Chilean Long-Term Health Insurance: Lapsing in Markets with Guaranteed Renewable Contracts

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Abstract

In theory, guaranteed renewable (GR) insurance contracts can efficiently protect individuals against reclassification risk without the negative side effects of price regulation, such as adverse selection. For these contracts to work properly, consumers must pay front-loaded premiums when healthy and stick with their contracts for many years in order to subsidize their future high-risk selves. This paper studies lapsing in the Chilean private health insurance market, a system characterized by the offering of GR contracts and that provides access to health care to more than 15% of the population in Chile. I find that most policyholders lapse their insurance plans just a few years after signing their contracts, with less than 27% of them staying in the same plan after 70 months. I show that policies and lapse patterns predicted by standard theoretical models of long-term contracts are the opposite of those observed empirically. Finally, premiums increasing over time, and consumers lapsing their contracts because of these price fluctuations, are a key determinant of insurers' profits. These characteristics have led to a system in which consumers feel uncertain about their future health care coverage, the opposite goal of long-term contracts.

Keywords— lapsing; long-term health insurance; guaranteed renewable contracts; individual private health insurance

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1 Introduction

Guaranteed renewable (GR) insurance contracts guarantee that the terms of a policy will not be cancelled or modified, even if the policyholder develops a medical condition. They are popular in insurance markets such as term life insurance and long-term care insurance. In theory, such contracts can mitigate reclassification risk—the exposure of individuals to substantial premium increases due to changes in health status—without causing adverse selection. The intuition is that consumers pay front-loaded premiums to guarantee affordable coverage in the future, regardless of any possible negative health shocks.

In standard models of perfectly competitive health insurance markets with long-term contracts and insurer commitment to a smooth price schedule, individuals purchase a contract when young and healthy and rationally decide to stick with their plans in order to subsidize their future old and high-risk selves. In this environment, lapsing only occurs by healthy consumers trying to find a lower price in the spot market (*i.e.* reclassification risk, see Ghili et al., 2022 among many others). In imperfectly competitive markets without insurer commitment, however, there are multiple reasons that could lead to policyholders lapsing their contracts besides reclassification risk. For example, consumers might be sensitive to premium (or income) fluctuations and lapse their contracts in response to them.[1] If firms internalize these lapses, this might lead to a lapse-supported pricing equilibrium, in which premiums changing, and consumers leaving their contracts, are a main component of insurers' profits (Gottlieb and Smetters, 2021).

This paper studies lapsing in the Chilean private health insurance market, a system characterized by the offering of GR contracts, using detailed market-wide claim-level data from 2013 to 2016. In particular, I document that the annual switching rate in the market is high, especially compared to switching rates in health insurance markets offering short-term contracts, and that most policyholders lapse their insurance plans just a few years after signing their contracts, with less than 27% of them staying in the same plan after 70 months. Overall, policies and lapse patterns predicted by standard theoretical

[1] Another plausible reason for consumers to lapse their contracts is that consumers' preferences for plans might evolve over time. For example, a female policyholder might want to switch plans during her childbearing age in order to get access to hospitals with better maternity care (Atal, 2019).

models of long-term contracts are the opposite of those observed empirically in Chile. Finally, in line with a lapse-supported pricing equilibrium, I find that premiums increasing over time, and consumers lapsing their contracts because of those price changes, are a key determinant of insurers' profits. These characteristics have led to a system in which consumers feel uncertain about their future health care coverage, the opposite goal of long-term contracts.

The Chilean health care system provides a unique setting for this type of study for at least two reasons. First, Chile has one of the very few health insurance markets, in addition to Germany, featuring GR contracts. By law, Chilean workers must choose between a public option (generally considered of low quality) or a private market with contracts offering guaranteed renewability. In contrast to the typical annual short-term health insurance contracts available in the U.S., individuals in GR contracts can stay in their plans as long as they wish (*i.e.* one-sided commitment) and non-price characteristics of the contract are fixed over time. Prices can change but in a limited way. Specifically, premium changes are community rated; that is, price adjustments over the lifecycle of a contract are independent of changes in policyholders' health status. Second, unlike other insurance markets with GR contracts, such as the German private health insurance market or the U.S. term life insurance market, the Chilean regulator gives researchers access to unusually rich market-wide individual-level data, thus allowing for a detailed characterization of lapsing patterns in a health insurance market offering long-term contracts. Moreover, the private market is relevant on its own as it provides access to health care to more than 15% of the Chilean population, or almost 3.5 million people.

I begin by providing reduced-form evidence of lapsing in the Chilean private health insurance system. In particular, the annual lapsing rate in the market is almost 20%, a high rate considering that this is a market offering GR contracts. For example, the annual switching rate in U.S. private health insurance markets offering short-term contracts, and with a public option, is only around 10% (KKF, 2022). Moreover, I find that less than 27% of policyholders signing a new contract stay in the same plan after 70 months, with young enrollees being more likely to lapse early in their contracts. This is a potential contradiction to the goal of long-term contracts, in which individuals are supposed to pay front-loaded premiums when young and healthy and stick with their policies for many years in order to

subsidize their future old and high-risk selves.

Consumers lapsing their policies could undermine the effectiveness of long-term contracts in health insurance markets, especially if the reasons policyholders are leaving their plans are not only related to positive health shocks (*i.e.* reclassification risk). For example, insurers' ability to adjust premiums over time might induce individuals to leave their GR contracts. In line with this, I show that premium (and income) fluctuations are strong predictors of lapsing in the Chilean system. Specifically, in the case of premium changes, I find that they increase the probability of policyholders lapsing their contracts by four, and that, in response to them, consumers move to lower quality plans in order to avoid paying higher prices. Furthermore, these lapsers are more likely to be high-risk than stayers, which is in direct contrast to the predictions from the standard models of long-term insurance contracts.

Finally, I test the predictions of the lapse-supported pricing theory introduced by Gottlieb and Smetters (2021), and tested in the term life insurance industry in the U.S. They argue that lapses in that industry are not explained by the rational models of long-term contracts (*i.e.* by reclassification risk). Instead, these lapses are induced by the pricing strategies used by insurers, and they are a big component of companies' profits. In line with their model predictions, in Chile I find that most policies sold would lose money without prices changing and the corresponding lapses. In practice, the majority of policies are indeed profitable, with premiums increasing over time being a main determinant of insurers' profits.

In terms of policy implications, anecdotal evidence from local news suggests that insurers adjusting their prices over time is a common practice and that consumers are highly affected by these changes. Specifically, premium fluctuations, and the lapses induced by them, have led to a market in which consumers do not feel certain nor secure about their health insurance coverage in the future, which is the main purpose of designing a health insurance market offering long-term contracts, leading to high rates of dissatisfaction among enrollees. For example, between 2011 and 2015, in a survey of policyholders, only 43% answered that they were satisfied (or very satisfied) with the private system (Superintendencia, 2020). Possible solutions to get closer to the efficient and welfare improving contracts designed by Ghili et al. (2022) are for regulators to be more involved in how premiums are set initially, in order to help insurers set optimal front-loaded prices, to make long-term contracts insure against income fluctuations

as well, and to regulate the way in which companies can adjust their premiums over time.

This paper contributes to the broad literature of long-term contracts in insurance markets. Recent studies highlight the potential benefits of GR contracts and ask whether they should be implemented in health insurance markets in the U.S.[2] Ghili et al. (2022) charactize optimal long-term insurance contracts with one-sided commitment, as in Harris and Holmstrom (1982) and Hendel and Lizzeri (2003), and find that in certain scenarios, these contracts can achieve higher consumer welfare than ACA-like contracts. Similarly, Atal et al. (2020) show that GR contracts in Germany, despite not being optimally designed, obtain similar welfare outcomes as those in Ghili et al. (2022). These studies' favorable evaluation of long-term contracts are based on assumptions such as perfect competition, insurers' commitment to an optimally designed smooth premium schedule, and the absence of income uncertainty, because income paths are flat or consumers have perfect foresight of their income paths. In the Chilean setting, however, the market is characterized by a small number of firms that adjust their premiums constantly, and with consumers facing both premium and income fluctuations.

Empirical studies of health insurance markets with long-term contracts are rare because few health insurance markets offer these contracts. Pauly and Herring (2006) show evidence of front-loaded prices in GR contracts in the individual market in the pre-ACA period. In the context of the small group market pre-ACA, Fleitas et al. (2020) document limited dynamic pass through of expected medical costs into premiums, and provide evidence that GR contracts indeed give protection against reclassification risk. Browne and Hoffmann (2013) study the German private health insurance market and find that front-loading in premiums generates lock-in of consumers. Furthermore, they document that consumers that lapse their contracts are healthier than those who do not. Closest to this paper, Atal (2019) and Figueroa (2023) investigate how contract lock-in and adverse selection, respectively, can impact the functioning of long-term contracts in the Chilean health insurance system. This paper complements the literature by documenting that policies and lapse patterns predicted by standard theoretical models of long-term contracts are the opposite of those observed empirically in Chile.[3]

[2]In the case of policy research in the U.S., to name some examples, Cochrane (2017) and Pope (2020) advocate for long-term contracts to replace the current short-term contracts in the individual market, and Duffy et al. (2017) from RAND posit the question of whether the individual market could perform better under long-term contracts.

[3]There is also a growing number of studies that examine why consumers lapse contracts in the term life insurance

The remainder of the paper is organized as follows. Section 2 describes the main institutional details of the Chilean health insurance system and introduces the data. Section 3 documents lapsing rates in the private market and studies why policyholders lapse their plans. Section 4 provides evidence of lapse-supported pricing and section 5 discusses the implications of this pricing strategy in the market and potential solutions. Section 6 concludes.

2 Institutional Framework and Data

The insurance system in Chile combines public and private provision.[4] The safety net public option, FONASA, is a pay-as-you-go system financed by the contributions of affiliates and public resources. The private sector—operated by a group of insurance companies—is a regulated health insurance market. In 2015, FONASA covered 77.3% of the population and the private system covered 15.1%. The remainder of the population is presumed to be affiliated with special healthcare systems such as those of the Armed Forces or to not have any coverage at all.[5]

Workers and retirees have the obligation to contribute 7% of their wages to the public system, or to buy a plan that costs at least 7% of their wages in the private system, with a cap of $207 per month.[6] The two systems differ in many respects, including provider access, premiums, coinsurance structure, exclusions, and quality. Unlike the private sector, in FONASA there are no exclusions based on pre-existing conditions, nor pricing based on age or gender, and there is no additional contribution for dependents. As a consequence, the private sector serves the richer, healthier, and younger portion of the population (Pardo and Schott, 2013).

The private health insurance market is comprised of 13 insurance companies, which are classified into two groups: six *open* (available to all workers) and seven *closed* (available only to workers in certain

industry (*e.g.* Fang and Kung, 2021 and Gottlieb and Smetters, 2021) and the consequences of premium adjustments over time in the long-term care insurance market (*e.g.* Aizawa and Ko, 2023).

[4]The details of the Chilean health care system have already been described elsewhere, in particular Duarte (2012), Atal (2019), Cuesta et al. (2019) and Pardo (2019). I draw from those papers heavily in this section.

[5]See Figure A.1 for historical market shares in each segment of the health insurance market in Chile.

[6]All monetary amounts are measured in U.S. dollars using the exchange rate on December 2016 unless noted otherwise.

industries). This paper focuses only on *open* insurers, which account for 96% of the private market. Contracts in the private sector are, for the most part, individual arrangements between the insured and the insurance company. A key feature of these contracts is that they offer guaranteed renewability, meaning that enrollees can stay in their health insurance plans as long as they wish. Furthermore, insurers cannot change the characteristics of these plans over time. Only the price can change but in a limited way in order to protect consumers from reclassification risk (see details below). Once a policyholder has been in a contract for one year, she may lapse her contract and switch to another company. Switching plans within an insurer is allowed at any time.

Base premium and risk-rating factors

The monthly premium for individual i under plan j in year t, P_{ijt}, is a combination of a base premium P^B_{jt} and a risk-rating factor r_i so that:

$$P_{ijt} = P^B_{jt} \times r(enroll\ age_i, gender_i) \tag{1}$$

where $r(enroll\ age_i, gender_i)$ is the risk-rating factor, which is a function of age at enrollment and gender. These factors are fixed over time as long as enrollees stay in their plans. For dependents, there is a similar $r(enroll\ \ age_i, gender_i)$ function and the full premium of the plan in that case is the base price P^B_{jt} multiplied by the sum of the risk-rating factors r_i of each member of the family. A couple of features of the market restrict the extent to which private firms can risk-rate their plans when individuals enroll. First, base premiums are set at the plan (and not the individual) level. Second, the r function is not individual-specific: each firm can have at most two r functions.[7]

Several features of the plan determine the base premium P^B_{jt}. A plan has two main coinsurance rates, one for inpatient care and another for outpatient care. Unlike in the U.S., plans do not include deductibles and out-of-pocket maximums. Additionally, plans offer either unrestricted open networks or tiered networks.[8] Hospitals in Chile cannot deny health care to patients, and therefore all consumers have

[7]These factors were mainly used to adjust premiums based on expected health care costs differences between demographic groups. In Figure A.2 in the Appendix I plot risk-rating factors for a representative company and expected costs by demographic groups in 2016. For more details regarding risk-rating factors, see Figueroa (2023).

[8]Unrestricted network plans provide the same coverage for all hospitals. Tiered networks offer differentiated

access to all hospitals, although they may have zero coverage from their plan.[9]

Premium adjustments

Base premiums are indexed to inflation, and adjustments to the base premium in real terms can be made once a year. In March of each year, companies must inform the regulator of their projected premium increases for the year. Each company must also inform their clients (through letters) about these increases, justify their reasons for the changes, and offer alternative contracts to their clients that keep monthly premiums more or less constant but that often imply lower coverage.

Reclassification could occur if firms could adjust the base premium P^B_{jt} of any given plan j based on the health status of the pool of enrollees in j. However, the market regulation involves also a restriction that limits the extent of reclassification of individuals already in a contract: the increase in P^B_{jt} of any particular plan j of insurer k cannot be higher than 1.3 times the weighted average price increase of all plans of insurer k. Formally

$$\frac{P^B_{jt+1} - P^B_{jt}}{P^B_{jt}} \leq \frac{1.3}{|J_k|} \sum_{j' \in J_k} \frac{P^B_{j't+1} - P^B_{j't}}{P^B_{j't}} \tag{2}$$

where J_k is the set of plans of company k.

Figure A.4 in the Appendix suggests that this regulation works in limiting the extent of reclassification risk. For the season 2013/2014, which is representative of the pattern for all years in the sample, 5 out of 6 companies applied the same percentage price increase to all their plans, and the sixth firm increased its prices within a narrow window of 2.2% and 2.6%. Moreover, in Figure A.5 I plot the evolution of base prices conditioning on plan quality, showing that they all increase at similar rates within a company. This practice limits the correlation between individual health status and individual price increases, which implies limited reclassification.

coverage across sets of private hospitals, as PPO plans in the U.S.. Few plans offer restricted networks, as HMO plans in the U.S., and they are rarely observed in the data and not offered publicly. I do not consider them in my analysis.

[9]Other important characteristics of the plans are: a) Capitation scheme: Plans can either be capitated or not, b) Maternity-related expenses: Some plans do not have coverage for maternity-related expenses.

Pre-existing conditions

Each new potential insured has to fill a "Health Declaration" before signing a new contract with a private firm. The companies are allowed to deny coverage of any pre-existing condition during the first 18 months of enrollment, or even to reject the prospective enrollee altogether. Essential to this paper is the fact that enrollees are usually not required to fill a new declaration if they are switching to a lower quality plan within a company. Although there is no available data on the extent to which insurers deny coverage, anecdotal evidence and conversations with industry actors suggests that this is a regular practice.

Front-loaded premiums

Front-loaded premiums—premiums higher than concurrent expected costs—is one of the main features of insurance markets with long-term contracts. For example, Hendel and Lizzeri (2003) and Ghili et al. (2022) propose contracts that lock-in individuals with front-loaded premiums, but where the level of front-loading and insurance against reclassification depends on income paths to properly balance reclasssification risk and consumption-smoothing. Empirically, evidence of front-loaded premiums has been found in health insurance markets in the pre-ACA period (Pauly and Herring, 2006), in the German private system (Browne and Hoffmann, 2013), and in the Chilean private market between 2007-2009 (Atal, 2019). Importantly, lapses that are not explained by reclassification risk—consumers realizing that are healthier than expected and finding cheaper premiums conditional on plan quality—are against the rationale of front-loaded premiums and long-term contracts. This is because the purpose of these policies is that individuals pay high prices when young and healthy in order to subsidize their future old and high-risk selves.

I follow Atal (2019) and show evidence of front-loading in the Chilean private market by looking at the evolution of premiums relative to expected medical spending for single policyholders who stay in the same contract for 6 years (from 2012 to 2017). Let h_{it} be the expected claims in year t for individual i, and P_{it} the corresponding premium. I show that the ratio $markup_{it} = \frac{P_{it}}{h_{it}}$ is decreasing in t.[10][11]

[10] Expected medical spending is calculated separately by age, gender and year using claim data. In unreported results, I find similar findings if I use instead realized medical spending.

[11] As Pauly and Herring (2006) and Atal (2019) argue, front-loading does not necessarily imply a decreasing premium schedule. Premiums can increase only to reflect the increase in the spot price of the healthy individuals.

Still, decreasing markups is a strong test of front-loading, as even in its presence, markups could increase over time if individuals display enough inertia (as is often the case in health insurance markets, see Handel, 2013). In markets with consumer inertia, firms are expected to use an "invest-then-harvest" pattern for prices (*i.e.* start charging a low price and increase it over time, see Ericson, 2014). In the context of one-sided commitment, GR contracts combined with an "invest-then-harvest" strategy do not imply unambiguous price patterns. Intuitively, inertia relaxes the no-lapsing constraint that is needed to incentivize the healthier to stay. Therefore, firms can charge in period two a price that is above the actuarially fair premium for the healthy type. This increased revenue in period two is passed on to the first period in the form of lower premiums. Moreover, the evidence I provide here is limited to the first 6 years of enrollment.

I test the hypothesis of decreasing markups using a panel of sampled individuals enrolled in the same contract from January 2012 to December 2017. Figure 1 displays the results. Overall, even though I only use 6 years of data, the figure shows that markups decrease over time as individuals stay enrolled in the same plan. Therefore, consumers lapsing their plans only a few years after enrollment are leaving money on the table as they are contributing front-loaded premiums to a plan that they will likely not use at its full extent.[12]

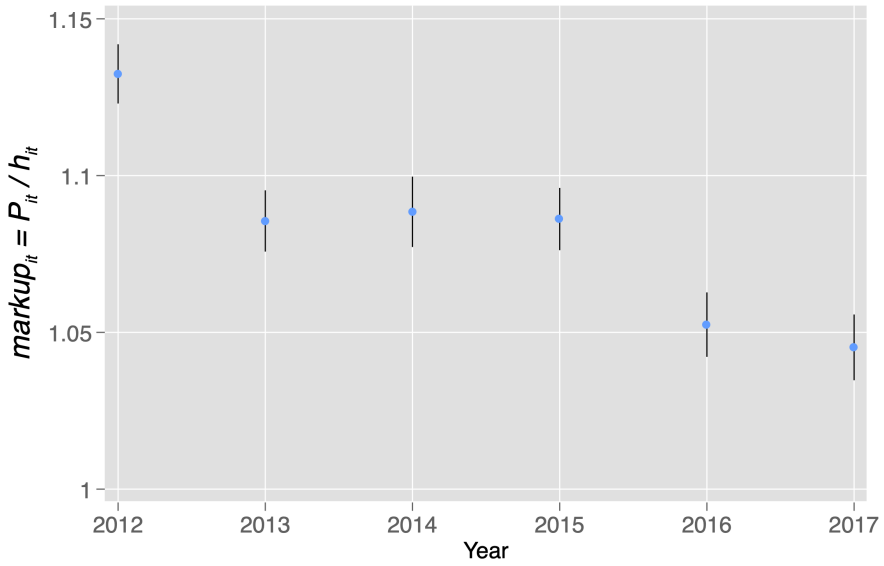
Hospitals in Chile

The health care system combines public and private provision. The public hospital network is broader than the private one, with 191 public hospitals compared to 83 private hospitals in 2016 (Chile, 2016). The private and public sectors are mostly segmented. Private insurers primarily cover admissions to private hospitals, whereas the public option mostly covers admissions to public hospitals. In fact, 97% of private insurer payments are to private hospitals, whereas only 3% are to public hospitals (Galetovic and Sanhueza, 2013). An important feature of this market is price transparency, as consumers are often able

Instead, front-loading means that the (expected) markup decreases as individuals stay in the contract. Since the theory predicts full insurance, there is no distinction between total cost and insurer cost. However, since individuals that stay in the same contract keep their coverage rates, the distinction is not relevant for testing the dynamics of either one relative to premiums.

[12]In Figure A.3 in the Appendix I repeat the same exercise but splitting policyholders by gender, finding similar results.

Figure 1: Front-loading in GR contracts



Notes: This figure shows a plot of $markup_{it} = \frac{P_{it}}{h_{it}}$ across years, where h_{it} is the expected claims in year t by individual i, and P_{it} the corresponding premium. I use a panel of single policyholders enrolled in the same contract from January 2012 to December 2017. Vertical lines denote 95% confidence intervals.

to obtain price quotes before choosing a hospital.

In the calculation of coverage rates across plans that I use in section 4, I focus on a particular geographic segment of the market. Specifically, I focus on the private hospitals in the city of Santiago, which is the largest health care market in the country and where more than a third of private hospitals and around half of the capacity is located (Galetovic and Sanhueza, 2013).

2.1 Data

I exploit administrative data collected by the *Superintendencia de Salud* containing the universe of insureds in the private market for the period of 2013-2016 (Superintendencia, 2006).[13] Insurers must report

[13]In practice, I have data from 2011 to 2019. The reason I focus most of the analysis in the period 2013-2016 is that these were stable years in the market. In particular, the regulator did not pass any important mandate during this period, there were no mergers or bankruptcies among insurance companies, and plan identifiers from one of the insurers are unreliable before 2013.

data on individual claims to the regulatory agency. These data cover every health service provided to a private plan policyholder in 2013–2016, including financial and medical attributes along with consumer, plan and hospital identifiers. Additionally, I have data on all private plans offered during the period of analysis. This includes data on plans' company name, base prices, risk-rating function r, preferential networks, extra plan characteristics, availability in the market over time, and the date at which the plan was introduced in the market. Furthermore, I can match plans and their enrollees and observe basic demographics of policyholders and their dependents.

Even though plans in this market are differentiated by the coverage rate offered in each of the main private hospitals, those rates are not available in the data. Instead, an online platform called *QuePlan.cl* provided me with access to their administrative plans database, allowing me to observe the actual contract of each plan. Thus, I can extract the actual coverage rate of each plan in each hospital. In addition, *QuePlan.cl* gave me access to "plan scores", a measure of plan quality. I use this variable in the reduced-form evidence of section 3.[14] For more details regarding data construction see Figueroa (2023).

3 Reduced-form Evidence of Lapsing

In this section, I describe some important features of the Chilean private health insurance market. First, individuals in Chile lapse their contracts at a high rate, especially compared to switching rates in health insurance markets offering short-term contracts. Second, less than 27% of policyholders remain in the same contract after 70 months, with young enrollees being more likely to lapse early than old enrollees, a fact that is against the rationale of long-term contracts. Third, premium (and income) fluctuations are an important reason of why consumers leave their plans. In the case of premium induced lapsing, lapsers tend to have higher medical risk than stayers. Thus, rational expectations models of reclassification risk and insurer commmitment to a smooth premium schedule face several challenges for being the primary

[14]The "plan score" is a standarized measure that goes from 0 to 10, where 10 represents a plan with almost perfect coverage for the most expensive private hospitals of Santiago. As the score goes down, the coverage rate for private hospitals goes down as well.

explanation for these patterns of lapsing observed in the data.

3.1 Substantial Lapsing

The switching rates in the Chilean private system are remarkable, especially considering that this is a market with GR contracts. Specifically, as documented in Table 1, in 2016 almost 20% of policyholders lapsed their plans during the year, with 10.7% switching plans within their companies, 6% switching companies, and 9.5% leaving the private market in order to go the public option. The annual switching rates in 2015 and 2014 were 18% and 17% respectively. For comparison, the annual switching rate in Medicare Advantage in 2020 was 10%, which is a similar private health insurance market with a public option but offering short-term contracts (KKF, 2022).

Table 1: Switching rates private market

Switching Rates (%)			
	2014	2015	2016
Within company switching	9.59	10.17	10.71
Company switching	5.04	5.45	5.89
Public option switching	7.65	7.98	9.51
Any switching	17.02	17.86	19.86

Notes: This table shows annual switching rates across policyholders in the data in 2014, 2015 and 2016. I restrict the sample to policyholders that are employees (*e.g.* not retired) and younger than 80 years old.

Regarding tenure in a contract, Figure 2 documents tenure rates of policyholders in Chile. In particular, I look at policyholders that signed a new contract in March of 2011 and I follow them until December of 2016.[15] The upper panel only considers leaving the insurance company as switching while the lower panel considers leaving the insurance plan as switching. In the latter case, I find that less than 27%

[15]I restrict this exercise to new policyholders in March of 2011 because before this date, by regulation, companies were able to increase premiums according to the age of the policyholder, even if she remained in the same plan, making lapsing more likely.

of enrollees stay in the same contract after 70 months, which undermines, potentially, the effectiveness of long-term contracts. This is because the purpose of these contracts is that policyholders subsidize themselves by signing a contract and paying front-loaded premiums when young and healthy, and then staying long enough until their contracts protect them once they become old and sick.[16] To investigate this further, in Figure A.6 in the Appendix I find that less than 25% of policyholders younger than 30 years old stay in their contracts after 70 months, and that rate jumps to almost 43% for enrollees older than 50 years old. In the next subsection, I explore some of the reasons why people lapse their plans at such a high rate.

3.2 Why Policyholders Lapse?

A high lapsing rate in the system can affect the functioning of long-term contracts in health insurance markets. This is true especially if the reasons policyholders are lapsing their plans are not only related to positive health shocks, as predicted by reclassification risk theory, which could lead to a system with individuals feeling uncertain about their future coverage. Therefore, in this section, I explore empirically whether premium and income fluctuations can explain lapsing in the Chilean private health insurance system.[17]

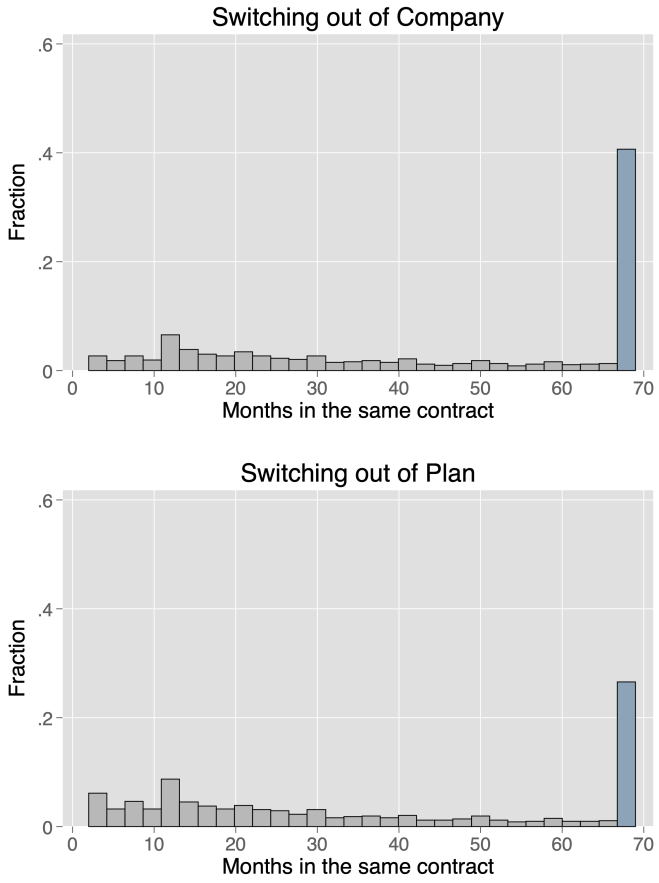
In the case of prices, I examine the relationship between premium increases and the probability of switching plans within a company.[18] Figure 3 shows the results of an event study regression where the dependent variable is a dummy equal to one if the consumer switches plans within an insurer, and the event is the month in which the contract was signed in the first place. In Chile, the signing month

[16] I find similar results if I look at policyholders starting a new contract in other dates. For example, for policyholders signing a new contract in August of 2011 or January of 2012, only 28% and 29% of them, respectively, are in the same contract by December of 2016.

[17] There are other reasons, besides premium changes and income changes, that could explain switching rates in this market and, hence, undermine the effectiveness of the system. For example, Atal (2019) documents that changes in preferences for hospital networks can induce policyholders to switch plans.

[18] I do not examine switching companies because this type of switching can only be done after being one full year in the current company. Thus, a spike in switching one year after enrollment could be attributed to premium changes or to the fact that policyholders could not switch before that. Furthermore, as highlighted by Table 1, within company switching is almost as twice as important as between company switching. This is explained by the fact that to switch companies the policyholder must fill a new health declaration, risking then coverage denial. To switch plans within a company, a new health declaration is not needed in most cases.

Figure 2: Tenure in GR contracts



Notes: This figure shows histograms of how many months policyholders stay in their contracts after signing a new contract in March of 2011. I drop one insurance company from the sample with plans that cannot be matched before 2013. The top figure shows this for the case where only switching out of the company is considered. The bottom figure shows the case in which any switching is considered.

is the month in which premium changes are applied to each policyholder. Importantly, given the nature of the contracts, these premium changes are the sole reason for enrollees to switch plans in this month in particular (*i.e.* it is the only characteristic of the plan that is changing in the contracts). Furthermore, I also control for policyholder fixed effects and date (month-year) fixed effects, meaning that I am looking at the effect of the signing month on lapsing at the individual level, controlling for dates in which lapsing might be higher (or lower) than average. In order to have a clean panel of policyholders, I restrict the estimation sample to enrollees that do not switch insurance companies and that do not leave the private market and re-enter in later dates.[19] This exercise is done on a 20% random sample of policyholders.

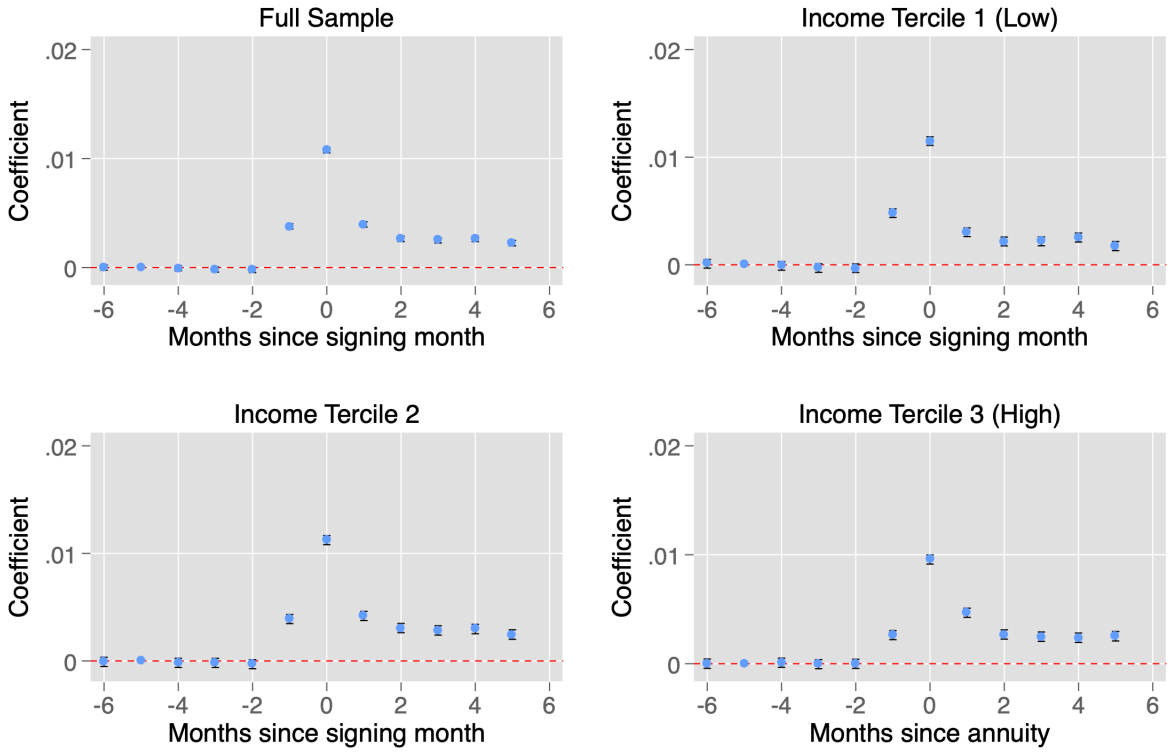
As documented in the figure, I find a large spike in the probability of switching plans in response to premium changes, and the effect appears consistent across income terciles. In terms of magnitude, the lapsing probability goes from 0.3% on average in any month of the year to 1.2% during the signing month. Furthermore, in line with the results from section 3.2, I find that younger policyholders are more sensitive to premium fluctuations than older individuals (see Figure A.7 in the Appendix). Finally, in Figure A.8 in the Appendix, I repeat the same exercise but with the dependent variable now being switching from the private market to the public option. I show that policyholders on the lowest income tercile are prone to leave the private sector in response to premium changes.[20]

What is the story behind these results? As noted in section 2, every year a company decides to increase prices, they must send a letter to their enrollees informing them of this change and offering an additional plan that keeps their premiums more or less constant. However, when prices for all plans are increasing at similar rates within a firm, the only way to do this is by offering a lower quality plan. To confirm this, I zoom-in into the enrollees that are switching plans during the signing month of the contract in Figure 3. Specifically, I compare the plan scores (*i.e.* plan quality) of their health insurance plans before and after switching. If these switches are being triggered by premium changes, then, on

[19] I also restrict the sample to employees of age between 25 and 60 years old for males, and between 25 and 65 years old for females.

[20] To confirm that these lapses are induced by premium changes, in Figure A.9 in the Appendix I repeat the analysis of Figure 3 but only for the 2011-2012 period and the 2013-2014 period. During the first period, insurers increased their prices by 6% on average, but in the latter period they increased premiums by only 1.9%. In line with the hypothesis of premiums being the main reason explaining lapsing, I find that in the 2011-2012 period the effect of the signing month on lapses is much larger than in the 2013/2014 period.

Figure 3: Probability of switching plans due to price changes



Notes: This figure shows an event study regression where the dependent variable is a dummy equal to one if a consumer switches plans within an insurer. The event is the month in which price changes are applied to health plans. Controls include individual fixed effects and date (month-year) fixed effects. I restrict the estimation sample to policyholders that do not switch insurance companies and that do not leave the private market and re-enter in later dates. Additionally, I drop individuals with zero or missing income at any month. This exercise is done on a 20% random sample of policyholders. Vertical black lines report the 95% interval.

average, plan scores should go down and prices should remain more or less constant. These two trends are confirmed in Figure 4 across income terciles.

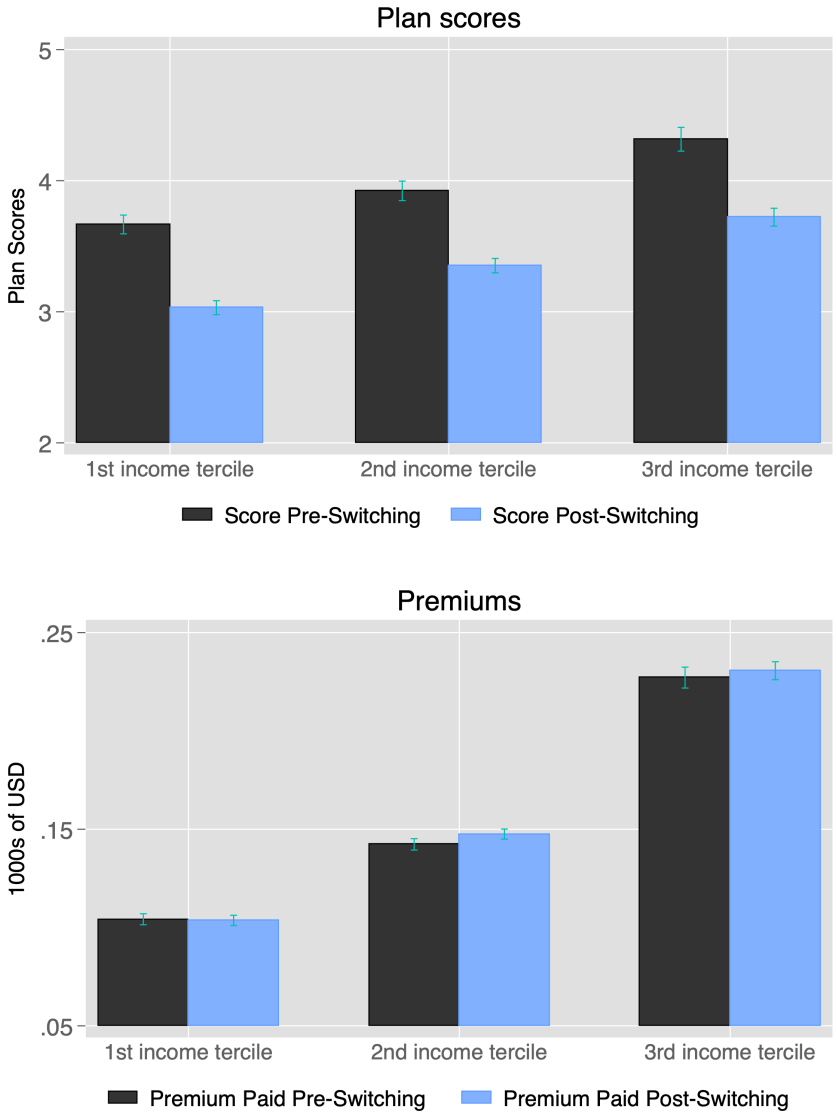
Under an optimal smooth front-loaded premium schedule and reclassification risk, policyholders lapsing their contracts should spend less in health care than stayers. However, in a liquidity constraint environment where premiums are adjusted constantly, it is plausible that those individuals with higher health care costs are the ones leaving their plans in order to avoid paying higher premiums as well (Ericson and Sydnor, 2022). Motivated by this, I compare individuals lapsing during the signing month in Figure 3 to those individuals that do not lapse during the signing month by estimating the following regression:

$$p(claim_{it} > 0) = \beta_0 + \beta_1 \mathbb{1}\{Lapsers\}_{it} + \beta_2 X_{it} \tag{3}$$

where $p(claim_{it} > 0)$ is the probability that policyholder i incurs in a positive number of claims in the 6 months before and the 6 months after the signing month. $\mathbb{1}\{Lapsers\}_{it}$ is a dummy equal to one if the policyholder lapses her insurance plan during the signing month in Figure 3, and X_{it} is a vector with additional controls, which includes insurer FE, year FE, age FE, gender FE, income tercile FE, region FE and policyholder FE. Table 2 displays the results, where each column is a different specification with different controls. Finally, to better match individuals to health care spending, I restrict the sample to single policyholders.

The results from the table show a clear picture. Policyholders lapsing their plans during the signing month are more likely to file at least one claim in the 12-month period surrounding the lapse. In particular, after controlling for insurer FE, those that lapse their plans in the signing month have a 6 to 8 percentage points higher probability of filling at least one claim in a 12-month period. Furthermore, in Table A.1 in the Appendix I find that the difference in the probability of filling at least one claim between lapsers and stayers is the largest for young policyholders. This indicates that those individuals leaving their plans after their premiums rise are more likely to be high-risk, especially among young enrollees, a result that is in stark contrast with reclassification risk theory, but in line with a setting where liquidity constraint individuals face premium fluctuations. Confirming this last hypothesis, Table

Figure 4: Plans before and after switching



The upper figure shows the plan scores before and after switching during the signing month of the contract. The lower figure shows premiums paid by policyholders before and after switching during the signing month of the contract. Green lines report the 95% interval.

A.2 in the Appendix shows that that the difference in health risk between lapsers and stayers is the largest for individuals in the lowest income tercile.[21]

Table 2: Regression - Lapsers and probability of positive spending

	(1)	(2)	(3)	(4)	(5)
$\mathbb{1}\{Lapsers\}$	0.038	0.076	0.077	0.066	0.056
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
Firm FE	No	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	Yes
Demographic Characteristics	No	No	No	Yes	No
Policyholder FE	No	No	No	No	Yes
F-stat	36	726	510	464	17
Observations	278,463	278,463	278,463	278,463	278,463

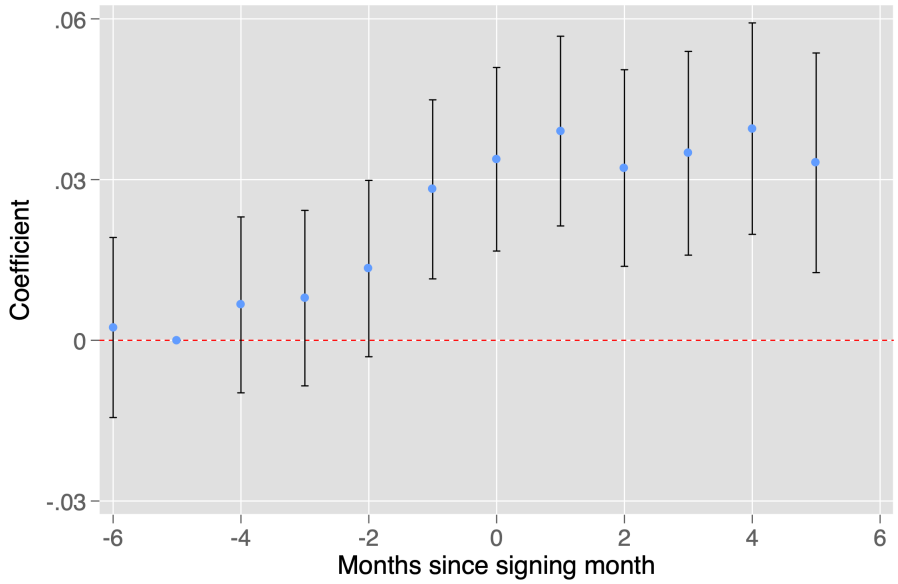
Notes: This table shows the results of a regression where the dependent variable is a dummy equal to one if policyholder i fills a positive number of claims 6 months before and after the signing month, and the main independent variable is a dummy $\mathbb{1}\{Lapsers\}$ equal to one if the policyholder lapsed her plan during the signing month in Figure 3. Each column is a different specification with different controls. Demographic characteristics include insurer FE, year FE, age FE, gender FE, region of residency FE, income tercile FE and policyholder FE. Standard errors are in parenthesis and are clustered at the policyholder level. The mean of the dependent variable in the sample is 0.78.

Finally, to better characterize health care spending patterns by lapsers, in Figure 5 I run an event study regression on policyholders that lapse during the signing month in Figure 3, where the dependent variable is a 3-month rolling average of health care spending, and the event is the month in which the contract was signed in the first place. The figure highlights an interesting pattern in which individuals start spending more on health care the month previous to lapsing, and then keep spending more in the months after leaving their plans. In particular, the average monthly spending in the first five months before lapsing is USD$64, which increases to USD$95 in the last 5 months after switching. It is important to notice that these results do not imply that markups gained by insurers from these lapsers will necessarily decrease after they switch because, as shown in Figure 3, most of them are moving to lower quality plans with lower coverage. In section 4, I link these lapses to companies' profits over time.

Lapsing and income fluctuations

[21] In unreported results, I repeat the analysis in Table 2 but running instead a logistic regression, finding similar outcomes.

Figure 5: Health care spending for lapsers



Notes: This figure shows an event study regression where the dependent variable is a 3-month rolling average of health care spending. The event is the month in which price changes are applied to health plans. Controls include individual fixed effects and date (month-year) fixed effects. I restrict the estimation sample to policyholders that switch plans because of price changes in Figure 3. Vertical black lines report the 95% interval.

In Chile, prices increasing in policyholders' plans have a direct effect on income as premiums are deducted from policyholders' wages. Therefore, income fluctuations more generally are a natural variable that could potentially lead to lapsing in the market. Recall that the theory of optimal long-term contracts assumes, for simplicity, that income plays no role in consumers lapsing their plans.[22] Thus, empirically studying whether policyholders respond to income changes by lapsing their plans is relevant in order to design effective health insurance markets offering long-term contracts. In particular, if the income of a policyholder goes up, and if she is healthy enough, she might decide that with her new income she would be better off with a higher quality insurance plan, so she could lapse and upgrade her plan. Similarly, if her income goes down, she might decide to downgrade her insurance plan in order to pay lower premiums. That is, whether consumers leave their plans after a change in income depends on how preferences for health insurance plans vary with income.

To empirically test this hypothesis, I run a regression of a dummy equal to one if the policyholder lapses in a particular year (within the company or to another company) and zero otherwise on a dummy equal to one if the policyholder is exposed to a change in income of at least 30% in that year (not accounting for premium changes). I use a sample of policyholders active in the private market from 2013 to 2016. The results are displayed in Table 3. Each column displays the results for a different specification with different controls.

The results from the table confirm that policyholders do respond to income changes by lapsing their insurance plans. Specifically, from an average probability of lapsing of 9% in the sample, a change in income of at least 30% in a particular year increases the probability of a policyholder lapsing her insurance plan by 2 to 3 percentage points, depending on which controls are included.[23]

One caveat to these results is that unobservable characteristics of the policyholders might be

[22] In theoretical models with long-term contracts, lapsing only occurs by healthy consumers trying to find a lower price in the spot market. This is because these models treat policies as securing a certain level of income (or consumption), which is feasible by assuming *ex-ante* known income paths. However, if income paths are uncertain, then insurance against these income shocks is needed as well, which is not provided by real applications of long-term insurance policies (*e.g.* the GR health insurance contracts offered in Chile and Germany).

[23] The switching rate is different than the rate reported in Table 1 because here I am restricting the sample to employees who stay in the private market continuously from 2013 to 2016. This restricted sample is less likely to lapse than the full sample of policyholders used in Table 1.

Table 3: Regression results - Income changes and lapsing

Lapsing	(1)	(2)	(3)	(4)	(5)
$\mathbb{1}\{\lvert\Delta Income\rvert \geq 30\%\}$	0.030	0.020	0.023	0.023	0.008
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age and Gender FE	No	Yes	Yes	Yes	No
Other Characteristics	No	No	Yes	Yes	No
Year FE	No	No	No	Yes	Yes
Policyholder FE	No	No	No	No	Yes
F-stat	1,583	556	530	517	35
Observations	1,557,660	1,557,660	1,557,660	1,557,660	1,557,660

Notes: This table shows the results of a regression of a dummy equal to one if the policyholder lapses in a particular year (within the company or to another company) and zero otherwise on a dummy equal to one if the policyholder is exposed to a change in income of at least 30% in that year. Each column is a different specification with different controls. The sample is composed by policyholders that were active in the private market throughout 2013 to 2016. Standard errors are in parenthesis and are clustered at the policyholder level. The mean of the dependent variable in the sample is 0.09.

correlated with income changes, which would bias my coefficients. For instance, maybe driven people are more likely to receive positive changes in income and also are more likely to search for new plans in the market. To control for this, in column (5) of the table I exploit the panel nature of the sample and I add policyholder fixed effects. That is, now I am identifying the impact of income fluctuations on lapsing by looking at how income changes for the same policyholder affect her probability of leaving her plan. Noteworthy, even with less variation in the independent variable, I still find a sizable effect of income changes on lapsing probability. Finally, in line with price increases explaining lapsing in this market, Table A.3 in the Appendix shows that negative income changes are much more important than positive income changes in inducing policyholders to leave their plans.

To summarize, I find that both premium and income fluctuations induce lapsing in the Chilean private health insurance market, and that, in the case of premium induced switching, lapsers are higher risk than stayers. This is in contrast to reclassification risk theory and an optimal smooth premium schedule, but in line with empirical research in other industries offering long-term contracts. For example, Gottlieb

and Smetters (2021) find that in the term life insurance market in the U.S., consumers not being able to forecast income shocks explain why most individual policies are terminated by the policyholder before the policies expire or pay a death benefit. Regarding price fluctuations, Aizawa and Ko (2023) document that adjustments to premiums over time are common and a key part of profits in the long-term care insurance industry. In the next section, I document evidence that lapses, particularly those explained by premium changes, are an important component of insurance companies' profits. This is relevant as policymakers designing health insurance systems with long-term contracts might want to consider that, in the absent of regulation, lapse-supported pricing, or individuals leaving their plans in response to how premiums are set, could be a potential equilibrium in the market.

4 Lapsed-Supported Pricing

The previous section documented substantial lapsing rates in the Chilean private health insurance market, and that premium and income fluctuations induce policyholders to lapse their contracts. As shown by Gottlieb and Smetters (2021), an equilibrium with consumers leaving their plans in response to how premiums are set in the market could emerge endogenously if these lapses are an important component of insurers' profits. In Chile, insurance companies are allowed to change prices from year to year as long as they do it at similar rates across all their plans in the market (*i.e.* no reclassification risk). A relevant question is then how profits depend on firms increasing prices, and, thus, on policyholders leaving their plans. That is, does the prediction from the theoretical model of Gottlieb and Smetters (2021), which was used to explain lapsing patterns in the term life insurance industry in the U.S., also hold in the Chilean private health insurance market?[24]

Anecdotal evidence from local news suggests that insurers increasing their prices over time is a common practice to keep their profits high and that consumers are highly affected by these changes. This

[24]Firms in the U.S. long-term care insurance (LTCI) market, which offer similar GR contracts, adjust their premiums in a similar fashion. As Aizawa and Ko (2023) argue, they do so to transfer aggregate risks to consumers. In this section, I argue that in the Chilean health insurance market lapses also motivate these price changes because, in expectation, if individuals do not lapse and premiums are stable, policies are not profitable (see Figure 6). This is not the case in LTCI as policyholders in this market barely lapse.

has led to many policyholders suing their insurance companies to stop their premiums from going up. As an article from 2013 states:

> *They [insurers] can get rid of expensive, old and sick beneficiaries, whom, faced with non-stop ruthless annual [price] readjustments, are forced to migrate... These enrollees have "enjoyed" the private system when they did not actually use it and lose it when they desperately need it... Currently, nearly 50,000 members apply for protection annually to avoid the rise in the base price. This number may seem small if one considers the universe of around 1.5 million affiliates, but it is constantly growing.*
>
> — *Ciper (2013)*

The information of the article is in line with the results documented in section 3, that is, premium fluctuations affect mainly high-risk enrollees, and policyholders lapse their contracts too early. This has led to a market in which consumers do not feel certain nor secure about their health insurance coverage in the future, which is the main purpose of designing a health insurance market offering long-term contracts. Furthermore, satisfaction rates among enrollees in the private market are consistenly low across surveys. For example, in 2011, 2013, 2014 and 2015, in a survey of policyholders, the rates of consumers that were satisfied (or very satisfied) with the private system were 41%, 43%, 39% and 48%, respectively (Superintendencia, 2020).

To empirically investigate how important are these price changes in firms' profits, I simulate expected actuarial profits for each plan assuming that a 20 years old male individual signed a new contract in 2013 and decided to stay in that plan until age 80, without prices changing over time. This is how these markets should work under an optimally designed premium schedule (Ghili et al., 2022). The upper panel of Figure 6 shows the result of this exercise for a representative firm, with profits for each policy and each age of the policyholder calculated year-by-year. The lower panel calculates cumulative profits for each policy and each age of the policyholder.[25] Expected costs are calculated as the average medical spending by age across active male policyholders in 2013 multiplied by the coverage rate offered by each

[25]In unreported results, I find that cumulative profits' outcomes do not change qualitatively if I use a present value formula for cumulative profits instead.

plan.

The figure confirms an enormous reliance on companies increasing their prices over time in order to obtain positive profits. For example, the median plan from this representative firm would gain almost USD$500 in annual profits when this policyholder is 20 years old, but if he remained in the same plan until age 80, the company would lose around USD$2,500 annually in the final years of the policy. Importanty, this median plan would lose almost USD$24,500 of cumulative profits with this policyholder in the span of 60 years, and across all policies the company would lose USD$50 millions. Moreover, Figure A.12 plots year-by-year and cumulative profits for a 20 years old female. In this situation, prices do allow for small cumulative profits thanks to regulation that allows companies to charge higher prices to women, but not enough to compensate the losses from men.[26] This fact, coupled with men accounting for a much larger share of the private system, suggests that companies increasing their prices over time is a key part of their profits.[27]

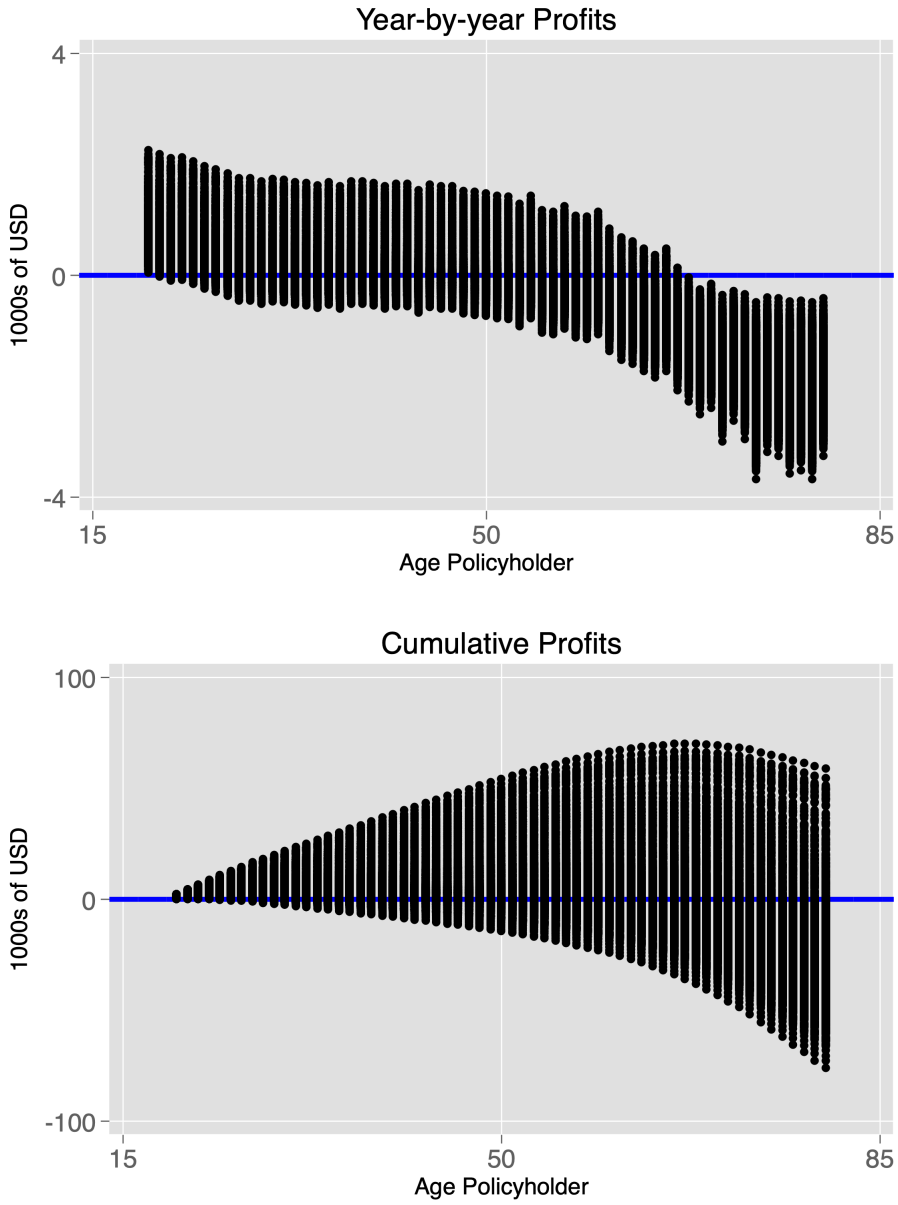
What is the impact of these price changes in realized profits? In Figure 7 I plot cumulative realized actuarial profits for policyholders that signed a new contract in a representative insurance company in 2013 and I follow them until December of 2016 (or until they lapse). For simplicity, in the figure I only look at single males of age less than 35 when signing the contract, but the results are very similar for the rest of the enrollees (see Figure A.13 in the Appendix). As can be seen in the figure, most policies accrue positive profits for the insurer, especially those that lapse early.[28] Importantly, on average, policyholders that remain in their contracts accrue high profits for the company. As I will show in Figure 8, this is due to them paying higher and higher premiums over time while, on average, staying as low-risk individuals. Finally, total profits for this company are USD$27 million over this period for these policies, with only 35% of individuals remaining in their initial policies by December of 2016. Thus, because they induce high-risk policyholders to lapse their plans while low-risk individuals pay higher and higher premiums if

[26]For example, the median plan from a representative firm would gain almost USD$800 of cumulative profits with a female policyholder in the span of 60 years. This is much smaller than the USD$24,500 that the median plan would lose with a male policyholder.

[27]Figure A.10 and Figure A.11 in the Appendix repeat the same exercise for the six insurers, for year-by-year profits and cumulative profits respectively, finding similar results.

[28]For this particular firm, 95% of policyholders that lapse their contracts during the first 12 months are profitable. That share decreases to 85% for policyholders that stay around 48 months in their policies.

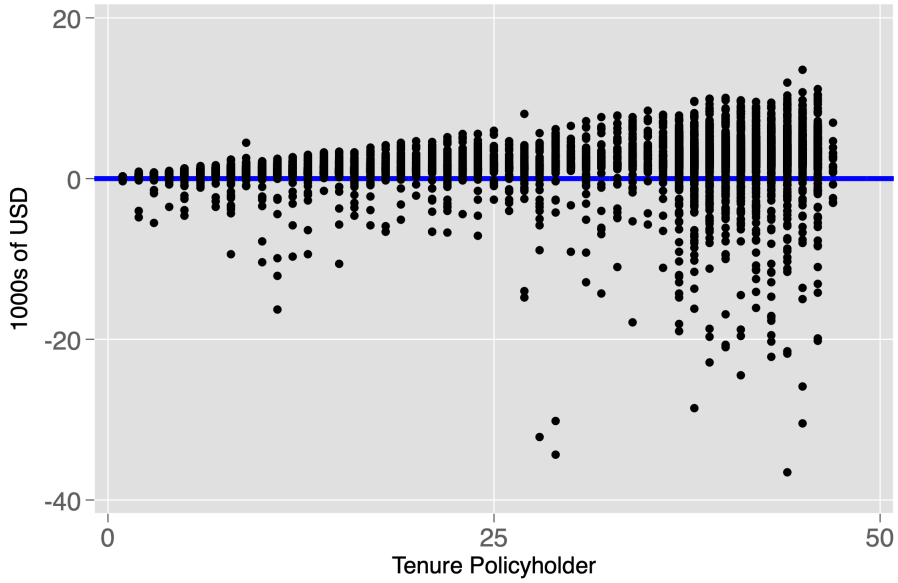
Figure 6: Expected actuarial profit



Notes: Each dot in the figure represents the expected actuarial profit for a particular plan of enrolling a male policyholder of a particular age. The upper panel computes annual profits for each age and each plan. The lower panel computes cumulative profits for each age and each plan. Data come from one representative insurance company. The price is calculated for a 20 years old male that signed a new contract in 2013. The cost is the expected medical spending by age across active policyholders in 2013 multiplied by the coverage rate of the plan. Profits are measured in U.S. dollars using the exchange rate on December 2013.

they remain, price changes are a relevant component of insurers' profits.[29]

Figure 7: Realized actuarial profit



Notes: Each dot in the figure represents the accumulated realized actuarial profit for a particular single male policyholder of age less than 35 that signed a new contract in 2013 until he lapses. Tenure measures how many months the policyholder remained in the contract. Data come from one representative insurance company. Profits are measured in U.S. dollars using the exchange rate on December 2013.

In order to analyse this strategy more closely, in Figure 8 I extend my data to 2019 for one particular company, and look at the evolution of single policyholders that signed a new contract in the first quarter of 2013.[30] In particular, the upper left panel plots monthly average profits across active policies, the upper right panel plots the total number of active policies in each month, and the lower left panel plots total monthly profits across active policies. Finally, the lower right panel plots average medical spending by policyholders in each month. Black dots denote policyholders that remain in the same plan, blue dots denote policyholders that lapse their plans but remain in the same company and red dots denote policyholders that lapse their plans and leave the company.

[29]Figure A.14 repeats the same exercise for the six companies, with similar findings. Additionally, Figure A.15 plots realized profits for policyholders that signed a new contract in a representative insurance company in 2014, again finding similar results.

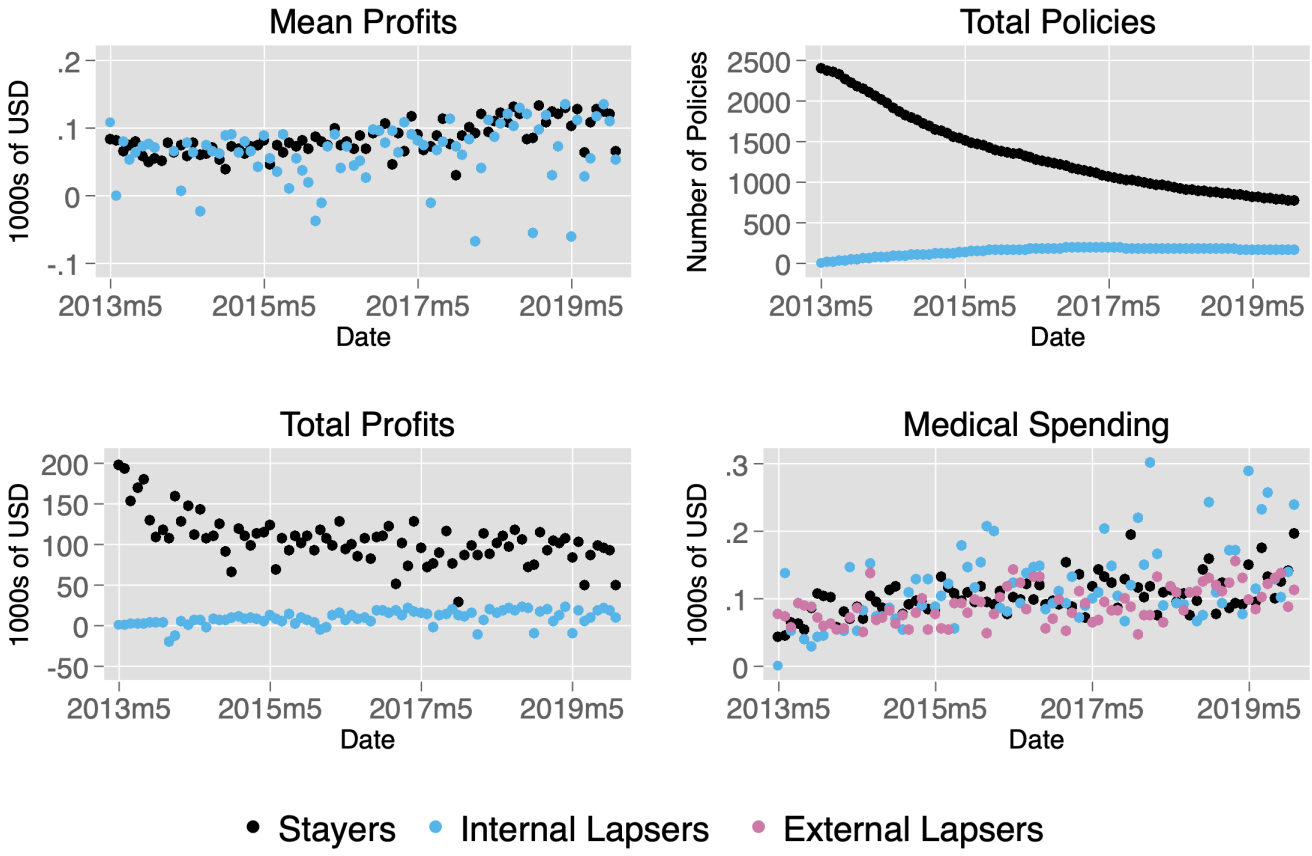
[30]Many changes occurred after 2016 that make it unfeasible to analyse additional insurance companies. For example, one company filled for bankruptcy and two other companies merged in 2017. Also, data from other firms are unreliable after 2016 or they just do not have a large sample of policies in the market. For those reasons, I focus only on one company with robust and reliable information.

The figure highlights four main points; first, average profits, and their variance, from policyholders that do not lapse slightly increase over time. Specifically, average (variance) profits in 2013 were USD$71 (USD$220), and they rise to USD$109 (USD$291) in 2019. This result might be counterintuitive considering that Figure 1 shows that premiums in this system are front-loaded. However, front-loading and increasing average realized profits can happen at the same time if the policyholders lapsing their plans early are high-risk (or will become high-risk with a higher probability). Figure 8 suggests that this is indeed what is happening, which is in line with the results from section 3.2. For example, average profits for lapsers that remain in the company in 2013 were USD$67 (USD$4 less than stayers), but in 2019 those profits were only USD$75 (USD$34 less than stayers). This is a combination of those policyholders paying lower premiums than stayers (they tend to lapse to cheaper lower quality plans) and also spending more in health care over time.

Second, the number of active policies in the market declines substantially over this period. From 2,400 active policies in the beginning of 2013, only 764 of them are active in December of 2019. Similarly, policies of lapsers that remain in the company increase over time. Third, total profits across these policies decrease over this period, which is explained by the last two points. Lastly, average medical spending for those that remain in the company but lapse their plans is much higher than for stayers (or even than movers that leave the company). For example, in 2019, lapsers that remain in the company spent on average USD$167 in health care, while stayers spent on average USD$125 (movers that leave the company spent USD$116). This is explained by the fact that if individuals want to switch companies, they have to fill a health declaration before joining a new insurer and they might get denied coverage if they report chronic conditions. This is not required if the policyholder is switching plans within an insurer, especially if the switch is to a lower quality plan.

To summarize, policies in the Chilean private health insurance system are not profitable if individuals stay in their plans and premiums do not change. In practice, these policies accrue positive profits for insurance companies, which is explained by real prices increasing over time, and by policyholders lapsing their contracts. Importantly, insurers benefit from these lapses because switchers tend to be higher risk than stayers, in line with the results from section 3.2.

Figure 8: Realized actuarial profit 2013-2019 for one company



Notes: The figure looks at single policyholders that signed a new contract in the first quarter of 2013. The upper left panel plots monthly average profits across policies. The upper right panel plots the total number of active policies in each month. The lower left panel plots total profits in each month. The lower right panel plots average medical spending in each month. Black dots denote only policyholders that remain in the same plan. Blue dots denote only policyholders that lapse their plans but remain in the same company. Red dots denote only policyholders that lapse their plans and leave the company. Data come from one insurance company. Profits are measured in U.S. dollars using the exchange rate on December 2013.

5 Policy Implications and Discussion

Section 4 shows both anecdotal and empirical evidence that premium fluctuations are a relevant feature of the Chilean private health insurance market. This has led to a system with consumers lapsing their plans often and, hence, feeling uncertain about their prospective health insurance coverage in the future. This section discusses the implications of these market characteristics and possible solutions to address these issues.

One of the consequences of a system in which individuals are being induced to lapse their plans in response to premium changes is that a large proportion of policyholders in Chile are suing their insurance companies to stop prices from increasing in their contracts. For example, in 2016, 143,000 policyholders sued their insurers, with judges most of the time favoring insurees. At the same time, insurers spent more than USD$40 million dollars in these lawsuits, which has led to higher costs in the system and, thus, to companies to increase their premiums further (Libertad y Desarrollo, 2017).[31]

Why are these contracts, that are effective and welfare improving in the theoretical models of Ghili et al. (2022) and Atal et al. (2020), among many others, not working effectively in Chile? One important difference is that, as noted in section 3.2, these models assume that income paths are flat or that consumers have perfect foresight of their income paths. In practice, income changes often and consumers normally cannot predict these changes. For example, premiums from health insurance plans in Chile are deducted from policyholders' wages, such that when an insurer increases prices, consumers' income goes down. Section 3 shows that these fluctuations lead to individuals lapsing their plans at high rates, even though, theoretically, these contracts are supposed to be for the long-term. Ghili et al. (2022) argue that one way to solve the problem of income paths being uncertain would be to make long-term contracts insure against income changes as well. That is, instead of long-term health insurance contracts,

[31]By 2023, the national discussion has shifted to whether the market is viable in the long-term. Because of the higher costs of COVID-19 and, more importantly, because of a new policy that bans gender-based pricing and add restrictions to age-based pricing (see Figueroa, 2023 for details), insurers argued that they needed to increase prices over 20% in recent years. The regulator responded by prohibiting them to do so, arguing that such a price hike was not reasonable given the current situation in the country. As a consequence, in the last few years, companies have reported big losses and they are concerned that, at this pace, in the near future the private system will go bankupt and all their policyholders will be left uninsured or will have to switch to the low quality public option (La Tercera, 2022).

policymakers would need to design and implement long-term income contracts that provide protection against changes in income more generally. Of course, the implementation of such a contract in practice is not an easy task.[32] A similar, but maybe easier, solution would be for the government to provide subsidies in the scenario of large (negative) fluctuations in income such that policyholders do not lapse their policies.[33]

In the case of premium adjustments, and the lapses induced by them, they are relevant because they make the market profitable for insurers, as predicted and tested by Gottlieb and Smetters (2021) in the term life insurance industry. Specifically, as described in section 4, without prices changing, and consumers leaving their plans, especially those with high health care costs, most of the policies sold in the market would not be profitable. A way to solve this issue would be for the regulator to be more involved in how base premiums are set initially. That is, to help insurers set prices similar to the optimal ones designed by Ghili et al. (2022), such that real prices do not have to change over time for companies to make reasonable profits. Atal et al. (2020), for example, show that, in Germany, pricing regulation works well enough in designing front-loaded premiums that will cover expected costs, even if policyholders remain in the same plan for many years, and still leave room for profits. The Chilean private market then, or any country designing insurance markets with long-term contracts, could learn from the German experience in order to set front-loaded base premiums that would not require real prices changing over time.[34]

Additionally, dynamic pricing regulations (*i.e.* regulations that limit insurers' ability to adjust rates) are also an alternative to stop firms from increasing their premiums over time. For example, in the context of U.S. private long-term care insurance (LTCI), many states adopted new standards in their oversight of the LTCI industry in the early 2000s to deter rate increases for existing consumers. However,

[32]Insurance against income changes is not provided by real applications of long-term health insurance policies (*e.g.* the GR health insurance contracts offered in Chile and Germany).

[33]In Chile this would likely be politically unfeasible as the private system provides coverage to the high-income population. The public option offers coverage to the low- and middle-class. Thus, subsidies to the high-class would not be a popular idea.

[34]An important caveat is that in Germany there is not detailed data for the full private market. Hence, it is hard to assess with a high level of confidence whether policyholders in that country do not suffer from the same lapsing problems as policyholders in Chile. This is especially important as premium adjustments take place in Germany based on changes in health care costs (Browne and Hoffmann, 2013). Investigating lapsing in the German private health insurance market is an interesting area for future research.

as studied by Aizawa and Ko (2023), there is a trade-off in that these regulations might increase consumer welfare by decreasing uncertainty about future rate increases, but they might also induce insurers to exit from the market or charge a higher markup, which will adversely affect consumer welfare. Studying this trade-off in health insurance markets with long-term contracts is an important avenue for future research.

6 Conclusion

This paper studies the Chilean private health insurance system, a market characterized by offering GR contracts, and documents that there is substantial lapsing in this market and lapse-supported pricing. I argue that the rational model with optimally designed long-term contracts developed by Ghili et al. (2022), among others, cannot explain key observable features of this insurance market: the high annual switching rate, even compared to health insurance markets offering short-term contracts in the U.S.; the short tenure of most policyholders in their GR contracts; the lapsing response of consumers to price changes and income changes, with lapsers being higher risk; and, the fact that these price changes, and the corresponding lapses, are a key component of insurers' profits.

These features have led to a system in which consumers feel uncertain about their future health care coverage, which is the main purpose of designing a health insurance market offering long-term contracts. Regulating the way in which base premiums are set initially can fix the need to increase prices over time, while allowing contracts to protect consumers from income changes can prevent lapses in the market.

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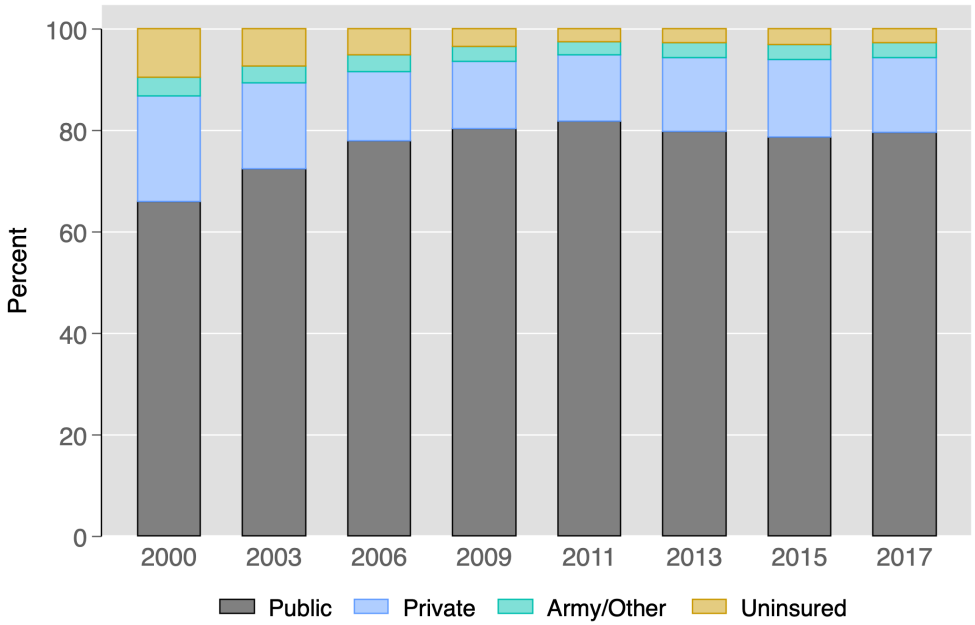
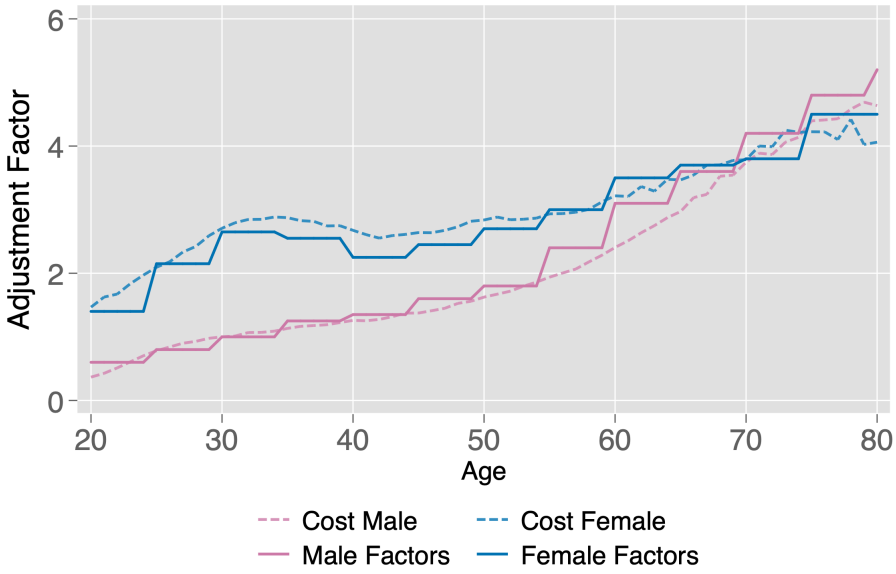
A Additional tables and figures

Figure A.1: Historical market shares across segments



Notes: This figure shows the historical market shares across segments in the health insurance market in Chile. The data come from the Chile National Socioeconomic Characterization Survey (CASEN).

Figure A.2: Risk-rating factors for one firm



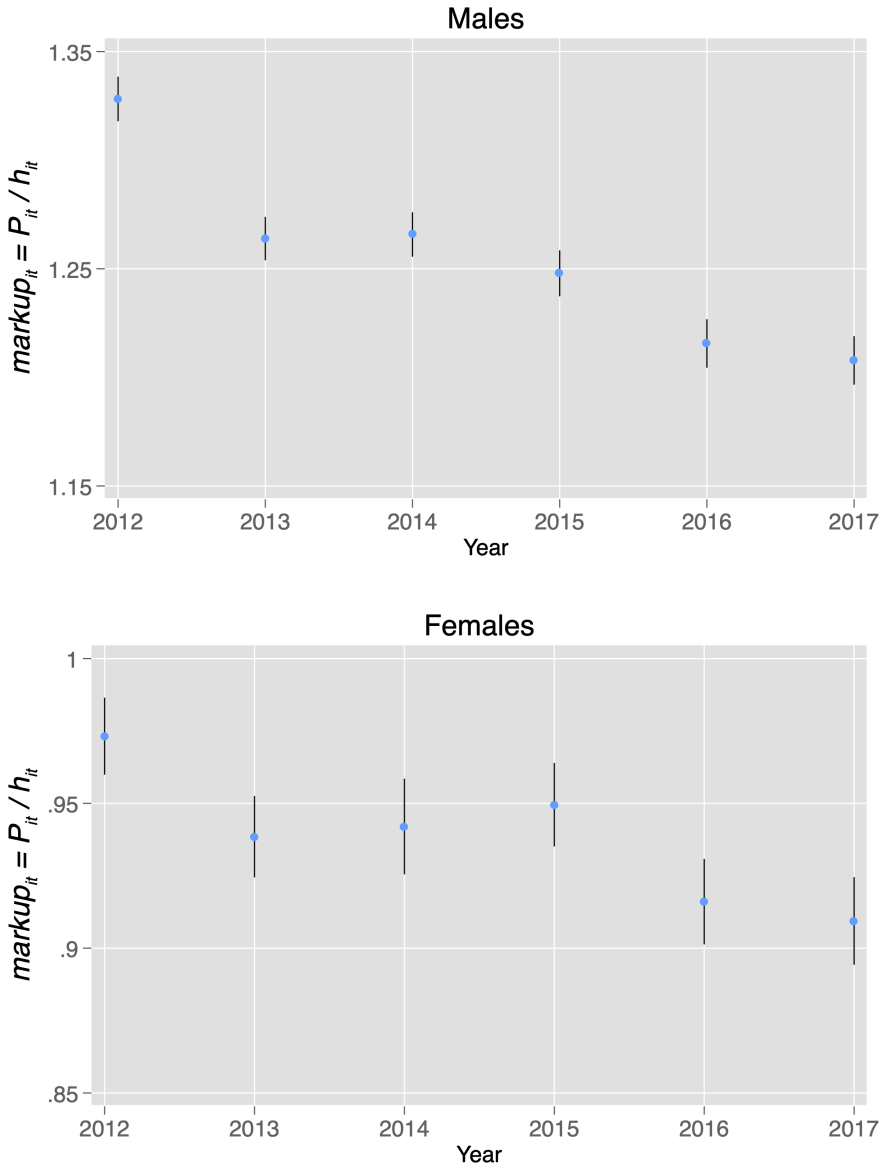
Notes: This figure shows risk-rating factors for a representative company in 2016 and health care costs by gender and age (relative to a 30-years old male) across enrollees in the private market in 2016.

Table A.1: Regression - Lapsers and probability of positive spending by age group

	(1)	(2)	(3)	(4)	(5)
	Age $<$ 35				
$\mathbb{1}\{Lapsers\}$	0.033	0.079	0.080	0.072	0.071
	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)
	Age $\geq$ 35				
$\mathbb{1}\{Lapsers\}$	0.042	0.074	0.075	0.062	0.049
	(0.009)	(0.009)	(0.009)	(0.008)	(0.009)
Firm FE	No	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	Yes
Demographic Characteristics	No	No	No	Yes	No
Policyholder FE	No	No	No	No	Yes

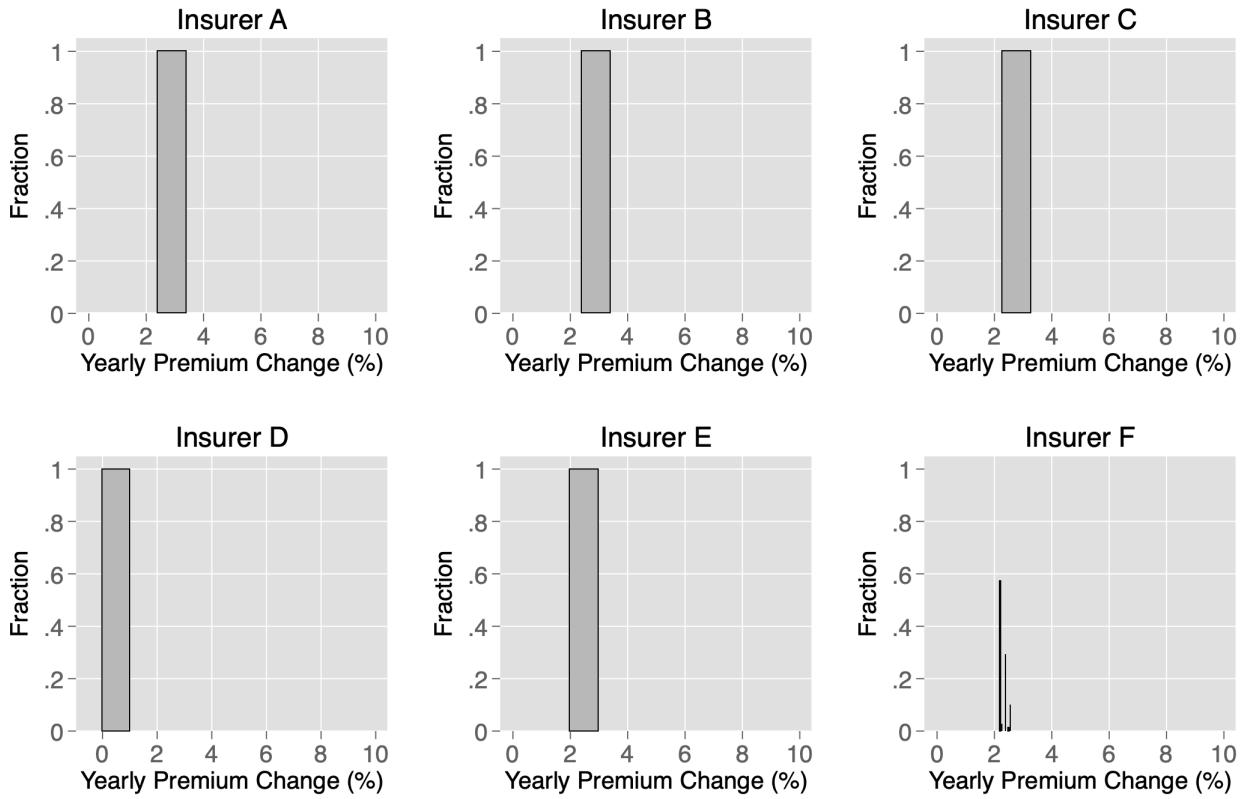
Notes: This table shows the results of a regression where the dependent variable is a dummy equal to one if policyholder i fills a positive number of claims 6 months before and after the signing month, and the main independent variable is a dummy $\mathbb{1}\{Lapsers\}$ equal to one if the policyholder lapsed her plan during the signing month in Figure 3. Each column is a different specification with different controls. Demographic characteristics include insurer FE, year FE, age FE, gender FE, region of residency FE, income tercile FE and policyholder FE. Standard errors are in parenthesis and are clustered at the policyholder level.

Figure A.3: Front-loading in GR contracts



Notes: This figure shows a plot of $markup_{it} = \frac{P_{it}}{h_{it}}$ across years, where h_{it} is the expected claims in year t by individual i, and P_{it} the corresponding premium. I use a panel of single policyholders enrolled in the same contract from January 2012 to December 2017. Vertical lines denote 95% confidence intervals. The top panel displays female policyholders. The bottom panel displays male policyholders.

Figure A.4: Base price changes 2013/2014

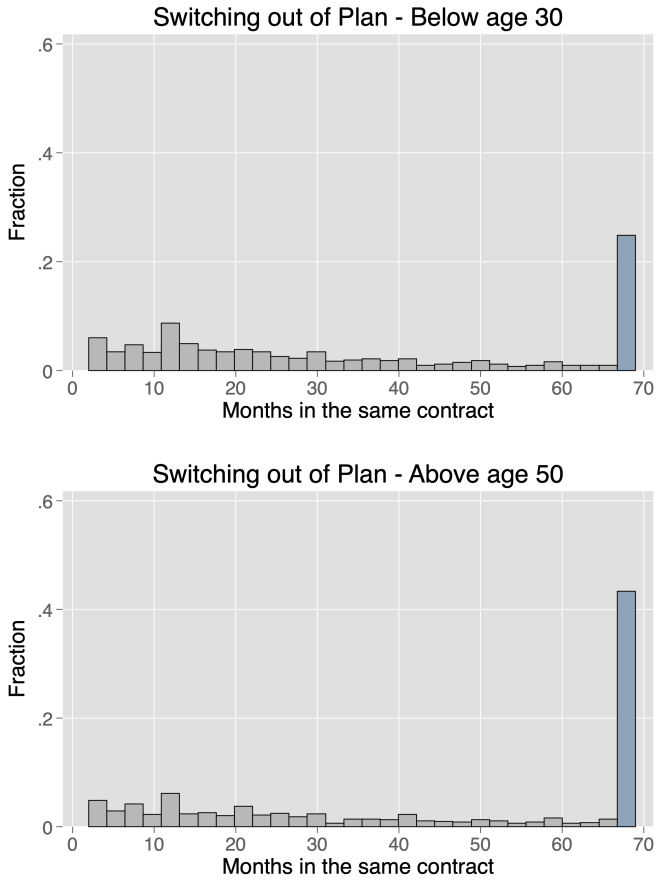


Notes: This figure shows an histogram of the annual base price changes for the six insurance companies in Chile for the period 2013/2014. Plans with less than 50 policyholders by January 2013 are excluded from the figure.

Figure A.5: Base price evolution

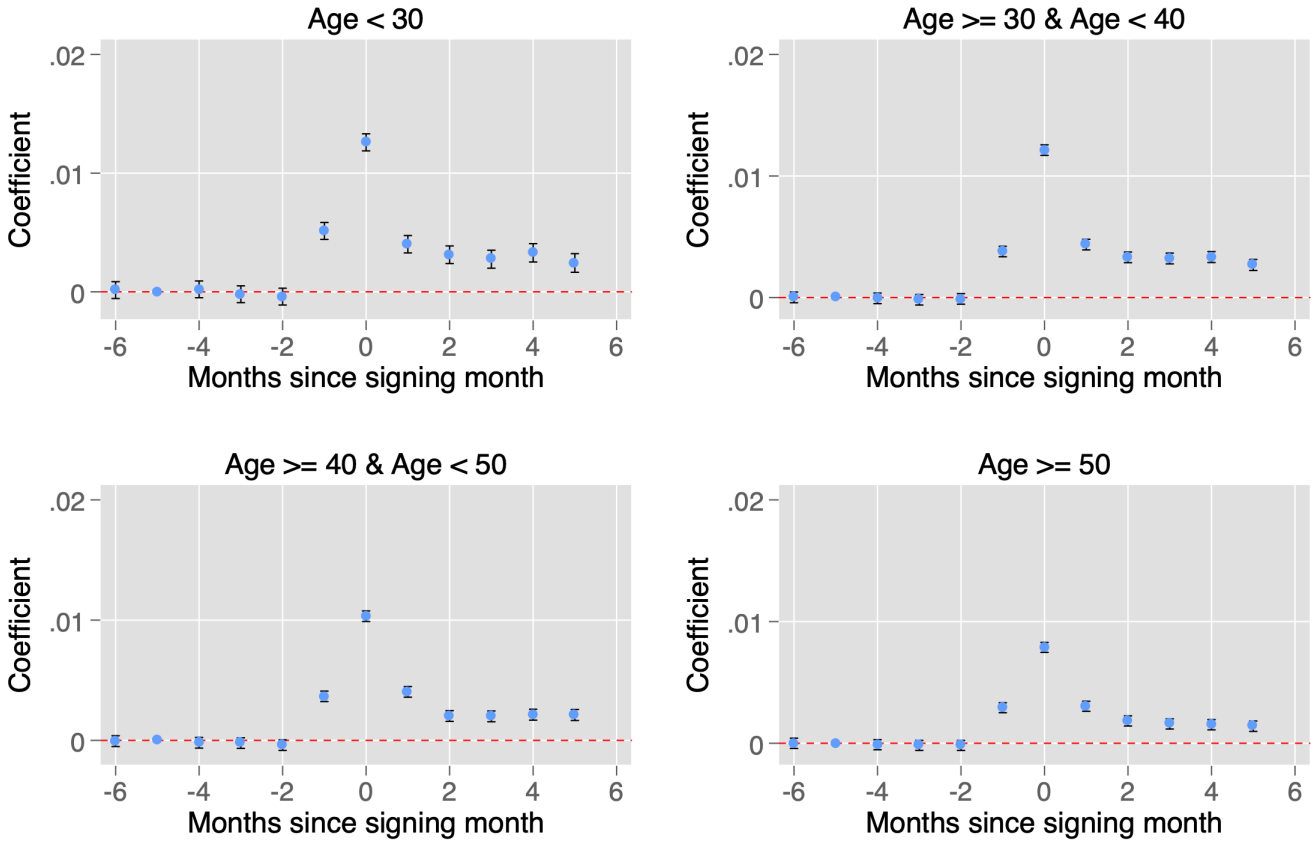
Notes: This figure shows the evolution of base prices for five of the six insurance companies in Chile for the period 2013-2018. The company missing filed for bankruptcy in 2017. Plans are divided into terciles according to their plan scores. Chilean UF is the unit, indexed to inflation, in which base prices are measured in Chile.

Figure A.6: Tenure in GR contracts



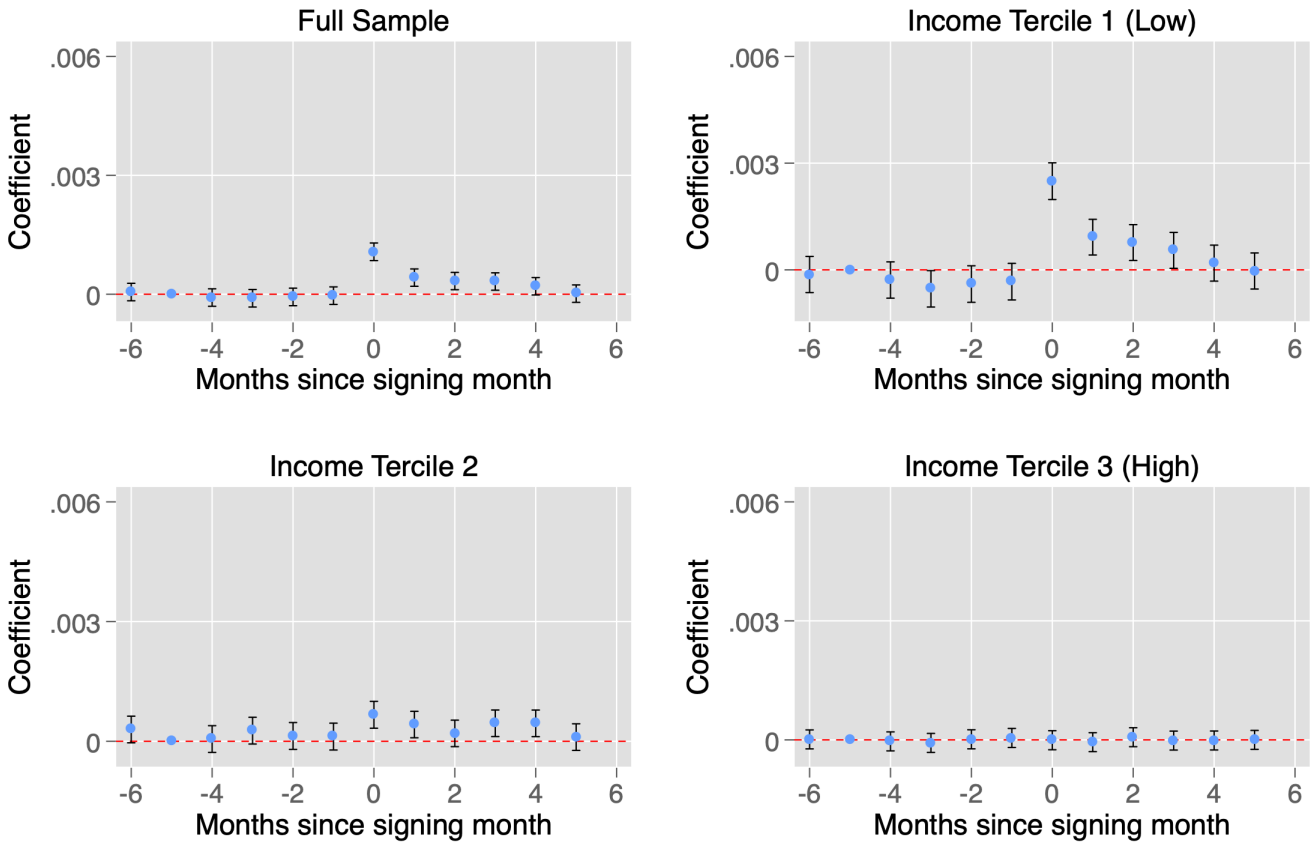
Notes: This figure shows histograms of how many months policyholders stay in their contracts after signing a new contract in March of 2011. I drop one insurance company from the sample with plans that cannot be matched before 2013. Any switching is considered.

Figure A.7: Probability of leaving the private market due to price changes



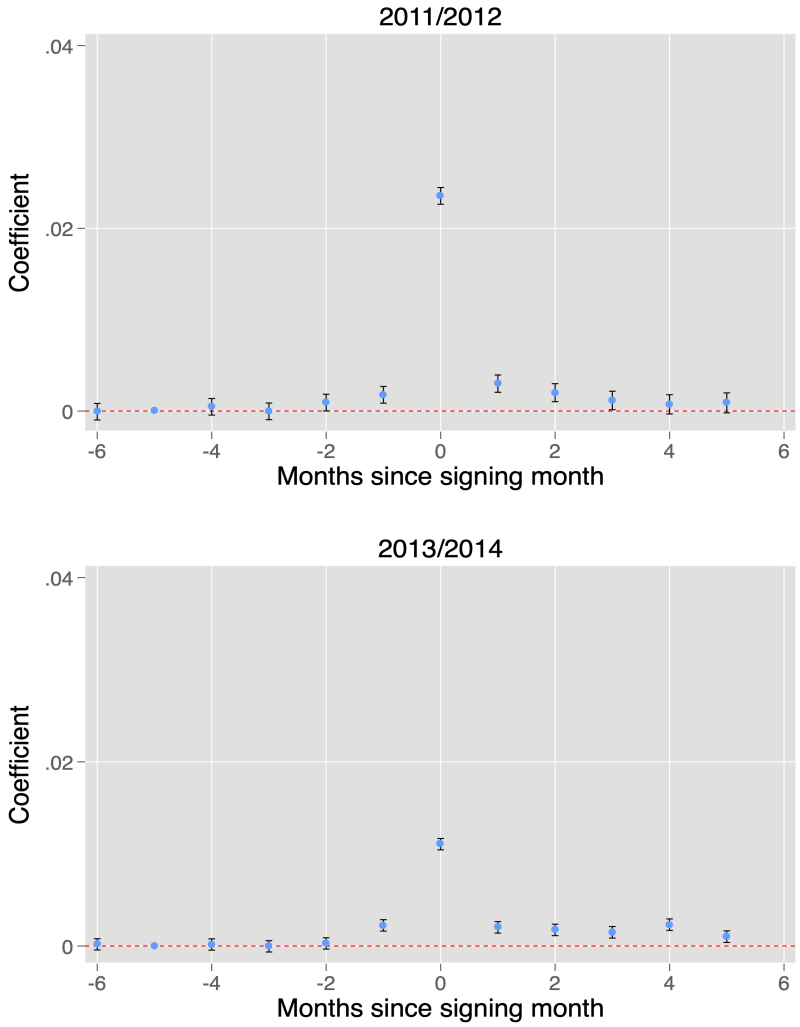
Notes: This figure shows an event study regression where the dependent variable is a dummy equal to one if a consumer switches plans within an insurer. The event is the month in which price changes are applied to health plans. Controls include individual fixed effects and date (month-year) fixed effects. I restrict the estimation sample to policyholders that do not switch insurance companies and that do not leave the private market and re-enter in later dates. Additionally, I drop individuals with zero or missing income at any month. This exercise is done on a 20% random sample of policyholders.

Figure A.8: Probability of leaving the private market due to price changes



Notes: This figure shows an event study regression where the dependent variable is a dummy equal to one if a consumer leaves the private market and do not re-enter in the future. The event is the month in which price changes are applied to health plans. Controls include individual fixed effects and date (month-year) fixed effects. I restrict the estimation sample to policyholders that are active in the data for at least 12 months and that do not leave the private market and re-enter in later dates. Additionally, I drop individuals with zero or missing income at any month. This exercise is done on a 20% random sample of policyholders.

Figure A.9: Probability of switching plans due to price changes



Notes: This figure shows an event study regression where the dependent variable is a dummy equal to one if a consumer switches plans within an insurer. The event is the month in which price changes are applied to health plans. Controls include individual fixed effects and date (month-year) fixed effects. I restrict the estimation sample to policyholders that do not switch insurance companies and that do not leave the private market and re-enter in later dates. Additionally, I drop individuals with zero or missing income at any month. This exercise is done on a 20% random sample of policyholders.

Table A.2: Regression - Lapsers and probability of positive spending by income terciles

	(1)	(2)	(3)	(4)	(5)
	1st Income Tercile				
$\mathbb{1}\{Lapsers\}$	0.072	0.109	0.110	0.103	0.080
	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)
	2nd Income Tercile				
$\mathbb{1}\{Lapsers\}$	0.032	0.047	0.048	0.038	0.038
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
	3rd Income Tercile				
$\mathbb{1}\{Lapsers\}$	0.031	0.032	0.031	0.019	0.020
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Firm FE	No	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	Yes
Demographic Characteristics	No	No	No	Yes	No
Policyholder FE	No	No	No	No	Yes

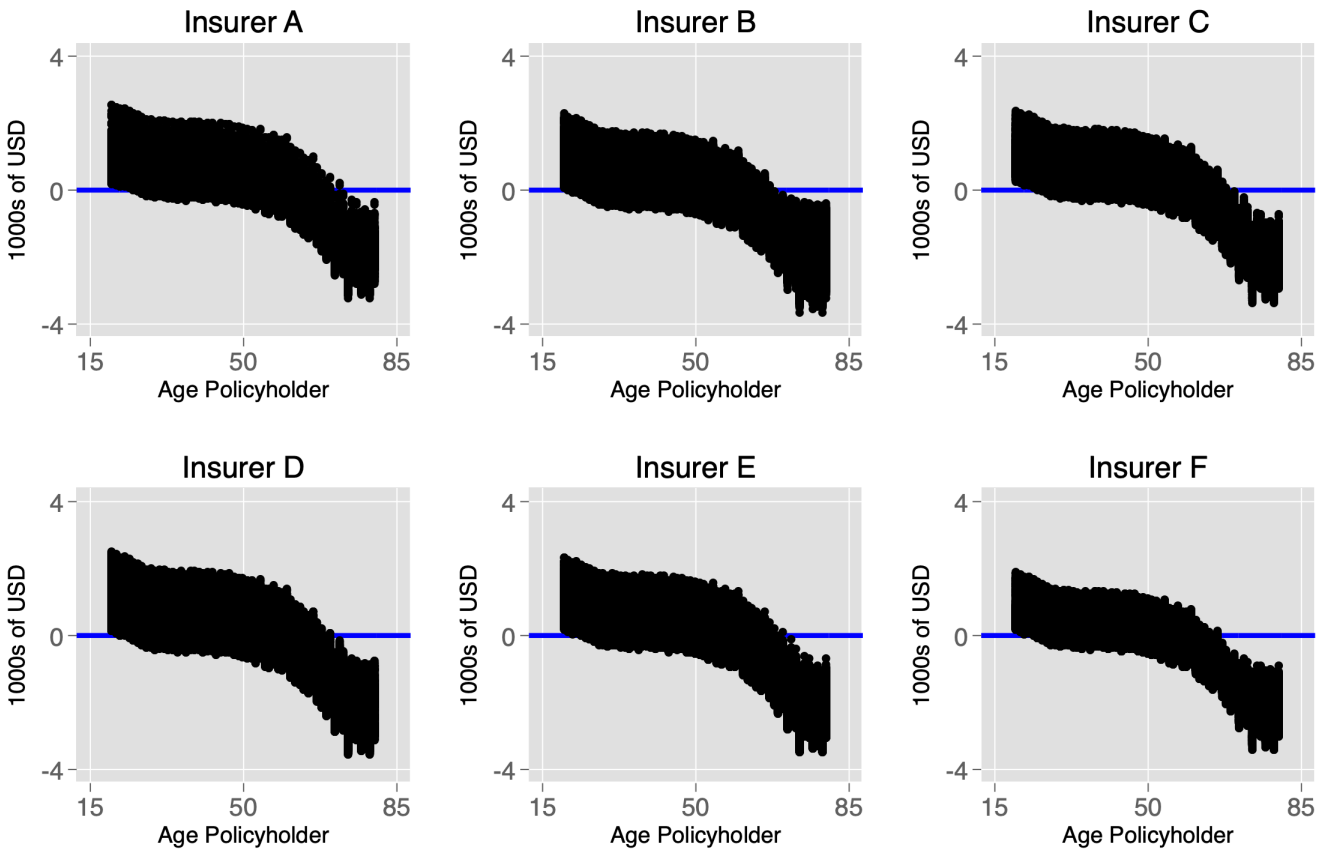
Notes: This table shows the results of a regression where the dependent variable is a dummy equal to one if policyholder i fills a positive number of claims 6 months before and after the signing month, and the main independent variable is a dummy $\mathbb{1}\{Lapsers\}$ equal to one if the policyholder lapsed her plan during the signing month in Figure 3. Each column is a different specification with different controls. Demographic characteristics include insurer FE, year FE, age FE, gender FE, region of residency FE and policyholder FE. Standard errors are in parenthesis and are clustered at the policyholder level.

Table A.3: Regression results - Income changes and lapsing

Lapsing	(1)	(2)	(3)	(4)	(5)
$\mathbb{1}\{\Delta Income \leq 30\%\}$	0.031	0.024	0.027	0.026	0.015
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
$\mathbb{1}\{\Delta Income \geq 30\%\}$	0.030	0.019	0.022	0.022	0.005
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age and Gender FE	No	Yes	Yes	Yes	No
Other Characteristics	No	No	Yes	Yes	No
Year FE	No	No	No	Yes	Yes
Policyholder FE	No	No	No	No	Yes
F-stat	794	544	523	509	33
Observations	1,557,662	1,557,662	1,557,662	1,557,662	1,557,662

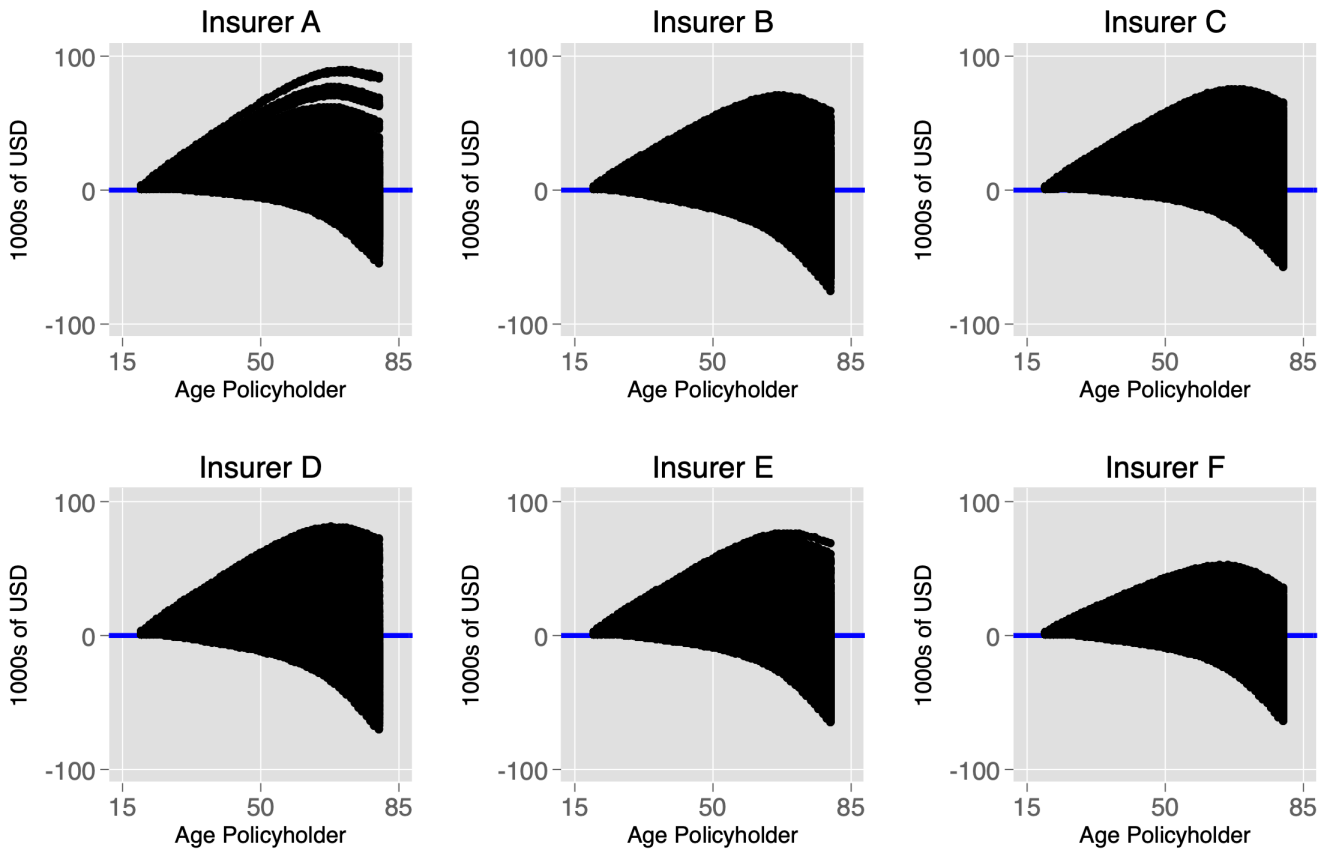
Notes: This table shows the results of a regression of a dummy equal to one if the policyholder lapses in a particular year (within the company or to another company) and zero otherwise on a dummy equal to one if the policyholder is exposed to a change in income lower or equal to 30% in that year and a dummy equal to one if the policyholder is exposed to a change in income greater or equal to 30% in that year. Each column is a different specification with different controls. The sample is composed by policyholders that were active in the private market throughout 2013 to 2016. Standard errors are in parenthesis and are clustered at the policyholder level. The mean of the dependent variable in the sample is 0.09.

Figure A.10: Expected actuarial profit - Year-by-year



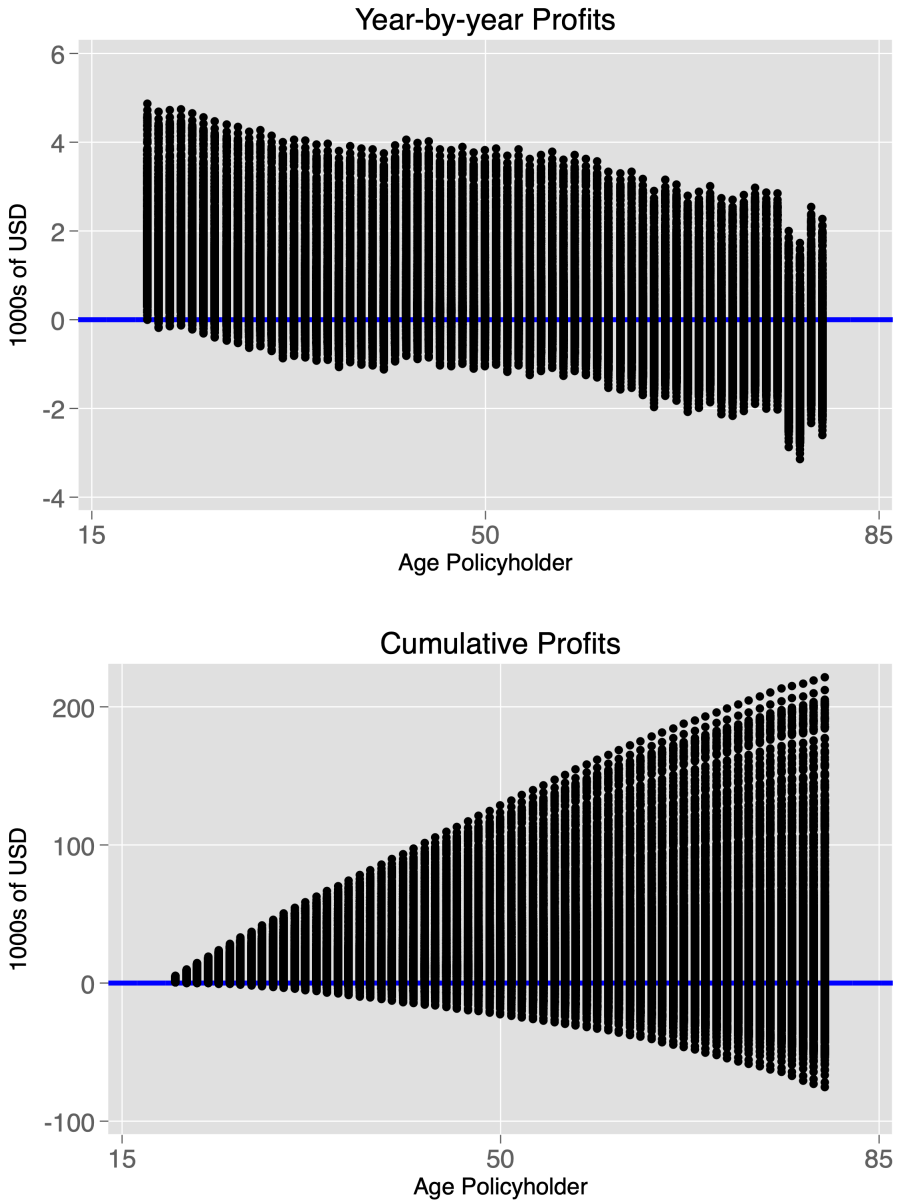
Notes: Each dot in the figure represents the expected actuarial profit for a particular plan of enrolling a male policyholder of a particular age. Data come from the six insurance companies. The price is calculated for a 20 years old male that signed a new contract in 2013. The cost is the expected medical spending by age across active policyholders in 2013 multiplied by the coverage rate of the plan. Profits are measured in U.S. dollars using the exchange rate on December 2013.

Figure A.11: Expected actuarial profit - Cumulative



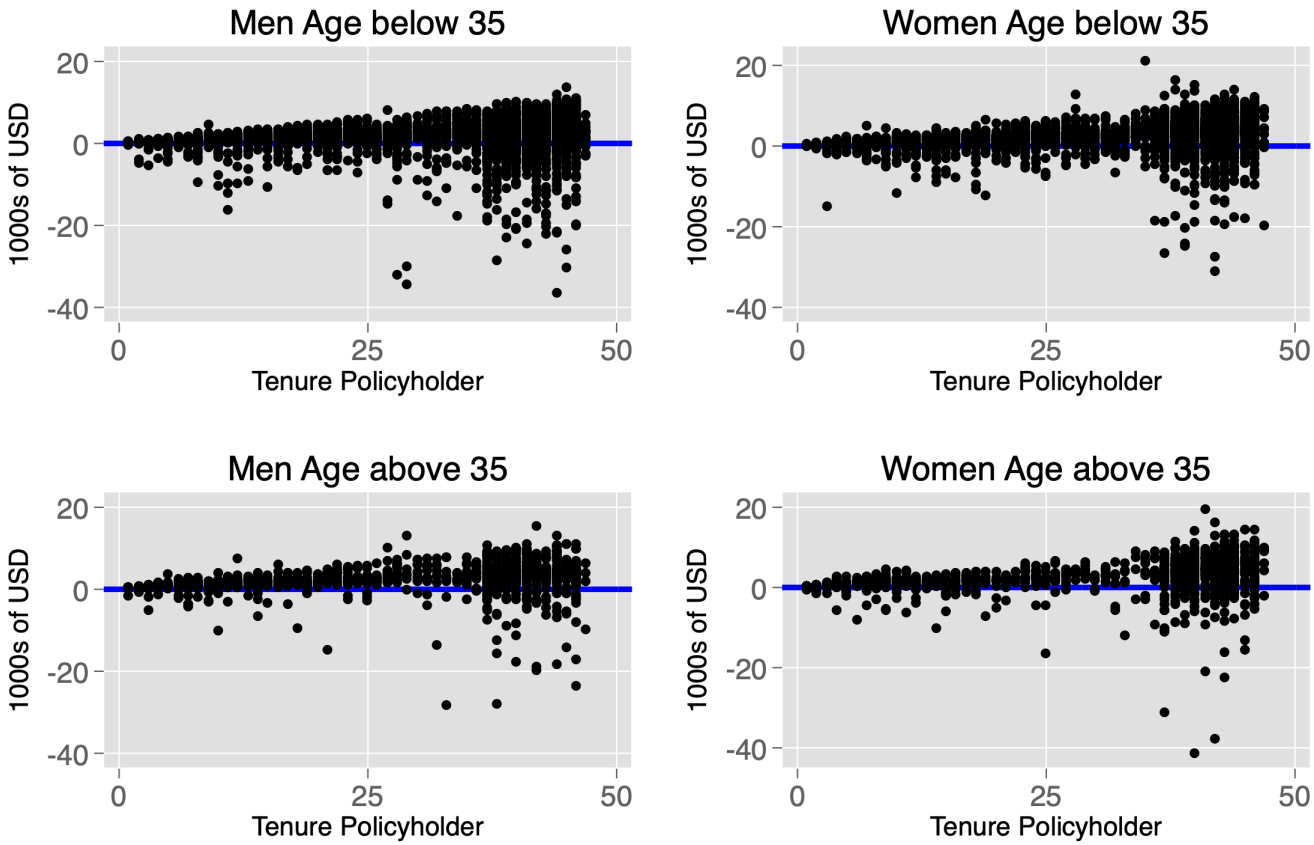
Notes: Each dot in the figure represents the expected actuarial cumulative profit for a particular plan of enrolling a male policyholder of a particular age. Data come from the six insurance companies. The price is calculated for a 20 years old male that signed a new contract in 2013. The cost is the expected medical spending by age across active policyholders in 2013 multiplied by the coverage rate of the plan. Profits are measured in U.S. dollars using the exchange rate on December 2013.

Figure A.12: Expected actuarial profit - Females



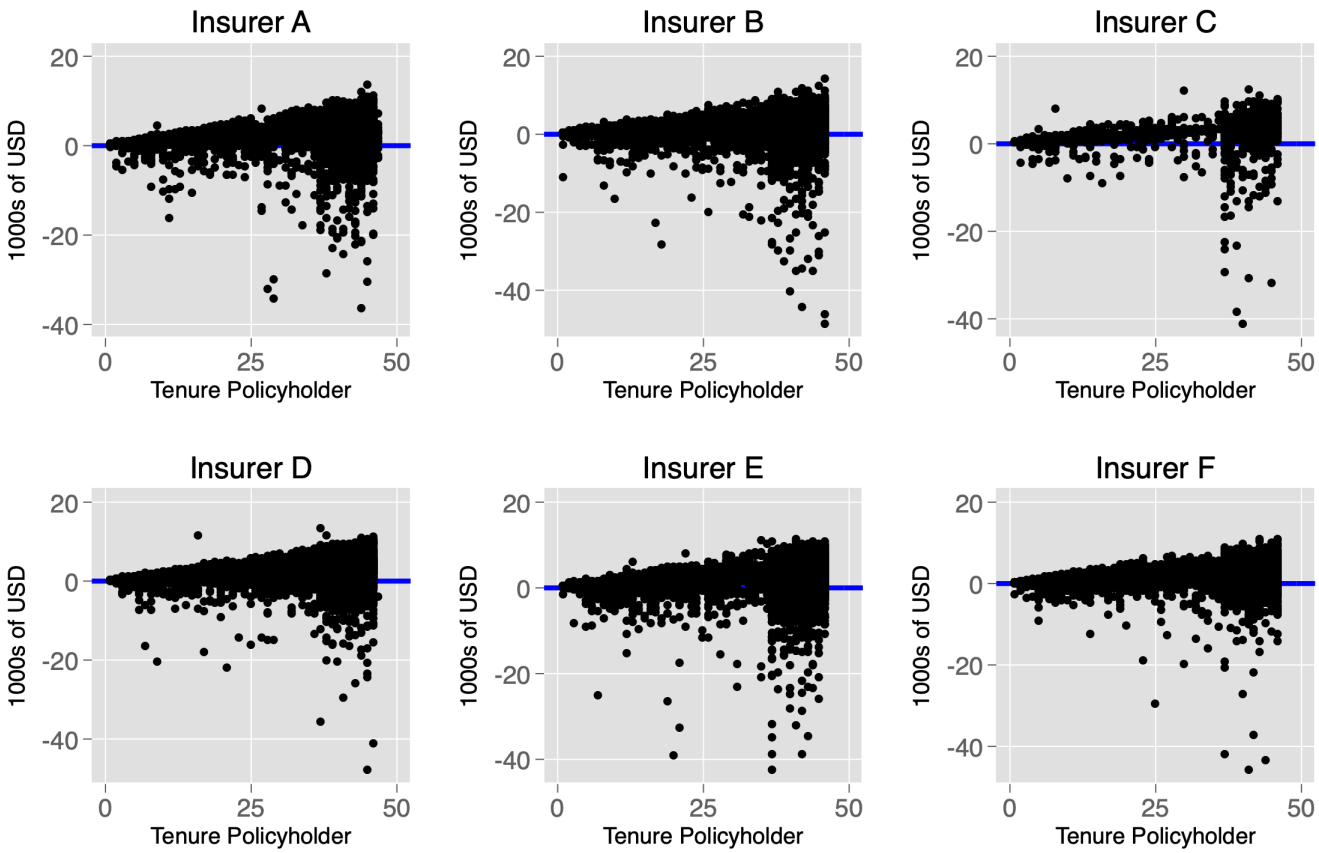
Notes: Each dot in the figure represents the expected actuarial profit for a particular plan of enrolling a female policyholder of a particular age. The upper panel computes annual profits for each age and each plan. The lower panel computes cumulative profits for each age and each plan. Data come from one representative insurance company. The price is calculated for a 20 years old female that signed a new contract in 2013. The cost is the expected medical spending by age across active policyholders in 2013 multiplied by the coverage rate of the plan. Profits are measured in U.S. dollars using the exchange rate on December 2013.

Figure A.13: Realized profit - By demographics



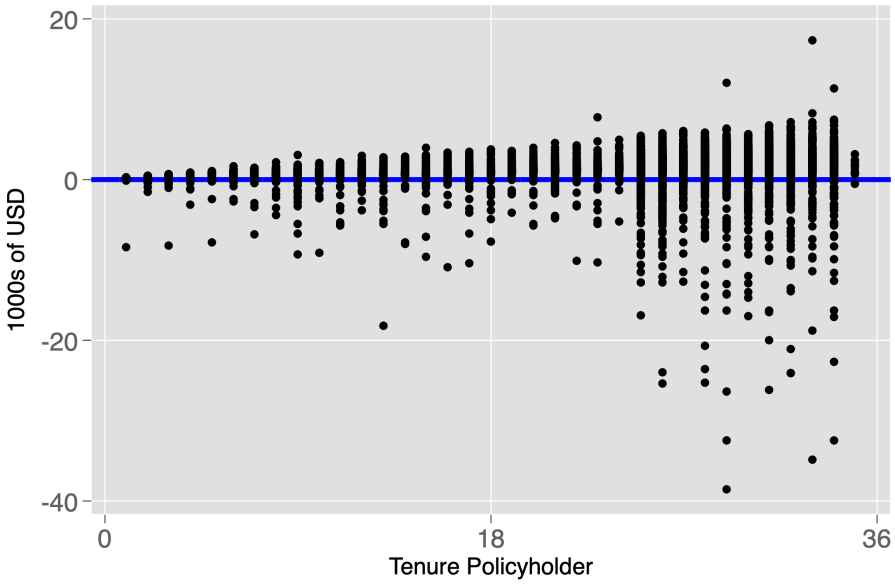
Notes: Each dot in the figure represents the cumulative realized actuarial profit for a particular male policyholder of age less than 35 that signed a new contract in 2013 until he lapses. Tenure measures how many months the policyholder remained in the contract. Data come from one representative insurance company. Profits are measured in U.S. dollars using the exchange rate on December 2013.

Figure A.14: Realized profit



Notes: Each dot in the figure represents the cumulative realized actuarial profit for a particular male policyholder of age less than 35 that signed a new contract in 2013 until he lapses. Tenure measures how many months the policyholder remained in the contract. Data come from the six insurance companies. Profits are measured in U.S. dollars using the exchange rate on December 2013.

Figure A.15: Realized profit - 2014



Notes: Each dot in the figure represents the cumulative realized actuarial profit for a particular male policyholder of age less than 35 that signed a new contract in 2014 until he lapses. Tenure measures how many months the policyholder remained in the contract. Data come from one representative insurance company. Profits are measured in U.S. dollars using the exchange rate on December 2014.