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Universal health insurance under a dual system, evidence of adverse selection against the public sector: the case of Chile

Javier Bronfman¹

Abstract

This paper examines health insurance choice and its dynamics using panel data from Chile's National Socio Economic Characterization Survey 1996-2001-2006. Evidence indicates that private insurance is losing customers to the public sector. Two different logistic models are used to explain the determinants of insurance choice as well as what drives the decision to move from the private to the public sector and vice versa. Income is a highly important determinant of choice, as well as age, education, geographical location and health status. Evidence of adverse selection against the public sector was found in both decision models. The results of this paper are in line with most of the previous investigations done on Chile's health insurance system but it advance previous knowledge on the topic by including the dynamism and power for causal inference that panel data permits

Keywords: Health systems, Adverse Selection, Chile

JEL Code: I11, I13, I18

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“Better health is central to human happiness and well-being. It also makes an important contribution to economic progress, as healthy populations live longer, are more productive, and save more.” (WHO 2014)

I. Introduction

Health shocks can be devastating to individual’s well-being. Aside from their deterioration in health, they can be affected by foregone income and the high—and possibly catastrophic—cost of health care services. All over the world, both private health insurance markets and national health systems have been developed to deal with the high cost and uncertainty associated with health care. Additionally, the focus on improving and protecting individuals’ health is an important development outcome, as it is also needed to reach higher levels of development. Thus different national health systems have developed to promote good health among their citizens by ensuring access and quality of health services.

Since the 1980s healthcare reforms, Chile has relied on a universal and dual healthcare system consisting of both private and public insurance providers. Even though health care is universal and all citizens are insured against health shocks, this system is also characterized by its high level of income segmentation, and is plagued by problems due to market and government failures associated with its design and the widespread loose regulations of private insurance.

Although this dual system provides an interesting setting in which to explore the existence of market and government failures linked to information asymmetries and lack of regulation, very few studies have been conducted in this area, and most of those that exist are over a decade old. All previous studies have relied on cross-sectional data, thus lacking exploration of what determines individuals to move from one type of provider to another. Understanding these dynamics and the causes of change could help shed light on this situation and explain some of inherent problems of the system.

Using panel data to examine insurance choice and its dynamics over time, this chapter empirically investigates the main determinants of individuals’ choice of health insurance provider within the setting of Chile’s dual health insurance system. In addition, the study examines which factors bring about a change of individual affiliation from one insurance

provider type to the other. The results of this investigation will contribute to the literature by adding new evidence on the way a universal mixed health insurance system works, advancing previous knowledge on the topic through its inclusion of the dynamism and power for causal inference that panel data permits.

The chapter is divided into seven sections. The following section will provide information about the history and main characteristics of the Chilean health system. Section III will discuss the theoretical framework behind information asymmetries and market failures, as well as the relevant literature on health insurance and Chile's health system. Section IV will explain the data and provide some descriptive statistics. Section V and VI will explain the methodology and discuss the empirical results. Finally, the section VII presents main conclusions and policy implications.

II. The Health System in Chile

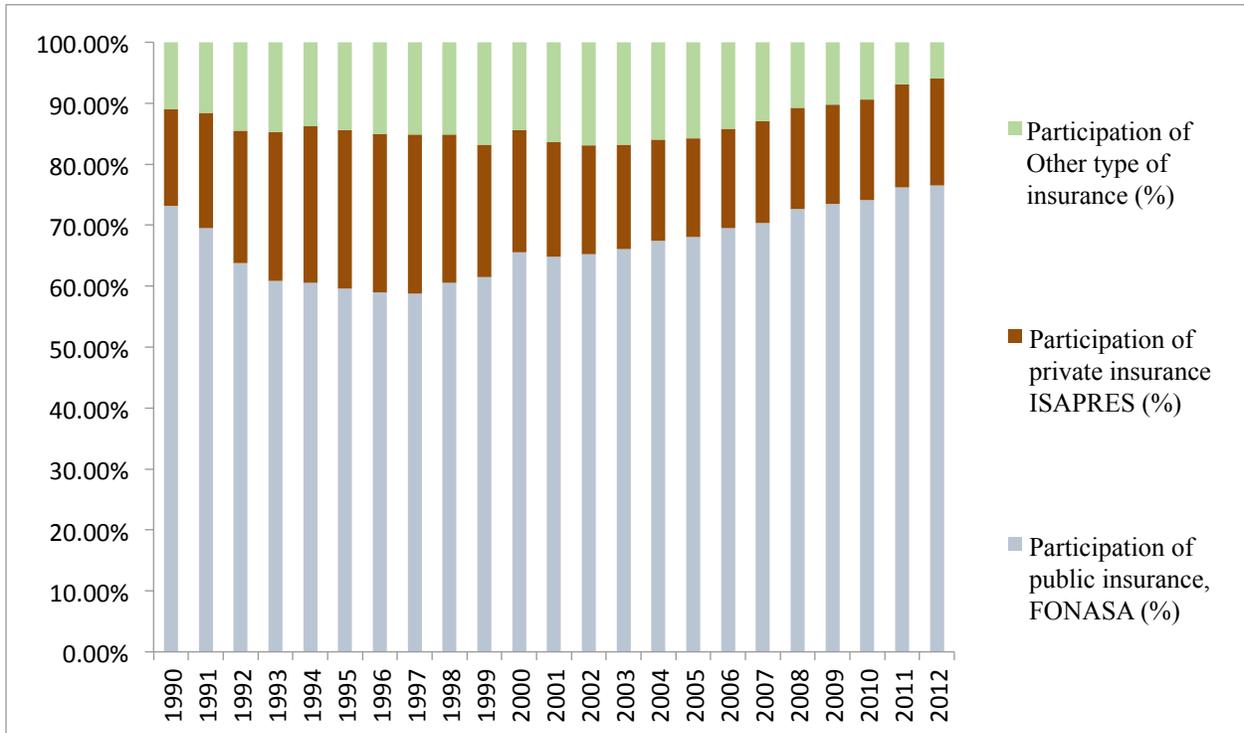
Since the early 1920s, the Chilean government has mandated that workers contribute a portion of their income to the national health system via compulsory worker's insurance. Initially, healthcare was provided through a network of public hospitals and administered centrally. During the Pinochet government (1973-1990), the national healthcare system was reformed to allow the development of a private health sector in order to improve efficiency in health delivery and promote individual choice. Since the enactment of this decree number 3 in 1981, the Chilean health system has changed dramatically, transforming into a universal yet dual system with both public and private health insurance options. Competition among providers was expected to improve the overall performance of the system.

The health reform brought about the creation of new institutions called "*Instituciones de Salud Privada*" (ISAPRES), a private institution capable of providing both health insurance and health care. Decree number 3 permitted workers the choice of whether to make their mandatory health insurance contributions directly to the government insurance program, called "*Fondo de Salud Pública*" (FONASA), or toward the newly-created ISAPRES.² Graph 1 illustrates the

² Coexisting with these two main insurance providers are the closed insurance schemes for the Armed Forces and private insurances for foreigners. These *other* insurance schemes represent only a small fraction of the insured population (Superintendencia de Salud 2014).

share of beneficiaries in each type of system from 1990 to 2012. Since the mid-1990s, FONASA has experienced a rise in total beneficiary participation, reaching 76% in 2012. Simultaneously, the percentage of the total population enrolled in both ISAPRES and other types of insurance has dropped significantly.

Figure 4.1 Percentage of beneficiaries by insurance type.



Source: Superintendencia de Salud (2014)

The new legislation mandates that workers contribute 7% of their taxable income to health insurance, with a cap of approximately \$250 US dollars per month. This contribution can be utilized to acquire insurance through FONASA or the ISAPRES system. FONASA affiliation entitles an individual to receive health care from public hospitals and public health providers at a co-pay level which depends exclusively on his or her income. Co-pays in the public sector range from 0% to 20% of a subsidized government set price on health care service (see Appendix 1). Individuals insured by FONASA can also receive health services from private providers, but at a much higher cost, since the reimbursement cap is based on government set prices, which are significantly lower than private sector ones. ISAPRES differs from FONASA by offering a much

wider range of insurance plans with different prices and benefits.³ Prices charged by ISAPRES are determined by individual risk factors and the level of desired benefits; individuals can purchase health plans with greater benefits by contributing more than the mandatory 7% of taxable income if desired.

The idea behind the mixed system, and the subsequent creation of ISAPRES, was to foster market competition, thus promoting choice and improving efficiency while keeping universal coverage through mandatory contributions to the system. Theoretically, in a competitive system, individuals can move their resources from the public to the private sphere, as well as moving them within the private insurance market. ISAPRES contracts are lifetime agreements; however, individuals can opt out once every year or when they change jobs and ISAPRES can refuse coverage to new entrants. In principle, ISAPRES can only terminate contracts if the worker does not comply with payments, but there is evidence of their raising the cost of insurance in order to discourage riskier customers from enrolling or remaining enrolled. ISAPRES can unilaterally raise the price of the plans, arguing an increase in health costs. Even though this practice has been contested in court with positive results for the insured, the cases that go to court constitute a very low proportion of ISAPRES' total portfolios (Paraje et al. 2013). FONASA, on the other hand, is unable to exclude anyone from coverage. Public-sector insurance is required by law to provide health coverage to all individuals who want to enroll in the public system, regardless of their risk or health status. Thus FONASA serves as the ultimate safety net for those who cannot afford or are otherwise excluded from private insurance options.

This feature enables private insurance providers to cherry-pick individuals or family groups with lower risks, leaving the public sector with riskier (and therefore more expensive) individuals –in essence, skimming the market and risk-dumping into the public sector. Moreover, as market concentration in the private sector has increased, the potential for competition between ISAPRES has decreased significantly over time. Both the Herfindahl-Hirschman index (HHI), which measures market concentration, and the C4 index, which reflects the market share, show that enrollment in the four largest ISAPRES plans has increased significantly since 2001 (Paraje et al. 2013); this is a reflection of takeovers and smaller ISAPRES being removed from the

³ It has been estimated that ISAPRES currently offers over 12,000 different health plans (Paraje et al. 2013).

market.⁴ Additionally, there are several barriers to other insurance providers who wish to enter the market. Even if capital requirements do not present a major barrier, initial investment in advertising and sales force, and the lack of capacity to build long-term contracts with health providers that can compete with existing ISAPRES plans (which are vertically integrated with the major providers) discourage new entrants to the market (Agostini et al. 2011). Although the law does not permit direct vertical integration between ISAPRES and health providers, these institutions have been able to integrate through grouped corporation structures, arguing that it is not the ISAPRE that controls the health provider but a different corporation. Vertical integration has increased significantly over the past decade; today there are 6 ISAPRES⁵, all of which are vertically integrated with health centers and hospitals around the country through different corporate structures (Tobar et al. 2012).

In theory, the idea behind the 1980s health reform—to introduce competition between health insurance providers— was well intended. A market operating under a perfect competitive environment could lead to an efficient allocation of resources and the maximization of social outcomes. Unfortunately, in the case of Chile’s healthcare sector, both market and government failures are abundant. On the supply side, only few actors provide health insurance, limiting competition and choice. There are significant barriers to entry, restraining the capacity of new entrants that could foster competition, thus increasing social welfare through the creation of a less rent-extractive equilibrium. Similarly, on the demand side, the possibility of moving from one private provider to another is limited. Given the fact that ISAPRES can reject individuals based on their health risks or refuse to pay for health services derived from preexisting conditions, both the elderly and those suffering from chronic illness are significantly limited in their ability to move within the private sector. Once the enrolled participant (or a family member covered under their insurance plan) develops a chronic illness, or their health risks becomes too high, they must stay with their insurance provider, usually facing increased costs to keep same coverage. Cid et al. (2009) estimates that 30% of ISAPRES beneficiaries are “captured” by their health insurance provider due to chronic illness or age, meaning they cannot move to another provider due to preexisting conditions. This evidences a very loose regulatory framework.

⁴ The HHI rose from under 1,500 points in 1990 to above 2,000 points in 2011, and C4 rose from below 70% to almost 90% during the same period.

⁵ ISAPRES can be divided in two groups: open and closed. Closed ISAPRES are linked to firms, and only individuals working in those firms can become members. These institutions represent less than 3% of the total pool of beneficiaries within the private insurance market.

As evidenced in the previous discussion, Chile's market of mandatory health insurance is far from the perfect competitive market model. In addition to the supply- and demand-side problems, information asymmetries within the market foster moral hazard and/or adverse selection situations. These problems have been identified for decades as unavoidable features in health insurance markets (Arrow 1963), and therefore the importance of regulation to limit the negative effects of these asymmetries is paramount in this sector. The following section will discuss some of the problems caused by these information asymmetries from a theoretical point of view, as well as examine in depth the relevant empirical literature on which this study is built on and contributes to.

III. Theoretical Framework and Literature Review

In order to understand market failures, one must first comprehend how a perfect market works. The competitive market model and its equilibrium predict the maximization of social surplus and the efficient allocation of resources. There is no allocation of resources that would benefit society more than when marginal social costs equal marginal social benefits. Market equilibrium is Pareto efficient, meaning that there is no choice of quantity and price that could raise the benefits of one or more individuals without hurting the welfare of others.

For the market to maximize social welfare and produce an efficient allocation of resources, a number of conditions must be met: (i) there are a large number of buyers and sellers, meaning no one can determine or influence prices; (ii) individuals and firms are rational, meaning they maximize their objectives (firms maximize profit and individuals maximize utility); (iii) factors of production have perfect or high mobility; (iv) there is full information availability and an absence of information asymmetries; (v) transaction costs are very low or nonexistent; (vi) there are no externalities, meaning the price mechanism is able to capture all social costs and benefits resulting from consumption and/or production; (vii) no entry or exit barriers exist; and (viii) the product is homogeneous in its characteristics. The level of market efficiency is determined by the existence or lack of these conditions. When one or more are missing, the market by itself will not be able to allocate resources efficiently, and the resulting equilibrium will not meet the Pareto criteria, leading to a negative effect on society's welfare.

Depending on which one of the characteristics of the competitive market is missing, different market failures may arise, and therefore, different solutions can be proposed. In the case of health insurance markets, and particularly in the case of Chile's health system, the market does not work exactly as predicted by the competitive framework, due to its institutional arrangements, information asymmetries. Additionally, health services by nature lead to positive externalities, or situations where the social benefit is higher than the private benefit (e.g. vaccines, preventive care services, clear air and water), justifying government intervention. This study discusses several aspects of market and government failure in Chile and focuses its empirical analysis on the existence of adverse selection, a problem that generates market segregation, fosters inequality, and could possibly jeopardize the sustainability of the entire system.

In terms of information asymmetry problems, moral hazard is understood as a change in an agent's risk-taking behavior after being insured –in other words, a post-contractual opportunism. Moral hazard arises when the insured do not face the complete social cost of their actions and insurance companies must bear a portion or all of the cost. Therefore, being insured could incentivize a change in behavior and create deadweight losses. In the case of health insurance, moral hazard is considered a special case of information asymmetry; agents know more about their own health status, behavior and health service demand than insurance companies. Individuals may use more than the optimal amount of health services when insured, as opposed to when they are not insured, due to the price after insurance being lower than the marginal benefit to them. Thus, given that they do not pay the full cost of health services, individuals covered by insurance have the incentive to over-consume them. Most insurance markets deal with this moral hazard by raising the premium and co-pays to control overuse.

In his influential paper on health economics, Pauly (1968) develops the theoretical framework behind the moral hazard problem in health insurance. His paper illustrates the social losses produced by the overconsumption of health services that occurs because of lower prices for insured individuals. The article acknowledges the fact that demanding more health services is not "moral perfidy, but a rational economic behavior" (Pauly 1968, 535). Nyam (1999) revises Pauly's (1968) article, arguing that Pauly overestimates welfare loss due to moral hazard.⁶ By incorporating the missing income effect into his analysis, Nyam (1999) shows how moral hazard

⁶ See Appendix 3 for more details.

welfare loss might actually be lower, and could be offset by social gains such as risk-bearing, insurance companies' ability to permit access to high-cost health care procedures and income transfers when individuals are sick. In order to reduce the moral hazard problem, Pauly (1968) proposes two solutions: deductibles and coinsurances. On one hand the deductible consists of a certain set amount of the health cost to be excluded from coverage; on the other, the coinsurance requires the insured individual to pay a percentage of the health service cost. These two devices increase the out-of-pocket cost of health care services for insured individuals, lowering the deadweight loss by decreasing overconsumption and excess demand. By increasing the cost, deductibles and coinsurances induce individuals to consume fewer health care services, leading to more efficient resource allocation. Another way to deal with moral hazard, in the tradition of policies used in the car insurance market and principal-agent theory, could be the use of incentives. Providing discounts or rewards to people who do not overuse their healthcare insurance and use preventive care services, could lead to a better allocation of resources.

In the case of Chile, the capacity to control the moral hazard is limited in the public sector, since law forbids premium changes in FONASA. On the other hand, ISAPRES can adjust premiums and design their plans to minimize moral hazard by including co-pays and deductibles that can be adjusted over time. It must be noted that fee-for-service doctors are also affected by moral hazard. These doctors have an incentive to over-treat and over-prescribe medicines for their insured patients, usually in an attempt to cover themselves from lawsuits. Therefore, doctors' moral hazard leads to inefficient resource allocation, adding to the moral hazard welfare loss that comes from insured individuals' behavior. This particular type of moral hazard is prevalent in the Chilean system due to the vertical integration between ISAPRES and health providers. There are limited incentives to control costs, since in the end health corporations (insurance companies plus health care providers) can transfer the price to the individual over time, as well as limit his or her ability to move to another private insurance. This leaves the individual with no other option than staying at the same ISAPRE or moving to FONASA.

The other information asymmetry problem relevant to the health insurance market is adverse selection—a pre-contractual information asymmetry. Adverse selection has been long studied both theoretically and empirically; Rothschild and Stiglitz (1976) provide a theoretical model explaining adverse selection in health insurance. Since insurance companies do not have complete information about the potential risk of their customers, they need to disperse the risk

and create a pool of high- and low-risk individuals in order to balance their portfolio. However, from the demand side, high-risk individuals are always more keen to be in the pool and share risk, since the cost of insurance is based on the average risk pooled. It becomes increasingly unattractive for low-risk individuals to participate, and when they drop out, it creates an adverse selection problem—thus raising the cost of insurance. This equilibrium leads to market failures; under provision of insurance, higher costs could eventually cause insurance company bankruptcy.

In the absence of the ability to charge risk premiums, the common solution to this adverse selection problem has been to provide universal coverage, or mandatory insurance. By creating mandatory insurance, the pool of risk would make the insurance scheme work, creating cross-subsidies between healthier and younger individuals and the ill and the elderly. If everyone is insured, there is no selection bias, and therefore the risk is balanced; this lowers the incentive to leave the insurance company or take advantage of it. In some ways the Chilean health system is universal: everybody is covered. However, the characteristics of this dual system could be generating a large adverse selection problem for FONASA, where individuals with more serious health problems and thus more expensive treatments end up seeking coverage.

ISAPRES, on the other hand, reduces adverse selection using market mechanisms. It offers different policies with different prices and coverage levels, allowing people who can afford it to self-select the high-cost coverage if they are riskier. This self-selection process provides information to the insurance companies by revealing individual preferences, thus decreasing information asymmetries. Nonetheless, this solution could create significant coverage gaps between those who have the resources to acquire high coverage for their high level of risk in the private market and those who do not. Individuals with a lower financial capacity will be left out, thus generating and/or sustaining social inequality.

Several papers have studied health insurance choice in dual systems empirically. These studies both try to understand what drives the specific selection of insurance type and the possible problems associated with information asymmetries previously discussed. Cameron et al. (1988) proposed a microeconomic model for health insurance choice and the utilization of health care services. Using data from the Australian Health Survey (1977-1978), they conclude that individual health status has a greater impact on the demand for health care services than on the choice of insurance type, and income shows a higher relation to insurance choice than to health

care service use. They find evidence of moral hazard, due both to an increase in health services used when an individual is covered by insurance and an increase in services used when insurance companies are more generous in terms of coverage.

Taking advantage of the national health insurance policy change in Australia, as well as the theoretical framework developed in Cameron et al. 1988, Cameron and Trivedi (1991) investigate the determinants of health insurance enrollment under two different policy settings in Australia. They first study the decision of getting extra coverage from 1977-1978 (using the 1977-78 Health Survey). Because basic health insurance in Australia was mandatory, they were able to look at the determinants of incremental coverage. The second period studied was March 1983 (using the March 1983 Health Insurance Survey), after mandatory insurance was abolished. The article found evidence that income is a significant determinant of whether an individual has incremental insurance as well as whether they have insurance in the second period. Premium prices play an important role during the first period, mostly for middle-income families. Health risk factors appeared not to be significant in determining insurance choice in both periods, showing evidence against adverse selection. They did, however, find that sex and age were significant determinants of insurance coverage and insurance choice in both periods, reflecting different risk preferences.

Few studies have analyzed the Chilean health system, and those that do exist generally rely upon data from the cross-sectional CASEN surveys from the 1990s period. Using the CASEN survey data from 1990 and 1994, Sapelli and Torche (1998) explore the individual variables that determine the choice between private and public health insurance. Their paper focuses on individuals who are mandated by law to acquire such insurance (including dependent workers and retirees). Using a logistic regression, the authors conclude that income has a positive impact on choosing private insurance over the public one, as do age, proximity to private healthcare facilities, and health status. In terms of adverse selection, the article finds that the information asymmetry regarding private information on health status generates an adverse selection against the ISAPRES, while observable information on health status, such as age and women in reproductive ages generates an adverse selection against FONASA. However, the adverse selection toward the private insurance disappears in the second period studied.

Sanhueza and Ruiz-Tagle (2002) study the determinants of choosing private insurance using the CASEN 1996 data. By estimating simultaneous equations, they calculate the

probability of electing private insurance in the dual system. They find that the probability of having private health insurance increases with income as well as with the proximity of private providers. Other factors, like age of the household head, the existence of a constructed health risk index, and the percentage of females in the household, decrease the probability of having private insurance. Additionally, they show evidence that poorer health status increases the probability of having private insurance, evidencing adverse selection toward private insurance. Regarding moral hazard, the article finds a positive and significant correlation between the demand for health services and the probability of having private insurance, evidencing moral hazard against ISAPRES, meaning those who are insured by ISAPRES tend to demand more health services after being insured.

Sapelli and Vial (2003), using 1996 CASEN data, examine the presence of adverse selection and moral hazard in the Chilean health insurance system through an analysis of dependent and independent workers' choice of insurance and utilization of health services. In the context of dependent workers (workers with contracts) who are mandated to contribute to either the private or the public system, they analyze the relationship between health care services utilization and the choice of insurance provider. For independent workers (self employed), for whom there was no mandate, they analyze the relationship between the decision to purchase health insurance and the utilization of health services. The results show evidence of adverse selection against ISAPRES for independent workers, and against FONASA for dependent workers, based on observable characteristics of risk (e.g. age, pregnancy, number of children in the family, and number of women in fertile age in the family). In terms of moral hazard, they find no evidence of hospitalization overuse, but a positive and significant difference in doctor visits for those mandated to contribute. Dependent workers had more than double the number of doctor visits than those not contributing.

Using the 2000 CASEN data, Henriquez (2006) shows that a "good" or "very good" self-reported health status has a positive and significant effect on the probability of having private insurance, while having a health-related functional limitation has a negative and significant effect on the probability of having private insurance. Using a two-stage model to control for the endogeneity associated with the decision to have insurance, Henriquez (2006) shows evidence that having private insurance positively affects the use of ambulatory care services but not hospitalizations.

Previous studies on the determinants of health insurance choice in Chile and the issues of moral hazard and adverse selection in the system have based their analyses on cross sectional data; thus, they are unable to look at the role choice plays in change over time between these two types of insurance schemes. By using an updated dataset and the additional time variability that a panel survey provides, this study expands the existing literature on health insurance choice and the information asymmetry problems in the Chilean health insurance system. The empirical analyses will focus on the existence of adverse selection in the system. Since the survey follows individuals over time, this study can model participant choice as well as examine some of the characteristics that determine why people change from ISAPRES to FONASA or vice versa. The analysis of these dynamics could provide valuable information regarding the problems faced by the dual system in Chile, as well as serve as empirical evidence to drive health reform.

IV. Data and Descriptive Statistics

This chapter uses the three waves of the Panel CASEN survey 1996, 2001 and 2006. Same data set used in chapter 1 and 2. This data set contains information on health insurance affiliation as well as on individual characteristics and exposure to health shocks. Thus permitting the study of insurance choice as well as the determinants of movement from ISAPRES to FONASA and the other way around.

Table 4.1 illustrates the percentage of individuals covered by each type of insurance for each wave of the survey. As seen here, there is a declining trend in ISAPRES beneficiaries: based on the panel data in 1996, 31% of the people were covered by ISAPRES, while 10 years later, that coverage had declined to 15%. Over time, ISAPRES could be losing significant prevalence among Chilean people (see also Appendix 2).

Table 4.1 Percentage of health insurance beneficiaries, by insurance type

Health Insurance provider	1996 cross section	1996 panel	2001 cross section	2001 panel	2006 cross section	2006 panel
ISAPRES	33.2	30.8	32.8	21.4	14.3	14.5
FONASA	66.8	69.2	67.2	78.6	85.7	86.5
Observations	17,839	8,943	12,957	9,283	12,726	8,984

Source: Author's calculation using the CASEN 1996, 2001, 2006 panel data.

Note: the additional panel respondents not presented in the table correspond to "other" types of insurance, such as defense forces insurance or insurance for foreigners.

Table 4.2 provides insight on the distribution of health care insurance by age group. This table illustrates how older people and retirees (those over 65 years old) make up a large proportion of those with public insurance, indicating that as age increases, so does the probability of being insured by FONASA. In 1996, 9% of the elderly were covered by ISAPRES, a percentage that fell to 4% in 2001 and rose to 7% in 2006. If people are moving from the private to the public sector as they get older, this could indicate an adverse selection consequence of the mixed system. The reduction in income due to low pensions (low replacement rates) could also explain why, on average, older people are more prone to contribute to FONASA than ISAPRES.

Table 4.2 Distribution of health care insurance beneficiaries, by age group (in percentage)

	1996	2001	2006
<i>14 years old and younger</i>			
ISAPRES	30.0	19.4	12.8
FONASA	70.0	80.6	87.2
<i>15 to 30 years old</i>			
ISAPRES	35.2	27.4	17.8
FONASA	64.8	62.6	82.2
<i>31 to 45 years old</i>			
ISAPRES	36.2	20.1	16.2
FONASA	63.8	79.9	83.8
<i>46 to 55 years old</i>			
ISAPRES	30.4	28.1	17.2
FONASA	69.6	71.9	82.8
<i>56 to 64 years old</i>			
ISAPRES	24.2	11.5	15.2
FONASA	75.8	88.5	84.8
<i>65 and Older</i>			
ISAPRES	9.3	4.7	7.5
FONASA	90.7	95.3	92.5

Source: Author's calculation using the CASEN 1996, 2001, 2006 panel data.

Table 4.3 indicates the distribution of health insurance by income quintile. Not surprisingly, poorer people are most often covered by FONASA, and wealthier people choose ISAPRES as their health insurance provider. Interestingly, this table also shows some of the dynamics of health insurance choice. Over the span of the decade covered by the survey, there was a decline in private insurance in all quintiles, including a significant decline in the 5th quintile.

Table 4.3 Distribution of health care insurance, by income quintile (in percentages)

Income Quintile	1996		2001		2006	
	ISAPRES	FONASA	ISAPRES	FONASA	ISAPRES	FONASA
I	2.6	97.4	4.6	95.4	3.4	96.6
II	12.2	87.8	7.1	92.9	2.1	97.3
III	23.3	76.7	9.6	90.4	5.8	94.3
IV	31.3	68.7	17.7	82.3	10.0	90.0
V	56.0	44.0	47.3	52.7	35.1	64.9

Source: Author's calculation using the CASEN 1996, 2001, 2006 panel data.

In order to understand why these changes occurred, and to what extent they could represent an adverse selection toward FONASA, the next section will explain the methodology used to estimate insurance choice and the determinants of insurance dynamics.

V. Empirical Analysis

To better comprehend the main determinants of health insurance choice, a logistic regression on the dichotomous variable of health insurance (scored 1 if the individual chooses ISAPRE and 0 if they choose FONASA) is estimated. These logistic regressions are computed separately for each year. Then, based on the panel data and the literature on poverty dynamics (Zubizarreta 2005; Neilson et al. 2008 and Castro and Arzola, 2008), an analysis of transition matrices is provided to explore the variables that determine changes between insurance providers. This transition analysis has not been conducted previously for Chile, thus expanding what we know about insurance choice under the dual system. Two logistic regressions are estimated: one to evaluate the determinants of changing from ISAPRE to FONASA, and the other to evaluate the change from FONASA to ISAPRE. Estimations for both the 1996-2001 period and the 2001-2006 period are conducted.

Given the availability of variables in the data set, these models can test whether the initial choice and the subsequent change generate adverse selection by including health risk variables as well as controls. The specific variables included in the econometric models are: gender; age; whether one is a female at reproductive age; education; poverty; urban dummy; income; decrease in income between periods; poverty status (defined in relation to the national income poverty line); employment variables (employed, unemployed, ratio of employed adults to household size); number of children (those below 7 years old) living in the household; health shock experience in the past 5 years (a variable included in the 2001 and 2006 waves assigned a value of 1 if the individuals had experienced any high-cost health problem); precarious self-reported health status (a variable took the value of 1 if the individual reported having a bad or very bad health status on 5 point scale); and a dummy that accounted for health disability.⁷

⁷ The health disability dummy corresponds to having someone on the household with any of the following disabilities: eyesight, hearing and or speaking impediments, and psychological, mental or physical disability.

Coupled with the evidence presented in the descriptive statistics, which shows how unevenly distributed the population is between the two systems (where riskier individuals are more likely to be enrolled in FONASA), the inclusion of risk variables such as disability, health shocks, age, being a female of reproductive age, and self-reported health status in a multivariate analysis can provide evidence of adverse selection towards one type of insurance. This reinforces the evidence of the shortcomings within this type of dual-system institutional arrangement. If adverse selection towards FONASA occurred, then the experience of a health shock, poor health, or a disability would improve an individual's chances of changing from private to public insurance, thus reducing his or her chances of choosing ISAPRE.

VI. Results

The insurance choice model presented in Table 4.4 provides the logistic regression results for each of the years studied. The probability of choosing ISAPRE is estimated for each year, in the context of the literature on health insurance choice, to understand the main variables that influence this choice. As expected, income plays an important role in determining choice (the higher the income, the higher the odds of choosing ISAPRE over FONASA); these results are statistically significant and consistent over all three years. Similarly, each year of education increases the odds of having insurance from ISAPRE over the odds of being enrolled in FONASA for all years. On the other hand, as age increases (controlling for the rest of the variables), the odds of choosing ISAPRE lessen; this is a statistically significant and common result for all years. In contrast, unemployment decreased the odds of being insured by an ISAPRE in 1996 and 2001, but had no significant effect in 2006. Being employed increases the odds of being covered in the private sector for 1996 and 2001.

In terms of the adverse selection variables, being a female of reproductive age decreases the odds of being insured by ISAPRE in 2001. Holding all other variables constant, the odds of choosing ISAPRE over FONASA for a female of reproductive age are only 56% of those odds for others. Having someone in the household with a health disability appears to be a statistically significant variable influencing choice in all years. Having a household member with any kind of disability decreases the odds of choosing ISAPRE over FONASA for all years. Being affected by

a negative health shock in the previous five years decreases the odds of being insured by and ISAPRE in 2006. Holding the rest of the variables constant, the odds of being in a private insurance scheme are 64% lower than being in FONASA for individuals that experienced a negative health shock. However, this variable was not found to be driving choice in 2001. Finally, reporting a “bad” or “very bad” health status decreases the odds of choosing ISAPRE over FONASA. Those with poorer health have, respectively, 50% and 60% lesser odds of choosing ISAPRE over FONASA in 2001 and 2006. All these results provide evidence of adverse selection towards FONASA; it seems that those with higher health risks and conditions that require more (and probably more expensive) health care services choose are more likely to choose FONASA over ISAPRE. Younger, wealthier people choose ISAPRE over the public insurance scheme, thus evidencing issues of equity and a lack of risk pooling across the system.

Some of the results in this study are in line with what previous research has found, higher income appears to be a significant determinant of choosing ISAPRES over FONASA. Similarly age and health risks factors are found to be positively correlated with the odds of choosing FONASA over ISAPRE (Sapelli and Vial (2003) and Henriquez 2006). However, this study found evidence of adverse selection against FONASA in contrast to the results reached by Sapelli and Torche (1998) study. They found evidence of adverse selection against ISAPRES. That said, one still needs to exercise caution when comparing results since methodologies and data used by studies tend to differ, and thus the new results could be driven by changes in the population and in the health system over time.

Table 4.4 Logit regressions estimates on health insurance choice for 1996, 2001 and 2006

Variables	Health Insurance Choice 1996 (Isapre=1, Fonasa=0)		Health Insurance Choice 2001 (Isapre=1, Fonasa=0)		Health Insurance Choice 2006 (Isapre=1, Fonasa=0)	
		Odds Ratio		Odds Ratio		Odds Ratio
Male dummy	-0.052 (0.25)	0.95 (0.24)	-0.14 (0.24)	0.87 (0.21)	-0.04 (0.28)	0.96 (0.27)
Female in reproductive ages ^a	-0.16 (0.31)	0.86 (0.26)	-0.58** (0.29)	0.56** (0.17)	-0.45 (0.35)	0.64 (0.22)
Age	-0.03*** (0.01)	0.97*** (0.01)	-0.04*** (0.01)	0.96*** (0.01)	-0.02*** (0.01)	0.98*** (0.01)
Years of educ.	0.18*** (0.05)	1.19*** (0.05)	0.21*** (0.03)	1.24*** (0.04)	0.21*** (0.04)	1.23*** (0.05)
Log per capita income	0.99*** (0.22)	2.68*** (0.59)	1.25*** (0.17)	3.49*** (0.61)	1.77*** (0.19)	5.86*** (1.11)
Income poor ^b	-0.69** (0.29)	0.50** (0.15)	0.03 (0.35)	1.03 (0.36)	0.69 (0.48)	1.98 (0.96)
Disability dummy 1996	-1.01***	0.37***	-0.87* (0.45)	0.42* (0.19)	-0.70 (0.49)	0.50 (0.24)
Disability dummy 2001			-0.19 (0.36)	0.83 (0.14)	-1.21** (0.59)	0.30** (0.18)
Employed	0.32* (0.19)	1.37* (0.26)	0.43** (0.21)	1.53** (0.32)	-0.11 (0.28)	0.89 (0.25)
Unemployed	-1.77*** (0.53)	0.17*** (0.09)	-1.08*** (0.39)	0.34*** (0.13)	-0.46 (0.66)	0.63 (0.41)
# Empl. to HH size ratio	-0.51 (0.44)	0.60 (0.26)	-1.02*** (0.35)	0.36*** (0.13)	-0.96** (0.45)	0.38** (0.17)
Number of children ^c	0.07 (0.13)	1.07 (0.14)	-0.0003 (0.26)	1.00 (0.26)	0.13 (0.35)	1.13 (0.40)
Heath shock 2001			0.21 (0.28)	1.23 (0.35)	0.41 (0.36)	1.50 (0.54)
Heath shock 2006					-0.44* (0.26)	0.64* (0.17)
Precarious self-reported health			-0.59** (0.23)	0.55** (0.13)	-0.52* (0.29)	0.60* (0.17)
Urban	1.47*** (0.24)	4.33*** (1.03)	1.85*** (0.30)	6.39*** (1.94)	0.79*** (0.27)	2.22*** (0.59)
Constant	-13.74*** (2.29)		-17.86*** (1.81)		-24.38*** (2.12)	
Pseudo R ²	0.269		0.323		0.341	
Observations	5,922		7,074		7,125	

Source: Author's calculation using the CASEN 1996, 2001, 2006 panel data.

Note: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Estimations with cluster standard errors at the municipal level did not yield different results.

^a According to the WHO, women's average reproductive age is considered to be between 15 and 35 years. This variable takes the value of 1 if a female is in that range and 0 otherwise.

^b Income poor corresponds to a dummy variable that takes the value of 1 if the individual is classified as poor according to the national poverty line set by the government.

^c Number of children corresponds to the number of children below 7 years old in the household.

Table 4.5 shows the transition matrices: here we can see the percentages of those who change from FONASA to ISAPRES (and vice versa), as well as the percentage of people who stay with their initial insurance provider. The matrices show changes from the 1996-2001 period and the 2001- 2006 period. 40% of those insured by ISAPRES in 1996 changed to FONASA in 2001, and only 4% made the opposite switch. For the period of 2001-2006, the results are similar: 40% of ISAPRES insurance holders changed to FONASA, while only 3% changed from FONASA to ISAPRES. Table 6 provides an overall view of individual change. From 1996 to 2001, almost 85% of individuals did not change insurance providers, 12% changed from private insurance to public, and 3% switched from public to private insurance. For the 2001-2006 period, 90% of respondents stayed with their initial insurance, 8% moved from ISAPRE to FONASA, and only 2% went to the private sector after being covered by FONASA in 2001.

Table 4.5 Transition matrices for 1996-2001 and 2001-2006 periods

Transition matrix I (1996-2001)			
		2001	
		ISAPRES	FONASA
1996	ISAPRES	60.0	40.0
	FONASA	4.0	96.0

Transition matrix II (2001-2006)			
		2006	
		ISAPRES	FONASA
2001	ISAPRES	59.8	40.2
	FONASA	2.9	97.1

Source: Author's calculation using the CASEN 1996, 2001, 2006 panel data.

Table 4.6 Insurance dynamics, by percentage of people in each state

	1996-2001	2001-2006
Pub-Priv change	2.8	2.3
Priv-Pub change	12.4	8.1
Stayed in Public	66.2	77.5
Stayed in Private	18.7	12.1

Source: Author's calculation using the CASEN 1996, 2001, 2006 panel data.

The next set of tables takes into account those individuals who choose to move from one insurance type to the other (and particularly from ISAPRES to FONASA). Taking advantage of the longitudinal dimension of the data set, the following analysis estimates the determinants of change in insurance enrollment.

Tables 4.7 and 4.8 display the results of a logistic regression of the decision of change during the 1996-2001 and the 2001-2006 periods, respectively. These regressions complement the previous results by providing information about the factors that could be determining why individuals choose to leave a certain insurance scheme and move to another. If those individuals that become riskier, or more expensive to insure and treat, are more likely to leave ISAPRES and become members of FONASA, this would add evidence confirming the hypothesis of adverse selection against the public sector.

Table 4.7 Logic regressions estimates on change of insurance provider (1996-2001)

Variables	Change from Fonasa to Isapre	Odds Ratio	Change from Isapre to Fonasa	Odds Ratio
Male dummy	0.29 (0.41)	1.33 (0.55)	0.38 (0.39)	1.46 (0.57)
Age	-0.04** (0.02)	0.96** (0.22)	0.03** (0.01)	1.03** (0.01)
Female in reproductive ages dummy	0.06 (0.51)	1.06 (0.55)	0.45 (0.47)	1.57 (0.73)
Years of educ.	0.18*** (0.06)	0.19*** (0.07)	-0.15*** (0.04)	0.85*** (0.04)
Log per capita income	1.02*** (0.36)	2.77*** (1.00)	-0.99*** (0.22)	0.37*** (0.08)
Income declined from 1996 to 2001 ^a	-0.24 (0.39)	0.79 (0.31)	-0.38 (0.29)	0.69 (0.20)
Income poor 1996	-0.70* (0.39)	0.50* (0.20)	0.31 (0.39)	1.36 (0.54)
Income poor 2001	-0.97 (0.66)	0.38 (0.25)	-0.83* (0.44)	0.43 (0.19)
Disability dummy 1996	-0.09 (0.67)	0.91 (0.61)	-0.07 (0.56)	0.93 (0.52)
Disability dummy 2001	-0.75 (0.78)	0.47 (0.37)	0.20 (0.91)	1.22 (1.11)
Employed in 2001	0.96*** (0.37)	2.60*** (0.95)	-0.17 (0.37)	0.84 (0.31)
Unemployed in 2001	-1.97* (1.11)	0.14* (0.16)	2.31*** (0.81)	10.01*** (8.19)
Loss of empl. from 1996 to 2001 ^b	3.77*** (1.37)	43.21*** (59.13)	-1.13 (0.92)	0.32 (0.29)
# Empl. to HH size ratio	-0.07 (0.71)	0.93 (0.66)	0.87 (0.61)	2.38 (1.46)
Number of children	0.43 (0.39)	1.53 (0.59)	0.38 (0.42)	1.46 (0.61)
Health shock 2001	0.99 (0.69)	2.69 (1.89)	-0.21 (0.31)	0.81 (0.25)
Precarious self-reported health	-0.46 (0.62)	0.63 (0.39)	0.48 (0.32)	1.62 (0.52)
Urban	0.88* (0.51)	2.42* (1.23)	-1.09* (0.59)	0.33* (0.19)
Constant	-16.59*** (3.71)		12.42*** (2.42)	
Pseudo R ²	0.306		0.175	
Observations	5,225	5,225	1,090	5,225

Source: Author's calculation using the CASEN 1996, 2001, 2006 panel data.

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Estimations with cluster standard errors at the municipal level did not yield different results.

^a Income declined takes the value of 1 if the nominal income per capita of that individual decreased between the two periods, ^b Loss of employment takes the value of 1 if an individual was employed in the first period and unemployed during the following period.

Table 4.8 Logic regression estimates on change of insurance provider (2001-2006)

Variables	Change from Fonasa to Isapre	Odds Ratio	Change from Isapre to Fonasa	Odds Ratio
Male dummy	-0.34 (0.48)	0.71 (0.34)	-0.25 (0.43)	0.78 (0.34)
Age	-0.02* (0.01)	0.98* (0.01)	0.01 (0.01)	1.00 (0.01)
Female in reproductive ages dummy	-0.58 (0.59)	0.56 (0.33)	0.83 (0.61)	2.30 (1.41)
Years of educ.	0.18** (0.08)	1.19*** (0.09)	-0.17*** (0.06)	0.84*** (0.23)
Log per capita income	1.06*** (0.32)	2.89*** (0.93)	-1.47*** (0.34)	0.23*** (0.08)
Income declined from 2001 to 1996	0.79** (0.39)	2.20** (0.86)	-0.85** (0.34)	0.43** (0.15)
Income poor 1996	-0.41 (0.39)	0.66 (0.26)	1.60*** (0.47)	4.93*** (2.33)
Income poor 2001	-0.87 (0.55)	0.42 (0.23)	0.01 (0.57)	1.01 (0.57)
Income poor 2006	1.09* (0.62)	2.97* (1.83)	-0.38 (0.99)	0.68 (0.68)
Disability dummy 1996	-0.29 (0.69)	0.74 (0.51)	0.42 (0.88)	1.52 (1.33)
Disability dummy 2001	0.46 (0.78)	1.58 (1.23)	2.46*** (0.66)	11.75*** (7.72)
Employed in 2006	0.41 (0.57)	1.50 (0.86)	1.61*** (0.49)	5.00*** (2.44)
Unemployed in 2006	-0.64 (1.08)	0.53 (0.57)	-1.02 (1.18)	0.36 (0.43)
Loss of empl. from 2001 to 2006	-1.88 (1.51)	0.15 (0.23)	2.92* (1.50)	18.06* (27.89)
# Empl. to HH size ratio	-0.32 (0.92)	0.73 (0.67)	0.42 (0.68)	1.52 (1.03)
Number of children	-0.79 (0.59)	0.46 (0.27)	-0.53 (0.35)	0.59 (0.21)
Heath shock 2001	-0.33 (0.45)	0.72 (0.32)	-0.96 (0.60)	0.38 (0.23)
Heath shock 2006	-0.29 (0.46)	0.74 (0.34)	-0.09 (0.32)	0.92 (0.3)
Precarious self-reported health 01	-0.045 (0.45)	0.96 (0.43)	1.49*** (0.53)	4.45*** (2.37)
Precarious self-reported health 06	-0.62 (0.54)	0.54 (0.29)	0.45 (0.49)	1.57 (0.77)
Urban	0.36 (0.42)	1.43 (0.60)	1.74** (0.78)	5.70** (4.44)
Constant	-16.87*** (3.68)		16.79*** (4.09)	
Pseudo R ²	0.183		0.245	
Observations	5,903	5,903	669	669

Source: Author's calculation using the CASEN 1996, 2001, 2006 panel data.

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Estimations with cluster standard errors at the municipal level did not yield different results.

Table 4.7 presents the results of the 1996-2001 change model. As expected, income and education appear to be positive and significant determinants of the probability of changing from public to private insurance; in other words, the higher the income, the higher the odds of changing from FONASA to ISAPRES. People living in urban areas are more likely to change from private to public insurance, and less likely to move in the opposite direction. Employment variables show the anticipated signs: being employed increases the odds of moving from the public insurance to a private scheme, and being unemployed decreases those odds. A strong trend is also found among the unemployed insured in the public sector. Holding other variables constant, the unemployed have 10-to-1 odds of moving from ISAPRE to FONASA. Contrary to what is expected, being unemployed in 2001 after being employed in 1996 (a proxy for an individual's losing their job over this period) increases the odds of moving from FONASA to ISAPRE. A possible explanation of this unexpected result could be that individuals in that position become dependent beneficiaries of ISAPRE through someone else, given that they are unemployed. It should also be taken into account that a five-year period might be too long to gauge the effects of a transition from employment to unemployment. In terms of the variables related to higher cost of health care (age, gender, reproductive age, disability, health shock, and self-reported health status), only age was found to be a statistically significant driver of change between 1996 and 2001; the others were found to be not statistically significant. These results could be driven by the fact that individuals with higher health risks or higher health-service costs self-selected into a particular insurance plan in 1996, and thus their changes are not captured in the analysis.

Table 4.8 presents the results of the change decision logistic regression for the period of 2001-2006. Some results appear similar to those found in the previous period; however, some important differences are worth mentioning. Higher levels of education and income increase the odds of moving from public to private insurance and decrease the odds of leaving an ISAPRE. Experiencing an income loss (defined as having a lower income per capita than in the previous period covered by the survey) increases the odds of moving from FONASA to ISAPRE, and decreases the odds of moving in the other direction. A possible explanation could be that a change in job, which requires revisiting health insurance affiliation, combined with the efforts of ISAPRE's sales force, may have an effect on an individual's decision to switch to ISAPRE.

Employment variables have the expected signs, but only the employment dummy variable has a positive and significant effect on the likelihood of moving from FONASA to ISAPRE. Contrary to the previous period, between 2001 and 2006 being employed and then unemployed increases the likelihood of leaving the private sector and getting insured by FONASA.

In terms of adverse selection evidence, several variables in this model imply that between 2001 and 2006 FONASA received individuals who were more “liable” or more “expensive” to care for. Living in a household where there is a person with a disability increases the odds of leaving ISAPRE and moving to FONASA; individuals in that situation had 12-to-1 odds of moving to FONASA compared to those living in a disability-free household. Similar results occurred in the case of self-reported health status; those who reported poor health showed higher odds of moving to FONASA than those with better health (4.5-to-1 odds). Having experienced a health shock does not appear to drive the decision to change from one system to the other.

Overall, the results of the 2001-2006 change decision model suggest some adverse selection against public-sector insurance. Older individuals and those with worse health conditions are more likely to move from the private insurance system to the public one, thus putting pressure on and eventually increasing the costs of FONASA.

VII. Conclusions

Individual health is a world of uncertainty and risk. Health shocks can be disruptive to individuals and families in both social and economic terms. General insurance markets have developed to diffuse risk and help with smoothing consumption rates. Individuals acquire insurance in order to spread out the cost of potential future catastrophes and cope with shocks. Additionally, depending on their design, health insurance systems can reduce the price of procuring preventive care, which can lessen the probability of health issues later on.

Governments have vested interests in the well-being of their citizens, particularly their health, given that health is central to human development and that healthier populations are more economically productive. This knowledge has driven the creation and utilization of different schemes of health insurance around the world, ranging from the purely private (e.g. Netherlands and Switzerland) to universal public health (as in Canada or United Kingdom). Depending on the

country and its institutional health system arrangements, regulations are put in place to control adverse selection and moral hazard; however, evidence has shown repeatedly that the insurance market still fails particular with respect to public insurance sector, leading to a asymmetric distribution of health risks and health costs. There is still need for further empirical research to find the scheme that can most efficiently minimize social losses.

Using panel data from Chile's National Socioeconomic Characterization Survey 1996-2001-2006, this study examines health insurance choice and its dynamics over a ten-year time period. Between 1996 and 2006, many people changed their insurance providers, revealing a common trend: private insurance appears to be losing the sickest customers to the public sector.

The results of the logistic regressions for yearly choices are evidence of the determinants of insurance selection. Income and education seem to be highly important in determining the choice; higher income and more years of education increase the odds of choosing private insurance. Age, health disability, and the experience of a health shock (for 2006) are associated with an increase in the likelihood of choosing FONASA over ISAPRE. These results are evidence of adverse selection toward the public sector. Additional evidence of this phenomenon can be extracted from the decision to change insurance models. Older individuals, and those with worse health conditions, are more likely to leave ISAPRE and move to FONASA. This trend is motivated by the fact that FONASA cannot reject any beneficiary nor adjust their prices to account for risk or health care costs.

The results of this research are aligned with those in previous studies done on Chile's health insurance system, and advance the knowledge that explains why people change insurance providers over time. Because the results make use of data on changes over time, they serve to strengthen claims about the existence and causes of adverse selection toward public provision in the case of health insurance, and thus could add to the base of knowledge used to drive health reform in Chile. Unfortunately, given data limitations, moral hazard cannot be analyzed in detail here. Future research should try to address moral hazard questions alongside adverse selection issues, using panel data sets as a way to better understand the potential problems that can arise within a universal but dual system.

Chile is currently undergoing several reforms aimed at tackling social inequality. A large tax reform was recently passed by Congress, allowing the public sector to invest more resources

in education and health, however, if these efforts are not made in conjunction with institutional reforms, such as better regulation over private health insurance companies, eventually resources will not be enough to treat those with public-sector insurance. In order to minimize these problems, health reform could start by not allowing ISAPRES to price discriminate and forcing them to provide more transparent information and clearer health plans. ISAPRES could be mandated to offer a universal health plan covering high-cost treatments and preventive care. Additional elective coverage could be made available as a way to continue to prioritize individual choice and minimize the sense of excessive government intervention over private decisions.

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Annex 1. FONASA Bracket scheme, copays by beneficiary categories.

Bracket	Beneficiaries	Copay Percentage
A	<ul style="list-style-type: none"> - Extreme poor. - Beneficiaries of basic solidary pensions. - Beneficiaries of family subsidy (Subsidio Único Familiar, SUF) 	0%
B	Individuals with a monthly taxable income of \$210,001 or less.	0%
C	Individuals with a monthly taxable income between \$210,001 and \$306,000. Note: With 3 or more dependents they would move to group B.	10%
D	Individuals with a monthly taxable income higher than \$306,001. Note: With 3 or more dependents they would move to group C.	20%

Source: Superintendencia de Salud

Note: Monetary figures are expressed in Chilean pesos (\$550 Chilean pesos to a dollar approximately).

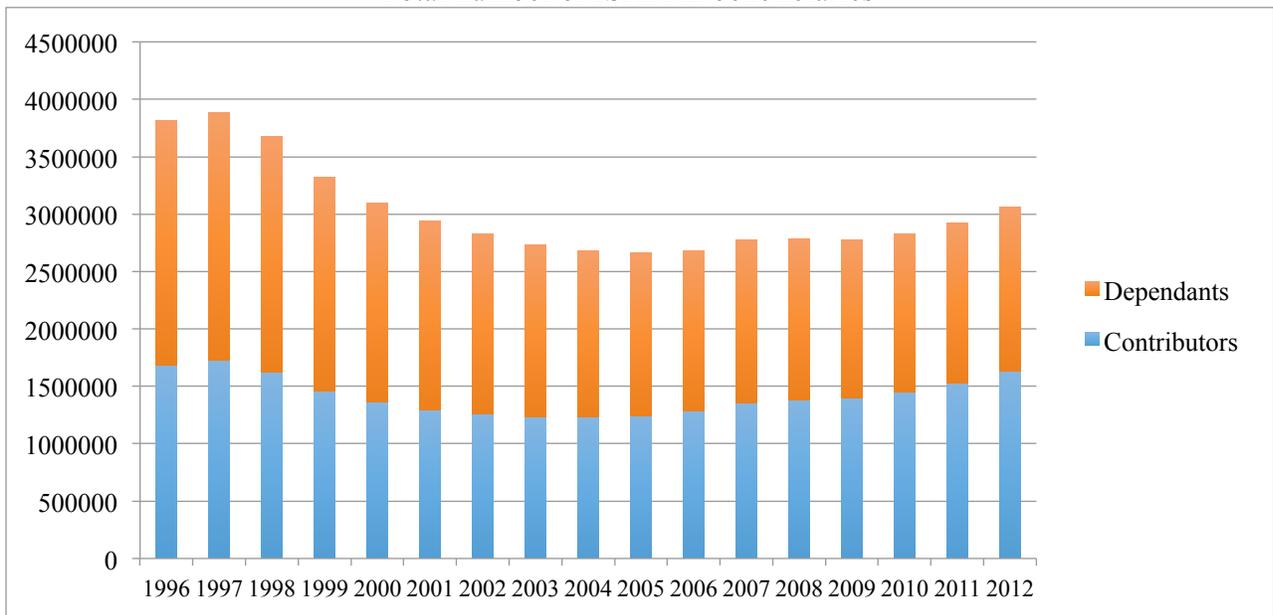
Annex 2. Statistics of Health Insurance Beneficiaries (1996-2012)

Year	Public insurance, FONASA	Participation of public insurance, FONASA	Private insurance ISAPRE	Participation of ISAPRES	Other providers	Participation in Other providers	Total population
1996	8,672,619	59.01%	3,813,384	25.95%	2,209,787	15.04%	14,695,790
1997	8,753,407	58.76%	3,882,572	26.06%	2,260,383	15.17%	14,896,362
1998	9,137,599	60.53%	3,679,835	24.37%	2,279,496	15.10%	15,096,930
1999	9,403,455	61.47%	3,323,373	21.72%	2,570,671	16.80%	15,297,499
2000	10,157,686	65.60%	3,092,195	19.97%	2,234,851	14.43%	15,484,732
2001	10,156,364	64.86%	2,940,795	18.78%	2,561,472	16.36%	15,658,631
2002	10,327,218	65.23%	2,828,228	17.86%	2,677,085	16.91%	15,832,531
2003	10,580,090	66.10%	2,729,088	17.05%	2,697,251	16.85%	16,006,429
2004	10,910,702	67.43%	2,678,432	16.55%	2,591,194	16.01%	16,180,328
2005	11,120,094	68.01%	2,660,338	16.27%	2,569,544	15.72%	16,349,976
2006	11,479,384	69.51%	2,684,554	16.25%	2,351,436	14.24%	16,515,374
2007	11,740,688	70.38%	2,776,912	16.65%	2,163,172	12.97%	16,680,772
2008	12,248,257	72.71%	2,780,396	16.50%	1,817,519	10.79%	16,846,172
2009	12,504,226	73.50%	2,776,572	16.32%	1,730,776	10.17%	17,011,574
2010	12,731,506	74.14%	2,825,618	16.46%	1,614,239	9.40%	17,171,363
2011	13,202,753	76.20%	2,925,973	16.89%	1,196,814	6.91%	17,325,540
2012	13,377,082	76.53%	3,064,076	17.53%	1,038,565	5.94%	17,479,723

Source: Superintendencia de Salud 2014.

Note: Other providers correspond to Private insurance for foreigners, Insurance schemes for Police and Armed forces.

Total number of ISAPRE beneficiaries



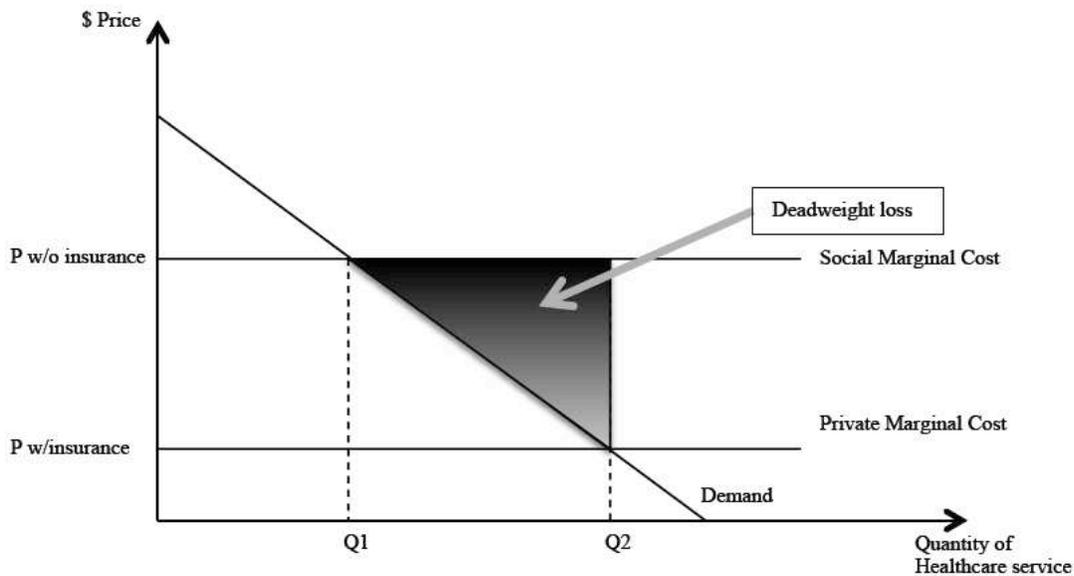
Source: Superintendencia de Salud 2014.

Annex 3. The effect of adverse selection and moral hazard on social welfare

The market of insurance, particularly health insurance, is characterized by the presence of information asymmetries, causing two undesirable situations: moral hazard and adverse selection. Both situations, through different mechanisms, lead to an inefficient allocation of resources generating a negative effect on social welfare.

The first situation, moral hazard, occurs when insured individuals access health services at a lower price than the marginal social cost, they tend to over consume imposing large costs on society. Since the opportunity cost of those resources is higher than the price paid for them, a non-efficient resource allocation results. Figure 1 shows the deadweight loss due to moral hazard when individuals are covered by health insurance. The price with insurance is lower than the social marginal cost, therefore individuals maximize their utility when their private marginal cost is equal to their marginal benefit (demand curve), making the individual over consume health services in the amount of $Q_2 - Q_1$. The difference between the private cost and the social cost times the overconsumption is the total deadweight loss produced by the moral hazard.

Figure A3-1.



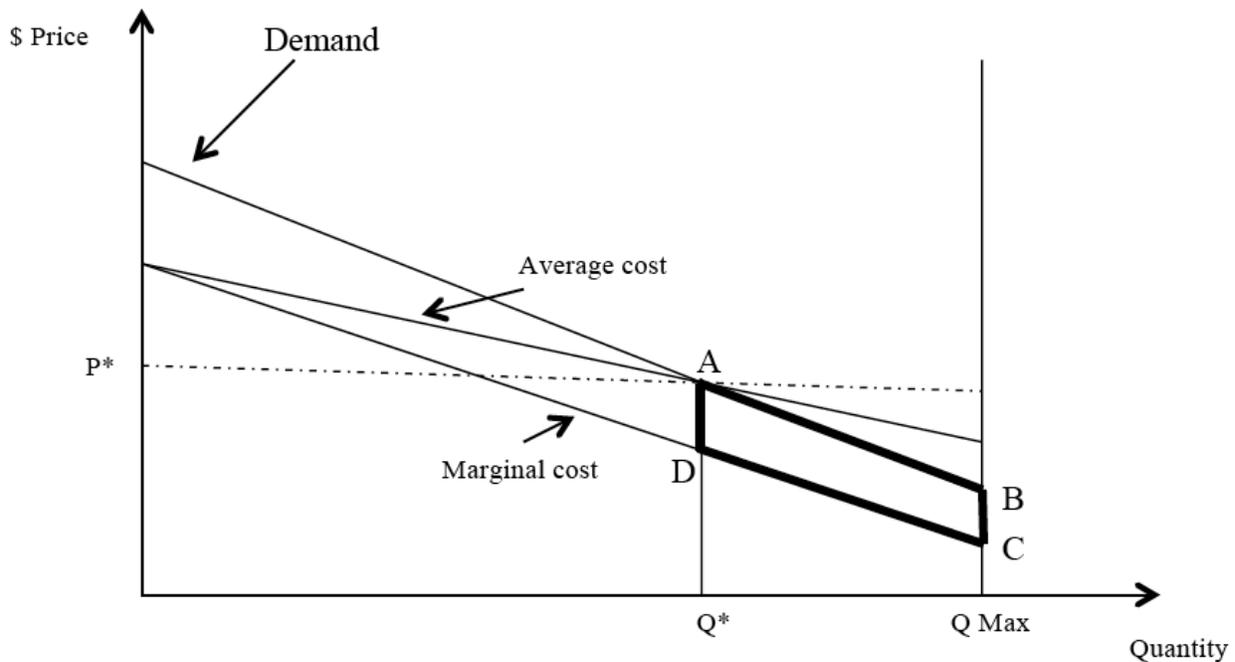
Source: Adapted from Gruber (2005) p.406

In the case of adverse selection, social losses are created due to under provision of health insurance. Figure 2, adapted from Einav and Finkelstein (2011), provides a “textbook” setting of adverse selection based on Rothschild and Stiglitz (1976) article. The demand for health insurance is determined by the expected costs of healthcare and risk premium for each individual, where willingness to pay for insurance is positively related to risk. The marginal cost curve is downward sloping due to the expected costs and willingness to pay relationship (riskier or sicker individuals are willing to pay more for insurance than their healthier counterparts). In this selection market setting the demand curve and the cost curve are directly related due to

adverse selection. Costs of health insurance are influenced by the health risk of individuals that at the same time are driving the demand curve.

The efficient allocation of resources in a competitive market is determined when marginal cost equals demand or marginal benefit. In the case of health insurance and adverse selection the equilibrium is reached when average cost is equal to the demand. Since the average cost is always above the marginal cost (due to the adverse selection), the equilibrium does not maximize social welfare but creates a deadweight loss represented by ABCD.

Figure A3-2.



Source: Adapted from Einav and Finkelstein (2011)

In this case the demand curve is always above the marginal cost, therefore the social maximizing quantity of health insurance should be Q_{max} , however, the health insurance market in presence of adverse selection yields an equilibrium quantity of Q^* , where average cost meets the demand curve. The market equilibrium in presence of adverse selection, leaves out all individuals between Q^* and Q_{max} , generating an inefficient resource allocation. Individuals left out do value the insurance above its marginal social cost but below the average cost.

The above theoretical analysis is based on the assumption that all individuals are risk-averse, and differ only in their privately known probability of incurring in health costs and that there are no transactions costs. There is theoretical research, as well as empirical research, which estimates the existence and size of adverse selection insurance markets where administrative costs and heterogeneity of preferences are taken into account (see Brown & Finkelstein 2007, Newhouse 2002, Fang et al. 2008 and Finkelstein & McGarry 2006; Bhattacharya 2007).

For further discussion of markets in the presence of adverse selection see Einav and Finkelstein (2011) who provide a comprehensive theoretical analysis and discuss some of the empirical evidence of previous literature on different scenarios that depart from the simple model presented above.