\frac{\partial \lambda(\ell_{\lambda,\sigma^2}-1)\log\sum_{k=1}^N \exp\left(\frac{V_{ik}+\xi^0_{ik}}{\lambda(\ell_{\lambda,\sigma^2}-1)}\right)}{\partial\lambda} < 0.$$

Comparative Static 2 *The expected value of a decision with an intermediary is weakly decreasing in the intermediary bias c^I.*

In RI model This follows directly from inducing a stronger misalignment of incentives. Given the value of the intermediary

$$U_i^I = \mathbb{E}[U_{\text{Intermediary}}] = \sum_{k=1}^N \int_{\xi_i} \xi^I_{ik}\mathcal{P}^{*,I}_{ik}(\boldsymbol{\xi}_i)\ G(\mathrm{d}\boldsymbol{\xi}_i),$$

with

$$\mathcal{P}^{*,I}_{ik}(\boldsymbol{\xi}_i) = \mathbb{1}\big(\arg\max_k \xi^I_{ik} + c^I\mathbb{1}(k \text{ is annuity})\big) = \mathbb{1}\big(\arg\max_k \xi^I_{ik} + c^I_k\big),$$

we have that as c^I_k increases to $c^{2,I}_k$, the change in the value of the expression Δ is given by realizations of $\boldsymbol{\xi}_i$ that induce different choices,

$$\boldsymbol{\xi}_i: \quad \arg\max_k \xi_{ik} + c^I_k \neq \arg\max_k \xi_{ik} + c^{2,I}_k.$$

The consumer can only lose in this case, since they are induced to switch from buying a higher value annuity (in terms of ξ_{ik}) to a lower value one.

Given prior assumption G_λ The argument above applies. Explicitly, we can compute

$$\frac{\partial U_i^I}{\partial c^I} = \frac{\partial\sqrt{\frac{6\sigma_i^2}{\pi^2}}\log\sum_{k=1}^N\exp\left(\frac{\xi^{0,I}_{ik}+c^I\mathbb{1}(k\text{ is annuity})}{\sqrt{6\sigma_i^2/\pi^2}}\right) - \sum_{k=1}^N \mathcal{P}^{0,*,I}_{ik}c^I\mathbb{1}(k\text{ is annuity})}{\partial c^I},$$

where

$$\mathcal{P}^{0,*,I}_{ik} = \frac{\exp\left(\frac{\xi^{0,I}_{ik}+c^I\mathbb{1}(k\text{ is annuity})}{\sqrt{6\sigma_i^2/\pi^2}}\right)}{\sum_{j=1}^N\exp\left(\frac{\xi^{0,I}_{ij}+c^I\mathbb{1}(j\text{ is annuity})}{\sqrt{6\sigma_i^2/\pi^2}}\right)}.$$

For the first term, the standard result for the log exp formula yields

$$\frac{\partial\sqrt{\frac{6\sigma_i^2}{\pi^2}}\log\sum_{k=1}^N\exp\left(\frac{\xi^{0,I}_{ik}+c^I\mathbb{1}(k\text{ is annuity})}{\sqrt{6\sigma_i^2/\pi^2}}\right)}{\partial c^I} = \sum_{k=1}^N \mathcal{P}^{0,*,I}_{ik}\mathbb{1}(k\text{ is annuity}).$$

For the second term,

$$\frac{-\sum_{k=1}^{N}\mathcal{P}_{ik}^{0,*,I}c^{I}\mathbb{1}(k\text{ is annuity})}{\partial c^{I}} = -\sum_{k=1}^{N}\frac{\partial\mathcal{P}_{ik}^{0,*,I}}{\partial c^{I}}c^{I}\mathbb{1}(k\text{ is annuity}) - \sum_{k=1}^{N}\mathcal{P}_{ik}^{0,*,I}\mathbb{1}(k\text{ is annuity}).$$

The sign of the derivative is therefore determined by the term

$$-\sum_{k=1}^{N}\mathbb{1}(k\text{ is annuity})\frac{\partial\mathcal{P}_{ik}^{0,*,I}}{\partial c^{I}} = -\sum_{k\text{ is annuity}}\frac{\pi^{2}}{6\sigma^{2}}\mathcal{P}_{ik}^{0,*,I}\left(1-\sum_{j\text{ is annuity}}\mathcal{P}_{ij}^{0,*,I}\right) < 0.$$

Comparative Static 3 *The demand for intermediation can—all else equal—increase or decrease with the prior variance* σ_i^2.

In RI model I construct a heuristic argument for a flat prior G with identical (interchangeable) marginal distributions across products. For any shape of G, let us analyze the effect of adding a mean-preserving spread to the values of $\boldsymbol{\xi}_i$. In particular, let us interpret this as stating that "the probability of two values of the vector $\boldsymbol{\xi}_i$ being 'close' is smaller."

It is useful to write the benefit from intermediation, $U_i^I - U_i^{NI}$, as

$$\underbrace{U_i^I - \int_{\xi_i}\max\boldsymbol{\xi}_i\ G(\mathrm{d}\boldsymbol{\xi}_i)}_{\text{Intermediary distortion}} + \underbrace{\int_{\xi_i}\max\boldsymbol{\xi}_i\ G(\mathrm{d}\boldsymbol{\xi}_i) - U_i^{NI}}_{\text{Intermediary information value}},$$

The first term describes the distortion introduced by the intermediary by steering the consumer into a sub-optimal product. The harm from this distortion is given by the probability that it takes place (that the highest value product is not selected)

$$\boldsymbol{\xi}_i:\quad \arg\max_k \xi_{ik} + c_k^I \neq \arg\max_k \xi_{ik},$$

and the harm itself, which is

$$\max_k \xi_{ik} - (\max_k \xi_{ik} + c_k^I) - c_k^I.$$

Starting from a degenerate distribution, an increase in the spread of the values will increase the harm, but not the probability that it takes place, as longs as the c^I term dominates. As the spread increases, the harm is capped at c^I, but the probability of it happening decreases—precisely because values are less likely to be close. Put differently, if $k \in N$ is the maximum entry of $\boldsymbol{\xi}_i$, it is more likely also that it is the maximum entry of $(\xi_{ij} + c_{ij}^I)_{j\in\mathcal{J}}$. The distortion introduced by the intermediary is therefore non-monotonic: it increases, then decreases with the stakes of the decision.

The second term describes the informational value provided by the intermediary. If the prior dimensions are interchangeable, we can write it as

$$\int_{\xi_i} \left(\max_{k \in \mathcal{J}} \xi_{ik} - \lambda \log \frac{1}{|\mathcal{J}|} \sum_{j \in \mathcal{J}} \exp\left(\frac{\xi_{ij}}{\lambda}\right)\right) \, \mathrm{d}G(\boldsymbol{\xi}_i),$$

using Lemma 2 in Matejka and McKay (2015). We want to argue that the term within the integral is increasing in the spread of the entries of $\boldsymbol{\xi}_i$. For two values ξ_{i1} and ξ_{i2}, asumme wlog that ξ_{i1} is the max of the two and see that we have

$$\begin{aligned}
&\lambda \log \left(\frac{1}{2} \exp\left(\frac{\xi_{i1}}{\lambda}\right) + \frac{1}{2} \exp\left(\frac{\xi_{i2}}{\lambda}\right)\right) \\
&\quad = \lambda \log \left(\exp\left(\frac{\xi_{i1}}{\lambda}\right) \frac{1}{2} \left(1 + \exp\left(\frac{\xi_{i2} - \xi_{i1}}{\lambda}\right)\right)\right) \\
&\quad = x_1 + \lambda \log \left(\frac{1}{2} \left(1 + \exp\left(\frac{\xi_{i2} - \xi_{i1}}{\lambda}\right)\right)\right).
\end{aligned}$$

Note that the larger the difference between ξ_{i2} and ξ_{i1} (weakly negative always), the smaller the value and therefore the larger the absolute difference between the max and the "average log sum exp" term. The same argument applies to the difference of the max of the $|\mathcal{J}|$ entries of $\boldsymbol{\xi}_i$ to each of the other ones. Therefore, the informational value of the intermediary increases in the stakes of the decision.[39]

Given prior assumption G_λ for U^{NI} and EV(I) for U^I Figure C.36 shows an example—the intuition from the more general case carries over to it. Not shown in the figure is that as the variance of the prior goes to infinity, the cost of the intermediary distortions goes toward zero. The distortion is unlikely to bind in that case, since the probability that two values are close enough is small.

Comparative Static 4 *The demand for intermediation can –all else equal– increase or decrease with the prior mean for the intermediary's preferred product,* ξ_i^0.

In RI model Again, I construct a heuristic argument. Consider first the expected value derived from intermediation, U^I, which reads

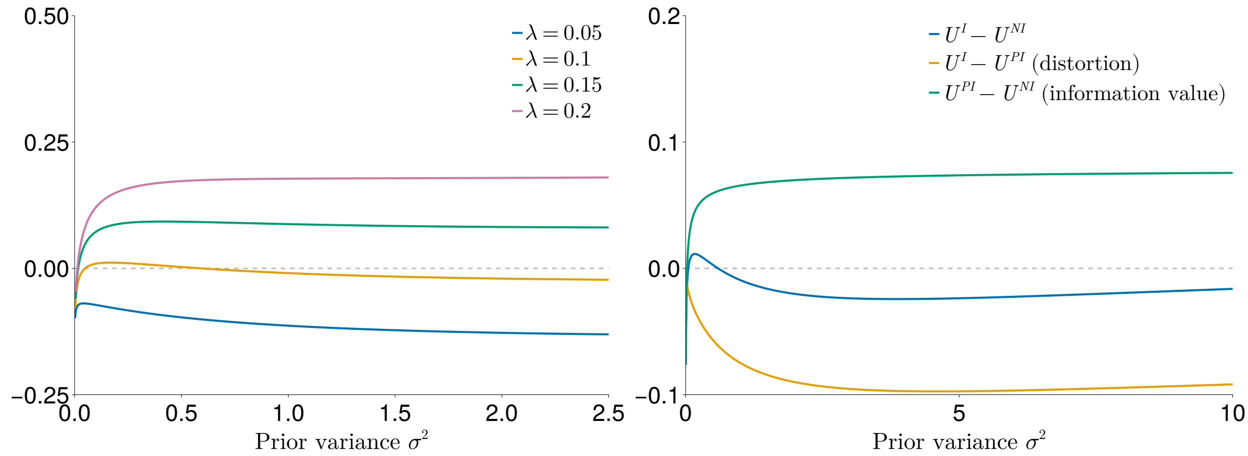
$$\int_{\xi_i} \sum_{k=1}^{N} \xi_{ik}^I \mathbb{1}(\arg\max_k \xi_{ik}^I + c_k^I) \; G(\mathrm{d}\boldsymbol{\xi}_i),$$

and again re-write it in reference to an unbiased intermediary

$$\int_{\xi_i} \sum_{k=1}^{N} \xi_{ik}^I \mathbb{1}(\arg\max_k \xi_{ik}^I) \; G(\mathrm{d}\boldsymbol{\xi}_i) + \int_{\xi_i} \sum_{k=1}^{N} \xi_{ik}^I \left[\mathbb{1}(\arg\max_k \xi_{ik}^I + c_k^I) - \mathbb{1}(\arg\max_k \xi_{ik}^I)\right] \; G(\mathrm{d}\boldsymbol{\xi}_i)$$

[39] In practice, there is one additional source of harm from the intermediary, from them charging a commission for the product purchased and therefore lowering their value from $\boldsymbol{\xi}_i$ to $\boldsymbol{\xi}_i^I$. The intermediary distortion channel is not affected by it, since these values are the same across perfect and biased intermediaries. With a flat prior, the harm from the intermediary from this source is constant across different values of σ_i^2, since the ex-ante probability of choosing each product is constant at $\frac{1}{|\mathcal{J}|}$.

Figure C.36: Value of intermediation and prior variance σ^2



(a) For different λ_i (b) For $\lambda = 0.1$

Notes: This figure shows the value of intermediation $U^I - U^{NI}$ under the Cardell prior for U^{NI} and an EV(I) prior for U^I. Parameter values are $|\mathcal{J}| = 10$, $c^I = 3.2$, $\xi_{0k} = 5$, $\xi^I_{0k} = 4.85$.

As the prior mean of the intermediary's preferred product j increases (the product for which c^I_{ik} is positive/the largest), the probability that the intermediary distorts the consumers' choices decreases, since it is more likely that incentives are aligned and the highest utility product is precisely j. The distortion therefore decreases as the prior mean for j increases: following the logic of the comparative static for the variance, it leads to a reduction in the probability of a distortion of any size. The value of the perfect intermediary increases in the prior mean of j, as a higher mean also shifts the distribution of the maximum of all dimensions –the expected value of which is precisely the expected value of using the perfect intermediary.[40]

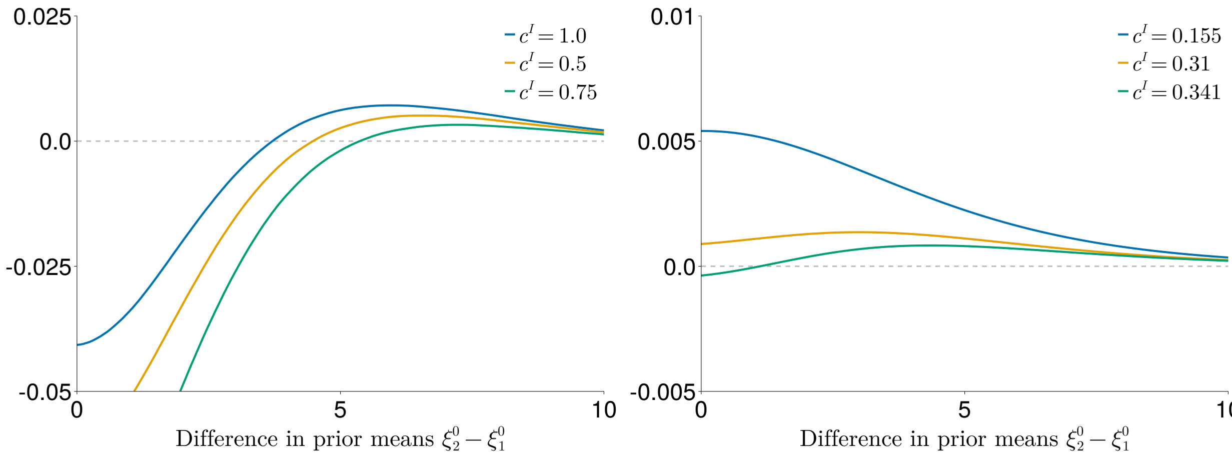
I argue that the expected value of not using an intermediary also increases in the prior mean of j: the individual can construct a strategy that would yield higher utility at the same cost as before.[41] The value of intermediation $U^I - U^{NI}$ therefore depends on how the value of the perfect intermediary evolves relative to that of not using an intermediary. Simulations suggest that this can go either way, rendering the overall effect ambiguous, see Figure C.37a.

Given prior assumption G_λ for U^{NI} and EV(I) for U^I The intuition from the previous paragraph carries over to this case. Figure C.37b shows an example.

[40] An additional mechanism would arise if we explicitly consider the fact that the consumer only pays commissions if they purchase certain products, which affects their own utility ξ^I_{ik}. If we assume that the utility cost of the commission payment is the same across the "distorted" products $\xi^I_{ik} - \xi_{ik} = d$ for all k s.t. $c^I_{ik} > 0$ –a meaningful simplification–, this effect can be summarized by the probability of paying a commision times its value. This quantity would then increase in the prior mean of j, as it implies it is more likely that the retiree eventually purchases it.

[41] The idea is that the individual could construct the same signal structure that they previously had, acting "as if" the value of j was $\xi_{ij} - \Delta\xi^0_{ij}$. The strategy would then (by construction) have the same mutual entropy cost, but a higher payoff.

Figure C.37: Value of intermediation and prior mean ξ_k^0



(a) Prior G_λ for U^{NI}, U^I

(b) Prior G_λ for U^{NI} and EV(I) for U^I

Notes: This figure shows the value of intermediation $U^I - U^{NI}$ under (a) the Cardell prior for both U^{NI} and U^I, and (b) a Cardell prior for U^{NI} and an EV(I) for U^I. Parameter values for (a) are $|\mathcal{J}| = 2$, $\xi_{0k} = 5$, $\xi_{0k}^I = 5$, $\sigma^2 = 6.0$ and $\lambda = 0.96$, solving numerically for U^I given the implied prior $G_\lambda = \text{LPS}\left(\sqrt{\frac{\lambda^2\pi^2}{6\sigma^2+\lambda^2\pi^2}}\right)$. Parameter values for (b) are $|\mathcal{J}| = 2$, $\xi_{0k} = 5$, $\xi_{0k}^I = 4.85$, $\sigma^2 = 6.5$ and $\lambda = 0.96$.

C.4 Unobservable taste shock

In the empirical model, I allow for an additive shock ε_{ik} to the life-cycle utility ζ_{ik} of each product. Two reasons guide this choice.

First, some choice patterns are hard to rationalize given the unobservable heterogeneity that can be feasibly incorporated into the estimation routine. Examples include present-bias, liquidity constraints or financial commitments at the start of retirement. The idiosyncratic shock serves to capture some of this variation that remains unexplained by the life-cycle model.

Second, the identification of the model's parameters—in particular those governing preferences over the different pension products—relies on the assumption that both types of intermediaries are are perfectly (and costlessly) able to observe the true utility value of a product.[42] Given this assumption, a model without an unobserved preference shock would be challenging to estimate using an SMLE routine. For any given realization of preferences, the intermediary problem would yield either 1s or 0s as choice probabilities, inducing non-linearities and leading the likelihood to severely punish variation unexplained by the life-cycle model.

In this subsection, I derive a distributional assumption on ε_{ik} that preserves the closed form solutions to the rational inattention problem, and the choice of intermediary. As such, its main advantage is that it does not impose an additional computational burden on the estimation routine.

[42]This assumption can be relaxed to some extent. For example, the identification argument should still go through if I assume that intermediaries are subject to a (known) degree of "mistakes."

Recall that the assumption on the prior reads

$$\xi_k \sim G_\lambda := \lambda \log X(\rho_p),$$

where $X(\rho)$ is a positive stable distribution with parameter

$$\rho_p = \sqrt{\frac{\pi^2\lambda^2}{6\sigma_p^2 + \pi^2\lambda^2}} \in (0,1).$$

The optimal choices of the individual therefore take the optimal form

$$P_{ik} = \frac{\exp\left(\frac{V_{ik}+\xi_{ik}^0}{\lambda(\ell_p-1)} + \frac{V_{ik}+\xi_{ik}}{\lambda}\right)}{\sum_j \exp\left(\frac{V_{ij}+\xi_{ij}^0}{\lambda(\ell_p-1)} + \frac{V_{ij}+\xi_{ij}}{\lambda}\right)},$$

with $\ell_p = \frac{1}{\rho_p}$.

We write

$$\xi_k = \zeta_k + \varepsilon_k,$$

where ζ_k is the life-cycle utility. I assume that

$$\varepsilon_k \sim H := \lambda \log X(\rho_s),$$

with

$$\rho_s = \sqrt{\frac{\pi^2\lambda^2}{6\sigma_s^2 + \pi^2\lambda^2}} \in (0,1).$$

This assumption has two convenient implications.

1. **Closed form expected utility formulas:** as before, given the assumption on the prior $\boldsymbol{\zeta}_i$, we obtain a closed form expression for the expected utility from making a decision without an intermediary. This is

$$\lambda(\ell_p - 1) \log \sum_{k\in\mathcal{J}} \exp\left(\frac{V_k + \xi_k^0}{\lambda(\ell_p - 1)}\right),$$

where ℓ_p depends on the variance of the prior σ_p^2 and the information cost λ.

2. **Closed form choice probabilities including unobserved shock:** the solution to the rational-inattention

problem is given by the choice probabilities

$$P_k(\boldsymbol{\varepsilon}) = \frac{\exp\left(\frac{V_k+\xi_k^0}{\lambda(\ell_p-1)} + \frac{V_k+\zeta_k+\epsilon_k}{\lambda}\right)}{\sum_{j\in\mathcal{J}}\exp\left(\frac{V_k+\xi_k^0}{\lambda(\ell_p-1)} + \frac{V_k+\zeta_k+\epsilon_k}{\lambda}\right)}.$$

We do not observe the realization of the shock $\boldsymbol{\varepsilon}_i$, so we would like to integrate it out. Take F to be the cdf of a Gumbel(0,1) distribution, and define $\ell_s = \frac{1}{\rho_s} = \sqrt{\frac{6\sigma^2}{\pi^2\lambda^2}+1}$. Then we have, following the same steps used to derive the formula for the expected utility in Appendix C.1.1,

$$\begin{aligned}
P_k &= \int_{\boldsymbol{\varepsilon}} P_k(\boldsymbol{\varepsilon})\ \mathrm{d}G(\boldsymbol{\varepsilon}) \\
&= \int_{\boldsymbol{\varepsilon}} \frac{\exp\left(\frac{V_k+\xi_k^0}{\lambda(\ell_p-1)} + \frac{V_k+\zeta_k+\varepsilon_k}{\lambda}\right)}{\sum_{j\in\mathcal{J}}\exp\left(\frac{V_j+\xi_j^0}{\lambda(\ell_p-1)} + \frac{V_j+\zeta_j+\epsilon_j}{\lambda}\right)}\ \mathrm{d}G(\boldsymbol{\varepsilon}) \\
&= \int_{\boldsymbol{\varepsilon},\boldsymbol{e}} \mathbb{1}\left(\arg\max_{j\in\mathcal{J}} \frac{V_j+\xi_j^0}{\lambda(\ell_p-1)} + \frac{V_j+\zeta_j-\lambda(\ell_s-1)\gamma^{EM}+\varepsilon_j^s}{\lambda} + e_j = k\right)\ \mathrm{d}G(\boldsymbol{\varepsilon})\ \mathrm{d}F(\boldsymbol{e}),
\end{aligned}$$

where we define $\varepsilon_j^s = \varepsilon_j + (\ell_s - 1)\gamma^{EM}$. The distributional assumption on ε_j then implies

$$\begin{aligned}
P_k &= \int_{\mathbf{f}} \mathbb{1}\left(\arg\max_{j\in\mathcal{J}} \frac{V_j+\xi_j^0}{\lambda(\ell_p-1)} + \frac{V_j+\zeta_j-\lambda(\ell_s-1)\gamma}{\lambda} + \ell_s f_j = k\right)\ \mathrm{d}F(\mathbf{f}_i) \\
&= \int_{\mathbf{f}} \mathbb{1}\left(\arg\max_{j\in\mathcal{J}} \frac{V_j+\xi_j^0}{\lambda(\ell_p-1)\ell_s} + \frac{V_j+\zeta_j-\lambda(\ell_s-1)\gamma}{\lambda\ell_s} + f_j = k\right)\ \mathrm{d}F(\mathbf{f}) \\
&= \frac{\exp\left(\frac{V_k+\xi_k^0}{\lambda(\ell_p-1)\ell_s} + \frac{V_k+\zeta_k-\lambda(\ell_s-1)\gamma}{\lambda\ell_s}\right)}{\sum_{j\in\mathcal{J}}\exp\left(\frac{V_j+\xi_j^0}{\lambda(\ell_p-1)\ell_s} + \frac{V_j+\zeta_j-\lambda(\ell_s-1)\gamma}{\lambda\ell_s}\right)} \\
&= \frac{\exp\left(\frac{V_k+\xi_k^0}{\lambda(\ell_p-1)\ell_s} + \frac{V_k+\zeta_k}{\lambda\ell_s}\right)}{\sum_{j\in\mathcal{J}}\exp\left(\frac{V_j+\xi_j^0}{\lambda(\ell_p-1)\ell_s} + \frac{V_j+\zeta_i}{\lambda\ell_s}\right)}.
\end{aligned}$$

Implications of assumption As outlined in Appendix C.2, this assumption requires that the shape of the distribution of the shock ε_{ik} changes both *within* non-intermediated retirees and *across* intermediation channels. Indeed, what we require is

1. For a non-intermediated retiree with information cost λ_i, ε_{ik} is drawn from

$$\lambda_i \log X(\rho_i), \qquad \rho_i = \sqrt{\frac{\pi^2\lambda_i^2}{6\sigma_i^2+\pi^2\lambda_i^2}}.$$

2. For an intermediated retiree, ε_{ik} is drawn from a Gumbel distribution with variance σ_i^2.

The primary motivation behind this assumption is again computational: imposing different distributions would require either solving the rational inattention for problem self-reliant retirees numerically, or computing the choice probabilities of intermediated retirees through simulation.

The assumption introduces another mechanism through which retirees are differentiated—namely, the distribution from which their idiosyncratic shocks are drawn. This may affect the incentives for seeking out intermediation across different values of the information cost λ_i. As shown in Appendix C.2, this effect is quantitatively small in the empirical appplication.

A second implication of the assumption is on welfare, given the idiosyncratic shocks are assumed to be welfare relevant. The change of shape therefore introduces a difference in the utility derived from products when they are purchased through an intermediary, relative to when they are not.

In counterfactuals, I account for the potential change in consumer welfare due to the change in the shape of the distribution. For a given individual, I "transform" draws of the shock across products from the adequate log positive stable distribution to a Gumbel (or viceversa) using empirical quantiles of the distributions. This transformation allows me to retain the "relative size" of the shocks and preserve the consistency of the optimal product choice across counterfactuals to the highest extent possible. As seen in the main text (e.g. Table 7), the welfare effects from the shock adjustment are negligible across the considered counterfactuals. The change in the taste shock changes the optimal product in the intermediary ban counterfactual (with price adjustment) for 3.5% of the simulated sample (around 7.6% of those intermediated).

Finding the right distribution for $\boldsymbol{\zeta}_i$ It is desirable to establish under which conditions the distribution of $\boldsymbol{\zeta}_i, \boldsymbol{\varepsilon}_i$ and $\boldsymbol{\xi}_i$ are internally consistent. Given the assumptions on the distributions on $\boldsymbol{\xi}_i$ and $\boldsymbol{\varepsilon}_i$, we aim to find a distribution for $\boldsymbol{\zeta}_i$ such that

$$\zeta_k + \varepsilon_k \sim \xi_k,$$

where $\varepsilon_k \sim \lambda \log X(\rho_s)$ shifted to have mean zero, $\xi_k \sim \lambda \log X(\rho_p)$ shifted to have mean ξ_k^0, and $X(p)$ is a positive stable distribution with parameter $p \in (0,1)$. As before, we set these parameters to be

$$\rho_p = \sqrt{\frac{\pi^2\lambda^2}{6\sigma_p^2 + \pi^2\lambda^2}}, \qquad \rho_s = \sqrt{\frac{\pi^2\lambda^2}{6\sigma_s^2 + \pi^2\lambda^2}}.$$

By matching the means, we must have ζ_k have mean equal to ξ_k^0. Recognizing that we can nonetheless correct for the means by shifting the resulting distributions appropriately, assume ε_k and ξ_k are non-shifted (but scaled by λ) log positive stable distributions, which implies their variance is given precisely by σ_p^2 and σ_s^2, and the means by

$$\mu_p = \lambda \left(\frac{1}{\rho_p} - 1\right)\gamma, \qquad \mu_s = \lambda \left(\frac{1}{\rho_s} - 1\right)\gamma.$$

Consider now $\zeta'_k = \frac{\zeta_k}{\lambda}$. We are then looking for a random variable Z_F with distribution F such that

$$Z_F + \log X(\rho_s) \sim \log X(\rho_p).$$

To find this distribution, we use Lemma 2.2 in Cardell (1997) or Remark 2 in Galichon (2021), which state that

$$\rho_2\rho_1 \log X(\rho_1) + \rho_2 \log X(\rho_2) \sim \rho_2\rho_1 \log X(\rho_2\rho_1).$$

Multiplying by $\frac{1}{\rho_2\rho_1}$, we get

$$\log X(\rho_1) + \frac{1}{\rho_1} \log X(\rho_2) \sim \log X(\rho_2\rho_1). \tag{L}$$

Therefore, the distribution we are looking for is $\frac{1}{\rho_s} \log X(\frac{\rho_p}{\rho_s})$.

As an aside, it turns out the same distribution $\eta \log X(\rho)$ will be the conjugate – in the sense of Cardell (1997) – of both a Gumbel distribution $\mathcal{G}(0,\eta)$ and a log positive stable $\log X\left(\frac{1}{\eta}\right)$. That is, scaling a log positive stable yields the unique distribution that (in general) preserves *both* the Gumbel and the log positive stable families. For $\rho \in (0,1)$ and $\eta \in (0,\infty)$,

$$\eta \log X(\rho) + \mathcal{G}(0,\eta) \sim \mathcal{G}\left(0, \frac{\eta}{\rho}\right) \eta.$$

For $\eta > 1$,

$$\log X(\rho) + \log X\left(\frac{1}{\eta}\right) \sim \log X\left(\frac{\rho}{\eta}\right).$$

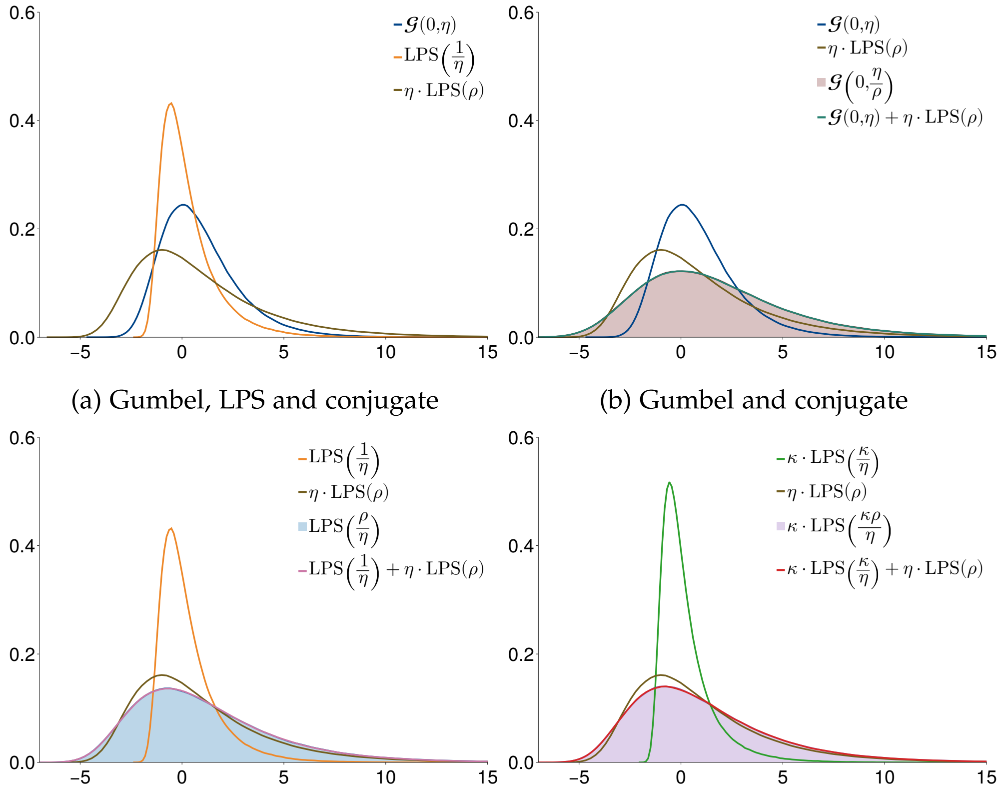
Finally, for $\kappa < \eta < 1$, we can multiply (L) by a constant to obtain

$$\eta \log X(\rho) + \kappa \log X\left(\frac{\kappa}{\eta}\right) \sim \kappa \log X\left(\frac{\kappa\rho}{\eta}\right),$$

This equation reduces to Remark 2 in Galichon (2021) by setting $\eta = \rho_2$, $\rho = \rho_2$ and $\kappa = \rho_1\rho_2$.

Figure C.38 shows the conjugate property of the scaled log positive stable distribution, sampled using the algorithm proposed in Kanter (1975) (see also Appendix C.2).[43]

[43] Note that one can choose $\rho \in (0,1)$. One can therefore find infinite ways of dividing a Gumbel as a sum of a scaled log pos stable and another Gumbel: this is the property that generates the nested logit model. Similarly, one also repeat the same procedure for any log positive stable distribution. Finally, it follows that one can also repeat the same procedure for a scaled log pos stable, which is self-conjugate.



(a) Gumbel, LPS and conjugate

(b) Gumbel and conjugate

(c) LPS and conjugate

(d) Scaled LPS and conjugate

Figure C.38: Conjugate property of the scaled log positive stable distribution

Notes: These figures show the conjugate properties of the scaled log positive stable distribution (LPS). See description in the text. (a) shows an example for the two distributions that have the same conjugate—a Gumbel with scale η and a LPS with parameter $1/\eta$. The conjugate is an η-scaled LPS with parameter $\rho \in (0, 1)$. Its distribution-preserving property can be seen in (b) for the Gumbel and in (c) for the log positive stable distribution. (d) shows how the same distribution is also the conjugate to another scaled log positive stable distribution with a scaling factor $k < \eta$.

D Life-cycle model

D.1 Solution concept

This subsection generally follows Illanes and Padi (2021), with some notational changes.

Ignore the individual subscript i and product subscript k for simplicity of notation. Recall the problem of the consumer for each product is given by

$$\max_{\{c_t, a_t\}_{t=0}^T} \mathbb{E}_\mu \left[\sum_{t=0}^T \beta^t u(c_t, f_t | s_t, d_t) \right] \tag{7}$$

$$\text{s.t.} \quad a_t = m_t - c_t, \qquad m_{t+1} = a_t R + p^{t+1},$$

$$f_{t+1} = a_t R + b^{t+1}, \qquad a_t \geq 0 \quad \forall t,$$

$$m_0 = w_0,$$

where c_t denotes consumption, f_t bequeathed wealth, a_t savings, m_t total funds available, p^t the pension products' payment and b^t the incidental bequests if the individual dies in period t. Recall also

$$u(c_t, f_t | s_t, d_t) = \begin{cases} \frac{c_t^{1-\gamma}}{1-\gamma} & \text{if } s_t = 1, \\ \delta_{\text{beq}} \left(\frac{f_t^{1-\gamma}}{1-\gamma} \right) & \text{if } d_t = 1, \\ 0 & \text{otherwise.} \end{cases}$$

The mortality process is governed by d_t,

$$d_t = \begin{cases} 1 & \text{w/ prob. } \mu_t \\ 0 & \text{otherwise,} \end{cases}$$

where $\{\mu_t\}_{t=0}^T$ is the vector of death probabilities at every t.

Let $s_t \in \{0, 1\}$ describe whether the retiree is alive or dead at period t. The variable evolves according to d_t

$$s_t = \begin{cases} 1 & \text{if } s_{t-1} = 1 \text{ and } d_t = 0, \\ 0 & \text{otherwise.} \end{cases}$$

We solve the problem by backward induction. By assumption, the probability of death at period T is 1. Utility is therefore given by

$$V_T(f_T) = \delta_{\text{beq}} \frac{f_T^{1-\gamma}}{1-\gamma}.$$

In the next to last period, if the individual is alive, we have

$$\begin{aligned} V_{T-1}(m_{T-1}, b^T) = &\max_{c_{T-1}} \frac{c_{T-1}^{1-\gamma}}{1-\gamma} + \beta\delta_{\text{beq}} \frac{\left((m_{T-1} - c_{T-1}) \cdot R + b^T \right)^{1-\gamma}}{1-\gamma}, \\ &\text{s.t.} \quad c_{T-1} \leq m_{T-1}. \end{aligned} \tag{8}$$

Solving for the optimal policy yields,

$$c_{T-1}^{-\gamma} \geq \beta\delta_{\text{beq}} R \cdot \left((m_{T-1} - c_{T-1}) \cdot R + b^T \right)^{-\gamma},$$

$$c_{T-1}(m_{T-1}, b^T) = \min \left\{ m_{T-1}, \frac{m_{T-1}R + b^T}{(\beta\delta_{\text{beq}} R)^{\frac{1}{\gamma}} + R} \right\}.$$

We can then plug this into (8) to obtain $V_{T-1}(m_{T-1}, b^T)$. Note the optimal policy is *kinked*: for a low enough value of m_{T-1}, the retiree consumes all their current wealth. Solving for this cutoff yields

$$\underline{m}_{T-1} = \frac{b_T}{\left(\beta\delta_{\text{beq}} R \right)^{\frac{1}{\gamma}}}.$$

By the Envelope Theorem, we have that for $m \geq \underline{m}_{T-1}$, the marginal utility of additional wealth is given by

$$V'_{T-1}(m, b^T) = c_{T-1}(m, b^T)^{-\gamma},$$

since the FOC holds with equality. Notice that this is also true for $m < \underline{m}_{T-1}$: the consumer is not saving, so the marginal utility of additional wealth is the marginal utility of consumption. Hence,

$$V'_{T-1}(m_{T-1}, b^T) = c_{T-1}(m_{T-1}, b^T)^{-\gamma}$$

is a continuous function.

For a general period $t < T-1$, the consumer solves

$$\begin{aligned}
V_t(m_t, \{p^t, b^t\}_{t+1}^T) = &\max_{c_t, a_t} \frac{c_t^{1-\gamma}}{1-\gamma} + \beta\left(\mu_{t+1}\delta_{\text{beq}}\frac{(f_{t+1})^{1-\gamma}}{1-\gamma} + (1-\mu_{t+1})V_{t+1}\big(m_{t+1}, \{p^t, b^t\}_{t+2}^T\big)\right). \\
&\text{s.t.} \quad a_t \geq 0, \\
&m_{t+1} = a_t \cdot R + p^{t+1}, \\
&f_{t+1} = a_t \cdot R + b^{t+1}.
\end{aligned}$$

Following Jappelli and Pistaferri (2017), Chapter 5, we can show that this problem can be solved using the same recursion as one without the liquidity constraint. Toward an induction argument, suppose we have shown that V'_{t+1} is continuous in m_t. Omitting function arguments for ease of notation, we have the FOC

$$c_t^{-\gamma} - \beta R\Big(\mu_{t+1}\,\delta_{\text{beq}}\, f_{t+1}^{-\gamma} + (1-\mu_{t+1})V'_{t+1}\big(m_{t+1}, \cdot\big)\Big) \geq 0. \tag{9}$$

The continuity of V'_{t+1} implies that the solution to the problem can be written as a cutoff decision based on a $\bar{m}_t$ for which the FOC in (9) holds with equality at $c_t = \bar{m}_t$,

$$\bar{m}_t^{-\gamma} = \beta R\Big(\mu_{t+1}\,\delta_{\text{beq}}\,\left(b^{t+1}\right)^{-\gamma} + (1-\mu_{t+1})V'_{t+1}\big(p^{t+1}, \cdot\big)\Big).$$

We have

$$c_t(m_t, \cdot) = \begin{cases} m_t & \text{if } m_t < \bar{m}_t, \\ c_t^*(m_t, \cdot) & \text{otherwise,} \end{cases}$$

where $c_t^*(m_t, \cdot)$ solves (9) with equality. We can then write the derivative of the value function in period t as

$$\begin{aligned}
V_t(m_t, \cdot)' = &c'_t(m_t, \cdot)\left(c_t(m_t, \cdot)^{-\gamma} - \beta R\Big[\mu_{t+1}\,\delta_{\text{beq}}\, f_{t+1}^{-\gamma} + (1-\mu_{t+1})V'_{t+1}\big(m_{t+1}, \cdot\big)\Big]\right) \\
&+ \beta R\Big(\mu_{t+1}\,\delta_{\text{beq}}\, f_{t+1}^{-\gamma} + (1-\mu_{t+1})V'_{t+1}\big(m_{t+1}, \cdot\big)\Big).
\end{aligned}$$

Note that if the constraint $a_t = 0$ does not bind, the Envelope Theorem holds: the FOC binds with equality, and therefore

$$\begin{aligned} V_t(m_t, \cdot)' &= \beta R \Big(\mu_{t+1}\, \delta_{\text{beq}}\, f_{t+1}^{-\gamma} + (1-\mu_{t+1}) V'_{t+1}(m_{t+1}, \cdot) \Big) \\ &= c_t(m_t, \cdot)^{-\gamma}. \end{aligned}$$

If the constraint binds, then it must be that every unit of additional wealth is consumed, therefore

$$V_t(m_t, \cdot)' = c_t(m_t, \cdot)^{-\gamma}.$$

Therefore, we can recursively verify that the value function is continuously differentiable with respect to m, and the solution based on the FOC valid.

D.2 Solution with binding constraints

To solve the consumption-savings problem, I use the Endogenous Gridpoint Method (Carroll, 2006). Intuitively, rather than spanning a grid of current assets m_t and finding the optimal consumption decision c_t to it—which involves a costly root finding to solve (9)—one can instead find a grid of possible *savings* decisions a_t and find the wealth level m_t for which this savings decision is optimal by using the FOC.

For a given a_t, we have

$$\begin{aligned} m_{t+1} &= a_t \cdot R + p^{t+1}, \\ f_{t+1} &= a_t \cdot R + b^{t+1}, \\ c_t &= \Big(\mu_{t+1}\, \delta_{\text{beq}}\, f_{t+1}^{-\gamma} + (1-\mu_{t+1}) V'_{t+1}(m_{t+1}, \cdot) \Big)^{-\frac{1}{\gamma}}, \\ m_t &= c_t + a_t. \end{aligned}$$

We can use this to obtain the value function and its derivative at a wealth level m_t,

$$\begin{aligned} V_t(m_t, \cdot) &= \frac{c_t^{1-\gamma}}{1-\gamma} + \beta R \left(\mu_{t+1} \delta_{\text{beq}} \frac{(f_{t+1})^{1-\gamma}}{1-\gamma} + (1-\mu_{t+1}) V_{t+1}(m_{t+1}, \cdot) \right), \\ V'_t(m_t, \cdot) &= c_t(m_t, \cdot)' = c_t^{-\gamma}. \end{aligned}$$

By setting $a_t = 0$, we can find the cutoff level $\bar{m}_t$ at which the constraint binds, but the FOC holds with equality. For any $m_t < \bar{m}_t$, we therefore have

$$
\begin{aligned}
a_t &= 0, \\
m_{t+1} &= p^{t+1}, \\
f_{t+1} &= b^{t+1}, \\
c_t &= m_t, \\
V_t(m_t, \cdot) &= \frac{m_t^{1-\gamma}}{1-\gamma} + \beta R \left(\mu_{t+1} \delta_{\text{beq}} \frac{(f_{t+1})^{1-\gamma}}{1-\gamma} + (1-\mu_{t+1}) V_{t+1}(m_{t+1}, \cdot) \right), \\
V_t'(m_t, \cdot) &= c_t^{-\gamma}.
\end{aligned}
$$

This allows us to construct an approximation to both V_t and V_t' that accounts for the constraint binding. By interpolating these functions across m_t we can therefore repeat this step for period $t-1$, and recursively derive the life-cycle value of the product

$$\zeta_{ik} = V_0(w_0; \{\mu_t\}_{t=1}^T, \delta_{\text{beq}})$$

Algorithm

1. Solve for V_{T-1} and V'_{T-1} explicitly as seen for (8) above.
2. Using V_{T-1} and V'_{T-1}, solve for V_{T-2} and V'_{T-2} on a grid for a_{T-2} given by $[0, \bar{a}_{T-2}]$, where $\bar{a}_{T-2}$ denotes the maximum level of wealth attainable by the consumer at period $T-2$

   $$\bar{a}_{T-2} = R^{T-2} w_0 + \sum_{t=0}^{T-2} R^{T-2-t} p^t.$$

   This implies a grid for m_t, with its lowest point corresponding to $\bar{m}_{T-2}$.
3. Solve for V_{T-2} and V'_{T-2} on a grid for m_{T-2} given by $[p^{t-2}, \bar{m}_{T-2}]$
4. Interpolate V_{T-2} and V'_{T-2} across the implied grid for m_{T-2}.
5. Repeat steps 2-4 until period 0, using the interpolated values for V_{t+1} and V'_{t+1} at every step.

D.3 Solution in unconstrained case

The EGM is efficient and quick when accounting for the borrowing constraint is necessary in the optimization (i.e. when the retiree would otherwise optimally choose to borrow). Intuitively, retirees without taste for bequests (δ_{beq}), or those with low survival expectations and products that guarantee incidental bequests—such as the Phased Withdrawal or guaranteed annuities—could find it optimal to borrow in an unconstrained problem.

If the FOCs hold with equality throughout, we can use an alternative algorithm following Einav, Finkelstein, and Schrimpf (2010). Instead of solving the full backwards induction, we can write the problem as a maximization in terms of the initial consumption value c_0, using the FOC to derive the implied consumption and incidental bequest path.

Formally, define φ_t as the Lagrange multiplier when the first order conditions hold with equality

$$\beta^t(1-\mu_t)c_t^{-\gamma} = \varphi_t \quad \forall t \in \{0, 1, \ldots, T\}, \tag{R1}$$

$$\beta^t \mu_t \delta_{\text{beq}} f_t = -\varphi_t + \frac{1}{R}\varphi_{t-1} \quad \forall t \in \{1, 2, \ldots, T\}, \tag{R2}$$

$$a_t = m_t + p^t - c_t, \quad \forall t \in \{0, \ldots, T\}, \tag{R3}$$

$$m_{t+1} = a_t \cdot R + p^{t+1} \quad \forall t \in \{0, 1 \ldots, T-1\}, \tag{R4}$$

$$f_{t+1} = a_t \cdot R + b^{t+1} \quad \forall t \in \{0, 1 \ldots, T-1\}. \tag{R5}$$

One can solve for an implied path of consumption given a guess for initial consumption c_0.

Algorithm: Consumption path given c_0

1. Find a_0 from R3
2. Find m_1 from R4 and f_1 from R5
3. Find ϕ_0 from R1
4. Find ϕ_1 from R2
5. Finc c_1 from inverting R1
6. Repeat steps for $t \in \{1, \ldots, T\}$

This allows for writing and solving for the value function (and consumption/bequest path) by numerically maximizing with respect to c_0. When valid, the implementation is faster and more precise than backward induction using the EGM.

D.4 Implementation in estimation

Unit of utility The cardinality of the units of utility are important for the interpretation of the models' parameters and the identification of the model. As argued in Matejka and McKay (2015), the cost of information λ_i cannot be separately identified from the scale of the utility of the vector $\boldsymbol{\xi}_i$: the rational-inattention model predicts identical behavior from $\boldsymbol{\xi}_i$ being scaled by a constant and λ_i being divided by the same constant. It follows that λ_i can only be interpreted relative to the unit of $\boldsymbol{\xi}_i$, which must remain fixed within and across retirees with heterogeneous choice sets and preferences. The variance of the idiosyncratic shock ε_{ik} is only identified given this normalization. The intuition is identical to that of logit demand in characteristic space, which requires either a normalization of the coefficient on one attribute or the scale of the error term.

Given that the model is driven by variation in λ_i across individuals, the unit of utility must also remain comparable across and *within* retirees with different mortality hazards and bequest motives. The unit of utility should accurately capture the stakes of the decision as measured by the prior variance σ_i^2 or, more generally, the dispersion in the values of $\boldsymbol{\zeta}_i$. I therefore express all pension product values ζ_{ik} in terms of *wealth equivalents*. This approach resembles the one in Einav, Finkelstein, and Schrimpf (2010). For each considered product, I solve for the scalar $\mathbf{w}^{\mathbf{s}}_{\mathbf{ik}}$ that solves

$$\zeta_{ik} \stackrel{!}{=} \max_{\{c_{it},a_{it}\}_{t=0}^{T}} \mathbb{E}_{\mu_i}\left[\sum_{t=0}^{T}\beta^t u(c_{it}, f_{it}|s_{it}, d_{it})\right] \tag{10}$$

$$\text{s.t.} \quad a_{it} = m_{it} - c_{it}, \qquad m_{i,t+1} = a_{it}R,$$

$$f_{i,t+1} = a_{it}R, \qquad a_{it} \geq 0 \quad \forall t,$$

$$m_{i0} = \mathbf{w}^{\mathbf{s}}_{\mathbf{ik}} \cdot (w_0 + w_{\text{pension}}). \tag{11}$$

The interpretation of $\mathbf{w}^{\mathbf{s}}_{\mathbf{ik}}$ is as a *relative* wealth increase over the benchmark of the retiree having full disposal of their entire wealth, including pension savings w_{pension}. A value of 1 would imply that the pension product provides the same value as the optimal consumption path under full disposal.

Practical implementation The solution method outlined above, while efficient, is infeasible within the estimation routine for the choice model. Estimation would require solving the life-cycle problem for more than 100,000 pension products at every guess of the distribution of these parameters. Therefore, and given the dimensionality of the problem, I follow a similar approach to Einav, Finkelstein, and Schrimpf (2010) and solve the life-cycle problem for every individual and every product in their choice set *offline*, on a fixed grid of mortality shifters m, bequest motives δ_{beq} and outside wealth w. I impose a grid of 17 discrete integer values for the mortality shifters m, ranging from -15 to 15 following Illanes and Padi (2021). I impose a log-linear grid of 30 points between 0 and 30,000 for the bequest motives δ_{beq}. Finally, I allow five shares of wealth being held in pension savings, ranging from 20% to 100% in equal intervals.[44]

In this routine, I need to find the value of the product both with and without intermediary commissions, and at different annuity prices, which are needed for the counterfactual simulations. To ease the computational burden, I solve the life-cycle once for each individual, pension product, unobserved tuple $(m, \delta_{\text{beq}}, w)$. I then use Taylor approximations to obtain values at different values of the pension product streams $\{p^t, b^t\}_{t=0}^{T}$, taking advantage of the fact that the derivatives of the value function V_t' are computed and stored in the first solution. For a grid of 2550 points, a full run of the life-cycle solution for 13,420 retirees takes between 18 and 24 hours on a 32-core machine.

In a second step, I find the values of $\mathbf{w}^{\mathbf{s}}_{\mathbf{ik}}$ for all i and k. The equation in 10 can be used solving the method in D.3. I also leverage that these values are not specific to an individual i: given the same age, μ_i, δ_{beq}, and total wealth $w_0 + w_{\text{pension}}$, the problem is identical. I therefore solve the unconstrained problem across the grids of m, δ_{beq} and a coarsened grid of total wealth $w_0 + w_{\text{pension}}$ obtained from running a k-clustering algorithm on the full vector of possible values. I then interpolate across these grids to find $\mathbf{w}^{\mathbf{s}}_{\mathbf{ik}}$.

[44] A value of 20% implies that the wealth I see in the pension data corresponds to 20% of the retiree's total wealth.

Since the full choice model predicts decisions to be a function not only of the maximum value, but of the full vector $\boldsymbol{\zeta}_i$, I interpolate across this grid to find values outside it in the estimation routine. I impose that the mortality shifters and the wealth levels be solely contained in the discrete grids specified above. Therefore, I only interpolate across values of the taste for bequests, δ_{beq}. The interpolation is justified if the value of the product $V_0(w_0; \delta_{\text{beq}})$ is continuous with respect to the parameter δ_{beq}, which follows from Berge's Theorem of the Maximum.

I abstract from the interest rate risk in calculating the value of the Phased Withdrawal in the life-cycle model. Adding this risk would impose additional computational burden due to the additional state variable and require additional assumptions about beliefs on its distribution. I also abstract from explicitly modelling risk ratings of insurance companies when computing the value of annuities. Some evidence in the Chilean setting suggests that their interpretation is challenging (FNE, 2018b).

To adjust prices in counterfactuals, I follow the strategy described in the main text and keep markups over average annuity costs constant. To compute the actuarial cost of annuities, I set the interest rate R_0 used by the insurance companies to be the Phased Withdrawal rate plus 50 basis points.[45] Using this rate, I find average annuity markups of up to 20% for retirees in the lowest savings quartiles, and significantly smaller (or even negative ones) for those with larger savings. These findings are in line with other estimates of these markups (FNE, 2018a).

[45]This rate serves as a natural benchmark given the Phased Withdrawal acts as the outside option. See Figure A.14 for a description of the rate and its evolution over the sample period. FNE (2018b) highlight how the composition of the insurance companies' balance sheets has shifted away from fixed-income instruments and toward equity over the 2000s and 2010s. Setting R_0 to be the yield of Chilean 10-year inflation-indexed bonds instead results in vert similar consumer welfare results as shown in the main text, but negative markups.

E Intermediary sampling probabilities

In order to capture correlations between geographic location, pension savings, and demand for intermediation in the data, I impose that retirees must "find" advice before using it. Anecdotally, these patterns reflect both intermediary outreach and the role of word-of-mouth recommendations and referrals.

Retirees decide on the advice channel based on their expected utilities U_i^{NI}, U_i^{SA} and U_i^{IA}. If the expected utility of making decisions independently exceeds that of receiving advice, $U_i^{NI} > \max\{U_i^{SA}, U_i^{IA}\}$, the retiree chooses to be self-reliant. If the opposite is true, the retiree attempts to find advice and is succesful with some probability that depends on their location (province) and their pension savings. If the retiree is not succesful in finding an intermediary, they must choose pension products on their own. This framework can be interpreted as a stylized or limiting case of the sequential search model as in McCall (1970) or Hortaçsu and Syverson (2004), with one free search draw and infinite search costs.

Formally, assume wlog that $U_i^{IA} < U_i^{SA}$, and denote the probability of finding an intermediary of each type as p_i^{SA}, p_i^{IA}. The probability of using each channel $(s_i^{NI}, s_i^{SA}, s_i^{IA})$ is

$$s_i^{NI} = \begin{cases} 1 & \text{if } U_i^{NI} > U_i^{SA}, \\ 1 - p_i^{SA} & \text{if } U_i^{SA} > U_i^{NI} > U_i^{IA}, \\ 1 - p_i^{SA} - p_i^{IA} & \text{if } U_i^{IA} > U_i^{NI}, \end{cases} \qquad s_i^I = \begin{cases} 0 & \text{if } U_i^{NI} > U_i^I, \\ p_i^I & \text{if } U_i^I > U_i^{NI}, \end{cases} \qquad \text{for } I \in \{SA, IA\}.$$

Implementation in estimation The probabilities of using each channel above are discontinuous in the value of U_i^{NI}, U_i^{SA} and U_i^{IA}. In order to obtain a smooth likelihood that can be optimized using gradient-based methods, I introduce a shock to the value of U_i^{NI}, $\epsilon_i \sim \mathcal{N}(0, \sigma_\epsilon^2)$. Maintaining wlog that $U_i^{IA} < U_i^{SA}$, this yields

$$\begin{aligned}
\Pr(U_i^{NI} + \epsilon_i > U_i^{SA}) &= 1 - \frac{1}{2}\left(1 + \operatorname{erf}\left(\frac{U_i^{SA} - U_i^{NI}}{\sqrt{2\sigma_\epsilon^2}}\right)\right), \\
\Pr(U_i^{SA} > U_i^{NI} + \epsilon_i > U_i^{IA}) &= \frac{1}{2}\left(\operatorname{erf}\left(\frac{U_i^{SA} - U_i^{NI}}{\sqrt{2\sigma_\epsilon^2}}\right) - \operatorname{erf}\left(\frac{U_i^{IA} - U_i^{NI}}{\sqrt{2\sigma_\epsilon^2}}\right)\right), \\
\Pr(U_i^{IA} > U_i^{NI} + \epsilon_i) &= \frac{1}{2}\left(1 + \operatorname{erf}\left(\frac{U_i^{IA} - U_i^{NI}}{\sqrt{2\sigma_\epsilon^2}}\right)\right).
\end{aligned}$$

In estimation, I set σ_ϵ^2 to be 0.001^2.

I parameterize the sampling probabilities of each intermediary to depend on the individual's savings s and their geographic location (province p). In particular, the probability of finding intermediation depends on the share of intermediated retirees a year prior, $k_{p,t-1}$. The probability of running into either a sales agent or an independent advisor depends on the relative numbers of both advisors in that province, h_{pt}.

The sampling probabilities then read

$$\begin{aligned}
p_{NI} &= \frac{1}{1+\exp\left(\phi k_{p,t-1}+\eta s_i+\eta_2 s_i^2+\zeta(1-h_{pt})\right)+\exp\left(\phi k_{p,t-1}+\eta s_i+\eta_2 s_i^2+\zeta h_{pt}\right)}, \\
p_{SA} &= \frac{\exp\left(\phi k_{p,t-1}+\eta s_i+\eta_2 s_i^2+\zeta(1-h_{pt})\right)}{1+\exp\left(\phi k_{p,t-1}+\eta s_i+\eta_2 s_i^2+\zeta(1-h_{pt})\right)+\exp\left(\phi k_{p,t-1}+\eta s_i+\eta_2 s_i^2+\zeta h_{pt}\right)}, \\
p_{IA} &= \frac{\exp\left(\phi k_{p,t-1}+\eta s_i+\eta_2 s_i^2+\zeta h_{pt}\right)}{1+\exp\left(\phi k_{p,t-1}+\eta s_i+\eta_2 s_i^2+\zeta(1-h_{pt})\right)+\exp\left(\phi k_{p,t-1}+\eta s_i+\eta_2 s_i^2+\zeta h_{pt}\right)}.
\end{aligned}$$

F Robustness exercises

F.1 Mixed prior

The benchmark results rely on assuming a flat prior: retirees are uninformed about any differences between pension products, and assume the realizations of utilities are the same across all options. The prior means are therefore identical across products. Individuals are also assumed to be aware of the actual variance of the utilities in their choice set. Prior means ξ_{ik}^0 and variance σ_i^2 are therefore set to

$$\xi_{ik}^0 = \frac{1}{N}\sum_{k=1}^{N}\zeta_{ik} =: \bar{\zeta}_i, \qquad \nu_i^2 = \alpha_{\nu_i^2}\mathrm{var}(\zeta_{ik}) = \alpha_{\nu_i^2}\frac{1}{N}\sum_{k=1}^{N}\left(\zeta_{ik} - \bar{\zeta}_i\right)^2, \qquad \sigma_i^2 = (1+\alpha_{\nu_i^2})\mathrm{var}(\zeta_{ik}).$$

This assumption significantly restricts the ability of retirees to select into products based on their preferences over pension products. In particular, it implies that retirees with a higher taste for annuities –those who live longer, or care less about leaving bequests– will only demand intermediation differently than other retirees insofar as the *stakes* involved in the decision are different (see discussion in the main text). In particular, this assumption makes it likely the model will interpret systematic differences in choices between intermediated and self-reliant retirees as a sign of intermediary distortions, as opposed to taste-based selection into the intermediaries themselves.

To relax this assumption, I re-estimate the model allowing for a *mixed* prior. Concretely, I allow individuals to have some knowledge about their idiosyncratic financial/life-cycle value of a product through their prior mean ξ_{ik}^0,

$$\xi_{ik}^0 = \theta\zeta_{ik} + (1-\theta)\bar{\zeta}_i,$$

where θ is an additional parameter to be estimated and controls the degree of ex-ante knowledge held by retirees. Note that $\theta = 0$ corresponds to the benchmark case, while $\theta = 1$ implies that retirees are perfectly aware of the financial utility from each product in their choice set, and need only acquire costly information in order to resolve the uncertainty about the idiosyncratic taste shock ε_{ik} of each product. The latter case corresponds to rational expectations, and would lead to the conclusion that intermediaries always improve consumer welfare, except for any price effects from adverse selection. This result follows from retirees only using intermediaries when their expected values justify it.

I set the variance of the prior to

$$\sigma_i^2 = (1-\theta^2+\alpha_{\nu^2})\mathrm{var}(\zeta_{ik}),$$

observing that assuming knowledge about a share θ of the uncertainty translates to a share of θ^2 of the variance.[46]

[46]In other words,

$$\mathrm{var}(\theta x + (1-\theta)\mathbb{E}[x]) = \theta^2\mathrm{var}(x).$$

Identification θ is identified through the exposure to intermediaries across different geographic locations, which acts as an instrument shifting retirees into (or out of) advice. The key variation is in the choices of *non-intermediated* retirees across provinces and how it comoves with intermediary exposure. Intuitively, the question is which individuals act as compliers with respect to the instrument. If demand for intermediation is driven by preferences over products, and retirees with higher taste for annuities are more likely to seek intermediation all else equal, the *composition* of the self-reliant pool should vary across geographic regions. Provinces with less exposure to intermediaries will feature a higher rate of individuals with higher taste for annuities, whereas regions with large exposure will feature less. This composition change predicts a negative relationship between the share of annuitants in the self-reliant population, and the exposure to intermediaries in that province. If, however, selection into intermediaries is not driven by preferences over pension products, the composition across provinces should remain roughly similar, and no such correlation should arise.[47]

Table F.19: Geography and annuitization of self-reliant retirees

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share intermediated, sample (2-quarter lag)	-0.0627	0.0212						
	(0.0230)	(0.0262)						
Share intermediated, other retirees (2-quarter lag)			-0.0156	-0.0403				
			(0.0293)	(0.0339)				
'Effective' registered intermediaries (2-quarter lag)					0.237	-0.0373		
					(0.0240)	(0.0572)		
Effective active intermediaries (2-quarter lag)							-0.177	0.0112
							(0.0188)	(0.0481)
Share annuitizing (3-quarter lag)	0.627	0.0507	0.617	0.0569	0.532	0.0499	0.574	0.0502
	(0.0222)	(0.0288)	(0.0224)	(0.0291)	(0.0215)	(0.0286)	(0.0205)	(0.0287)
Demographic controls	✓	✓	✓	✓	✓	✓	✓	✓
Price control	✓	✓	✓	✓	✓	✓	✓	✓
Province FE		✓		✓		✓		✓
Year-Quarter FE	✓	✓	✓	✓	✓	✓	✓	✓
Savings ventile FE	✓	✓	✓	✓	✓	✓	✓	✓
Cost ventile FE	✓	✓	✓	✓	✓	✓	✓	✓
R^2	0.137	0.154	0.137	0.154	0.138	0.154	0.138	0.154
N	64846	64846	64819	64819	64844	64844	64844	64844

Notes: This table shows coefficients from a regression of annuitization (dummy) on different measures of prevalence of intermediation at the province, the share of non-intermediated retirees annuiziting in the province, and other controls in the SCOMP data. Columns (1) and (2) use the share of retirees in the sample that used an intermediary in the province, two quarters before the observation. Columns (3) and (4) use the share of retirees *not* in the sample—those with other legal dependents, retiring early, due to disability, or selecting a survival benefit—that choose intermediation in the province itwo quarters before the observation. Columns (5) and (6) use the "effective" number of registered intermediaries retirees (number of intermediaries divided by total number of retirements) in that province, two quarters before the observation. Columns (7) and (8) use the "effective" number of *active* intermediaries —those intermediating at least one retiree in that quarter-province—, two quarters before the observation. Demographic controls include a quadratic polynomial in retirees' and partners' age and sex. Price control is the CNU ratio observed for annuities vs PW.

Table F.19 shows the result of these regressions in the data, using a variety of different measures of geographic exposure to intermediaries. The results vary across specifications and measures, showing small positive or negative correlations that vanish once controlling for province fixed effects. The exercise therefore suggests that the role of preferences in guiding demand for intermediaries is limited.

The model can also use the relationship between individuals' survival and their demand for intermediation to inform the parameter. Intuitively, if longer lived retirees select into intermediaries due to

When $\theta = 1$, all uncertainty is given by the idiosyncratic shock through α_{ν^2}, as desired.

[47] I thank Mark Egan for suggesting this exercise.

Table F.20: Mixed prior – consumer welfare

	Ban	Ban (prices)	De-bias	De-bias (prices)
Consumer welfare changes (in %)	-0.3	-1.4	2.2	1.1
Not intermediated in benchmark	–	-1.0	0.2	-1.0
Information costs	–	-0.4	0.2	-0.3
Choices	–	0.1	0.0	0.1
Commissions	–	0.0	-0.0	-0.0
Taste shock	–	-0.0	-0.0	-0.0
Price changes	–	-0.7	0.0	-0.8
Intermediated in benchmark	-0.6	-1.8	4.7	3.6
Information costs	-3.9	-4.4	0.0	-0.0
Choices	2.8	3.0	4.7	4.6
Commissions	0.3	0.3	-0.0	-0.0
Taste shock	0.1	0.1	0.0	-0.1
Price changes	0.0	-0.9	0.0	-0.9

Notes: This table shows cost changes of different annuity products due to shifts in adverse selection across counterfactuals. Costs are expressed as percentages relative to the benchmark. The upper (lower) section reports effects for 65-year-old retirees in the lowest (highest) savings quartile. The first and third columns show cost changes assuming choices adjust but prices remain fixed. The second and fourth columns show cost changes consistent with equilibrium selection patterns, as detailed in Section 7 of the main text.

their taste for annuities, there should exist a correlation between longevity and intermediation. As seen in Figure 4a in the main text, the data shows little evidence of this relationship, reinforcing that demand for intermediation is driven by factors other than longevity.

Results Table F.23 shows parameter estimates and welfare impacts under this specification. The estimated θ is around 0.12, suggesting individuals have little knowledge of their idiosyncratic values and that further selection into intermediaries based on preferences is limited. In line with this, the adverse selection into intermediaries remains roughly similar to the benchmark, with a difference in life expectancies between self-reliant and intermediated retirees of less than a year.[48] I recover slightly larger information costs under this specification, as well as more dispersion in survival expectations and a higher taste for bequests.

Turning to the welfare effects of counterfactual policies, allowing for selection into intermediaries based on taste leads to larger predicted welfare losses of banning them: before accounting for the adverse selection, the computed loss is of 0.3% of wealth. The adverse selection impacts are stronger across both counterfactuals, which may be reflective of the larger estimated heterogeneity in longevity. This combination yields a total loss from a ban of intermediaries of about 1.4% of wealth. Overall, the quantitative and qualitative gains or losses of the policies are very much in line with those obtained from the benchmark model: a ban on intermediaries does not lead to an improvement in consumer welfare despite the intermediary agency problem, and the access to intermediaries prevents larger gains from de-biasing intermediaries.

[48] Consistent with this, manually inputting higher values of θ induces stronger adverse selection patterns.

F.2 Random assignment to intermediaries

In line with the anecdotal and descriptive evidence presented in Section 3, the model assumes that selection into intermediaries is based on an unobserved need for advice that varies across individuals. In the model, this friction is captured by the cost of acquiring information, λ_i.

A concern with this specification is that it imposes retirees are aware of the nature and size of commissions, as well as the distortion introduced by intermediaries. If retirees in the data are not aware of the intermediary commissions when they seek out advice, they may overestimate the value of intermediation, and a ban may help them avoid costly distortions.

To partly address this concern, I consider an alternative model specification where retirees' demand for intermediaries is unrelated to their information cost. I retain the assumption that decisions made without advice are subject to costly information frictions and a flat/uninformed prior, but impose that intermediation happens completely at random across retirees. Intuitively, this specification maximizes the role of intermediary distortions. Given the flat beliefs, the model must explain any systematic difference in annuitization choices between intermediated and self-reliant retirees as arising from biased advice. The welfare gains from banning intermediaries —absent price effects of adverse selection—should therefore be larger than in the benchmark.

Identification Absent demand for intermediaries being driven by information costs, the model must infer costs of information acquisition solely from differences in choice probabilities between self-reliant and intermediated retirees. Any additional unexplained variation or "noise" in choices of non-intermediated retirees relative to intermediated ones will inform the magnitude of λ_i. Figure A.23 shows this intuition, which applies closely to this case given the assumption that intermediation is randomly assigned.

Results Table F.22 shows the consumer welfare results. The gain from a ban is of about 1.5% of wealth, which is reduced to about 0.5% after accounting for the increase in adverse selection. Intermediated retirees benefit more from the ban, as the avoided distortions are more than twice the costs of acquiring information. Price increases are larger across both counterfactuals, reflecting stronger adverse selection leading to cost increases of up to 9.5% for guaranteed and deferred annuities. Gains from de-biasing are overall very similar to the benchmark. Self-reliant retirees lose more from lack of access to intermediaries and stronger adverse selection.

F.3 Intermediation as default channel

The benchmark model assumes that retirees are always able to make decisions on their own, but may face hurdles in finding an intermediary when they prefer to be advised. In the data, there is a strong observed relationship between the probability of intermediation and both geographic region and pension savings (Figures 3 and A.16). Given the structure of choices, the model interprets these patterns as suggesting availability plays a significant role in shaping demand for intermediation.

Table F.21: Random intermediation – consumer welfare

	Ban	Ban (prices)	De-bias	De-bias (prices)
Consumer welfare changes (in %)	1.5	0.5	2.6	1.5
Not intermediated in benchmark	–	-0.9	0.0	-1.1
Information costs	–	-0.2	0.0	-0.2
Choices	–	0.1	0.0	0.1
Commissions	–	0.0	0.0	0.0
Taste shock	–	-0.0	0.0	-0.0
Price changes	–	-0.8	0.0	-0.9
Intermediated in benchmark	3.1	2.0	5.4	4.3
Information costs	-1.9	-2.1	0.0	0.0
Choices	4.6	4.7	5.4	5.1
Commissions	0.3	0.3	0.0	0.0
Taste shock	0.1	0.1	0.0	-0.1
Price changes	0.0	-0.9	0.0	-0.8

Notes: This table shows cost changes of different annuity products due to shifts in adverse selection across counterfactuals. Costs are expressed as percentages relative to the benchmark. The upper (lower) section reports effects for 65-year-old retirees in the lowest (highest) savings quartile. The first and third columns show cost changes assuming choices adjust but prices remain fixed. The second and fourth columns show cost changes consistent with equilibrium selection patterns, as detailed in Section 7 of the main text.

A concern is that this mechanism may be driving the consumer welfare results by underestimating the extent and damage of intermediary distortions. To address this concern while retaining the ability of the model to match the observed patterns, I estimate an alternative version of the model. I set the "default" option of intermediation channel to be a sales agent or an independent advisor. If the expected utility of making decisions on one's own exceeds that of being advised, the retiree has a probability of being sucessful in "rejecting" intermediation. This formulation retains a role for geography, word-of-mouth, and intermediary outreach, while relaxing the role of availability in determining consumer welfare impacts.[49]

Identification The same identification arguments as in the main text apply. The difference is in the interpretation of the patterns: the model now interprets the large exposure to intermediation as "preventing" retirees from making decisions on their own. As such, the model can rationalize the take-up of advice even in the absence of larger information acquisition costs.

Results Table F.23 shows the parameter estimates. Consistent with the intuition above, the recovered information costs are significantly smaller, which reduces the importance of the choice frictions: self-reliant retirees choose the highest-value annuity almost always, and spend only about 0.4% of wealth in acquiring information. Distortions, on the other hand, still lead to about a 4% loss in wealth.

Table F.22 shows the consumer welfare estimates. A ban leads to a 0.3% gain after accounting for adverse selection. The gains from de-biasing intermediaries are no longer restricted by the availability

[49]Anecdotal evidence suggests that retirees with significant pension savings are very likely to be contacted by intermediaries offering their services. However, intermediaries are less likely to approach those at the bottom of the savings distribution.

Table F.22: Default intermediation – consumer welfare

	Ban	Ban (prices)	De-bias	De-bias (prices)
Consumer welfare changes (in %)	1.6	0.3	2.1	0.9
Not intermediated in benchmark	–	-1.1	0.3	-0.8
Information costs	–	-0.0	0.4	0.4
Choices	–	-0.2	0.0	-0.2
Commissions	–	0.0	-0.1	-0.1
Taste shock	–	-0.1	-0.0	-0.0
Price changes	–	-0.9	0.0	-0.9
Intermediated in benchmark	3.1	1.6	3.9	2.5
Information costs	-1.1	-1.1	0.0	-0.0
Choices	3.8	3.6	3.9	3.7
Commissions	0.3	0.3	-0.1	-0.1
Taste shock	0.0	-0.0	0.0	-0.1
Price changes	0.0	-1.1	0.0	-1.1

Notes: This table shows cost changes of different annuity products due to shifts in adverse selection across counterfactuals. Costs are expressed as percentages relative to the benchmark. The upper (lower) section reports effects for 65-year-old retirees in the lowest (highest) savings quartile. The first and third columns show cost changes assuming choices adjust but prices remain fixed. The second and fourth columns show cost changes consistent with equilibrium selection patterns, as detailed in Section 7 of the main text.

of intermediaries, which is guaranteed by assumption. However, the low information costs also imply the gains for self-reliant retirees are smaller: despite all retirees accepting advice, their gain from is of just 0.3%. Intensified adverse selection once again erodes a sizeable share of the benefits from aligned incentives.

Table F.23: Robustness checks – parameter estimates

Parameter	Benchmark	Mixed prior	Random int.	Default int.	Description
Choice model					
$\bar{\lambda}$	0.043	0.071	0.019	0.005	Mean information cost
	(0.00116)	(0.00356)	(0.00163)	(0.00008)	
c^{SA}	0.277	0.340	0.330	0.333	Bias of sales agent
	(0.00972)	(0.01005)	(0.01379)	(0.00793)	
c^{IA}	0.204	0.228	0.242	0.241	Bias of independent advisor
	(0.00780)	(0.00683)	(0.00958)	(0.00929)	
Intermediary sampling					
ϕ	2.619	2.555	2.286	3.890	Past intermediation in province
	(0.18914)	(0.18458)	(0.16757)	(0.36453)	
η_1	-1.375	-1.410	-1.718	-2.036	Log savings
	(0.05348)	(0.05199)	(0.05039)	(0.08543)	
η_2	0.134	0.138	0.181	0.185	Log savings squared
	(0.00628)	(0.00611)	(0.00608)	(0.00870)	
θ	1.590	1.624	1.597	0.994	Share of ind. adv. in province
	(0.05383)	(0.05357)	(0.05241)	(0.06860)	
Preferences					
σ_m^2	24.268	54.965	46.796	83.200	Variance of mortality shifters
	(2.71965)	(3.40860)	(4.47604)	(4.66288)	
μ_m^1	2.861	1.691	1.967	0.865	
	(–)	(–)	(–)	(–)	Implied mean of mortality shifters
μ_m^2	2.117	0.854	1.156	-0.063	(by savings quartile)
	(–)	(–)	(–)	(–)	
μ_m^3	0.379	-1.023	-0.677	-2.105	
	(–)	(–)	(–)	(–)	
μ_m^4	-1.558	-3.055	-2.673	-4.285	
	(–)	(–)	(–)	(–)	
μ_{beq}	575.898	1130.846	960.403	2666.022	Bequest motive
	(36.08395)	(2.69928)	(81.92449)	(251.84539)	
Z_{beq}	0.072	0.088	0.083	0.099	Mass at 0 for bequest motive
	(0.00011)	(0.00646)	(0.00629)	(0.00605)	
α_{ν^2}	0.297	0.419	0.354	0.504	Variance of idiosyncratic shock (multiplier)
	(0.00649)	(0.02928)	(0.01824)	(0.01916)	
θ	–	0.127	–	–	Weight on true ζ_{ik} in prior mean
	(–)	(0.01189)	(–)	(–)	

Notes: This table shows the results from the Simulated Maximum Likelihood estimation for the benchmark model and the alternative specifications in Appendix F.1 through F.3. Standard errors are computed using the "sandwich" formula $\hat{H}^{-1}\hat{G}\hat{H}^{-1}$, with $\hat{H}$ an estimate of the Hessian, $\hat{G}$ an estimate of the outer product of the scores.