

Preferred providers, health insurance and primary health care in Chile

Höfter, Ricardo Andres Henriquez

The copyright of this thesis rests with the author and no quotation from it or information derived from it may be published without the prior written consent of the author

For additional information about this publication click this link.

<http://qmro.qmul.ac.uk/jspui/handle/123456789/1772>

Information about this research object was correct at the time of download; we occasionally make corrections to records, please therefore check the published record when citing. For more information contact scholarlycommunications@qmul.ac.uk



ZTH 4225 HOF

**PREFERRED PROVIDERS, HEALTH INSURANCE AND
PRIMARY HEALTH CARE IN CHILE**

by

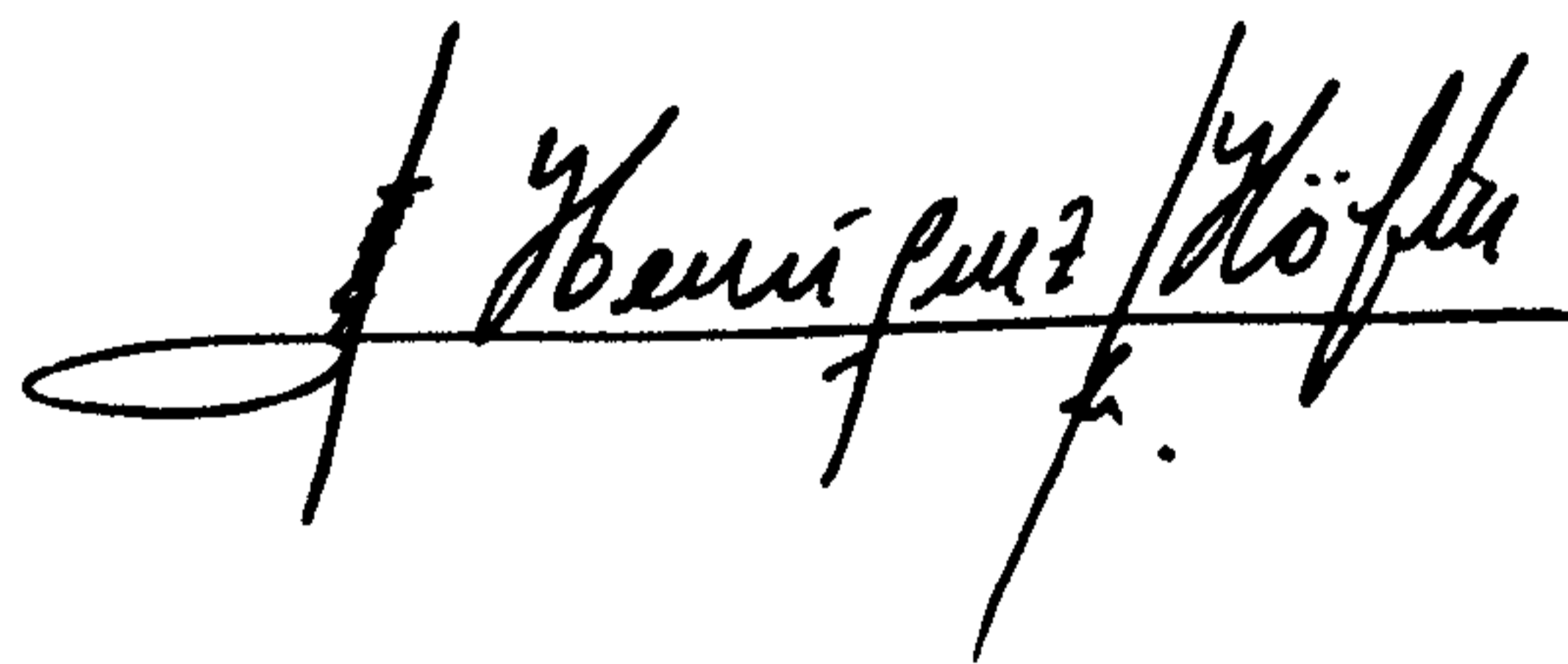
Ricardo Andrés Henríquez Höfter

Thesis submitted in partial fulfilment for the degree of Doctor of Philosophy

**Queen Mary College
University of London**

Declaration

*I, Ricardo Andrés Henríquez Höfler, declare that the work presented in this thesis
is my own work.*

A handwritten signature in black ink, reading "Ricardo Andrés Henríquez Höfler". The signature is written in a cursive style with a horizontal line through the middle of the text.

Abstract

Reforms in the early 1980s created Chile's mixed system of health care provision and finance. Since then Chileans have had to choose between a state-subsidised public health insurance system or the private health plans offered by several insurance companies. In the public system, users may be restricted to the public facility network, with no choice of doctor or medical centre, or they may opt for a free choice mode (preferred providers), which lets them choose both doctor and place of attention. Private insurance providers offer a wide variety of health plans, giving the customer a reasonable range of care options.

Although this public-private mix has now been operating for more than 20 years, there has been no empirical study of the factors determining the choice of the preferred providers' mode by public beneficiaries. Likewise, few studies have looked at the determinants in the choice between public and private insurance, and the relationship between the latter choice and the use of health services.

The first two empirical chapters of this thesis look at the determinants of these sources of choice, using different econometric tools: the choice of preferred providers is examined using a logit model; the analysis into the choice between public and private insurance uses a probit model; and the impact of holding private insurance as a factor in determining use of health services is estimated through a two-stage tobit model.

A further significant aspect of the reforms of the '80s was the process of decentralisation for primary health care provision. Since then a substantial part of preventive health care and promotion occurs locally, and among these services children's health checks are an important policy objective. To encourage attendance parents are given free food supplements if they keep to the timetable for their child's check-ups. However these free food handouts partially account for attendance at the check-ups. Thus the final empirical chapter of the thesis uses a probabilistic model to look at the monetary and non-monetary factors that lead parents to request health checks for their children.

INDEX

<i>Acknowledgements</i>	9
<i>Introduction</i>	10
Chapter 1 Provision and financing of health care in Chile	16
<i>Contents</i>	
1.1	Introduction 17
1.2	Provision and financing of health care..... 18
1.2.1	The public-private mix model 19
1.2.2	The Isapre system: industry structure and regulatory framework..... 23
1.3	Quality of health care..... 26
1.4	The role of private insurance 29
1.4.1	Substitutive, complementary and supplementary health insurance 29
1.4.2	Impact on the health system 30
1.4.3	Private health insurance in Chile: its role and impact on the health system... 34
1.5	Moral hazard and adverse selection in health insurance 41
Appendix 48
1.1	Health status and tendencies..... 48
1.1.1	Demographic and health transition 48
1.1.2	Health care performance and related indicators in the public system..... 51
1.2	The Chilean health system 53
1.2.1	Historical background: from the early 1920s to the 1970s..... 53
1.2.2	The reforms in the 1970s and 1980s 54
1.2.3	Post-reforms organisation 57
1.2.4	Financing of the public health system..... 60
1.2.5	The reforms in the 1990s..... 62
1.2.6	The network of health care facilities..... 64
1.2.7	Staff..... 66
1.2.8	Health care expenditure..... 67
1.2.9	Tendency in public and private health spending 68
1.2.10	Pharmaceutical spending: out of pocket payments 69
1.3	The health systems in Colombia and Holland 70

1.3.1	The Colombian health system	70
1.3.2	The Dutch health system	78
	References.....	84

List of Figures

Figure 1.1	Health insurance/health care provision decision tree	19
Figure 1.2	Contributions, co-payments and related providers.....	20
Figure 1.3	Health system organisation.....	58
Figure 1.4	Flow of public system funds for health	61

List of Tables

Table 1.1	Co-payment and co-financing structure	22
Table 1.2	Result indicators	51
Table 1.3	Utilisation indicators.....	52
Table 1.4	Public health system facility network	65
Table 1.5	Health care expenditure	67
Table 1.6	Public and private health expenditure.....	68
Table 1.7	Out of pocket expenses on pharmaceuticals.....	69
Table 1.8	Out of pocket expenses on pharmaceuticals by household and income quantile.....	70

**Chapter 2 The Determinants in the Choice of Preferred Providers among
the Publicly Insured in Chile: An Empirical Analysis..... 91**

Contents

2.1	Introduction	92
2.2	The preferred provider system.....	94
2.3	Expected utility gain from choosing preferred providers.....	98
2.4	Choice model.....	102
2.5	Data and variable definitions	105
2.5.1	The data.....	105
2.5.2	Variable definitions.....	107
2.6	Empirical results	113
2.6.1	Logit estimates.....	114
2.6.2	Sensitivity analysis	121
2.7	Conclusions	125

Appendix 1	127
Appendix 2	129
Appendix 3	130
References	135

List of Figures

Figure 2.1 Contribution, co-payments and providers in the public system	95
Figure 2.2 Relative cost of medical consultations	97

List of Tables

Table 2.1 Structure of co-payments	96
Table 2.2 Description of variables	108
Table 2.3 Descriptive statistics	112
Table 2.4 Logit estimates for the choice of preferred providers	115
Table 2.5 The effects on probability of changes in individual and household attributes	122
Table 2.6 The effects on probability of changes in access variables.....	124
Table 2.A Income ranges by income groups	127
Table 2.B Health services delivered by provider per 100 insured	127
Table 2.C Choice of provider by income deciles.....	128
Table 2.D Population by age and gender.....	130
Table 2.E Population by gender and zone of residence.....	131
Table 2.F Average monetary income by age, gender and income quantiles.....	132
Table 2.G Individuals reported ill by age and gender.....	133
Table 2.H General medical consultations by age and gender.....	134
Table 2.I Hospitalisations -number of days- by age and gender.....	135

Chapter 3 Private Health Insurance and Utilisation of Health Services.....139

Contents

3.1	Introduction	140
3.2	The health insurance system.....	142
3.3	Determinants of the health insurance decision	147
3.3.1	Data and econometric estimation.....	149
3.3.2	Simulation analysis	158
3.4	Private health insurance and utilisation of health services.....	161

3.5	Summary	168
	Appendix	171
	References.....	176

List of Tables

Table 3.1	Probit estimates for the choice of private health insurance.....	154
Table 3.2	The effect of age, sex, marital status and health status on the choice of private insurance	159
Table 3.3	The effect of income and employment characteristics on the choice of private insurance.	160
Table 3.4	Tobit second-stage coefficient estimates of outpatient health services and length of stay in hospital.....	164
Table 3.A	Descriptive statistics	171
Table 3.B	Variable definitions.....	172
Table 3.C	Age-sex factors	173
Table 3.D	Population distribution by type of health insurance and self-assessed health status	173
Table 3.E	Bootstrap statistics: outpatient health services equation.....	174
Table 3.F	Bootstrap statistics: length of hospital stay equation.....	175
Table 3.G	Length of stay (days) by cause of hospitalisation and type of health insurance.....	176
Chapter 4	Time Prices and the Demand for Primary Health Care in Chile...	182

Contents

4.1	Introduction	183
4.2	Two previous studies: Aedo (1995) and Makhoulf (1996)	185
4.3	Primary health care in Chile: outline	188
4.4	The role of time prices: evidence from the literature	192
4.5	Model	195
4.6	Empirical formulation, data and variables in the estimation	197
4.6.1	Empirical formulation	197
4.6.2	Data and variables in the estimation	198
4.7	Empirical results	204
4.7.1	Logit estimates.....	205
4.7.2	Marginal effects and elasticities	211

4.8	Summary and implications.....	213
	Appendix 1	216
	Appendix 2	218
	References.....	219

List of Tables

	Table 4.1 Probability of attendance for preventive care by children	206
	Table 4.2 Marginal effects from logit and elasticity of change in probability.....	212
	Table 4.A Variable definitions.....	216
	Table 4.B Descriptive statistics.....	217

Chapter 5	Summary.....	226
------------------	---------------------	------------

Contents

5.1	The research	227
5.2	Main findings and policy issues	228
	References.....	235
	General references.....	237

Acknowledgements

There are so many people I must thank for their contribution to this work. First, though, I must dedicate this thesis to my wife, Mónica, and my daughter, Josefa. Both were strongly caring and supportive during our stay in London, and always there, no matter what went well or badly. Likewise, I shall always be in debt to my beloved mother María Teresa, my sister, also María Teresa, and my brothers, Sergio and Christian. I know they were sad when I left home to study in London, but I am sure they have no doubt I made the right decision.

I am also very grateful to the W.K. Kellogg Foundation, who awarded me a scholarship to carry out my doctoral studies in England. I was privileged to win it, and am very proud to be a fellow of this Foundation.

I am deeply appreciative of the support of the University of Chile, who sponsored me and kept open my position as a Lecturer while I was studying abroad. In particular, I must thank Professor Jorge Gregoire and Professor José Yáñez, who have honoured me with their friendship since I was a student at the University's School of Business and Economics, and who strongly encouraged me to work for a Ph.D in Economics.

Finally, I am greatly indebted to Professor Richard Disney, at the School of Economics, University of Nottingham, and Doctor Dorothe Bonjour, at Queen Mary College, University of London. Professor Disney was extremely kind and patient, and always showed real interest in my country. Even after he left Queen Mary College to take up his new position at the University of Nottingham, he always kept in touch, providing me with useful comments and advising me on how to achieve better results. Doctor Bonjour was most friendly, and I deeply appreciate the time she spent reading my work.

Introduction

When Chileans interact with the national health system they must take a series of decisions about the provision and financing of their healthcare needs. In this thesis we deal with these decisions. The work is structured in 5 chapters. Chapter 1 introduces the reader into the complexities of the Chilean health system, providing the context in which the empirical chapters of the thesis are developed. The empirical part, the core of the thesis, runs from chapter 2 to chapter 4. Each of these chapters is reasonably self-contained and takes the form of an independent paper. Chapter 2 expands on the determinants of choice of provider among the publicly insured, focusing on the preferred provider system. Chapter 3 analyses the choice of private health insurance and how this relates to the utilisation of health services. Chapter 4 addresses primary health care demand, with a specific analysis of preventive care demand by children. Chapter 5 provides a summary.

Motivation

Despite the importance of these decisions, empirical research is scarce, which hinders a better understanding of the aspects involved. The aim of the empirical work is thus to help develop a clearer view of the determining factors in the choices Chileans face in their relationship with the health system. This, in turn, should help towards better policy definitions for provision and funding, and provide more information with which to evaluate the results.

Previous research has not looked at the decision-making process in the choice of provider by the publicly insured, despite its importance for determining better policies for health care provision for *Fonasa* affiliates. We feel it is important to look at the role of demographic, socioeconomic and access factors in individual decision-making in order to provide elements that may help correct inequalities or inefficiencies in the provision model.

*Hypotheses to be tested*¹

As noted before, there is little if any evidence available on the role played by income, education, family composition and access to medical care in the choice of provider by the publicly insured. The solidarity principle underlying the Chilean public health system means that income should not represent a restriction at the time to choose provider. We think, however, based on administrative data, that income does have a positive impact on the probability of choosing preferred providers, and that some degree of segmentation would underlie this positive correlation.

We also tested the notion that more educated individuals are better equipped to recognise the *pros* and *cons* of different options. As waiting time is far longer in public facilities and amenities are scarce, it follows that more educated individuals would be more likely to take advantage of the services offered by preferred providers.

By examining the effect of family composition in the choice of provider we are acknowledging that many restrictions faced by individuals can best be understood in the context of the family. We hypothesise that families with more children should be less likely to choose preferred providers, probably reflecting the equivalent income effect that larger households may have a lower standard of living than smaller ones with the same income.

We also hypothesise that some factors related to access to medical care could act as deterrents at the time of choosing provider. Specifically, we consider co-payments and waiting time. We believe that if there is no marked difference between the available options in terms of efficacy of treatment, the lower value of co-payments in public facilities should constitute a strong incentive to seek public provision. In the case of waiting time, most opinion polls conducted among the publicly insured have shown users are extremely critical of the excessive waiting time in public facilities. We think, based on the ample literature on the impact of

¹ This brief summary notes only the most relevant hypotheses to be tested. Full details are given in the respective chapters.

time prices on a number of economic decisions, that waiting time act as a money price in discouraging demand in public health centres. Waiting time is a crucial issue, as many public users have no real chance of opting for the preferred providers route.

In the choice of type of insurance we examine the role of a comprehensive set of factors (whose relevance is further assessed through a simulation analysis). Age and health status are given special importance as many critics argue that *Isapres* mainly enrol the younger and the healthy (the practice of “cherry picking”). We also assess the income effect as critics argue that *Isapres* give preferential access to high-income earners (in other words, *Isapres* would select individuals by income).

On the other hand, since insurance reduces the effective price of medical care, we test whether the privately insured tend to make more use of the health services (the moral hazard problem). But, given that the levels of utilisation do not depend solely on the individual’s health insurance coverage, we test whether the level of coverage depends on anticipated utilisation (the adverse selection problem).

On the issue of the demand for primary health care for children, we pay special attention to the role of time prices. We use the opportunity cost of travel time (measured by market wages) to test the hypothesis [in line with Acton (1975)] that when public expenditure programmes reduce the out-of-pocket cost of medical care, time prices act as a money price in discouraging demand. It would follow that users of free medical services would be more sensitive to waiting and travel time than paying users.

We also test the significance of several explanatory variables not previously examined, including the nutritional status of children (on a disaggregated basis), earned and non-earned income, family size, prescription of medicines, and the condition of receiving public subsidies. In the case of this last condition, we examine whether those who depend largely on state provision are more likely to demand the free services provided by the state (in our case preventive care, given the existence of food incentives).

The empirical work in chapters 2 to 4 draws on a longstanding multipurpose national survey known as *Casen* (*Encuesta de Caracterización Socioeconómica Nacional*), which has been carried out since 1985 by the Ministry of Planning. This survey is the main source of information used to characterise the population in both demographic and socio-economic terms. We use three versions of the *Casen* series (1990, 1992 and 2000), as each survey contains a different number of observations and questions within otherwise common registration modules. We complement *Casen* 1990 with information gathered by the Greater Santiago Employment and Unemployment Survey (*Encuesta de Ocupación y Desocupación del Gran Santiago*). This survey has been conducted quarterly since 1960, and collects information on the employment status and wages of individuals resident in greater Santiago, along with socio-demographic attributes such as age, sex and level of schooling.

CHAPTER 1

Chapter 1

The Chilean Health System

1.1 Introduction

The aim of this initial chapter is twofold: first, to introduce the reader to the complexities of the Chilean health system and second, to provide the context in which the empirical chapters are developed.

We begin by explaining the provision and financing of health care where, as we shall see, public and private agents interact in a model regulated by the state. The chapter follows with a brief discussion of quality issues across the health insurance/health care options, including: the quality of treatments and medical procedures, hospital equipment, accommodation and accessibility.

We then examine the role of private health insurance taking into account the classification of roles proposed in the literature,² which derives mainly from the experience of western European countries such as The Netherlands, Belgium, Germany and France. The analysis here expands on the impact of private health insurance on the health system in terms of equity in funding health care, access to health care, choice and cost containment. Finally, we examine the role and impact of the Chilean private insurers, the so-called *Isapres*, on the health system.

After examining the role of private health insurance, we turn to discuss the economics of moral hazard and adverse selection. We look at these in theoretical terms, as they are empirically tackled in chapter 3.

Complementary information is provided in the appendix. It includes a description of Chileans' health status and tendencies; a historical background; the reform process of the late 1970s and early 1980s; the post-reforms organisation; public system funding; the reforms of mid the 1990s; the health care facility network and staff, and health care expenditure and its trends. We also provide a description of the functioning of the health systems in Colombia and Holland, as these share similar features with the Chilean health system.

² The literature referred to as voluntary health insurance classifies the roles of private health insurance in: substitutive, complementary or supplementary.

1.2 Provision and financing of health care

Prior to its reforms in the early 1980s,³ the Chilean health system was run by a National Health Service (NHS), a large public system of providers. Like the British NHS, its Chilean counterpart was funded by direct taxation.

The reform introduced substantial changes in the organisation of the public system. The NHS was divided into regional health areas, re-grouped under the umbrella title of National Health Services System (NHSS). At present the NHSS consists of 26 Health Service Areas (HSA)⁴ distributed in the 13 regions of the country, which are responsible for operating public hospitals within their boundaries. In addition, the function of providing health insurance was assigned to the National Health Fund, known as *Fonasa (Fondo Nacional de Salud)*.

Two micro-adjustments were also incorporated: a compulsory contribution for health insurance, and a differentiated structure of co-payments. It was thought that individuals, besides supporting the health system via general taxes, should also contribute to financing the cost of the health services they required.

Finally, and decisively, the reform gave the private sector the opportunity to participate actively in providing and financing health care services. Private Pre-Paid Health Insurance Plans, known as *Isapres (Instituciones de Salud Previsional)* were set up creating the base of the *Isapre* system.⁵

Currently, a public-private mix model governs the provision and financing of health care services in Chile. In what follows we describe this mix where *Fonasa* and the *Isapres* play a relevant role. These institutions compete in a state-regulated context and provide coverage to nearly 87 per cent of the population. Of the remaining percentage, 10 per cent is covered by the insurance schemes of the armed forces and three per cent is thought to be uninsured (mainly indigents over whom the Ministry of Health has no records).

³ See Jiménez and Bossert (1995) for details of the pre-reform period.

⁴ The Health Service Areas (HSA) closely resemble the British Regional Health Offices.

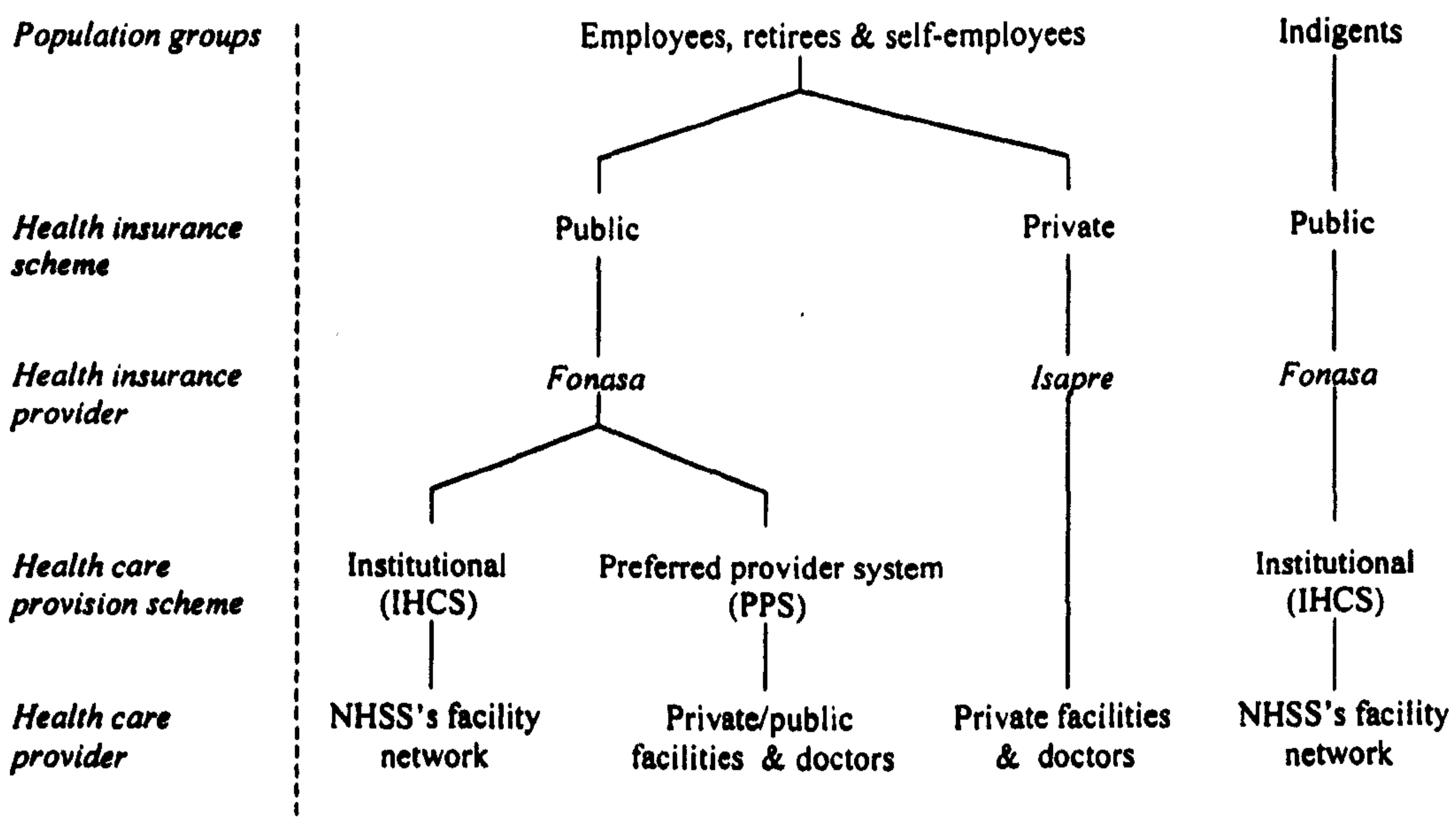
⁵ The evolution of the *Isapre* system can be found in Caviedes (1995) and Fisher (1995).

1.2.1 The public-private mix model ⁶

To ease the description of the Chilean public-private mix model we provide the reader with two figures. The first (Figure 1.1) is a vertical decision tree that simply shows the options of health insurance/health care provision available for different population groups. The second (Figure 1.2) is a horizontal diagram that complements the decision tree by including whether the individual is subject to contributions and co-payments.

Following Figure 1.1 and 1.2, employees, self-employed and retirees can opt for public or private health insurance. Whatever the option chosen they must contribute 7 percent of their taxable income to finance the cost of insurance.⁷ This contribution is compulsory for employees and retirees and can be channelled through *Fonasa*, the public insurer, or through an *Isapre*, the private alternative.⁸

Figure 1.1 Health insurance/health care provision decision tree

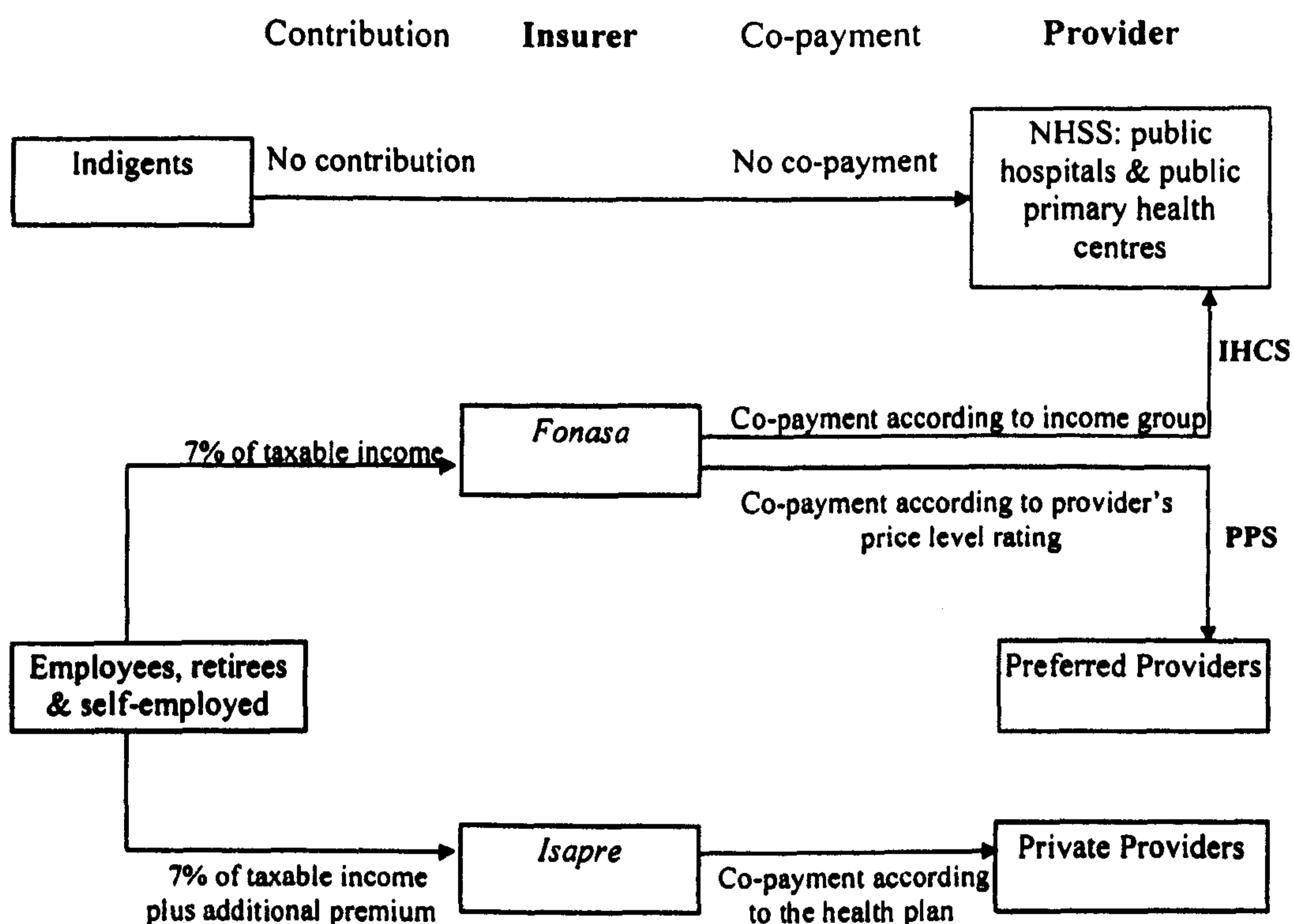


⁶ An interesting discussion on the public-private mix can be found in Oyarzo (1994).

⁷ Administratively the contribution constitutes a payroll deduction earmarked for health insurance that helps contributors to finance health coverage for themselves and their dependants.

⁸ Contributions are voluntary for self-employed, and the same public-private mix is open to them.

Figure 1.2 Contributions, co-payments and related providers



Fonasa offers a predefined set of health services at the single price of 7 percent of taxable income; no additional contribution is required. This “flat premium” allows every publicly insured individual and his/her family group to receive a fixed benefits package. As all those publicly insured obtain the same coverage, benefits are independent of the value of contributions.

Isapres, on the other hand, offer a variety of health plans and set premiums according to individuals’ attributes such as age, sex and number of dependants. In this case, benefits depend directly on the value of the premium.

Indigents are exempt from contributions and co-payments, and receive free health care from the state through the NHSS’s facility network. Employees, self-employed and retirees who opt for the public insurance administered by *Fonasa*, can obtain health care via two complementary routes: the Institutional Health Care Scheme (IHCS) and the Preferred Provider System (PPS). These options are open to all publicly insured individuals, although the higher cost of preferred providers limits the access of those on relatively lower incomes.

Under the IHCS, medical attention is provided through the NHSS's hospitals and primary health centres. Since this option has been designed to provide medical care at the lowest possible cost within a co-payment context, its administrative operation requires that every publicly insured person be evaluated on a means-tested basis.⁹ Four income groups have been defined: A, B, C, and D. Income group A corresponds to indigents who, as previously noted, receive free health care from the state. Individuals classified as low-income earners (group B) do not make co-payments. Individuals in group C and D must make an increasing percentage of co-payment.

This classification allows *Fonasa* to determine the percentage of co-financing and the respective value of co-payment. The percentage of co-payments under the IHCS ranges from zero, in the lowest two income groups (A and B), to 10 percent in the third (C) and 20 percent in the fourth (D).

On the other hand, the preferred provider route allows individuals a choice of doctors and hospitals. Basically, any doctor or private health facility can sign a contract with *Fonasa* to work as a preferred provider.¹⁰ To operate in the PPS, providers must be registered in one of the three pre-fixed price levels defined by *Fonasa* to determine the value of the set of pre-established inpatient and outpatient health services that can be offered. Services are partly co-paid¹¹ by the insured using a voucher, which includes a co-financing percentage from *Fonasa*. Providers redeem the voucher for 100 percent of the prices agreed.

Thus, before receiving medical care the publicly insured must purchase a voucher whose price depends on both the type of health service required and the price list in which the preferred provider is registered. This price list is called the price level rating of the preferred provider.

⁹ This evaluation is carried out by the municipalities (local level) in each region of the country.

¹⁰ Public hospitals are also allowed to providing health services under the preferred provider system. A typical service offered is accommodation in single and shared wards.

¹¹ Under the PPS, those insured pay 60 percent of the cost of basic medical visits and 50 percent of the cost of basic laboratory tests. Co-payments for more specialised medical visits and diagnostic tests vary according to the relative prices of the services demanded in relation to those for basic consultations and lab tests. For inpatient services *Fonasa* reimburses only 50 percent of the cost. Therefore, the more expensive and specialised the service, the higher the co-payment.

Table 1.1 shows a simple example to help illustrate the co-payment and co-financing structure under the two public routes described. We use the price of *medical visits to the newborn* in 2000, in Chilean pesos (Ch.\$).

Table 1.1 *Co-payment and co-financing structure (medical visits to the newborn)*

Institutional Health Care Scheme (IHCS)	Medical Visits to the Newborn			
Income groups	Price	Co-payment		Co-financing by <i>Fonasa</i>
		(%)	Value	
A	9080	0	0	9080
B	9080	0	0	9080
C	9080	10	908	8172
D	9080	20	1816	7264
Preferred provider System (PPS)	Medical Visits to the Newborn			
Price level rating	Price	Co-payment		Co-financing by <i>Fonasa</i>
I	9400	4700		4700
II	12220	7520		4700
III	15040	10340		4700

Under the IHCS a price of Ch.\$9080 is the base figure for calculating co-payments. For each group *Fonasa* co-finances the difference between the cost of the service and the co-payment, but the percentage of co-financing decreases from income group A (or B) to income groups C and D. The bottom half of Table 1.1 stands for the choice of preferred providers. The first column shows the price level rating of the provider. For each of these levels *Fonasa* defines the corresponding price (column 2). The individuals receive a fixed co-financing from *Fonasa* (column 4), independent of the rating of the preferred provider. Thus, the value of co-payment by users (column 3) increases with price.¹²

¹² The economic effects derived from the structure of co-payment and co-financing under the PPS are addressed in Chapter 2.

Finally, an employee can decide to channel his/her contribution through an *Isapre*. In this case he/she will be offered a range of health plans, each entailing different arrangements with respect to coverage caps, access to specific providers and co-payments. On average the privately insured make co-payments of about 23 percent of the total health expenditures incurred.

The *Isapres* take into account the compulsory contribution rate plus additional premiums to offer insured and their dependants both outpatient and inpatient medical care on a cost-sharing basis, and give them a choice of hospitals and doctors. Currently the *Isapre* system provides insurance to nearly 2.6 million people, of which 1.2 million are policyholders. Below we provide a description of the industry structure of the *Isapres* and some key regulations.

1.2.2 The Isapre system: industry structure and regulatory framework

The *Isapre* system is composed of two types of institution: open-end and closed-end *Isapres*. Open-end *Isapres* cater for the general public, whereas closed-end *Isapres* accept only their owner's workforce (such as the state copper industry or railway workers). Initially there were seven open-end *Isapres* and one closed-end. At its peak, in 1995, the system had 23 open-end *Isapres* and 11 closed-end. From 1995 onwards there was a process of adjustments and mergers that led to a highly concentrated system. Currently there are seven open-end and eight closed-end *Isapres*.

The seven open-end *Isapres* are controlled by six financial groups, and account for 86.9 percent of all affiliates (1.1 million individuals), and 87.6 percent of all beneficiaries (2.3 million individuals)¹³. They also account for 89.4 percent of the system's total operating income.

¹³ The affiliates are those who sign the insurance contract (mainly waged workers). They may include their economic dependants in the contract, and they and their dependants are known as the beneficiaries.

In addition to their insurance function, most open-end *Isapres* have vertically integrated with clinics and health centres, through which they have structured their own network of suppliers.

Beneficiary growth

Between 1985 and 1993 the number of beneficiaries grew strongly, reaching an annual rate of 29 percent. But in 1994 the annual rate fell to 6.9 percent and in 1995 to 2.9 percent. From 1998 onwards the rate was negative, reaching minus 9.7 percent in 1999 and minus 7.0 percent in 2000. The rate of decline has since steadied at between minus 4.9 and minus 3.7 percent.

The main reason for the negative growth rate in affiliates and beneficiaries from 1998 onwards was the poor performance of the Chilean economy from 1998 to 2002, which resulted in high levels of unemployment. A significant number of *Isapre* affiliates (about 400,000) could no longer finance their private health insurance and moved to the public insurance system run by *Fonasa*.

The client portfolio is heavily concentrated in the open-end *Isapres*, who cover 95 percent of the total. A total of 85.4 percent of affiliates are salaried employees, 3.3 percent are self-employed, 6.7 percent are pensioners, and 4.5 percent are voluntary affiliates. Of those employed, 33.5 percent earn less than US\$1,000 while 44.7 percent earn between US\$1,000 and US\$1,500.

The affiliates are strikingly young; 93.6 percent of the total are between 20 and 64 years, and those over 64 account for only 5 percent, whereas citizens over 64 represent 8 percent of the total population.

Financial aspects

The *Isapres'* operating income comes from the compulsory contributions and from additional voluntary contributions financed by either the employee or the employer. Between 1985 and 1995 operating income rose at an average annual rate of 26 percent, while operating costs remained steady at around 77 percent of

operating income. In the same period profits rose by an average annual rate of 95 percent, driven mainly by the strong increase in the number of affiliates, the real growth in wages, and the increased willingness of affiliates to make additional contributions.

But from 1999 to 2004 the growth of operating income fell sharply, fluctuating between 2.7 and 4.0 percent annual. Operating costs have remained at about 80 percent of operating income, and profits as a percentage of operating income have varied between 8.8 and 1.4 percent in the last 15 years.

Total assets in the *Isapre* system have risen steadily, from US\$71 million at its inception in 1985 to close to US\$422 million in 2004.

A significant financial component, and one that has been strongly criticised, is the administration and sales costs of attracting customers. The system's critics believe these as excessive, particularly compared with the comparable level of spending in the public insurance system, *Fonasa* (about 3.3 percent of operating costs). Initially, the *Isapres'* spending on administration and sales accounted for 26 percent of operating revenues (US\$31 million), falling to around 20 percent in the period 1990-1999. Since 2000 this item has accounted for between 14 and 16 percent of operating income, partly because the number of potential *Isapre* customers has been falling steadily.

Regulatory framework

The *Isapres* were created in order to give the private sector the chance to take part in attracting and managing the compulsory health contributions. *Fonasa* was given the task of regulating and supervising the new system, but unfortunately it was not given the human and technical resources to do so. Thus for nine years, until Law 18.933 was promulgated, the *Isapres* operated without a regulatory framework compatible with their role in the social security system, and without an operational supervisory agency. Without even a minimum framework, the system revealed a number of functional flaws that contributed to limit its growth.

In the early years the contracts offered by the *Isapres* typically excluded high-cost illnesses, lacked or were slow to offer coverage in certain areas and, most seriously, could be cancelled unilaterally and without explanation by the insurer at the end of each year. Thus the customers who fell sick and incurred substantial expenses often lost their insurance the following year and were sometimes unable to continue financing the treatment they needed.

Law 18.933 was promulgated at the end of 1989 in a partial and inadequate attempt to provide some regulation. In 1990 the incoming government prepared reforms to this law, which were approved finally in 1995 as Law 19.233. The new legislation regulated the process of annual contract adjustments, significantly reduced the restrictions on coverage, and recognised the affiliate's right to the contribution surplus (any surplus in the difference between the compulsory 7 percent contribution and the price of the health programme contracted for).

However, several serious gaps in the regulatory framework were not tackled, including coverage for catastrophic illnesses, mechanisms to help make possible the comparison and comprehension of health programmes, the setting up of a basic or minimum compulsory programme, and above all the mechanisms for risk compensation to prevent inequalities on the basis of gender and age in insurance policies where the premium is calculated on the basis of individual risk. The first two issues were dealt with subsequently through administrative regulatory mechanisms; the other two remain as regulatory failings in the system.

1.3 Quality of health care

Does the quality of health care differ among the available options? Unfortunately, the lack of reliable data and the scarce of pertinent studies make difficult to examine quality issues in the health system, and indeed quite complex to make *vis-à-vis* comparisons between the available alternatives.¹⁴

¹⁴ Only few studies analyse issues related to health care quality in Chile. Among others: Legros et al. (2000, 2002) and Gnecco (1999). These constitute evaluation reports on the Chilean Quality Assurance (QA) programme, initiated by the Ministry of Health in 1991.

Many factors influence the quality of health care. There are factors probably more important for doctors, like the quality of treatments and medical procedures, and others surely more crucial for health care managers or health economist, like hospital equipment, accommodation, accessibility and good staff attitudes to patients.

Strictly speaking, differences in the quality of treatments *per se* are likely to be fairly small, as consultants work concurrently in both the public and the private sector. Moreover nursing and paramedical staff are trained in public facilities but offer services indistinctly to both systems. However, the problem here is that apart from the claims of patients, there is no way to know how well (or how bad) public patients were personally treated by the medical staff, in comparison to private patients.

In what concern to the quality of medical procedures, little supervision and no systematic criteria exist to evaluate such procedures in both the public and the private sector. The main restriction to incorporate permanent mechanisms to assess de quality of medical procedures, in technical and in human terms, is the dual nature of the health care system and the state's complex role as the regulatory body for private health insurance and private health care providers.

Maybe the most common flaw in terms of medical/administrative procedures relates to hospitalisations. Administrative data show that the average length of stay in public hospitals is 9.2 days; while in private hospitals it is 5 days. This difference derives from the absence of pre-surgical hospitalisation days in private compared to public hospitals, where in the latter patients may spend two or three days before the operation. This probably reflects the fact that patients in the private sector arrive with an established diagnosis, while public patients need to be re-diagnosed.

There has been some progress, however, in the area of laboratory services, where more systematic supervisory procedures have been introduced. Since 1996 the Institute of Public Health (ISP) has been responsible for certifying the laboratories' participation in analysing test-samples, as a means of quality control. In 1998 the *ISP* oversaw 775 of the 892 clinical laboratories then operating in

Chile, 86.9 percent of the total. The programme reviewed 100 percent of the public sector laboratories, and 80 percent of private.

In other areas, systematic quality controls exist only in the public sector, which has set up quality circles. The private sector has been less active, although *Fonasa* is currently using certification requirements as a way of putting pressure on the private suppliers, and they are becoming more active in quality control procedures.

On the other hand, private providers offer, in general, better hotel services and up to date equipment, which are highly valued for high-income individuals who can afford costly full health plans.¹⁵ But for middle and middle to lower income groups the differences in the quality of equipment and accommodation are largely irrelevant, because the private plans they can afford often designate the same hospital of preference as that used by *Fonasa* affiliates in the institutional health care scheme.

In terms of accessibility the situation is not very different. Although public facilities are spread along the country, services are rationing by waiting time. In almost all studies waiting time ranks above any concerns with actual treatment received or problems with staff communication. The waiting time is especially of concern for patients who have less urgent or non-urgent problems and it is evident that the expectation of the public is that this type of care must be provided rapidly. Maybe this sometime high expectation is the reason why private providers typically offer timely ambulatory treatment of illnesses, but are less visible in case of inpatient treatments.

¹⁵ These attributes seem to play an important role in the demand for health insurance in Chile. Indeed, those who support the *Isapre* system argued that taking into account the timing of medical care, the attention offered and the infrastructure available, the quality of health care received by the privately insured is higher than that offered to the publicly insured.

1.4 The role of private insurance

Private and public health insurance fulfil different roles. Mossialos and Thomson (2002a) identify three main roles: substitutive, complementary and supplementary. This, like other classifications¹⁶, refers to the eminently voluntary nature of private health insurance, given that there are countries where it is compulsory (Chile, Uruguay, Switzerland). In other cases, such as the United States, private insurance predominates but remains voluntary.

The literature covering the development of modes of private insurance, whether substitutive, complementary or supplementary, concentrates largely on experiences in Western Europe. While health reforms in Latin America have often meant the creation of private insurance systems that interact with different schemes of public insurance (Argentina, Brazil and Uruguay), the difficulty in determining the nature of that interaction makes classification elusive.

For this reason we shall now describe the three main roles mentioned above drawing on European experiences, and consider their impact on health systems in terms of funding equity, access to health services, opportunities for choice, and cost containment. We shall also discuss the role played by the Chilean *Isapres* and their impact on the health system.

1.4.1 Substitutive, complementary and supplementary health insurance¹⁷

Substitutive private health insurance provides coverage which would otherwise come from the state. This type of insurance is generally acquired by individuals who are excluded, partially or completely, from the benefits of public health insurance (also referred to as statutory health insurance).¹⁸

¹⁶ See the Proposal for Taxonomy of Health Insurance. OECD (2004).

¹⁷ This subsection is mainly based on Mossialos and Thomson (2002b).

¹⁸ This is the case of Dutch citizens whose income exceeds €30,700, the unemployed in Belgium, or those who opt out of the public insurance scheme, such as German citizens with annual incomes above €45,900.

Complementary private health insurance provides cover for services excluded or not fully covered by public insurance. Some insurers restrict benefits to inpatient care, but where cover is available for outpatient care it may include a significant part of the costs of visits to primary care practitioners and specialists, nursing staff, drugs, tests, dental care, maternity care and complementary or alternative treatments. It may also cover residual health care costs. The benefits offered by complementary insurance are clearly influenced by the quality of public insurance cover, which varies from country to country. The characteristics of these policies, on the other hand, make them virtually inaccessible to low income or unemployed individuals (students, some groups of women and the old).

Supplementary private health insurance normally covers the same range of services as public insurance, and is often referred to as double cover. The aim is to provide an increased range of choices through a series of additional benefits such as access to private health facilities not accessible through public insurance when the full cost of the service is paid by private insurance; access to fast or privileged cover by bypassing queues in the public system; access to care independent of referral and gatekeeper systems; and choice of doctor and hospital. This option does not exempt individuals from contributing to public insurance.

1.4.2 Impact on the health system

Equity in funding health care

Wagstaff et al. (1999) note that complementary private insurance tends to be regressive, particularly when acquired by middle-income groups, who are generally a significant proportion of the population. Supplementary or substitutive policies, on the other hand, acquired mainly by high-income groups, would have a moderately progressive effect on equity in funding.

A recent study by the WHO Regional Office for Europe's Health Evidence Network¹⁹ argues that the presumed progressive effect of supplementary and substitutive insurance does not occur. Supplementary policies would appear to have a progressive effect because policyholders continue to contribute to public insurance, so their total contribution to the financing of the health system is relatively high. But the benefits of this type of insurance accrue exclusively to those covered, who belong to the highest income groups. Thus the net effect on the health system would be regressive. In the case of substitutive policies, the policyholders cease to contribute to the public system, and the state's capacity for pooling the risk is reduced. The net effect is probably regressive.

Access to health care

The extent to which the types of voluntary private insurance affect access to health care depends partly on the nature of the public insurance. Factors such as high premiums, the lack of open enrolment, life time cover and community rating, and the imposing of risk selection criteria are more significant in conditioning the access of low income individuals with prior illnesses, the old and the unemployed.

As a result of risk selection, some groups cannot afford an adequate level of health cover, while others cannot afford any at all. Clearly the groups facing the most difficulty in obtaining health cover are young adults, old people, the chronically sick or disabled, and low-income groups.

In Germany and Holland substitutive private health insurance form the main source of financial protection against the risk of sickness for the old and for large families. Governments in both countries have thus decided that private insurers should offer the elderly a package of basic health benefits in exchange for

¹⁹ "What are the equity, efficiency, cost containment and choice implications of private health care funding in Western Europe?" WHO Regional Office for Europe's HEN (July 2004).

A recent study by the WHO Regional Office for Europe's Health Evidence Network¹⁹ argues that the presumed progressive effect of supplementary and substitutive insurance does not occur. Supplementary policies would appear to have a progressive effect because policyholders continue to contribute to public insurance, so their total contribution to the financing of the health system is relatively high. But the benefits of this type of insurance accrue exclusively to those covered, who belong to the highest income groups. Thus the net effect on the health system would be regressive. In the case of substitutive policies, the policyholders cease to contribute to the public system, and the state's capacity for pooling the risk is reduced. The net effect is probably regressive.

Access to health care

The extent to which the types of voluntary private insurance affect access to health care depends partly on the nature of the public insurance. Factors such as high premiums, the lack of open enrolment, life time cover and community rating, and the imposing of risk selection criteria are more significant in conditioning the access of low income individuals with prior illnesses, the old and the unemployed.

As a result of risk selection, some groups cannot afford an adequate level of health cover, while others cannot afford any at all. Clearly the groups facing the most difficulty in obtaining health cover are young adults, old people, the chronically sick or disabled, and low-income groups.

In Germany and Holland substitutive private health insurance form the main source of financial protection against the risk of sickness for the old and for large families. Governments in both countries have thus decided that private insurers should offer the elderly a package of basic health benefits in exchange for

¹⁹ "What are the equity, efficiency, cost containment and choice implications of private health care funding in Western Europe?" WHO Regional Office for Europe's HEN (July 2004).

a premium rate set by the government. In Holland this premium is subsidised by young individuals covered by substitutive private insurance.

In the case of complementary private insurance, the evidence shows that when these policies offer cover for costs not covered by the public system they impose substantial financial barriers for low-income individuals. This occurs with those whose income is just above the threshold required for exemption from user charges. In France, where complementary private insurance has expanded to cover approximately 85 percent of the population, the quality of the cover is clearly determined by the individual's socio-economic status, age, employment and income level.²⁰

Supplementary private health insurance is known to increase the inequalities of access when the cover allows its affiliates to by-pass waiting lists in the public sector. Public resource allocation would also be affected by the operation of this kind of insurance, particularly where the border between public and private provision is blurred. In Ireland, where those with private insurance can use private beds in public hospitals despite the long waiting lists facing public patients, there has been a sustained rise in the use of all types of hospital treatment among private patients.

Choice

Depending on its role, private health insurance offers an alternative to the public system in terms of choice of insurer, provider and treatment. But the benefit to the insurer depends on the structure and regulation of the private market. In Germany and Holland the market for substitutive types of insurance severely restricts the choices for new and young policyholders, since the premium is set on the basis of age. Further, the history of health service use is non-

²⁰ See Bocognano et al. (2000).

transferable, so that if an affiliate wishes to change insurer she/he faces costs such as a higher premium or exclusion of pre-existing health conditions.

Recognising the importance of widening the opportunities for choice, Holland (1993) and Germany (1996) extended the option to choose a health fund to the entire population. Since then those with public insurance have more chance of choosing a provider than those with private insurance. However should the health funds be allowed to offer public insurance and complementary or supplementary type private policies in a single package for some groups, the possibilities of choosing their health fund could be reduced.

In some countries the private insurers offer a wide variety of health plans with different levels of benefits. In principle this allows people to choose a plan tailored for their needs, while also giving the insurers a useful tool for segmenting the market and employing risk selection. But it is not clear that the wide variety of plans benefits the consumer, particularly where she/he has neither time nor knowledge to compare and evaluate different plans; and where different insurers use different terms to describe their plans, comparing them is extremely difficult.

Cost containment

In those health systems where public insurance is dominant, the private insurers grow by offering, among other things, more opportunities for choice. In this context the companies find little incentive to contain costs, hence they are reluctant to implement strategies of managed care such as vertical integration or networks of preferred providers. In part this reflects their fear of the impact of reduced choice on their client portfolio (shrinking demand). Mossialos and Thomson (2002a) report that attempts in Belgium and France to reduce choice in exchange for lower premiums have had little success.

The private insurers' ability to implement cost control strategies is restricted on occasions by their scant bargaining powers, further accentuated when the markets are fragmented and the providers well organised. But lack of bargaining power affects not only the insurers but also the policy purchasers,

which finally benefits the former. Since private insurance is acquired mainly by individuals (not companies), who have virtually no bargaining power, cost increases are added to their premiums, creating a further disincentive to contain costs as far as the insurers are concerned.

1.4.3 Private health insurance in Chile: its role and impact on the health system

The private health insurance offered by the *Isapres* can be regarded as fulfilling a supplementary role, as it provides almost the same range of benefits offered by *Fonasa*, while allowing increased consumer choice and access to health services, guaranteeing superior accommodation and amenities and faster access to treatment, particularly in areas of health care with long waiting times, such as elective surgery.

The supplementary role played by private insurance has had implications for the development of the Chilean health system, and has not escaped criticism. Its critics mainly point to the funding inequities; restricted access; lack of a basic or minimum health care package, which limits the offer of plans for long-term and catastrophic care; comprehensiveness of private health plans and their cost; problems in comparing health plans; lack of mechanisms for risk compensation to prevent inequalities based on gender and age in insurance policies where the premium is calculated on the basis of individual risk; and the setting of premiums. In what follows we discuss these issues.

Equity in funding health care

It has been argued that since the *Isapres* commercial targets are mainly young and high-income individuals, they could be introducing a degree of progressivity into the system. This argument follows the line of Wagstaff et al. (1999) in suggesting that supplementary health insurance would have a modest progressive effect on funding.

The health plans (policies) offered by the *Isapres* appear to have a progressive effect because private policyholders continue contributing (indirectly) to the public insurance via general taxes, so their total contribution to the funding of the health system is relatively high. However, the benefits of the private health plans accrue exclusively to those covered, who belong to the highest income groups. Thus the net effect on the health system would be regressive.

Access to health care

Although the constitution guarantees all Chileans free and equal access to health care, *Isapres* select individuals according to income, and they also practice risk selection. Thus, high-income earners and healthy individuals represent the main commercial targets of *Isapres*.

A legal framework that restricts the access of the privately insured to public facilities has contributed significantly to reinforcing the *Isapres*' marketing strategy. *Isapres* can contract services with public hospitals only for emergencies and health care in non-shared wards. Health care services in shared rooms are excluded. This legislation, initially intended to encourage *Isapres* to create their own health care infrastructure, has precluded them from expanding towards relatively lower income groups via the offer of relatively cheaper health plans.

A further factor is the power of *Isapres* to establish restrictions on the product offered, such as a ceiling on benefits, lower benefits for pre-existing conditions and lower benefits for women who are pregnant at the time of enrolment. *Isapres* can also adjust the price and benefits of the health plan every year. These prerogatives of private insurers restrict the individual's freedom to choose. In fact, low-income employees or those with a higher probability of incurring high medical expenses (individuals with pre-existing diseases, the elderly, and women of reproductive age) are frequently restricted to public insurance. By the same token, those enrolled in an *Isapre* and who contract a chronic disease or reach retirement age are confined to their present *Isapre*,

because it would be difficult for them to take out a new policy with another *Isapre* at the same premium as the current policy.

On the other hand, most contracts offered by *Isapres* include stop-loss clauses that limit the financial risk of the insurer to a certain amount, above which there is no reimbursement. However, an optimal insurance contract is normally viewed as covering catastrophic events nearly in full, with demand-controlling cost-sharing in the form of deductibles and/or coinsurance at lower levels of expenditure. The stop-loss feature undoubtedly limits the extent of insurance offered, so high-risk individuals such as the elderly are commonly excluded from private insurance.

The lack of a basic or minimum health care package

Characteristic of Chile's private health insurance system is the freedom given to the *Isapres* to structure their health plans. There is a legal requirement to offer coverage for the same range of services included in *Fonasa's* service tariffs, which apparently prevents exclusions. However, *Isapres* can meet this legal requirement by paying for only minimum levels of cover.

In 1997 the Superintendency of *Isapres* ruled that no *Isapre* could offer cover below the levels set by *Fonasa* for free choice services, seeking to thus set a substantial minimum level for cover and avoid abuses. But the lack of a normative definition on the minimum level of cover has meant leaving the design of the health plans to the power of the market. Until 2000 this meant a widespread deficiency in coverage for high-cost/catastrophic illnesses. Although in theory the policy should cover high cost and infrequent events, in practice the payments in the health programmes, particularly those for lower income segments of *Isapre* clients, were inadequate.

There are several reasons for this: on the one hand, in the free interaction between offer and demand there is a preference for liquidity and a lack of foresight on the part of individuals; people tend to prefer high reimbursements for ambulatory treatment such as medical visits and tests, at the expense of hospital

care. Apparently the frequent use of the former offers the individual more chance of recovering his compulsory health contributions. On the other hand, the *Isapres* have little incentive to offer adequate protection against catastrophic illnesses, since, together with the problem of spontaneous preferences on the demand side, the state hospital network acts tacitly as re-insurance.²¹

Furthermore, until 1997 the public hospitals had no way of identifying *Isapre* beneficiaries, and these could take advantage of the situation to claim indigence and get free treatment. Today the situation has changed, as customers can be identified. But the failings in the public hospitals' system for charging patients still allows a fair number of *Isapre* patients to slip through the net.

These situations show up a failing in the workings of the market, since the lack of foresight of some imposes a cost on the rest of society (negative externality). The prevailing tendency of lack of foresight in spontaneous decision-making is a well-established element in the origins of compulsory social security systems. But paradoxically the regulatory framework of the *Isapre* system within health and social security, imposes obligatory contributions but does not define the preferred and essential destination of health social security, which is to provide protection in events which cannot be met by the individual's own financial resources

In this respect it should be noted that joint research by the Superintendency of *Isapres* and the Association of *Isapres* finally produced, at the beginning of 2000, a commitment by the private insurers to add a clause in all health contracts that would address the issue of catastrophic illnesses. The clause ensured that no affiliate would be liable for co-payments exceeding 2.1 times his monthly income (30 contributions of 7 percent of income), provided medical care was given by the network of providers defined by the respective *Isapre*. This cover co-exists with

²¹ In fact, when a privately insured individual is in bad health and requires expensive treatments or a long period of hospitalisation, she/he can move to *Fonasa* without additional cost. Independent of the health status of the individuals coming from *Isapres*, *Fonasa* has a legal responsibility to accept them and cannot charge differentiated premiums adjusted to risk. This situation produces a significant distortion in the private market, as private insurers have no incentive to offer long-term care contracts or, more significantly, to offer insurance against catastrophic illnesses.

the preferred providers option, which allows the affiliate to choose his preferred hospital or clinic but at the risk of having to make a substantial co-payment, or to eliminate this risk in exchange for giving up his free choice. What is important is that this cover is offered by all the *Isapres* for all plans, as the only way to circumvent the market failings noted previously which had blocked previous attempts to solve this problem.

Comprehensiveness of private health plans and their cost

Initially *Isapres* selected applicants with the lowest possible risk. At that time the 7 percent compulsory contribution allowed individuals to finance a high proportion of the coverage they required at a reasonable premium, with no annual restriction on their reimbursable costs. Given the composition of *Isapres*' portfolio, their financial risks were very low. Now, however, benefit coverage has been reduced through the setting of ceilings on expenses, variable according to the type of benefits. Thus, reimbursements have diminished steadily in indemnity plans that allow the insured a free choice of health provider.

As a result of these practices, in many cases the mandatory contribution is no longer sufficient to finance the cost of the private coverage required. So the privately insured have begun to pay additional premiums, over and above that defined by the 7 percent of taxable income.

On the other hand, private contracts are closely tied to wages. The health plans offered by *Isapres* tends to follow the life cycle pattern of wages, which may differ from the time profile of an individual's demand for health insurance. Even if capital markets work well, this problem will persist unless *Isapres* can offer long-term contracts in which the insured can pay higher contributions while their earnings are high and risk is low, in exchange for lower contributions later when their earnings are lower and risks higher.

Problems in comparing health programmes

Isapres currently offer more than 7,000 health plans. This fact alone makes it impossible to study and compare the offer in the market. A competitive system that makes the market responsible for allocating resources needs comprehensible and comparable information on the details of the service on offer. The less information available, the more imperfect the system and the smaller the social benefits of a competitive multi-policy system.

It is important to define the reasons for the problems in comparing health plans. One is simply the number on offer. It is fair to say that even the simplest and most easily comparable health plans cannot mitigate the difficulties of having thousands of options, which is partly the result of the lack of a minimum or reference plan mentioned before. A minimum plan could limit a market study to the level of payments or additional benefits, helping comparison and decision-making. Another factor is the complexity of the plans. The *Isapres'* freedom to draw up plans initially included their formal presentation. The Superintendency of *Isapres* has taken steps subsequently to make them more uniform. In 1997 the insurers were required to market their plans with an accompanying list of the 54 most frequent services (which represent 83 percent of system costs), noting the amount they would pay back for each, in *pesos*, both for free choice plans and for the *Isapre's* own network providers. This sheet has made it possible to compare health plans, thus improving the information available to the consumer and forcing the insurers to compete more in terms of services than marketing strategies.

Lack of risk compensation mechanisms

This structural fault relates to the lack of risk compensation or adjustment mechanisms. The price of the health plans depends on individual risk factors. Thus a woman of child-bearing age will pay up to four times more than a man of the same age, and children under one year and pensioners face the same treatment. The economic arguments for setting premiums against individual risk are quite

clear: the technical cost of the policy is a function of how costly the client is, and this in turn is a function of the frequency and nature of the health care required. But economic rationale runs counter to the social and political expectations of a system that forms part of social security, and aspires to more solidarity between genders and generations.

It is true that at the beginning the *Isapre* system had not yet developed risk compensation mechanisms, and the lack of examples or successful precedents in other countries may excuse this early failing. But the subsequent inability to correct the deficiency can only be understood in terms of the lack of consensus and of long-term policies for the *Isapres*. Multi-policy systems within the social security system mostly have mechanisms that make contributions proportional to income, but use risk compensation or adjustment to set the insurers' premiums against the risk they take.

Without these mechanisms, the Chilean system is open to criticism from those who see the principles of social security as incompatible with a price structure defined by individual risk which punishes and tends to exclude those more likely to incur costs – old people, women of child-bearing age and, increasingly, infants under one year.

Recent research by the World Bank shows that in the case of Chile most high cost illnesses occur in children under one. The progress in the care of premature babies and the increase in multiple births as a result of infertility treatments have made this the most expensive age group for the health insurers.

The setting of premiums

A structural element that distorts the functioning of the private health insurance market is the compulsory flat contribution for health. This makes sense in a public subsidiary health insurance regime like the one administered by *Fonasa*. However its application in a private system like that administered by the *Isapres* has produced at least two significant effects. First, young single policyholders with low risk and high income are commonly over-insured. Second,

there is an oversupply of health plans. Basically, *Isapres* face a heterogeneous demand which forces them to offer as many health plans as there are individuals with different seven percents of taxable income who require insurance.

Clearly the compulsory flat contribution responds to the State's need to counteract individuals' lack of foresight. Lack of foresight might induce the individual to disregard health insurance or not seek timely medical attention, thereby becoming a potential problem for the State. On the other hand, the mandatory contribution allows some degree of income re-distribution among the publicly insured by facilitating the access of the poor to health care at zero cost at point of demand. Indeed income re-distribution is the best explanation for the fact that the contribution is defined as a fixed percentage of the individual's income, which implies that those relatively richer pay more.

1.5 Moral hazard and adverse selection in health insurance

In this section we briefly discuss the economics of moral hazard and adverse selection as these are empirically examined in the second part of chapter 3, which we devote to examining the relationship between private health insurance and the utilisation of health services.

There is ample literature on moral hazard and adverse selection, so here we focus on just a few studies that provide a reasonable picture of the implications of these issues in the health insurance market.

Moral hazard

In the 1960s, the health economics literature²² adopted the term moral hazard²³ to describe the observed fact that health insurance, by lowering the

²² Arrow (1963, 1968); Pauly (1968, 1983); Zeckhauser (1970).

²³ Many definitions of moral hazard illustrate the early literature on insurance. They are mainly value-tinged definitions, which intent to reflect the "moral" behind an "inadequate" consumer behaviour. Buchanan (1964) says that "moral hazard is every deviation from correct human behaviour that may pose a problem for an insurer". Faulkner (1960) defines it as "the hazard that

marginal cost of care to the individual, increased the utilization of medical care. Pauly (1968) points out that the response of seeking more medical care with insurance than in its absence is a result not of moral perfidy, but of rational economic behaviour. Since the cost of the individual's excess usage is spread over all purchasers of that insurance, the individual is not prompted to restrain his/her utilisation of care. However, when individuals do not fully face the cost of medical care they may demand treatment inefficiently, in the sense that the cost of treatment sometimes exceeds the benefit.

To counteract moral hazard, health insurers use various forms of cost-sharing such as deductibles, co-payments and coinsurance, apart from several other forms of cover limitations.²⁴ These demand management instruments cause consumers to limit their demand for medical care, and thereby reduce premiums by restraining health care costs, but may expose consumers to large uninsured risk.²⁵ Lately health insurers have also been adopting supply management schemes through which they offer health care providers explicit financial incentives, such as prospective payments, capitations, and cost-sharing contracts, to limit expensive treatments.²⁶

The use of supply management instruments, particularly cost-sharing, has been widely recommended in the literature. The Rand studies showed that cost-sharing was effective in reducing health care costs (individuals subject to cost-

arises from the failure of individuals who are or have been affected by insurance to uphold the accepted moral qualities".

²⁴ According to Pauly (1968), a deductible is the exclusion of a certain amount of expense from coverage. Coinsurance requires the individual to pay some fraction of each dollar of cost.

²⁵ Ching-To and Riordan (2002) point out that under some conditions, optimal demand management results in deficient treatment.

²⁶ Other non-institutionalised mechanisms have been mentioned to reduce moral hazard. Arrow (1963) says that the professional relationship between physicians and patients can help to limit the normal hazard in various forms of health insurance. For example, when certifying the necessity of a given treatment or the lack thereof, the physician acts as a controlling agent on behalf of the insurer. Unfortunately, this control action is far from perfect as the physician himself is not under any control and it may be convenient for him or his patients to prescribe more expensive medication or more frequent treatments. This is less probable in the case of hospitalisation and surgery, which are usually more subject to peer inspection.

sharing contracts were found to purchase less medical care than those insured with full reimbursement of health care costs). A more recent study, by Manning and Marquis (1996), has found optimal the imposition of a coinsurance rate of almost 50 percent, with no ceiling on out-of-pocket spending.

Nyman (2004), however, argues that cost-sharing policies have been directed at problems that largely do not exist. He asks: who would regard an insurance policy that requires a US\$150,000 out-of-pocket payment (on a US\$300,000 liver transplant) as optimal? He argues that coinsurance is too blunt a policy instrument and that it should only focus on the efficient moral hazard. It would make little sense to apply co-payments to those with serious illnesses, whose care might also be associated with a great deal of pain and suffering. Furthermore, he points out that insurance makes the consumer better off, so the government should subsidise its cost. This would be so because the subsidy encourages consumers to purchase insurance voluntarily, contributing in this way to improving the welfare of society.

The literature, however, recognises that the additional health care spending under health insurance constitutes a welfare loss to society (called moral hazard welfare loss). This loss would be generated by the difference between the high cost of the resources devoted to producing the extra care (as reflected in the market price) and its low apparent value to the insured (reflected in the low insurance price). This traditional statement has been challenged by Nyman (2004), who says that there is a fundamental ambiguity in the welfare implications of moral hazard. In his view, the "conventional theory"²⁷ makes sense for some types of health care such as cosmetic surgery, but not for serious events such as coronary bypass operations or organ transplants. He argues that the welfare implications of a liver transplant purchased by an insured person with liver failure in order to save his life are very different from the welfare implications generated by the breast implant that a healthy insured woman purchases to improve her appearance.

²⁷ Nyman (2004) calls "conventional theory" the theory developed principally by Pauly (1968, 1983).

Nyman (2004) also argues that health insurance provides an economy-wide redistribution of income from those who remain healthy to those who become ill. Given that people value the additional income they receive from insurance more than they value the income they lose when they pay a premium and remain healthy, the national redistribution of income would increase the welfare of society. This theory would thus identify an efficiency argument to suggest the adoption of some form of national health insurance (as in Canada), an issue widely debated in the United States and some western European countries.

Adverse selection

Insurers know that not everyone presents the same risk and accordingly expect that those at highest risk will have the greatest demand for health insurance. However if insurers cannot tell good risks from bad risks they may end up with an overly risky population. Following Phelps (2003), this adverse selection problem hinges on the difference in information held by buyers of insurance and sellers of insurance. The buyers know more about their own health status than the insurer. This poses a complication to insurance companies when designing an insurance plan: if they put a plan on the market that attracts too many bad risks, they will lose money. If this happened repeatedly, they would go bankrupt.

Anticipating this purchasing behaviour, insurance companies devise contracts to screen individuals. Whether screening is successful or not depends largely on how regulated the health insurance market is. If the regulation in place does not allow premiums to reflect individual risk, or does not allow insurers to acquire information on the health status of potential clients before making contract offers, the success of screening strategies will be limited. Further, several studies

suggest that the main consequence to be expected from screening would be the incomplete coverage of low-risk rather than the exclusion of high-risk groups.²⁸

The empirical evidence for the presence of adverse selection in health insurance markets is not categorical. Cutler (1996) says that almost all health insurance systems where individuals are allowed choice of insurance have experienced adverse selection. He gives as an example the case of US Medicare, where enrollees who choose managed care are healthier than those who do not. He also remarks that almost every US large firm that has encouraged employee choice has found the cost of the most generous policies increases sufficiently rapidly that these policies become unavailable. Ettner (1997) also finds evidence of adverse selection in US Medicare and Gardiol et al. (2003) provides strong evidence of adverse selection in a highly regulated private insurance market in Switzerland. Marquis (1992), using data from the Rand Health Insurance Experiment, shows that the insured can accurately forecast their risk and that this forecast affects the purchase of insurance coverage. Her simulations suggest that adverse selection may in fact be quite substantial. On the contrary, Chiappori and Salanie (2000) conclude that the importance of adverse selection is limited, and Cardon and Hendel (2001) do not find evidence of adverse selection in the US health insurance employer provided market.

From a theoretical point of view, adverse selection is a matter of concern, as it causes market failure. Neudeck and Podcizek (1996) point out that in the presence of adverse selection the operation of freely competitive health insurance markets will in general be inefficient. On the other hand, second best efficiency usually requires that different risk types be spread through different contracts and that gains from low-risk contracts be used to subsidise high-risk contracts. However, such allocations cannot be sustained as a free-market equilibrium because firms would reject applications for loss-making contracts. Since high risks know this, they often have an incentive to hide their identity by imitating the

²⁸ Phelps (2003) remarks that the presence of unobservable differences in people's propensity to become sick leads to a variety of outcomes in either competitive or regulated health insurance markets that makes the healthy worse off than they would be with full identification of their type.

behaviour of low risks. There can thus be no cross-subsidisation between different contracts.

Both in western European countries, where health insurance is mainly provided by welfare state agencies or government-sponsored social insurance funds, and in the United States, where health insurance is mostly provided by private companies, the reform plans advocate some combination of regulated competition and government intervention to solve the inefficiency problem.²⁹ The logic behind these propositions is that the conditions to get second best efficiency, through some forms of social insurance, are difficult to meet, but that the government could obtain the same efficiency effect by regulating private insurance companies.

Many different regulatory solutions to the adverse selection problem can be found. According to Neudeck and Podcizek (1996), the traditional one of public provision of insurance is clearly the most interventionist. On the other hand, central insurance funds, like those proposed in The Netherlands and Germany, increase the scope for competition between private and statutory health insurers, while the creation of health alliances (proposed in the United States) with group choice is the most market-oriented way to solve the problem, because the necessary cross-subsidisation of contracts occurs within companies.

At microeconomic level, regulation policies to control risk selection can adopt the form of a standard contract in which the government specifies premium and coverage and obliges all private insurance firms to offer this contract and to accept all applications for it. As long as companies offer the standard contract they are free to supply any other contract as well. The regulator can also oblige insurance companies to offer a standard contract with full or partial coverage. Alternatively, the regulator may require some minimum insurance in the sense that

²⁹ Studies by Pauly (1974), Wilson (1977), and Strassl (1988), among others, have shown that some form of public provision of (compulsory) health insurance or premium regulation can help to solve the inefficiency problem.

insurance policies must cover at least a minimal proportion or part of treatment costs. Equivalently, consumers must satisfy the government that they have a contract for minimum health insurance. This requirement is a feature of almost all recent reform proposals.

Clearly many government interventions in the private health insurance market are motivated by distributional considerations: redistribution from low risks to high risks. The experience of the German and Dutch health reforms would indicate that greater emphasis on competition would reduce the potential for redistribution. Spence (1978), however, has argued that improvements in efficiency and the re-distributive possibilities are consistent with maintaining a reasonable array of consumer options through a competitive private health insurance market.

APPENDIX

1.1 Health status and tendencies³⁰

1.1.1. Demographic and health transition³¹

Over the past four decades the demographic profile of the Chilean population has changed from a society characterised by high fertility and mortality rates to one with low fertility and mortality, coupled with low immigration.

The reduction in fertility and the increment in life expectancy have ushered Chile into the third stage of demographic transition. Deaths rates experienced a clear decrease since the 1940s, while birth rates remained high until the early 1960s. The population growth rate reached its peak in 1965 at around 2.4 percent. But figures from the last census (2002) show us that the population grew at an average of only 1.2 percent per year between 1992 and 2002.

These demographic trends have transformed the age structure. There has been a relative increase in the number of elderly people, which expanded from 4.3 percent in 1960 to 7.4 percent in year 2001. But this aging process, most evident since the 1970s, has implied not only an increase in older age groups, but also major growth in the groups of young adults and middle-aged. Thus while in 1970 individuals aged between 15-64 years represented 56 percent of total population, this percentage increased to nearly 65 percent in 2001.

Although life expectancy at birth increased by 11 years between 1970 and 2000, the main determinant of the relative aging of the population is associated with declining fertility, which dropped almost 24 percent over the last 30 years.³²

In 1970 the average woman had 3.4 children, but by 2001 the total fertility rate had declined to 2.1, compared to 1.9 in developed countries and a world average of 3.3.

³⁰ This section relies on Chile: The Adult Health Policy Challenge, World Bank (1995).

³¹ The theory of demographic transition, based on the experience of developed countries, postulates the existence of predetermined stages of change in the dynamic of national populations. Accordingly, the demographic transition is the result of a succession of changes in birth, mortality and natural growth rates that commonly accompany the development of a country.

³² The main factors explaining low fertility are: implementation of family planning, increasing labour participation rates of women, and high female school enrolment ratios.

The average age rose from 25 to 31 years between 1970 and 2001. Likewise, following the decline in the size of successive birth cohorts due to the drop in fertility, the proportion of children (0-14 years) in the total population fell from 40 percent in 1970 to 28 percent in 2001.

These demographic changes have been accompanied by rapid urbanisation and industrialisation. In addition, internal migration has changed the spatial distribution of the population, which is currently characterised by a significant concentration in urban centres. The proportion living in urban areas increased from 58 percent in 1950 to 85 percent by the late 1990s.

Mortality and morbidity

Age-specific mortality has declined among all age groups in the past 40 years. The main decline has been verified in the population under 15, which is associated with significant reductions in the prevalence of infectious and parasitic diseases. Until the early 1960s, Chile had one of the highest infant mortality rates³³ in the Americas. Since then child deaths from diarrhoea, acute respiratory infections and malnutrition have decreased dramatically, with infant mortality rates falling from 110 per thousand live births in 1960 to 10 per thousand live births in 1999. This is well below the average rate of 55 per thousand live births in Latin America as a whole, and comparable with rates in most OECD countries. The improvement was mainly due to health care programmes aimed at the mother and child, education, basic sanitation, and the growth in per capita income.³⁴ Pre-school mortality³⁵ dropped significantly from 3.5 per thousand in 1970 to 0.4 per thousand in 1999. Malnutrition among children under six (measured by weight-for-age) also reduced substantially, from 15.9 percent in 1976 to 7.3 percent in 2001. The prevalence of severe and moderate malnutrition is among the lowest in developing countries, affecting less than one percent of children below six.

³³ Infant mortality rate: deaths of children below one year per thousand live births.

³⁴ Castañeda (1985) presents a detailed analysis of the influence of these factors.

³⁵ Pre-school mortality rate: deaths of children between 0-4 per thousand in the age group.

Maternal mortality³⁶ dropped sharply from 2.8 per thousand live births in 1960 to 0.2 per thousand live births in 1999, compared to 0.4 in Cuba, 0.18 in Costa Rica, 1.5 in Western Europe, and 0.7 in the United States. Maternal nutrition has also improved, as reflected by the reduction of low weight at birth (child below 2.5 kilos), from 11.6 to 5.5 percent between 1970 and 1999.

The increased average age of the Chilean population, rapid urbanisation and industrialisation, and significant changes in lifestyles, have contributed to the emergence of a new set of health problems. As a result, the mortality profile and disease burden are now characterised by the prevalence of non-communicable diseases and injuries.

Although most disease-specific mortality rates declined in the last three decades, the total number of deaths due to non-communicable conditions increased. This reflects the shifting population age structure, which in turn has produced a progressively larger number of adults and elderly persons susceptible to non-communicable diseases and disability. Furthermore, with the sharp decline in the relative importance of infectious and parasitic diseases as a major cause of death (from 12 percent in 1968 to only 2.7 percent in 1999), the relative weight of non-communicable conditions and injuries has grown steadily. At present, the situation in Chile is similar to that found in the more industrialised Latin American countries and OECD countries, where non-communicable diseases and injuries account for 55 to 80 percent of all deaths.

³⁶ Maternal mortality rate: deaths of women of fertile age per thousand live births.

1.1.2 Health care performance and related indicators in the public system

The performance of the public system is described using a set of indicators provided by the Ministry of Health. Some result indicators are presented in Table 1.2 for 1999, while some utilisation indicators are shown in Table 1.3, for 1998.

From Table 1.2 it is clear that both the immunisation programme and the professional care of delivery present adequate coverage, comparable with OECD countries. Likewise, the rates for low weight at birth and early, neonatal and 1-4 years mortality compare favourably with those in the rest of Latin America.

Table 1.2 Result indicators, 1999

Indicators	
Infant vaccination coverage (%) (DPT third doses/born alive)	95.7
Delivery coverage by professional staff (%)	99.6
Low weight at birth (%)	7.0
Late infant mortality rate (per 1,000 live births)	4.1
Early neonatal mortality rate (per 1,000 live births)	4.5
1-4 years mortality rate (per 1,000 in the age group)	0.4

Source: Ministry of Health, Chile. *Health Care in Chile. Performance Report 2000*.

From the figures related to utilisation shown in Table 1.3, we observe that the average length of stay in public hospitals was an estimated 6.6 days, while in private hospitals it was 4-5 days (not shown in the referred table). These figures compare positively with those of OECD countries such as Denmark (6.6), Ireland (6.9), United States (7.3) and Norway (7.8).

However, the Chilean figures hide differences among groups of causes of hospitalisation when public and private hospitals are compared in more detail. Rodríguez and Jiménez (1985), for instance, found that while the length of stay for obstetrical and gynaecological care was similar, the length of stay for surgical

care and internal medicine was lower in private hospitals. An explanation for this difference can be found in the lack of pre-surgical hospitalisation days in private hospitals compared to public ones, where patients spent two or three days in hospital before the operation. This probably reflects the fact that patients in the private sector arrive with their diagnosis established, while public patients need to be re-diagnosed. It may also reflect the limited specialised outpatient capacity in the public sector. But once a patient is hospitalised, the intensity of care provided by doctors did not differ among the hospitals studied, although laboratory and x-ray tests were higher in public hospitals.

Table 1.3 *Utilisation indicators, 1998*

Indicators	
Average length of stay (days)*	6.6
Discharges per 100 inhabitants	10.0
Major and minor surgeries per 100 inhabitants	7.0
Medical consultations per inhabitant	1.1
Emergency medical consultations per inhabitant	0.6
Total outpatient medical care per inhabitant	2.7
Clinical laboratory exams per 100 inhabitants	247.3
X-ray exams per 100 inhabitants	23.0

* Figures for 1997.

Source: Ministry of Health, Chile. *Health Care in Chile. Performance Report 1999*.

The public system reported 1.1 medical consultations per beneficiary in 1998, accounting for 75 percent of all outpatient consultations in the country. The same year the private sector had an average of 3.6 medical consultations per person, showing a higher per capita utilisation of health services.

As a whole, including both the public and the private sector, the number of medical consultations averaged 2.3 per person in 1998. This rate corresponds to approximately 40 percent of the rate for Cuba and Uruguay, and less than half the percentage for OECD countries.

Emergency consultations in outpatient departments of public hospitals represented 30 percent of all consultations, showing that although geographic coverage of health care is good, access is less adequate because of the limited hours of service in primary health care centres and the insufficient number of specialised ambulatory centres.

1.2 The Chilean health system

1.2.1 Historical background: from the early 1920s to the 1970s

Chile was a pioneer in Latin America in providing publicly supported health programmes. In 1924, a general social insurance scheme involving sickness coverage for blue-collar workers was introduced. This arrangement was complemented in 1938 with a law on preventive medicine, which introduced legislation to establish preventive health services. In 1942 the National Medical Service for Employees was created to provide health insurance coverage to white-collar workers and their dependants.

In 1952 the medical programmes of several public institutions, including the social insurance medical programme for blue-collar workers, were consolidated under a unified health structure, the National Health Service (NHS). This new structure was based on the British design (in 1948, four years earlier, the British government had established the National Health Service following the proposals contained in the Beveridge report). As in Britain, the Ministry of Health was the entity responsible for supervising the activities of the new organisation.

By the late 1970s the National Health Service and the National Medical Service for Employees covered nearly 85 percent of the population. Another 10 percent was self-insured, so they had to contract services from private providers

working on a fee-for-service basis; and 5 percent was covered by the medical programmes for the armed forces.

In parallel with these developments, from 1916 on various laws assigned responsibility to employers for work-related injuries and illnesses. In 1968 these laws were unified in Law 16,744, which obliged all employers to provide insurance against these risks, through the mutual societies, the Institute for Social Security Normalisation, or by direct provision of services and disability benefits. At present approximately 2.6 million workers from over 51,000 firms are insured, representing 60 percent of the economically active population.

1.2.2 The reforms in the 1970s and 1980s

Two fundamental pillars of the health system reform process were the “Labour Plan” and the reform of the pension system.³⁷ The Labour Plan, among other significant changes, eliminated the legal differences between blue-collar and white-collar workers. The social security system reform abolished the existing multiple social security schemes and established an individual capitalisation mechanism administered by private pension funds.

By the end of the 1970s, the health system had also been reorganised through a series of institutional and financial reforms. The principal aspects of these reforms were:

- A. REORGANISATION OF THE PUBLIC HEALTH SYSTEM
- B. DECENTRALISATION TO MUNICIPALITIES
- C. INCORPORATION OF THE PRIVATE SECTOR

³⁷ The Labour Plan, which radically modified the legal framework governing labour contracts, was passed in August 1979. The pension system reform was introduced in March 1981.

A. REORGANISATION OF THE PUBLIC HEALTH SYSTEM

The increasing complexity of the public health system and the government's interest in consolidating the decentralisation³⁸ process initiated in 1974, led the authorities to redefine the structure and functions of the Ministry of Health. Late in the 1970s the National Health Service was divided into regional service areas, re-grouping them under the umbrella title of the National Health Services System (NHSS). Currently the NHSS is composed of 26 Health Service Areas (HSA), which are responsible for the operation of public hospitals and for monitoring the provision of medical care in primary health centres.

The administrative and financial resources of the National Health Service and the National Medical Service for Employees were merged to create the National Health Fund, known as *Fonasa (Fondo Nacional de Salud)*. This new public institution was defined as the public insurer in charge of providing health insurance cover to individuals. Under the new structure, the Ministry of Health retained its supervisory role as well as the political responsibility for defining public health policies.

Together with these structural changes and as a way of improving the reimbursement mechanisms for hospitals and municipal health care centres, two new systems were designed: a fee-for service system for reimbursing hospitals called *Fap (facturación por atención prestada)*, and a fee-for service system for reimbursing municipal health centres called *Fapem (facturación por atención prestada en establecimientos municipalizados)*.

Through these mechanisms the authorities sought to link financial resources and level of service provision of both hospitals and municipal health centres. To achieve this, financial incentives were offered to providers to meet predetermined goals. These incentives were expected to help in introducing more

³⁸ This process was defined as the political and administrative division of the country into 13 regions, 51 provinces and 341 municipal districts.

efficient management in both HSA and municipal health centres. Overall the changes were meant to underpin the successful decentralised functioning of the health system.

Finally, legal changes were also introduced. In 1985, Law 18,469 was passed in an attempt to regulate and reunify the regime of health benefits in the public system. The law established a differentiated co-payment structure based on the individual's income level. The aim of the new system was to improve the process of cost recovery in order to generate resources for the poorest sectors and, more importantly, to abolish the differences in benefits created by the range of different existing social health insurance regimes.

B. DECENTRALISATION TO MUNICIPALITIES

The reforms started in 1979 with the reorganisation of the public health system were followed in 1981 by a process known as *municipalisation*.³⁹ This process decentralised the operational activities at primary health care level, in both urban and rural areas, by transferring the responsibility, infrastructure and personnel for the delivery of primary health care to the municipalities. The Ministry of Health kept responsibility for defining national policy on primary health care.

Municipalisation was meant to meet the following objectives: to decentralise the activities of the health system; to improve supervision of health centres remote from the corresponding HSA's central office; to adjust health care programmes to population needs; to allow municipal resources to be directed into the operation of primary health care centres; to achieve more municipal participation, and to allow better multi-sector integration, particularly in relation to social sectors such as education and housing.

³⁹ See Jiménez and Gili (1991).

C. INCORPORATION OF THE PRIVATE SECTOR

In 1980 new legislation allowed salaried employees to opt out of the social insurance pool and take the compulsory contribution for health insurance to private insurers. This new legal framework was decisive for the development of the private health insurance system. In 1981 Private Pre-Paid Health Insurance Plans, known as *Isapres* (*Instituciones de Salud Previsional*), were set up as the private alternative to the public insurance provided by *Fonasa*. Ten years later Law 18,933 was passed, creating the *Superintendencia* of *Isapres*, a public entity responsible for regulating the *Isapre* system.⁴⁰

1.2.3 Post-reforms organisation

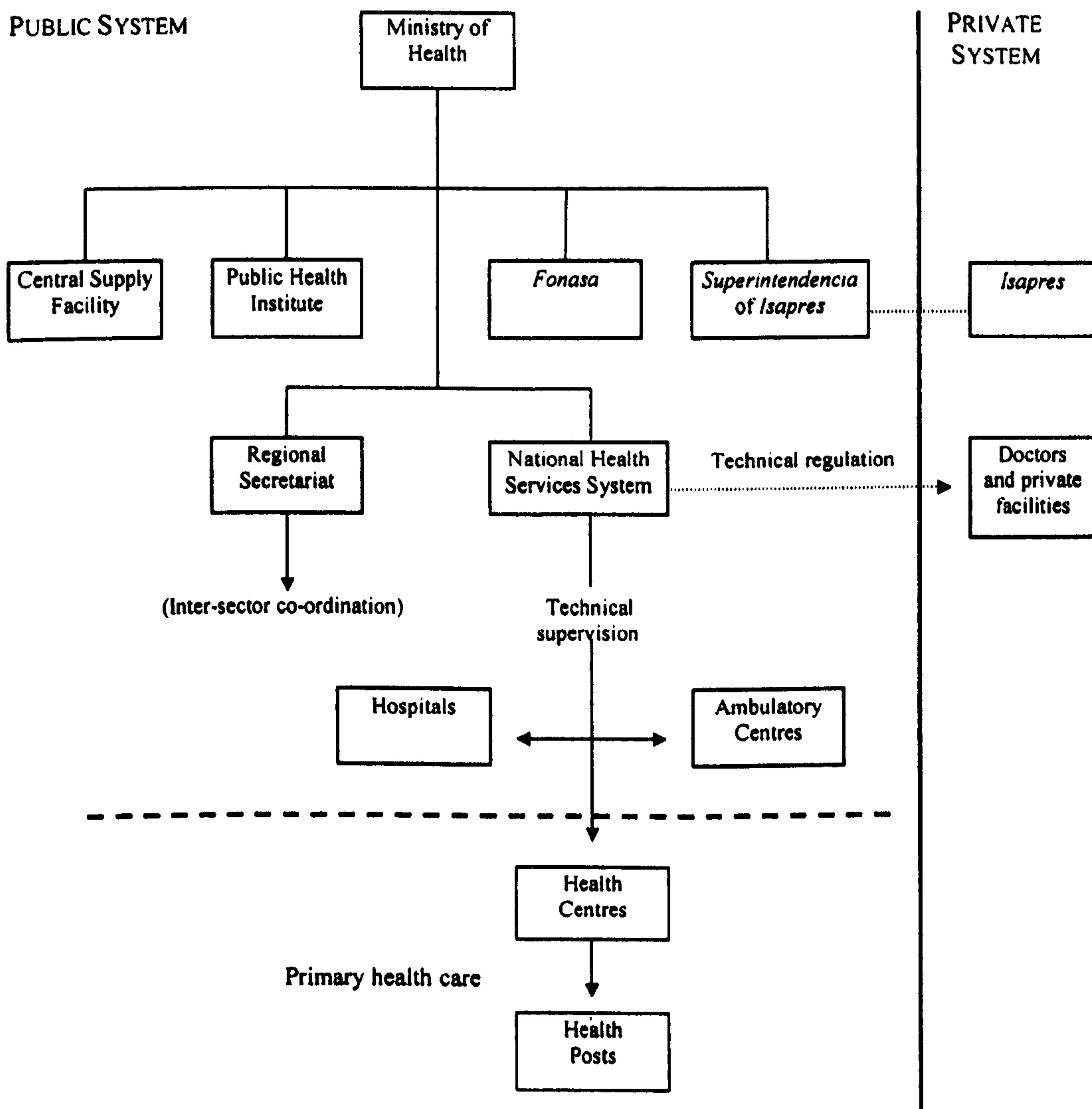
The reforms introduced during the 1970s and 1980s profoundly transformed the organisation of the health system. Figure 1.3 shows its current structure, where a public and a private system operate independently.

A. THE PUBLIC SYSTEM

The Ministry of Health is responsible for formulating public health policies, defining national standards, and planning and monitoring national programmes. It also supervises the delivery and financing of health services through its Subsecretariat of Health, which co-ordinates the operation of the National Health Services System and four autonomous agencies: *Fonasa*, the Central Supply Facility, the Public Health Institute, and the *Superintendencia* of *Isapres*.

⁴⁰ This law also determined that the contract between the insured and the *Isapre* was indefinite and that the insurer could not unilaterally end it.

Figure 1.3 Health system organisation



Source: Chile: The Adult Health Policy Challenge. A World Bank Country Study, 1995.

The National Health Services System provides health care through its network of outpatient facilities and hospitals associated with each of the 26 Health Service Areas (HSA). The HSA are regionally distributed and serve populations that range from 89,000 to 1.2 million.⁴¹ They are responsible for the operation of all public

⁴¹ To some extent, the HSA are similar to the 14 Regional Health Authorities (RHA) established in England in 1974. The English RHA served populations ranging from 2 million to 5 million and, like the Chilean HSA, they performed functions mainly related to planning, resource allocation and monitoring the performance of District Health Authorities.

hospitals in their respective geographic areas and for the technical supervision of the primary health care level run by municipalities.

Fonasa, the public insurer, is responsible for administering and distributing the financial resources of the National Health Services System, including central government allocations for health and the 7 percent compulsory contribution for health from active and pensioned salaried employees who are not *Isapres* insured. Currently *Fonasa* covers 67 percent of the insured population.

The Central Supply Facility is in charge of procurement and distribution of pharmaceuticals and other medical supplies to public health facilities and of milk and other products delivered by the National Supplementary Feeding Programme. The Public Health Institute is responsible for the quality control of all pharmaceuticals and food products, and the *Superintendencia* of *Isapres* is responsible for the regulation of the *Isapre* system.

B. THE PRIVATE SYSTEM

The private system is mainly associated with the *Isapres*, the private alternative to the public insurance provided by the state. These institutions, which account for about 20 percent of all those insured, are entitled to channel the 7 percent compulsory contribution made by each employee to finance the cost of health insurance. *Isapres* thus supersede the state in financing and delivering health care benefits and paying common illness subsidies.

Isapres offer their insured and their dependants both outpatient and inpatient health care on a cost-sharing basis either through their own facilities (some *Isapres* are vertically integrated) or under contracts with private and public providers. Each *Isapre* agrees with its insured, through a contract, the form in which health care services will be provided and the conditions for services and benefits. There is no statutory definition of a minimum benefit package in private sector insurance; the law only establishes sick-pay benefits and preventive care. Contracts must stipulate the services and benefits agreed upon, the form in which

premiums, services and benefits can be modified, the price of the health plan chosen, the restrictions on coverage, and the services excluded.

1.2.4 *Financing of the public health system*

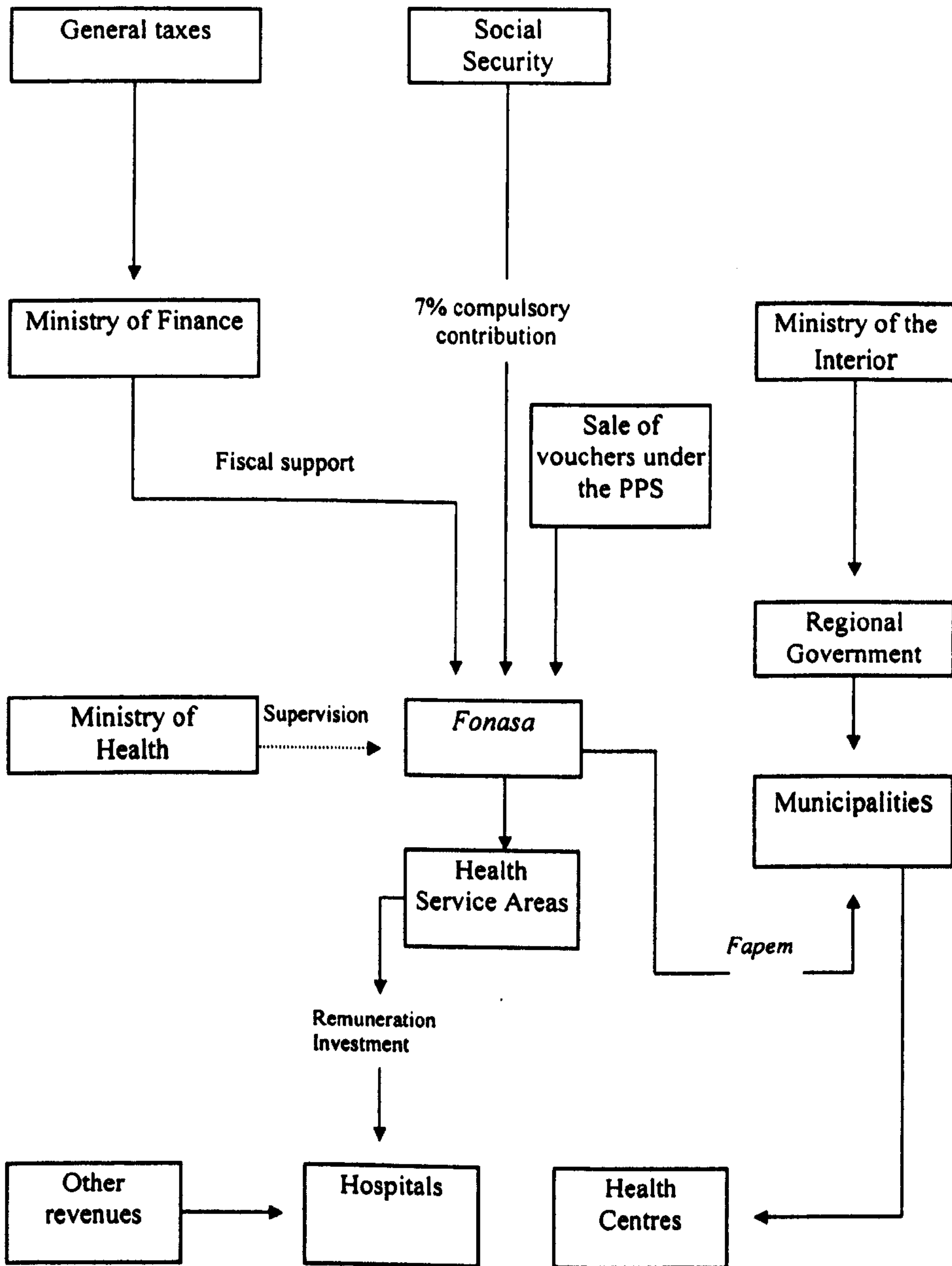
Fonasa is responsible for the financial administration of the resources committed for running the public health system. The flow of funds is shown in Figure 1.4. The main revenue sources are: employees' compulsory contributions (40 percent of total income); fiscal support (40 percent); sale of vouchers to *Fonasa's* insured under the preferred provider system (7 percent); fees from the sale of services in public facilities (6 percent), and others (7 percent).

Capital investment, particularly for primary health care centres and rural hospitals, is financed separately through the National Fund for Regional Development, administered by the Ministry of Interior.

As well as financing services, *Fonasa* provides the HSA with a budget allocation to cover salaries, investments, and the other fixed costs of public hospitals. There are ceilings, however, on the reimbursement a given hospital can receive from *Fonasa*. Public hospitals obtain additional resources from fees charged to *Isapres* insured for the use of hospital beds (excluding related services) in special wards, for which hospital authorities can set their own prices. Other funds come from co-payments charged under the Institutional Health Care Scheme (IHCS) for the publicly insured patients classified by *Fonasa* as non-indigents.

The municipal-run primary health care network is financed on a facility-specific basis for the amount and type of services provided. The mechanism used consists of a fee-for service system for reimbursement called *Fapem*. It includes 15 categories of primary health care services, with precise levels of reimbursement per service within each category. *Fapem* transfers are expected to cover the costs of all goods, services, personnel and maintenance expenditures incurred in the process of providing medical care. This mechanism is complemented with a fixed per capita rate system. Investment in infrastructure and equipment is a municipal responsibility.

Figure 1.4 *Flow of public system funds for health*



Source: Chile: The Adult Health Policy Challenge. Report 12681-CH, 1994, World Bank.

1.2.5 *The reforms in the 1990s*

A major challenge facing the government in 1990 was the deterioration in health care infrastructure, mainly as a result of the cuts in public spending on health between 1980 and 1990, following the economic crises of 1982 and 1985.

But there were also serious management problems, particularly in the Health Service Areas (HSAs). The situation was attributed to poor information and management systems, inexperienced decision-makers and inefficient resource allocation as a result of centralized payment systems. Effectively, the *Fap* system for reimbursing hospitals did not favour efficiency and cost-containment.

An evaluation of the impact of municipalising primary health care also showed up a number of difficulties. There was a serious problem of coordination between the municipal authorities and the regional health directors in implementing health policies. The *Fapem* system, particularly the spending ceiling set for each municipality in 1983 had several disadvantages. The *Fapem* prices, which were supposed to cover costs, were under-estimated and did not reflect the real cost of health care. As a result, municipalities were under-reimbursed and municipal expenditure for primary care progressively increased to reach 34 percent of total primary health care expenditure in 1993. And like *Fap*, *Fapem* did not include incentives to encourage quality nor cost containment, and promoted curative at the expense of preventive medicine, since most promotion and prevention services were not reimbursed.

As part of a strategic approach to solving these issues, the decision was taken to keep the main pillars of the health system - decentralisation and coexisting private and public sectors - while strengthening the regulatory role of the state. This policy decision was followed by a series of initiatives and reforms, which we shall now briefly describe.

Investments in the health system

Due to the poor state of health sector infrastructure, the government reached agreement on a tax reform to allow a 50 percent increase in the health budget over a four-year period. Additional local resources, loans from international agencies and donations went to finance a US\$500 million national investment programme for infrastructure and equipment for the public hospital network, disbursed over six years.

Focus on primary care

Major investments were made in primary care to improve the efficiency and quality of municipal primary health care facilities, and the public access to health care services. The supervisory role of *HSAs* in primary care was strengthened to correct the lack of coordination between local and regional authorities. A Primary Care Unit was created in the Ministry of Health to draw up plans and strategies to improve the development and quality of primary health care services in health centres. A program for the reinforcement of primary care was also implemented, and a project for rural health financed the improvement of health services' management in rural areas with low population density. Finally, a complete change of the financing mechanisms was progressively implemented.

New financing systems

The retrospective payment systems of *Fap* and *Fapem* brought disadvantages that, as mentioned earlier, included the lack of incentives for quality and cost containment, and prospective financing mechanisms were then introduced to improve the efficiency of public health care providers. Since 1994 hospitals of the NHSS have been reimbursed according to a Diagnostic Related Group system for the most frequent diagnoses, combined with a Prospective Payment for Service Rendered for less frequent procedures. In 1997 the *Fapem*

system was replaced by a per-capita scheme, based on the registered population in each health centre.

Regulation of the private sector

The problems associated with the functioning of the private insurance system (*Isapre* system) were debated at length in the Chilean congress, and the so-called *Isapre* Law (Law 19.381) was finally promulgated in 1995. This law strengthened the supervisory role of the Superintendency of *Isapres* and regulated a number of features, particularly those relating to exclusion periods and the health benefits not covered. The law specified the content of the health contracts, clearly defined the *Isapres*' obligations, and stipulated that excess contributions paid by those insured should be deposited in a personal account for them to dispose of.

Law 19.381 was modified in 1999 by Law 19.650, which eliminated the tax-deductible employers' contribution that benefited mostly middle and low-income workers. The aim was to better focus public expenditure. Finally, the Superintendency of *Isapres* and the *Isapres* agreed to include coverage for catastrophic illness in private health plans; since then most *Isapres* have begun to offer such coverage, for an extra fee.

1.2.6 The network of health care facilities

The health care facility network consists of three levels. The primary health care level includes four types of facilities: rural medical stations, rural health posts, rural health centres and urban health centres. Rural medical stations, the lowest echelon, are temporary sites for periodic visits by medical teams. Rural health posts, staffed by resident health auxiliaries, develop health promotion activities and provide medical services to catchment areas of approximately 1,000 individuals. Rural health centres, located in communities of between 2,000 and 5,000 population, offer round-the-clock nursing and medical care for general

health problems of limited complexity. Permanent professionals and auxiliary staff operate these facilities. Urban health centres provide ambulatory care for general health problems. These facilities provide health care for eight to nine hours daily, and the composition of their staff varies with the size of the locality. Overall, there are 406 urban and rural health centres, and 1,840 rural medical stations and health posts distributed across the country (see Table 1.4).

Table 1.4 *Public health system facility network*

Health care facilities	
Hospital type:	
Type 1	20
Type 2	32
Type 3	23
Type 4	107
Geriatric centres	2
Delegated hospitals	14
Attached outpatient facilities	120
Rural and urban health centres	406
Rural medical stations and health posts	1,840

Source: Chile: The Adult Health Policy Challenge. Report 12681-CH, 1994, World Bank.

Secondary and tertiary health care is provided in inpatient departments at hospitals. Public hospitals are classified under four categories, ranging from Type 4 rural hospitals, with minimal technology, to Type 1 hospitals with the maximum technology available in the country. The NHSS manages 107 Type 4 hospitals, which offer the first echelon of inpatient medical care. There are 23 Type 3 hospitals located in small towns which provide the four basic specialities (internal medicine, paediatrics, obstetric-gynaecology, and general surgery). Dispersed across the major cities there are 32 Type 2 hospitals which offer most medical and

surgical specialities and have intermediate technology. Tertiary care is offered in 20 Type 1 hospitals, which include all specialities and sub-specialities.

The private sector has 1,069 ambulatory care centres for single or medical group practice and 190 hospitals, encompassing both general and specialised inpatient facilities. There are also 30 hospitals under the administration of universities, the armed forces and state enterprises, which are not part of the public network.

1.2.7 Staff

The total number of physicians in the country is 19,760, which is about 13 physicians per 10,000 inhabitants.⁴² Of these, 10,473 (53 percent) work in Health Services Areas, 1,581 (8 percent) work in primary health centres run by municipalities, and 7,706 (39 percent) work exclusively in the private sector.

The physician/population ratio for Chile is comparable to that prevalent in Costa Rica (15) but well below the ratios found in countries like the United States (27.9), Cuba (58.8) and Uruguay (37). Moreover, both over-specialisation and the biased geographic distribution of physicians constitute a serious problem. The physician market in Chile is characterised by a low number of general practitioners (25 percent of the total) and a large and growing number of specialists (the remaining 75 percent) who are concentrated in the major urban areas.

The number of nurses is 15,200, giving a ratio of 10 per 10,000 inhabitants, which is in the range of the ratios found in other Latin American countries such as Costa Rica (11.3) and Uruguay (7), but lower than those prevalent in Cuba (17.4) and the United States (97.2.). The number of dentists is 6,384, that is, 4.2 dentists per 10,000 inhabitants. Again, this ratio is comparable to that of Costa Rica (4), but lower than the ratios in Cuba (8.8), Uruguay (12.6), and the United States (6).

⁴² This ratio was calculated using a total population figure of 15.2 million.

1.2.8 Health care expenditure

Table 1.5 presents the figures for health care expenditure for both the public and the private sector, and the corresponding share of GDP for the period 1990-1999. Health care expenditures, excluding direct household expenditures for medical care and medicines, expanded from an estimated of 3.0 percent of GDP in 1990 to an estimated of 4.4 percent in 1999. This figure is well below the 6.1 percent spent in Cuba and the median 8 percent found in OECD countries.

Table 1.5 *Health care expenditure, 1990-1999 (US\$ millions, December 1999)*

Years	Expenditure	% of GDP
1990	1,123	2.97
1991	1,327	3.25
1992	1,617	3.53
1993	1,886	3.84
1994	2,086	4.02
1995	2,264	3.95
1996	2,478	4.03
1997	2,649	4.00
1998	2,875	4.20
1999	2,971	4.39

Source: Research Department, *Fonasa*. Chile

Per capita health expenditures was estimated at about US\$156, well below OECD countries like Canada (US\$1,945) and the United States (US\$2,765), but comparable with per capita health expenditures in countries such as Uruguay (US\$158) and Costa Rica (US\$159).

Annual expenditures per publicly insured individual, including subsidies and medical care for *Fonasa*'s insured and indigents, amount to almost US\$100. In the *Isapre* system annual expenditures per insured is approximately US\$232.

1.2.9 Tendency in public and private health spending

In Table 1.6 we present both public and private health expenditure and their respective percentages of GDP for the period 1990-1999. Public expenditures, including maternity leave payments for *Fonasa* insured, constituted 3.0 percent of GDP in 1999. By comparison, *Isapre* expenditure represented approximately 1.42 percent of GDP in 1999, rising steadily since 1990.

Table 1.6 *Public and private health expenditure (US\$ millions, December 1999)*

Years	Public expenditure	% of GDP	Private expenditure	% of GDP
1990	755	2.0	368	0.97
1991	882	2.2	445	1.09
1992	1,079	2.4	538	1.17
1993	1,268	2.6	618	1.26
1994	1,395	2.7	691	1.20
1995	1,505	2.6	758	1.32
1996	1,640	2.7	838	1.36
1997	1,715	2.6	933	1.41
1998	1,889	2.8	976	1.42
1999	2,008	3.0	963	1.42

Source: The *Isapres* Industry Grouping A.G (Chile).

Although early in the 1990s the government introduced a tax reform to raise resources to improve the financial status of the public health system, the share of public health expenditure in GDP has not changed substantially in the period under review, remaining stable at around 2 to 3 percent of GDP.

Given the diversity of social programmes and transfers covered by public health expenditures, only 60 percent of total public health expenditure is committed to financing the direct provision of medical services in public facilities. In expenditures for direct medical attention, the largest share (85 percent) is estimated to be channelled into hospital-based services.

1.2.10 Pharmaceutical spending: out of pocket payments

Chile has no system of national health accounts, which could quantify the out of pocket payments of both public and privately insurance affiliates. The Central Bank's national accounts provide aggregate figures on health spending, but these figures cannot be broken down to estimate spending on the component items.

The Ministry of Health and *Fonasa* have done some exploratory research which offers gross estimates on private out of pocket spending on medicine. Table 1.7 (based on Urriola, 2004) shows that out of pocket expenses have fluctuated only moderately over the period 2000-2003, averaging US\$517 million. The main reason is that both the public insurer (*Fonasa*) and the private companies (*Isapres*) offer little or no coverage for pharmaceutical costs.

Table 1.7 *Out of pocket expenses on pharmaceuticals, 2000-2003 (US\$ millions)*

	2000	2001	2002	2003
Total expenditure	555	496	492	525

Source: By the author on the basis of Urriola (2004).

The Reform Commission 2003 headed by the Ministry of Health used data from the 1997 Household Budget Survey (*Encuesta de Presupuestos Familiares*) to estimate pharmaceutical spending by household and by income quintile. The figures appear in Table 1.8. Homes in the poorest quintiles clearly spend significantly less than those in the richest quintiles. But members of the poorest families tend to have poorer health than those of richer families, so that paradoxically those with the greater need for medicines have less access to them.

Tabla 1.8 *Out of pocket expenses on pharmaceuticals by household and income quantile, 1997.*

Quantile	Monthly expenditure per household (US\$)	Annual expenditure per household (US\$)
I	6	72
II	8	96
III	12	144
IV	13	156
V	41	492
Total	81	972

Source: Unpublished document from the 2003 Reform Commission, based on the 1997 Household Budget Survey, drawn up by the National Institute for Statistics.

1.3 The health systems in Colombia and Holland

This section offers a description of the current health systems of Colombia and Holland. Both countries, like Chile, have carried out far-reaching reforms in healthcare in the past 25 years, creating systems characterised by decentralised management of human, financial and infrastructure resources, by a clear division in the roles of buying and providing services, and by a mixed (public/private) system of funding.

1.3.1 *The Colombian health system: outline*

In the 1980s Colombia began a radical reform aimed at an effective decentralisation of state resources.⁴³ The next step was the devolution of public

⁴³ Decentralisation, according to Rondinelli (1981), may imply de-concentration, where functions and/or resources are transferred to regional or local offices of the same central authority (the Ministry of Health, which maintains its authority); delegation, where authority, functions and /or resources are transferred to an autonomous private, semi-public or public institution, which takes responsibility for a series of activities or programmes defined centrally; or devolution, where functions and sectoral or local resources are handed over to an autonomous local government agency, which takes responsibility for the management and delivery of health services and their funding. Decentralisation in Colombia and Chile represents a mix between de-concentration and devolution.

service functions, including the provision of health care, to local and regional government, and the reform of health system funding through the incorporation of private health insurance. These changes, closely related to those made in Chile at the beginning of the 1980s, modelled Colombia's current system and served as a paradigm for reform processes in other Latin American countries.

Fiscal decentralisation

As a result of government efforts, in the 1990s Colombia became one of the most highly decentralised countries in terms of allocation of public resources. At the beginning of the 1980s local government spending represented only 17 percent of all public spending. This trend was dramatically reversed through a series of reforms carried out between 1983 and 1993, and by 1997 more than 42.5 percent of all national income (11.6 percent of GNP) was spent via regional and local government [Jaramillo (1997), Vargas y Sarmiento (1997)].

Decentralising the allocation of public resources involved complex combinations of fiscal instruments including: increased tax authority for local governments; automatic transfers of national revenues to the municipalities (value-added tax and "municipal participation"); automatic transfers to the departments (the so-called *Situado Fiscal*); co-financing of capital investments; and natural resource royalties.

The Betancur administration (1982-1986) led the first wave of fiscal decentralisation with the promulgation in 1983 of Law 14, which restructured the distribution of the tax authority between the central, regional (departmental) and municipal levels of government. Under the new regime the regional governments were given control of revenues from beer, alcohol and tobacco taxes and the lotteries. Municipal governments were given control of property taxation, a special tax on the gross income of industry and commerce, and motor vehicle fees, and gained authority to set tariff rates and exemptions within centrally defined parameters. Between 1980 and 1987 municipal income associated with these taxes rose by 65 percent in real terms.

Under the 1968 Constitution, the financing of health and education expenditure had already been de-concentrated through the establishment of the above-mentioned *Situado Fiscal*. The funds in this system of transfers were allocated through the regional educational funds (*Fondos Educativos Regionales*) and the sectoral health funds (*Fondos Seccionales de Salud*), and became the basis for the de-concentrated administration of health and education services.

Municipal resources grew strongly from 1986 onwards with the promulgation of Law 12, which raised the floor from 30 to 50 percent of the revenues from VAT to be transferred to the municipalities. This was particularly relevant for the smallest municipalities, for whom these transfers represented 70 percent of their total resources. The VAT-based transfer system was replaced in 1994 with the Social Investment Transfer (or municipal participation system), established by Law 60 of 1993. This new system allocated to municipal governments a fixed percentage of national income, starting at 15 percent in 1994 and increasing to a minimum of 22 percent by 2002. These transfers are exclusively for use in social investment.

In 1992-1993 a system of co-financing or matching grants was set up through the enactment of Decree Laws 2132 and 206. These grants are for capital investment only, and may amount to no more than 10 percent of the total income of the receiving government (municipal or regional). Grants are organised on the basis of four distinct funds: transportation infrastructure, urban infrastructure, social investment, and rural investment infrastructure. This system was further consolidated in 1992, when the four funds were integrated into the national co-financing system (*Sistema Nacional de Cofinanciación*)

To these resources must be added the funds from royalties on resources such as oil, coal and other minerals. These have traditionally provided a significant source of funding for Colombia's local and regional governments. The distribution of these revenues is currently regulated through Law 141 of 1994, which requires that 68 percent of royalties be retained by the producing or transporting departments or municipalities, with the remaining 32 percent redistributed among local governments through a national royalty fund.

Devolution of health sector functions and resources

In 1987, following the democratic election of the municipal authorities begun in 1986 and the expansion of municipal resources as a result of higher transfers from central government, the Colombian government began devolving responsibility for delivering public services to the regional and municipal governments. These services included education, health, water, sanitation and secondary roads. This was a dramatic change from the situation up to the early 1980s, when local governments had few responsibilities beyond street cleaning and management of slaughterhouses and markets.

In the health sector, devolution implied the transfer of most of the staff and health care facilities to the 32 regional governments and 1,050 municipalities. Under the new scheme the distribution of responsibility, later confirmed by Law 60 (known as the *Ley de Competencias y Recursos*), was as follows: the central government was in charge of public health programmes and national campaigns, and sanitation; the regional governments took responsibility for providing secondary and tertiary health services with specialist regional and teaching hospitals, and the management of health programmes and campaigns in coordination with or on behalf of the central government; the municipal governments took charge of providing primary health care, with medical centres, clinics and local hospitals, and of developing prevention and educational activities and environmental health.

Devolution of health care provision to regional and local governments responded to a broad consensus generated in Colombia in the 1980s on the need for reforms in the health system. This movement, known as the *Apertura de Salud*, proposed a number of management objectives, including increased access to health services, more efficient and better quality services, more citizen participation, and redefined systems that took into account factors such as risk management, beneficiary behaviour, and the environment, as opposed to the simple concept of a healthcare network.

These objectives were to be accomplished through the local provision of health services by local health administrations, in accord with the municipal health system model promoted by the Pan American Health Organisation. Primary, secondary and tertiary care provision would be separated by governmental level, with local governments providing expanded primary care services and receiving dedicated resources for this purpose.

In 1990 Law 10 (Municipalisation of Health) set up a fiscal regime to fund the provision of health services at regional and municipal level. The law provided national resources to develop decentralized health programmes through *Ecosalud*, a national monopoly of new lotteries and gambling activities. The law also determined the setting up of separate accounts for resources at regional and municipal levels, permitting more effective earmarking and control of health funds. The National Hospital Fund was also created to promote investment in health care infrastructure and provide health sector-related supervision and technical assistance to departmental and local governments.

Law 10 also provided the grounds for decentralising the hospitals. In 1975 the establishment of the National Health System had brought with it the nationalisation of municipal and regional health facilities, which constituted the majority of Colombian hospitals at that time. Laws 10 and 60 mandated the separation of hospitals from direct administrative dependency, and granted them legal status and financial and managerial autonomy. To prepare these facilities for competition with the private sector under the reformed social insurance scheme (described later), Law 100 of 1993 permitted the conversion of hospitals to semi-public entities referred to as *Empresas Sociales del Estado* (ESE). Under this legislation, Level II and III hospitals were to be governed by autonomous boards, including one-third membership from community representatives, one-third from the scientific/medical sector, and one-third from the political administrative sector. Hospital directors were to be designated by the governor under whose jurisdiction the hospital fell, and were to serve renewable three-year terms.

Health finance reform

Alongside the complex implementation of decentralisation policies and the devolution of functions and resources to local and regional governments, there was also the national health insurance plan, introduced with Law 100.⁴⁴

Law 100 introduced a national health insurance system, based on a managed competition model, through the promotion of autonomous insurance and managed care organisations. This model sought to finance the health sector through demand subsidies, where resources were put at the disposal of the consumer, giving them more freedom of choice and promoting quality and efficiency through more competition.

Law 100 set up three regimes (two permanent and one temporary) for three groups of users: the contributory regime for all employees earning twice the minimum wage; the subsidised regime for the poorest groups; and the temporary regime for low-income citizens not covered by either of the other two (the so-called *vinculados*). Employees under the contributory regime must put in 12 percent of their wage earnings, of which 4 percent is paid by the employee and 8 percent by the employer, and which is capped at 20 times 12 percent of the minimum wage. The payroll deduction is divided, with 11 percent being used to finance coverage for contributing employees. Contributors select freely among an array of private, public or mixed managed care organisations known as *Entidades Promotoras de Salud* (EPS), which may be run for profit or as non-profit. The EPS retain a risk-adjusted capitation premium for each beneficiary. This premium, called *Unidad de Pago por Capacitación* (UPC), is set by the government and is about US\$140 per person per year. Any surpluses derived from individuals whose 12 percent payroll contributions are greater than the premium are transferred to the *Fondo de Solidaridad y Garantía* (FOSYGA), which receives the “excess”

⁴⁴ Law 100 created the General System of Social Security, which included the General System of Pensions, a system of Coverage for Professional Risks, Complementary Social Services and a System of Health Social Security.

contributions and reapportions them to *EPS* whose contributions fall short of the *UCP*.

The *EPSs* must finance a package of basic health services known as the compulsory health plan (*Plan Obligatorio de Salud, POS*), which can be contracted with the network of health service providers (*Instituciones Proveedoras de Servicios de Salud, ISPs*). Contributors may also pay an additional fee to obtain a complementary health plan with additional benefits.

The remaining one percent from the payroll contributions is reserved as a cross-subsidy, which along with national treasury contributions is used to finance the subsidised regime that covers the poorest portion of the population. Beneficiaries of this regime are identified through the *Sistema de Identificación de Beneficiarios de Programas Sociales (SISBEN)*, which uses surveys and indicators to rank individuals, but which has decentralised implementation to municipalities.

Initially two types of insurers were available for the subsidised regime: a network of autonomous public managed care organizations referred to as *Empresas Solidarias de Salud (ESS)*, and the *Cajas de Compensación Familiar*. The *ESS*, created to serve as insurance entities, were mandated to enrol non-contributor beneficiaries for whom they provide a more limited package of services known as the *Plan Obligatorio de Salud Subsidiado (POSS)*. Later, *EPSs* who so chose could also offer *POSS* to the subsidised population.

All insurance coverage was to provide for the basic health care plan (*Plan de Atención Básica, PAB*), which covered vaccinations and other basic primary care services. The *PAB* was to be provided by the municipalities. Both *EPS/ESS* freely contracted with public and private providers to obtain the required service package. All the insurance entities that offered any type of service to the subsidised regime were collectively known as *Administradoras del Régimen Subsidiado (ARSs)*.

In 1998 the new system had 28 *EPSs*, covering approximately 14.4 million people in the contributory regime. Another 250 *ARSs* covered about 8.5 million people under the subsidised regime. The *ARSs* included some *EPSs*, (private

insurers) as well as the public *ESSs*. The two regimes covered approximately 60 percent of the total population and 66.5 and 53 percent, respectively, of their objective populations. Private insurance companies and Health Maintenance Organisations (HMOs) covered about 1.5 million (4 percent of the population) in 1996.

Expansion of the *EPS/ESS* has run into difficulties over the issue of the *vinculados*. This group consists of the lower-middle income segment of the population on the border between the contributory and subsidised regimes. The *vinculados* are not obliged to contribute to the system but have full access to the health services provided by the public sector with a 30 percent co-payment (the remainder being contributed by supply subsidies). There is no register of the *vinculados*, so any individual claiming to fall into this category is accepted as such.

However the main obstacle to establishing a new funding system for social security in health through Law 100 has been the separate implementation of the scheme of territorial intergovernmental transfers established under Laws 10 and 60. It is thus not surprising that harmonizing the two mechanisms has become a highly complex issue. The social insurance scheme is based on demand subsidies and engages a plethora of private and semi-private institutions in managed competition, whereas the territorial regime was designed for the direct budget transfer of supply subsidies to public sector providers. Central government's aim is to secure that ultimately regional and municipal governments administer the social insurance regime in a decentralised manner. Regions and municipalities are to be responsible for administering the *SISBEN*, registering the beneficiary population, and encouraging enrolment in the *EPS/ESS* operating in their territory.

1.3.2 The Dutch health system: outline ⁴⁵

The Dutch health system has three distinctive features: the mix of public and private funding; the predominantly private provision of care; and the typical Dutch neo-corporatist policy arena.

Voluntary private health insurance is very important in the mixed funding of the health services. For acute medical care by general physicians and hospitals, about two third of the Dutch population (16 million in 2001) is covered under the mandatory sickness fund insurance. One third of the population may opt take out private insurance. Government contributes less than 10 percent out of general taxation, and direct patient payments (deductibles, co-payments, coinsurance and services not covered by social or private insurance) amount to another seven percent. Public funding (social insurance, mandatory private insurance and tax subsidies) contributes over 85 percent of health care funding.

In health care provision, Holland has a long tradition of private provision of collective goods through voluntary NGOs. The tradition dates back to mediaeval times when the guilds offered financial protection to their members in the case of sickness of death, and when local communities, churches and monasteries established hospitals for the poor, the old and the mentally deficient. This tradition of non-state care is still visible today. Most of the Dutch hospitals and other health care institutions belong to and are run by religious orders, charities or non-profit organisations.

The State's modest role in providing health care continued up until the Second World War. After the war governments began to intervene in the health sector through mandatory sickness fund membership, by regulating access to private health insurance for high-risk groups, and regulating the allocation of resources and planning of facilities. Logically, this intervention led to a growing interest in controlling the level of spending on health care. But the ownership and management of health facilities remained largely non-governmental.

⁴⁵ The description presented here relies mainly on Okma (2001).

The social policy arena in The Netherlands has its own tradition of neo-corporatism. After the Second World War, the health system was expanded through the creation of a wide range of advisory bodies formally representing almost all interest groups, and where care providers were given a dominant position. In the 1970s and 1980s other interest groups gained access to these structures. But from the late 1980s onwards, successive governments cut back on the size and influence of these neo-corporativist structures while explicitly including major interest groups in the newly organised consultations on multi-year healthcare budget allocations.

We shall now briefly describe Holland's provision of health services, the financing of health care and resource allocations, the contract models and payment structure, and the current health insurance schemes.

Health care services

Health care in The Netherlands is provided by thousands of institutions, tens of thousands of contracted or self-employed health professionals, and hundreds of thousands of health care workers. Most health care facilities are owned and managed by non-profit, non-governmental entities of religious and charitable origin. As a rule, they have self-appointed boards responsible for overall policies and budget approval, but the management is in charge of ongoing daily business. Most general practitioners (GPs) work in small group practices and health centres with other health workers. Up to the end of the 1980s most specialist doctors worked in small practices as private contractors, basing their activities on contracts with hospitals for the utilisation of beds, facilities and auxiliary services.

In the 1990s changing market conditions, government policies and more modern management practices led primary health care providers to seek collaboration and horizontal and vertical integration with secondary and tertiary providers.

Institutions and organisations for ambulatory care agreed to cooperate in providing efficient, consumer-oriented services. Hospitals, nursing homes and home care organisations created formal and informal alliances and regional networks. This blurred the traditional borderlines between the different sub-sectors or echelons in health care and related health services. As a result, traditional definitions of health care services no longer easily apply. For example, primary care traditionally included the services of general practitioners, dentists, physiotherapists and other therapists, ambulatory mental care, home nursing, home care and related medical and social services. But as health professionals and organizations integrate their services and change their organisational and contractual relations, it has become difficult to distinguish among primary, secondary and tertiary health care.

Dutch patients have an ample choice of provider. Those insured under the sickness fund are limited to health care providers contracted by their fund, but as most funds have contracted almost all providers in their working area, this rule does not really restrict consumer choice. Private patients are usually free to choose their provider. Most patients are registered with their general practitioner (GP), who plays the role of gatekeeper in prescribing drugs and referring patients to hospital and specialist care.

In the last two decades, Dutch governments have sought to reduce the rate of institutionalisation by shifting inpatient care to ambulatory care. Combined with the effects of technological innovation and patient preference, this has led to a sharp reduction in the number of hospital beds, and substantial shifts from inpatient care to day care and outpatient treatments. Increased collaboration between services, and the process of horizontal and vertical integration have enabled such shifts. While many health facilities collaborated in regional networks, chains of health facilities and other informal arrangements, most kept their independent legal status until the mid-1990s. But there has since been an increasing number of formal mergers and take-overs.

On the other hand, the recommendations of the 1994 Biesheuvel Report (mandated to evaluate the need for better integration between ambulatory and

hospital care), led the Ministry of Health to experiment with new payment mechanisms for specialist care in order to integrate these payments into hospital budgets and strengthen the role of doctors within the hospital management.

There have been similar developments in long-term care. The last decade has seen increased informal and formal co-operation between nursing homes, retirement homes and other facilities, including collective efforts to reduce overhead costs by pooling administration and managerial functions. In some cases this has led to full mergers. These trends of horizontal and vertical integration have been particularly strong in mental health care, where the ambulatory and institutionalised services have merged to form large-scale regional entities providing a wide range of services to the regional population.

Funding of health care and allocation of resources

Figures for 2001 show that social and private health insurance are the main source of funding for Dutch health care services, covering more than 85 percent of such services. A government subsidy from general taxation contributes a modest five percent, and direct patient payments account for about six percent of all health expenditures.

The government's main tool for allocating resources to the health system's sub-sectors and institutions is through the use of fixed budgets at different levels. The first stage is to set the ceiling on total annual spending on health, within the widest context of macro-economic and fiscal policies. Once there is consensus on the budget ceiling, the Ministry of Health allocates resource to the different sub-sectors (including hospital care, ambulatory care, pharmaceuticals and medical aids, mental health care, public health and prevention). It then sets the budgets for long-term care institutions and organisations, subsidy systems and other cost categories. But within this cascading budgeting model, health insurers and health care providers negotiate on volume, price and quality of services.

Contracting models and payments structure

However, while the Ministry of Health sets the annual budget for each hospital and other health care facilities, these institutions are paid by the sickness funds and the private health insurers. Each year the organisations representing the private insurance companies and the providers meet to design the contract structure that will serve as a base for negotiations between each health insurance agency and each health care provider.

For decades health service contracting has been based on the division between purchaser and provider. Independent public and private health insurers act as third party payers, contracting more than 80 percent of all health care. Until 1992 health service tariffs were uniform throughout Holland, but changes in the Tariff Act opened the way for health insurers and providers to set tariffs below the maximum legal levels. Actual payments are based on the budgets, and on tariffs for certain categories of service. General practitioners and dentists receive capitation payments for their sickness fund patients, but usually take fee-for-service payments from their private insured clients. The health care services under supplementary insurance offered by sickness fund or private insurers mostly receive payments based on fee for service.

Health insurance schemes

By combining mandatory employment-related health insurance with population-wide social health insurance for long-term care, the Dutch system has created a hybrid of the Bismarkian and Beveridge models. In the 1998 government manifesto, three funding segments or compartments can be distinguished in health care: the first is chronic care, funded mainly by long term care insurance (AWBZ); the second consists of acute care under social and private health insurance schemes; and the third contains all remaining care, for which citizens may opt to take out private insurance.

Long term care insurance

The sickness funds and private health insurers administer long-term care insurance (AWBZ) on behalf of their members. The AWBZ is a population-wide social health insurance, mandatory for all residents. Everybody in The Netherlands has access to AWBZ-financed services. Reflecting the importance of the solidarity principle in Dutch social insurance, every insured person must pay an income-related contribution (individuals without incomes pay no contribution), at a rate set by the government.

The AWBZ started as social insurance for the costs of long term care in institutions, but has expanded over the years and currently includes home care, shelter and day care for physically and mentally handicapped people, inpatient and outpatient rehabilitation, extended mother and child care, vaccinations and prenatal testing.

Social and private health insurance

Sickness fund insurance

Sickness funds are independent legal entities, with self-appointed boards, which receive their budgets from the Health Insurance Board. The budgets are based on factors that include age, gender, region and disability status. Apart from contracting health care services for their members, the funds also administer the long term insurance (AWBZ) on behalf of their affiliates.

Since 1941 membership has been mandatory for employees with incomes below a certain limit, as well as for some categories of recipients of welfare and unemployment benefits. In 1994 membership expanded to allow a larger group of elderly with low incomes to join the sickness fund insurance (known as ZFW, from the Sickness Fund Act of 1964). This was made possible by raising the income limit for eligibility. At the end of the 1990s the access to ZFW was expanded again to allow the self-employed to join.

Apart from income-related contributions, which are levied by the employers and channelled through the general taxation system, the sickness fund affiliates pay a flat rate directly to their fund (each fund can set its own premiums). The privately insured can also access a sick fund by paying a flat rate risk-adjusted premium.

Currently, about 64 percent of the Dutch population belongs to a sickness fund. The fund covers acute medical care from general practitioners and medical specialists, related hospital care, dental care for those under 18, medical aids and appliances, obstetrics and maternity care, and some other services.

Private health insurance

Dutch residents not eligible for sickness fund insurance may opt to take out private health insurance with one of 50 or so private health insurance companies. Private insurers offer a wide range of insurance policies with varying coverage, financial conditions and eligibility criteria. They usually charge higher premiums for elderly insured and can exclude pre-existing conditions from coverage.

References

- Acton, J.P. (1975). "Nonmonetary factors in the demand for medical services: some empirical evidence". *Journal of Political Economy* 83: 595-614.
- Arrow, K.J. (1968). "The economics of moral hazard: further comment". *American Economic Review* 58 (3): 537-538.
- Arrow, K.J. (1963). "Uncertainty and the welfare of medical care". *American Economic Review* 53: 941-973.

- Bocognano, A., A. Couffinhal, S. Dumesnil, and M. Grignon (2000). *Which coverage for whom? Equity of access to health insurance in France*. Paris, CREDES.
- Buchanan, J.M. (1964). "The inconsistencies of the National Health Service". *Occasional paper 7*. Institute of Economics Affairs. London.
- Cardon, J., and I. Hendel (2001). "Asymmetric information in health insurance: evidence from the National Medical Expenditure Survey." *RAND Journal of Economics* 32: 408-427.
- Castañeda, T. (1985). "Determinantes del Descenso de la Mortalidad Infantil en Chile: 1975-1983". *Cuadernos de Economía* 66: 195-214. Pontificia Universidad Católica de Chile.
- Caviedes, R. (1995). "Las Isapre en el Sistema de Salud Chileno", in J.Giaconi y Caviedes (eds.), *Las Isapres: Hacia la Modernidad en Salud; Realidades, Perspectivas y Desafíos del Sistema*. Asociación de Isapres A.G. and Cieddes, Chile.
- Cutler, D. (1996). "Public policy for health care". *NBER Working Paper 5591*.
- Chiappori, P., and B. Salanie (2000). "Testing for asymmetric information in insurance markets". *Journal of Political Economy* 108 (1): 56-79.
- Ching-To, A., and M. Riordan (2002). "Health insurance, moral hazard, and managed care". *Journal of Economics and Management Strategy* 11 (1): 81-107.
- Ettner, S. (1997). "Adverse selection and the purchase of Medigap insurance by the elderly". *Journal of Health Economics* 16: 543-562.

- Faulkner, E. (1960). *Health Insurance*. New York.
- Fisher, R. (1995). "Perspectivas Futuras del Sistema Isapre", in J.Giaconi y R.Caviedes (eds.), *Las Isapres: Hacia la Modernidad en Salud; Realidades, Perspectivas y Desafíos del Sistema*. Asociación de Isapres A.G. and Cieddes, Chile.
- Gardiol, L., P-Y. Geoffard, and Ch. Grandchamp (2003). "Selection and incentive effects in health insurance". Mimeo. Institute for Health Economics and Management. University of Lausanne.
- Gnecco G. (1999). "Making a commitment to quality: development of the quality assurance programme in Chile, 1991-1999". *International Journal for Quality in Health Care* 5: 443-445.
- Jaramillo, I. (1997). La descentralización en Colombia. Project report, "Descentralización y transformación de sistemas de salud". Ministerio de Salud/OMS/Harvard/FESCOL.
- Jiménez, J., and T. Bossert (1995). "Chile's Health Sector Reform: Lessons from Four Reform Periods". *Health Policy* 32: 155-166.
- Jiménez, J., y M.Gili (1991). "Municipalización de la Atención Primaria en Salud", in J.Jiménez (ed.), *Sistemas de Salud en Transición a la Democracia*.
- Legros, S., R. Massoud, and O. Urroz (2002). "The Chilean legacy in health care quality". *International Journal for Quality in Health Care* 14 (1) [supplement]: 83-88.

- Legros, S., R. Massoud, O. Urroz, and E. Kelly (2000). "Evaluation of the Chile National QA Program. Evaluation report 1 (3). Bethesda, MD: published for USAID by the Quality Assurance (QA) Project.
- Manning, W.G., and M.S. Marquis (1996). "Health insurance: the tradeoff between risk pooling and moral hazard". *Journal of Health Economics* 15: 609–640.
- Marquis, M.S. (1992). "Adverse selection with a multiple choice among health insurance plans: a simulation analysis." *Journal of Health Economics* 11: 129-151.
- Ministry of Health, Chile. *Health Care in Chile. Performance Report 2000*.
- Ministry of Health, Chile. *Health Care in Chile. Performance Report 1999*.
- Mossialos, E., and S. Thomson (2002a). *Voluntary Health Insurance in the European Union*. Report prepared for the Directorate General for Employment and Social Affairs of the European Commission.
- Mossialos, E., and S. Thomson (2002b). "Voluntary health insurance in the European union: a critical assessment." *International Journal of Health Services* 32 (1): 19-88.
- Neudeck, W., and K. Podczeck (1996). "Adverse selection and regulation in health insurance markets". *Journal of Health Economics* 15 (4): 387-408.
- Nyman, J. (2004). "Is 'moral hazard' inefficient? The policy implications of a new theory". *Health Affairs* 23: 194-199.

- OECD. *Proposal for a Taxonomy of Health Insurance*. Study on Private Health Insurance. OECD Health Project (2004).
- Okma, K. (2001). *Health Care, Health Policies and Health Care Reforms in The Netherlands*. International Publication Series Health, Welfare and Sport N° 7.
- Oyarzo, C. (1994). "La Mezcla Público-Privada: Una Reforma Pendiente en el Sector Salud". *Estudios Públicos* 55: 143-170. Centro de Estudios Públicos, Chile.
- Pauly, M. (1983). "More on moral hazard". *Journal of Health Economics* 2 (1): 81-85.
- Pauly, M. (1974). "Overinsurance and public provision of health insurance: the roles of moral hazard and adverse selection". *Quarterly Journal of Economics* 88: 44-62.
- Pauly, M. (1968). "The economics of moral hazard: comment". *American Economic Review* 58: 531-537.
- Phelps, C.E. (2003). *Health Economics*, 3 rd ed. Addison Wesley.
- Rodríguez, J., and J. Jiménez (1985). *Comparative Analyses of Productivity in Public and Private Chilean Hospitals*. Mimeo. Santiago de Chile: Ilades.
- Rondinelli, D.A. (1981). "Government decentralization in comparative perspective: developing countries". *International Review of Administrative Science* 47 (2).

- Spence, M. (1978). "Tacit co-ordination and imperfect information". *Canadian Journal of Economics* 11 (3): 490-505.
- Strassl, W. (1988). *Externe Effekte auf Versicherungsmärkten*. Mohr, Tübingen.
- Urriola, R. (2004). "Cuentas de salud de Chile" (Estimaciones preliminares). *Documento de Trabajo*. Fondo Nacional de Salud. Chile.
- Vargas, J., y A. Sarmiento (1997). "Descentralización de los servicios de educación y salud en Colombia". Unpublished manuscript.
- Wagstaff, A., E. van Doorslaer, H. van der Burg, S. Calonge, T. Christiansen, G. Citoni, Ulf-G. Gerdtham, M. Gerfin, L. Gross, and U. Hakinnen, (1999). "Equity in the finance of health care: some further international comparisons". *Journal of Health Economics* 18 (3): 263-290.
- WHO Regional Office for Europe's Health Evidence Network. *What are the equity, efficiency, cost containment and choice implications of private health care funding in Western Europe?* (July 2004).
- Wilson, C. (1977). "A model of insurance markets with incomplete information". *Journal of Economic Theory* 12: 167-207.
- World Bank. *Chile: The Adult Health Policy Challenge*. A World Bank Country Study, 1995.
- Zeckhauser, R. (1970). "Medical insurance: a case study of the tradeoff between risk spreading and appropriate incentives. *Journal of Economic Theory* 2: 10-26.

CHAPTER 2

Chapter 2

The Determinants in the Choice of Preferred Providers among the Publicly Insured in Chile: An Empirical Analysis

Abstract

This chapter analyses the determinants in the choice of provider among the publicly insured in Chile. The focus is on the Preferred Provider System (PPS) where the individuals can opt for a more consumer-oriented environment subject to a higher level of co-payments. Using a model of expected utility gain we develop a logit analysis based on a large multipurpose survey, the National Socio-economic Characterisation Survey, known as *Casen* (*Encuesta de Caracterización Socioeconómica Nacional*). We make use of several socio-economic, demographic and access variables in the econometric estimation. As a whole, the results adjust to the hypotheses formulated. The most relevant determinants in the decision process include individual's income, the relative value of co-payments, waiting time and zone of residence. The positive effect of income would indicate some degree of segmentation within the public system, while the impact of the relative value of co-payments shows that user charges can act as an important deterrent for some individuals. The unexpected negative effect of waiting time, included in the estimation as a provider attribute, would suggest a level of captivity in the sense that some individuals have no real choice but purely public provision. The result for zone of residence indicates that rural residents are less likely to choose preferred providers than urban residents. This is explained by the spatial distribution of preferred providers, who tend to cluster in urban areas.

Key words: preferred providers, public health insurance contribution, co-payments.

JEL Classification: I11, I18.

2.1 Introduction

In this chapter we analyse the determinants in the choice of health care provider among the publicly insured in Chile. The focus is on the Preferred Provider System (PPS), fully described in the next section. A logit model is used to examine a dichotomous choice: preferred providers versus public provision.

The choice of provider not only has implications in terms of waiting time and access to a more consumer-oriented environment,¹ but also for the performance of the public system.² By choosing preferred providers the publicly insured free up resources for those who rely exclusively on public sector provision, and partly alleviate the pressure on public health facilities - pressure that has increased over time due to demographic changes and changes in individuals' perception of the importance of their health status. But the higher cost of the preferred providers route limits the number of publicly insured individuals who can take this option. And although since 1981 individuals can opt out of public sector provision entirely through private health insurance plans, the public health system still has to cope with the medical needs of more than two-third of Chileans. In this context, our work has an important motivation: to explore the factors that influence the individual's choice of health care providers in order to provide empirical evidence for the debate on future changes in the regime for providing health services to the publicly insured.

The empirical analysis is based on the data contained in *Casen* 1992, the fourth in the series of National Socio-economic Characterisation Surveys (*Encuesta de Caracterización Socioeconómica Nacional*). This multipurpose survey, conducted by the state since 1985, is structured in 5 modules to collect information on aspects of housing, education, health, employment and income in Chile's 13 regions.

¹ A consumer-oriented environment in the context of medical care can be associated with certain attributes mainly linked to private provision such as "hotel" services, choice of doctor and a greater level of information about the medical condition and its treatment.

² Even though the choice of preferred providers could also have an impact on the public funding for public provision, we focus the analysis exclusively on the provision side.

The health module provides information on the utilisation of medical services, including both outpatient and inpatient medical care.³ Our analysis is based on outpatient events and particularly on general medical consultations. Data limitations precluded us from extending the analysis to examine inpatient events, as *Casen* 1992 does not provide the necessary details on hospitalisation and surgery (the principal inpatient services recorded). Individuals were asked if they had been hospitalised in the last three months, but the cause of the hospitalisation or whether they were in a shared or single ward was not reported. Similarly, individuals were asked if they had had a surgery in the last three months, but the specific type of surgery was not registered. The information on these events was thus too general to be used in our analysis.⁴

The organisation of the chapter is as follows. Section 2.2 presents a detailed description of the preferred provider system. In section 2.3 we discuss the expected utility gain that a public insured individual could obtain from choosing preferred providers. In section 2.4 we describe the binary choice model on which the econometric estimation is based. Section 2.5 describes the data and defines the variables included in the estimation. In section 2.6 we present and discuss the results. Here, we also present a sensitivity analysis that gives additional information on the magnitude of the impact of a change in each of the explanatory variables on the individual's choice. Section 2.7 concludes.

³ *Casen* 1992 collected information for preventive care, general consultations, consultations with specialists, casualty consultations, dental care, laboratory exams, surgery, hospitalisation, and maternity services.

⁴ An important factor in the analysis was the monetary cost of medical attention. Given the lack of information relative to the specific type of medical events (hospitalisations and surgery), it was not possible to determine their monetary cost.

2.2 The preferred provider system

A Preferred Provider System (PPS) was introduced in Chile in 1968 to allow white-collar workers (public and private employees, active or retired) and their dependants to choose doctors and hospitals, paying part of the cost.⁵ This system came to complement the benefits provided by the National Health Service created long before in 1952. However, it was not until 1985 that the PPS was fully consolidated through its extension to all workers, independent of their category or working status.⁶ Since then all individuals contributing to the public insurer, the National Health Fund, known as *Fonasa* (*Fondo Nacional de Salud*), can obtain medical care through the public facility network (public hospitals and public health centres) under what is called the Institutional Health Care Scheme (IHCS; simply purely public provision), or they can use providers who have an agreement with *Fonasa* (preferred providers). Any doctor or private health facility, including private hospitals, private clinics and private surgeries, can sign a contract with *Fonasa* to work as preferred providers, subject to certain regulations.⁷

The only legal requirement to access the benefits provided by *Fonasa* is the percentage of taxable income that must be spent, as a minimum, on health insurance (hereafter, the contribution). Since 1986 this percentage has stood at 7 percent. Currently nearly 10 million, almost 63 percent of the population, are insured under *Fonasa*. All those contributing can choose between the two options at any time. Insured who do not pay contributions only have access to the IHCS. In principle, the health care entitlement is the same for all the publicly insured, with the exception of the value of any additional co-payment.⁸

⁵ The system operated relatively simply: white-collar workers were entitled to buy a voucher (whose value incorporated a government contribution) with which they could freely choose both the doctor and the health facility where they would be attended. There have been minor changes, but in essence the system remains the same.

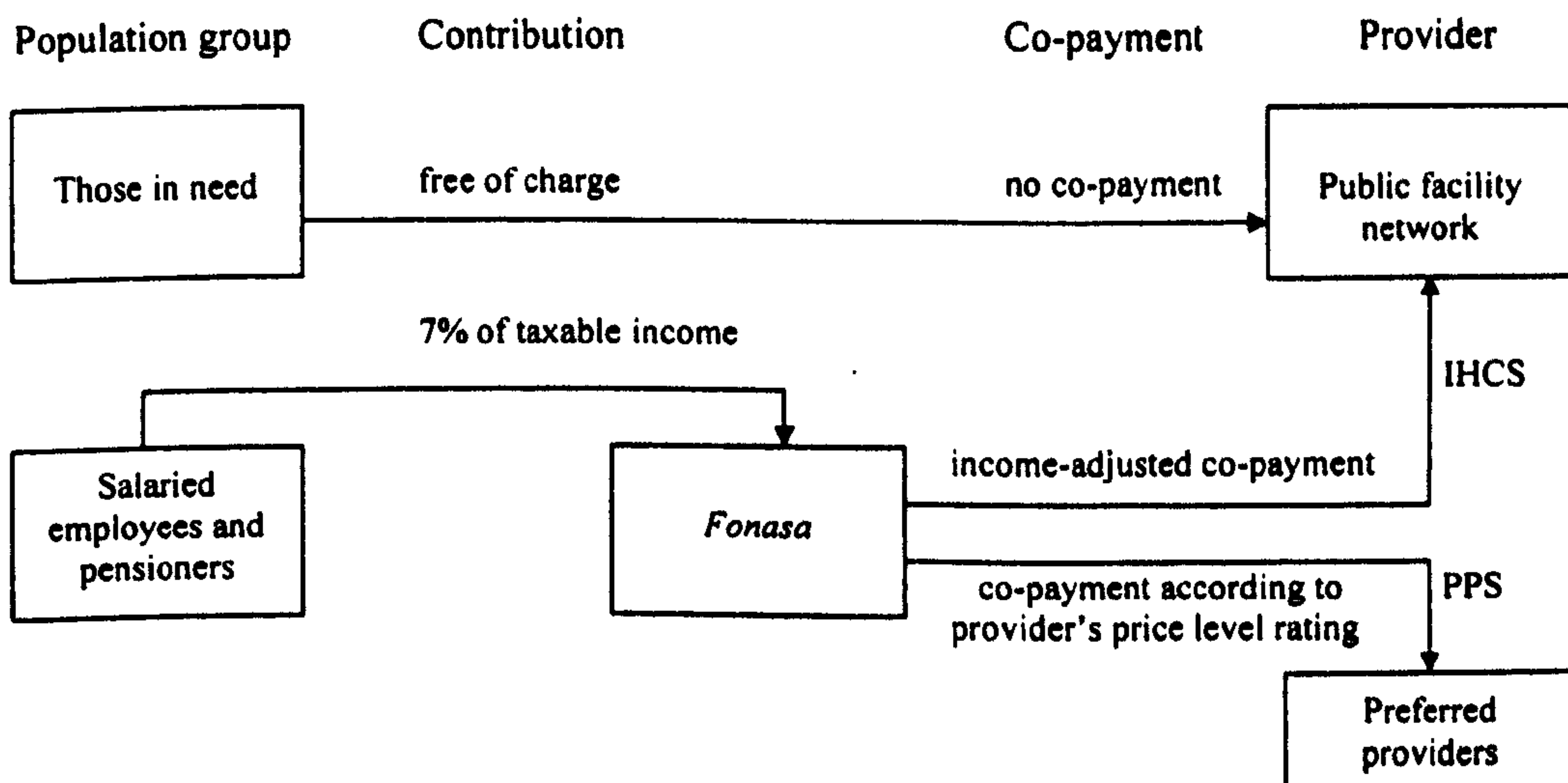
⁶ As part of the social security system reform process begun at the end of the 1970s, the Labour Plan eliminated the differences between blue-collar and white-collar workers. All categories of workers are now called employees.

⁷ Public hospitals are also allowed to provide health services under the preferred provider system. A typical service offered is accommodation in single and shared wards.

⁸ Co-payment: percentage of the cost of each health service to be covered by the insured.

Figure 2.1 provides a simple sketch to show how the contribution, co-payments and providers interact within the public system. Individuals in need are exempt from the legal contribution and co-payments and receive free health care through the public facility network. Salaried employees and pensioners contributing 7 percent of their taxable income can choose between the IHCS or provision via preferred providers. If the first alternative is chosen, they must make an additional income-adjusted co-payment.⁹ If the second option is chosen, co-payments are applied according to the rating of the preferred provider. The rating in this case is associated with one of the three subsidised price levels defined by *Fonasa*. It follows that the agreement between preferred providers and *Fonasa* is essentially an agreement on prices.¹⁰ Whatever the option chosen, *Fonasa* makes a differentiated contribution to help the publicly insured defray the cost of the medical services required.

Figure 2.1 *Contribution, co-payments and providers in the public system*



⁹ Public insured are classified in four income groups: A, B, C, or D (see Table 2.A in Appendix 1 for income ranges). Those in income group A (indigents) do not contribute and do not make co-payments (*Fonasa* has faced great difficulties in distinguishing between indigents and free-riders; specially relevant to 1992 data. We briefly discuss this issue in Appendix 2). Those in income group B (low-income level) must contribute but do not make co-payments. Those in income groups C and D must contribute and make co-payments (25 and 50 percent, respectively). Primary health care is free of charge for all the publicly insured independent of their income classification.

¹⁰ Under the PPS public hospitals are restricted to charging the lower price level.

The differential structure of co-payments under the two systems is expected to reflect the differences in costs as well as the ability of those publicly insured to pay. It can be understood by using a simple numerical example. Consider the case of general medical consultations and the associated price and co-payment structure found under the institutional health care scheme and preferred providers, respectively.¹¹ The figures and percentages correspond to those prevalent in 1992 and are expressed in Chilean *pesos* (Ch.\$) in Table 2.1¹².

Table 2.1 *Structure of co-payments (general medical consultations)*

Institutional Health Care Scheme	General Medical Consultation			
Income groups	Price	Co-payment		Co-financing by <i>Fonasa</i>
		%	Value	
A	1000	0	0	1000
B	1000	0	0	1000
C	1000	25	250	750
D	1000	50	500	500
Preferred provider	General Medical Consultation			
Price level rating	Price	Co-payment		Co-financing by <i>Fonasa</i>
I	2200	880		1320
II	2350	1030		1320
III	2750	1430		1320

The top half of Table 2.1 shows the price and co-payments for a medical consultation under the Institutional Health Care Scheme. A price of Ch.\$1000 is the base figure for calculating the co-payment according to income. Those in need (income group A) and those on low-income (income group B) are not charged. Salaried employees in income groups C and D are subject to an increasing percentage of co-payment. For all groups *Fonasa* co-finance the cost of the service, but the percentage of co-financing decreases from income group A (or B) to income groups C and D.

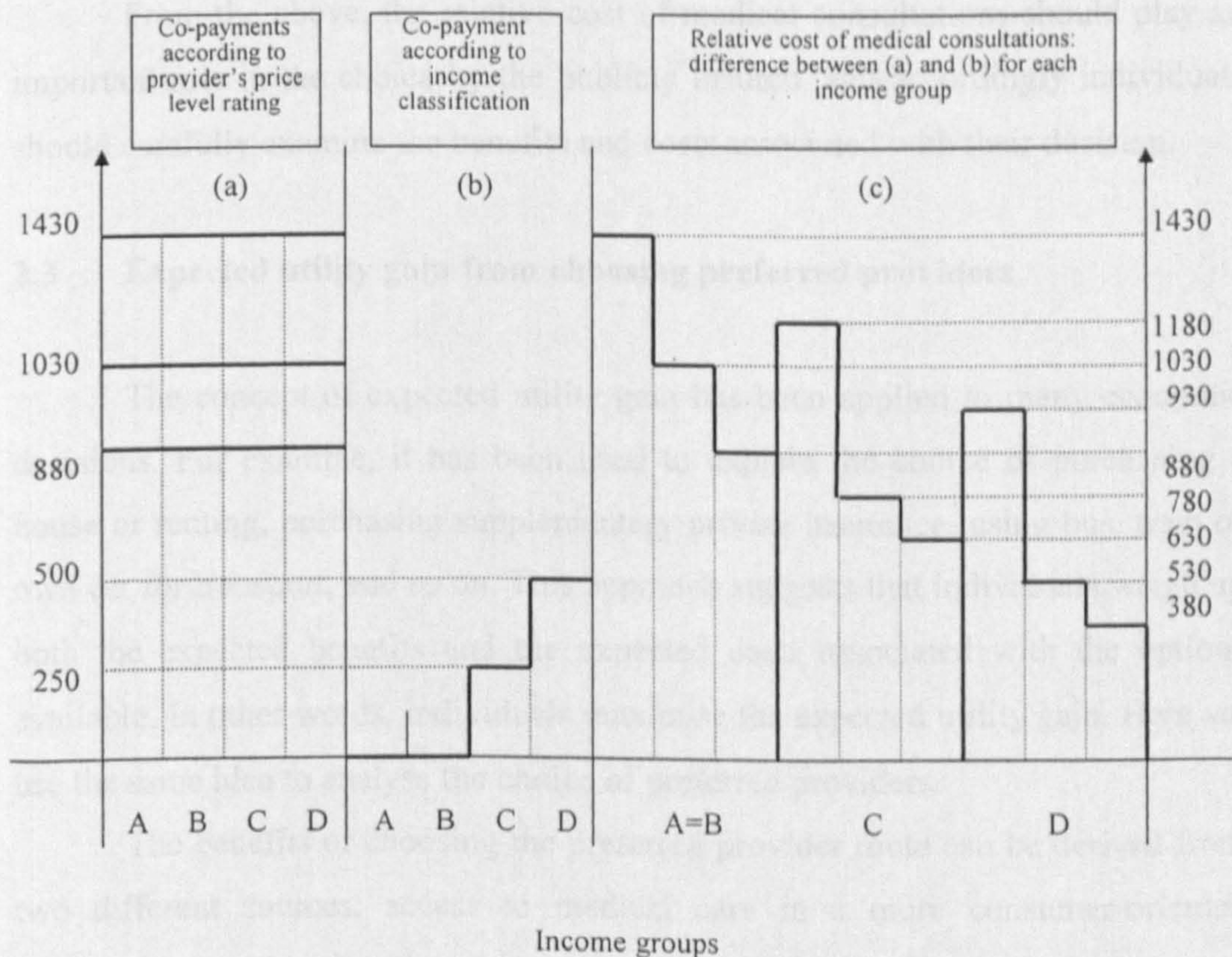
¹¹ Each year the Ministry of Finance, in conjunction with the Ministry of Health, defines the price of the medical services as well as the parameters and criteria to calculate the value of co-payments.

¹² The average referential (*observado*) exchange rate in 1992 was Ch.\$ 362.58 = US\$ 1.0.

The selection of preferred providers, on the other hand, implies the higher prices and co-payments detailed in the bottom half of Table 2.1. The three different prices for a medical consultation reflect the price level rating predetermined by *Fonasa*. In this case, the publicly insured receive a fixed contribution independent of the rating of the preferred provider. Thus, the percentage of co-payment increases with price.

However, the relative cost of choosing the preferred providers route falls as income increases. High-income individuals can gain greater access to preferred providers because the co-payment structure reduces the relative cost they face proportionally more than for low-income individuals. In other words, the subsidy (co-financing) provided by the government tends to benefit higher rather than lower-income individuals. Figure 2.2 shows this fact.

Figure 2.2 *Relative cost of medical consultations: difference between co-payments under the PPS and the IHCS, by income groups.*



Part (a) in Figure 2.2 describes co-payments for medical consultations under preferred providers (see bottom half of Table 2.1). In this case, co-payments are independent of income and a horizontal line is therefore drawn at Ch.\$1430, Ch.\$1030 and Ch.\$880, respectively. Part (b) shows the co-payment level according to income classification (see top half of Table 2.1). As we saw before, individuals in income groups A and B are exempt from co-payments while those in income groups C and D must make co-payments of Ch.\$250 and Ch.\$500, respectively. Finally, part (c) shows the relative cost of choosing preferred providers [difference between (a) and (b)]. Clearly, the relative cost of individual's choice varies depending on the income classification. Thus the relative cost of medical consultations for those in income groups A and B corresponds to the total cost shown in part (a). Conversely, those publicly insured classified in income groups C and D face a relative cost that is a decreasing percentage of the total cost presented in part (a).

From the above, the relative cost of medical consultations should play an important role in the choice by the publicly insured, and accordingly individuals should carefully examine the benefits and costs associated with their decision.

2.3 Expected utility gain from choosing preferred providers

The concept of expected utility gain has been applied to many economic decisions. For example, it has been used to explain the choice of purchasing a house or renting, purchasing supplementary private insurance, using bus, train or own car for transport, and so on. This approach suggests that individuals weigh up both the expected benefits and the expected costs associated with the options available. In other words, individuals maximise the expected utility gain. Here we use the same idea to analyse the choice of preferred providers.

The benefits of choosing the preferred provider route can be derived from two different sources: access to medical care in a more consumer-oriented environment and reduced waiting time. The attributes of a more consumer-

oriented environment essentially imply better "hotel" services, choice of doctor and greater information about the medical condition and its treatment. The utility placed on these attributes may be a function of the desire for privacy and/or information [Propper (1989) pp.780]. The difference in the quality of treatment *per se* is likely to be fairly small, as consultants work concurrently as preferred providers and state employees, while nursing and paramedical staff are trained in the public sector. If the attributes associated with what we called a consumer-oriented environment are assumed to be normal goods, we could expect that high-income individuals would be more likely to demand preferred providers. Unfortunately, these attributes are difficult to measure and thus hard to model [Hopkins and Kidd (1996) pp.1624].

On the other hand, to see why a reduced waiting time can benefit individuals, it is necessary to examine the implications of rationing in public sector services. This rationing takes two forms: by queue¹³ and by waiting list. Both forms impose a cost on individuals (or their family) in two respects: the opportunity cost of time and the expected improvement in health status. As Propper (1989) points out, queuing in person clearly has an opportunity cost, but it has been suggested [Lindsay and Feigenbaum (1984)] that waiting on a list *per se* has no opportunity cost.¹⁴ Rather, the cost of waiting on a list is associated with the likelihood that the medical problem may worsen during the waiting period, with associated uncertainty about the timing of medical attention. In what follows, however, and given the nature of the medical events in our analysis (general medical consultations), we will focus only on the effect of queuing in person for individuals' utility.

¹³ In Chile, waiting time is particularly high in public primary health centres. Scarpaci (1988) in his study carried out in a poor urban area of Santiago, found that individuals waited on average 4.6 hours to see a doctor in a public health centre.

¹⁴ Following Propper (1989 pp.779-780), this argument, which is open to debate, basically assumes that having to wait for medical treatment does not necessarily prevent the demander of medical care from carrying out some work or other activities. However, by definition, an individual on a waiting list is in a less good state of health than normal. Being ill and waiting on a list may both decrease the utility of some uses of time and/or prevent the individual from undertaking all his/her usual activities. This would suggest that waiting on a list has some positive opportunity cost for the demand of medical care.

Ceteris paribus, the expected utility gain from bypassing the long queues found in the public sector should be greatest for those who place the highest value on time. Accordingly, it would be reasonable to expect a higher value of time among the employed rather than unemployed, and for higher rather than lower income individuals. This presumption should thus provide a justification for including individual's income and employment status in the estimating equation.

Moreover, the benefits of jumping the public sector queue can differ not only according to income or employment status, but also with age, sex and education. For instance, the earnings pattern for individuals along their life cycle is generally depicted as a hump-shaped function of age. Earnings (income) increase with age (a period with a higher opportunity cost) until a certain point where individuals usually experience an income reduction as they retire and become pensioners (a period with a relatively lower opportunity cost).¹⁵ According to this pattern, one could expect individuals in their more productive years to be more prone to seek medical attention from preferred providers. By the same token, one could also expect older individuals with a lower opportunity cost to be less worried about queuing and thus to consider the IHCS (purely public provision) a satisfactory alternative. However, as age increases medical needs also increase, and individuals tend to make greater use of medical services. Thus, the perspective of queuing long hours would not be acceptable for the elderly.

Gender also implies significant differences in medical needs. Many studies have shown that females make more consultations than males [Lewis and Lewis (1977), Sindelar (1982a), Leopold and Langwell (1978)]. This tendency has been explained, primarily, as the result of biological differences and biological events affecting only females, such as pregnancy and maternity.¹⁶ These factors predict that females spend more time than males in consulting doctors (for themselves or for their children) and they should thus value more than males the shorter time required to get medical attention from preferred providers.

¹⁵ The prospect of a lower income at the time of retirement is common to most pensioners in Chile.

¹⁶ However, according to Sindelar (1982a), this tendency persists even after controlling for gynaecological and obstetrical care and severity of illness.

On the other hand, the positive correlation between education and income [van de Ven and van Praag (1981)] indicates that more educated individuals should have a higher time opportunity cost.¹⁷ So, one would expect more educated individuals to be better placed to value the possibility of jumping the queue in the IHCS. Likewise, more educated individuals may be better equipped to appreciate the more consumer-oriented attention offered under preferred providers.

The costs involved in the decision to choose preferred providers are mainly related to access. In this context an important restriction is given by the value of co-payments. A higher co-payment, which means a higher out-of-pocket outlay, could outweigh the benefits of a more consumer-oriented environment or the less time-consuming access to preferred providers, and induce individuals to select the less expensive option represented by the IHCS, *ceteris paribus*.¹⁸

The impact of the higher cost of medical attention under preferred providers also means the decision to seek medical care is usually taken in the context of the family rather than in isolation. In this sense, one might expect individuals belonging to families with more children to be less likely to choose preferred providers. The restriction on resources available as the family size increases could affect the possibility for each family member to access providers that imply a higher cost. In this case, a higher number of children in a household could contribute to this fact.¹⁹ Conversely, *ceteris paribus*, individuals belonging to families with more adults with positive income could be relatively more likely to demand preferred providers.

Finally, another restriction to access is determined by the location of preferred providers. Even though the extended network of public facilities ensures access for most of the population, the access to preferred providers is restricted by their location. These tend to cluster in urban areas where most of the population is concentrated, implying that on average individuals living in rural areas incur a higher cost to access preferred providers, mainly due to travelling expenses.

¹⁷ Education also proxies lifetime income.

¹⁸ This could be the case even though preferred providers allow the publicly insured to obtain private medical attention at subsidised prices.

¹⁹ The number of children is used in our analysis as a proxy for the number of dependants.

2.4 Choice model

We have described a situation where public insured individuals face two medical care options, and must choose one. Thus, the decision becomes dichotomic.²⁰ The nature of the decision, therefore, suggests the use of a binary choice model where each observation is treated as a single draw from a Bernoulli distribution (binomial with one draw). Our econometric estimation is based on an extensively applied binary choice model, the logit, where parameters can be estimated using maximum likelihood procedures.

It is assumed that a binary variable y_{ij} is measured, that takes the value one if individual i opts for preferred providers (indexed as alternative $j=1$) and zero if individual i opts for the IHCS (indexed as alternative $j=0$). Thus,

$$\begin{aligned} y_{ij} &= 1 \quad \text{if } j=1 \text{ (preferred providers)} \\ y_{ij} &= 0 \quad \text{if } j=0 \text{ (IHCS)} \end{aligned}$$

Writing the probability that individual i chooses alternative 1 as $P_{i1} = \Pr[y_{i1} = 1]$ then,

$$\sum_{j=0}^1 y_{ij} = \sum_{j=0}^1 P_{ij} = 1. \quad (1)$$

Assuming a sample of n individuals, the likelihood function is given by,

$$\ell = \prod_{i=1}^n P_{i0}^{y_{i0}} P_{i1}^{y_{i1}}. \quad (2)$$

Taking logs on (2) we get the following log-likelihood function,

²⁰ Strictly speaking individuals face one alternative under the IHCS and three price levels (alternatives) within the preferred provider option. However, as we explain later in section 2.5.2, data restrictions constrain us to just one price level under preferred providers so that the options reduce effectively to two.

$$\ln \ell = \sum_{i=1}^n (y_{i0} \ln P_{i0} + y_{i1} \ln P_{i1}). \quad (3)$$

The model behind (3) is made into a behavioural one by relating the selection probabilities to attributes of the alternatives in the choice set and the attributes of the individual making the choice. Such a model can be motivated by assuming that individuals maximise utility and that the utility function is stochastic; that is, a random utility model [due to McFadden (1981)].²¹

Assuming linearity and denoting by U_{i0} and U_{i1} the utility derived by individual i from demanding the IHCS and preferred providers, respectively; x_i a vector of individual's attributes, and z_{i0} , z_{i1} vectors of providers' attributes as perceived by individual i , we can write,

$$U_{i0} = \alpha_0 + x_i' \delta_0 + z_{i0}' \gamma + e_{i0}. \quad (4)$$

$$U_{i1} = \alpha_1 + x_i' \delta_1 + z_{i1}' \gamma + e_{i1}. \quad (5)$$

The observed choice between (4) and (5) reveals which alternative provides the greater utility, but not the unobservable utilities. The demand function for a particular alternative is the probability that the utility derived from it is higher than the utility derived from the other. The observed indicator $y_{ij} = 1$ if $U_{i1} > U_{i0}$, and the observed indicator $y_{ij} = 0$ if $U_{i1} \leq U_{i0}$. Therefore, the probability that y_{ij} be equal 1 will be given by,

$$\Pr(y_{ij} = 1) = \Pr(U_{i1} > U_{i0}).$$

²¹ According to Maddala (1983), the stochastic nature of the utility function emerges from the assumption that consumers are rational in the sense that they make choices that maximise their perceived utility subject to constraints on expenditures. However, there are many errors in this maximisation because of imperfect perception and optimisation, as well as the inability of the analyst to measure exactly all the relevant variables.

$$\begin{aligned}
&= \Pr[(e_{i0} - e_{i1}) < (\alpha_1 - \alpha_0) + x_i'(\delta_1 - \delta_0) + (z_{i1} - z_{i0})' \gamma]. \\
&= F(w_i' \beta).
\end{aligned} \tag{6}$$

where F represent the cumulative distribution function for the error term e_i , and with $w_i = [1, x_i', (z_{i1} - z_{i0})']$, $\beta' = [(\alpha_1 - \alpha_0), (\delta_1 - \delta_0)', \gamma']$. The logit model follows from the assumption that the cumulative distribution function of e_i is the logistic. Then, the probability that y_{ij} be equal 1 is written as,

$$\Pr(y_{ij} = 1) = \frac{\exp(w_i' \beta)}{1 + \exp(w_i' \beta)}. \tag{7}$$

It must be noted that in (4) and (5) the coefficients of vector x_i were allowed to vary between alternatives. Since only differences in utility matter, if any explanatory variable is equal between alternatives it will not influence individual choice. This means that the variable in question does not contribute to the explanation of why one particular alternative is chosen and its coefficient cannot be estimated. Accordingly, if the coefficients of those variables reflecting individuals' attributes, which do not vary between alternatives, are to be identified, they must be allowed to have differential impacts upon the probability of choosing one alternative rather than another, i.e., the coefficient vector must be made alternative-specific.

Following the discussion of section 2.3, we used three groups of explanatory variables in the empirical analysis. The first group accounts for the individual's demographic and socio-economic attributes as described by age, sex, education, employment status and income. The second group is composed of two variables reflecting individual's family composition: number of children and number of adults in the household. The third group accounts for the access to medical attention. We include here the zone of residence, the relative cost of medical consultations and waiting time. A description of the data utilised in the estimation and the definition of each variable are presented in the next section.

2.5 Data and variable definitions

2.5.1 *The data*²²

The data set used in the estimation was drawn from *Casen* 1992. The Ministry of Planning has carried out this multipurpose survey since 1985 with a periodicity of two years. *Casen* 1992 gathered information from a stratified sample of 35,948 households (143,459 individuals). The sampling unit was the household, although the survey record data were at the individual level. Any household member aged 18 or older was eligible to act as a spokesperson for all household members. Individuals were linked according to their relationship with the head of the household. The capacity to link individual records is important, as the decision to seek medical care is more likely to be taken within the family rather than in isolation. As Sindelar (1982a) pointed out, although many studies analyse the individual's maximisation without considering the family, it seems to be more appropriate to analyse his/her behaviour in the family context.

The survey sample was designed to be representative at national, regional, provincial and municipal level. The country was divided into 138 municipal districts reflecting two strata, urban and rural. Information was collected using five modules: housing, education and training, health, employment, and income. The health module recorded, among other aspects, data on both outpatient and inpatient health services utilisation from the 32,682 household members who reported having suffered an illness or accident during the three months preceding the interview. The fact that only ill individuals were considered is consistent with the argument of Akin et al. (1985) that if a combined sample of both healthy and sick people is used it is implicitly assuming that illness is unrelated to demand for medical care.

²² In Appendix 3 we examine how the sample used in this part of the analysis compares in terms of age, gender, income and health status to the whole population in the data set.

Among the group who suffered illness or accident only 82.46 percent were reported to have sought medical care, that is, 26,950 individuals (11,646 males and 15,304 females). Those publicly insured accounted for 68.59 percent of this figure (18,485 individuals). The remaining percentage corresponded to individuals insured through private pre-paid health insurance plans, through social security institutions belonging to the armed forces, and others.

We focused analysis of the choice of preferred providers by the publicly insured on the specific case of general medical consultations. This type of outpatient event is defined in *Casen* 1992 as physician visits where individuals have not been referred by another doctor. This means individuals voluntarily decide to visit a doctor (patient-initiated visit). The importance of this characteristic is that individuals make an independent choice, which is not influenced or induced by the doctor as follow-up visits are.²³ In this last case, if the first of a series of visits was made to a preferred provider, the follow-up visit will most likely be made to the same provider or possibly to another but also within the preferred provider system.²⁴

A related health service, preventive check-ups, was not included in the analysis. Although it would be possible to argue that preventive check-ups share similar characteristics with general medical consultations and should therefore be included, the concept of preventive check-ups utilised in *Casen* 1992 is aimed at capturing the utilisation made by specific groups: individuals facing chronic diseases (like diabetes and hypertension), the newborn, children, and pregnant women.²⁵ This restricted use of the concept excludes normal check-ups, which are usually associated with the voluntary decision of an individual to monitor his/her state of health, and are not induced by doctors.

²³ Hershey et al. (1975) present a detailed discussion of the implications of using patient-initiated visits or follow-up visits, among other measures, to study individuals' utilisation of medical care.

²⁴ By using general medical consultations the possible bias on individuals' choice produced by the effect of an induced demand is to some extent mitigated.

²⁵ Individuals in these groups present a higher biomedical risk. Therefore they are encouraged to seek medical attention on a regular basis, independent of whether they themselves feel healthy.

The sample of 18,485 publicly insured individuals in bad health who sought medical care was reduced to those who made at least one general medical consultation in the last three months preceding the survey, that is, 9,540 individuals (4,082 males and 5,458 females). Two further restrictions on the sample were considered: on the one hand, not every publicly insured individual can freely choose providers (see section 2.2) so the sample was constrained to that fraction of publicly insured in income groups B, C and D. On the other hand, *Casen* 1992 includes as potential providers public health facilities like primary health care emergency services and public clinics for specialities, which are not institutionally related with the provision of general medical consultations. The survey also includes health facilities belonging to the Armed Forces, where access is restricted to their members and families. After deletion of the observations that did not correspond to income groups B, C, and D, and excluding the health facilities not related to general medical consultations or where access was restricted, the sample reduced to 4,481 individuals (1,966 males and 2,515 females). Finally, given that we only worked with the adult population (individuals aged 15 or older), the sample was reduced to 1,904 individuals (757 males and 1,147 females).

2.5.2 *Variable definitions*

A description of the variables and the defined default groups in the model are reported in Table 2.2. The dependent variable, which we called the “option”, is defined as a binary one taking the value 1 if a preferred provider was chosen and 0 if the IHCS was chosen. Given that *Casen* 1992 did not include a specific question to identify, explicitly, the choice made by each individual, the dependent variable was built combining the responses to three questions included in the health module: income group under public insurance, type of health facility chosen, and the way in which individuals paid for the medical attention received. With respect to the first question, and as we pointed out before, we only considered

observations corresponding to the publicly insured and, particularly, those classified in income groups B, C, and D. We matched each individual of this subsample with his/her choice relative to one of the following five health facilities: public hospitals and public health centres associated with the IHCS, and private hospitals, private clinics and private health centres, associated with preferred providers. We controlled this match by relating each publicly insured with his/her response about the way in which he/she paid for the attention received; i.e. either according to income classification or according to providers' price level rating.

Table 2.2 *Description of variables*

<i>Dependent variable:</i>	
<i>Option</i>	Binary variable (dummy): 1=preferred providers, 0=IHCS.
<i>Explanatory variables:</i>	
<i>Age</i>	Age of the individual (in years).
<i>Female</i>	Binary variable (dummy): 1=female, 0=male.
<i>Education</i>	Set of four binary variables (dummies) for the highest educational level achieved: primary school, primary and secondary school, professional training and university degree. The default being no education.
<i>Employment status</i>	Binary variable (dummy): 1=employed, 0=otherwise.
<i>Income</i>	Individual's monthly monetary income (Chilean <i>pesos</i>). Correspond to the aggregation of several income concepts, including earnings from main job, pensions and public subsidies.
<i>Number of children</i>	Number of household members aged 15 or less.
<i>Number of adults</i>	Number of household members aged above 15 with income greater than zero.
<i>Urban</i>	Geographic binary variable (dummy): 1=urban zone, 0=rural zone.
<i>Relative cost of medical consultations</i>	Difference in the value of co-payments between preferred providers and the IHCS, measured in Chilean <i>pesos</i> .
<i>Waiting time</i>	Waiting time at public health centres (in minutes).

Three groups of explanatory variables were used in the econometric analysis, reflecting the individual's attributes, family composition and access to medical care. Among the first group we included age, sex, education, employment status and income. Age entered the model in linear terms recording the individual's age in years.²⁶ Only those aged 15 or above were considered because the analysis was constrained to the adult population. Sex was codified by a binary variable taking the value 1 for females and 0 for males.

Education entered the estimation as a set of four binary variables (0,1) accounting for the highest level of education achieved. Four levels were considered: primary school, primary and secondary school, professional training and university degree; the default being no education. Employment status was defined as a binary variable taking the value 1 if employed and 0 otherwise.

Income, a continuous variable, reflects individual's monthly monetary income.²⁷ This variable captures current income, which is a suitable measure of the individual's capacity to pay in the context of a common and relatively affordable health service such as a general medical consultation. The 1992 *Casen* survey does not record information that could be used as a reasonable proxy for permanent income, which in turn would be more appropriate in the case of chronic conditions or catastrophic illnesses.

Although we think that health care decisions, including the choice of provider, are best understood in the family context, we were constrained to use a measure of individual income because of a practical problem with the definition of "household" used in the *Casen* survey. *Casen* defines the household as comprising a single person, or a group of people who may or may not be related but who live

²⁶ We do not include a quadratic term for age for two simple reasons. First, in all the estimates that included age squared the result was statistically negligible. Second, it is not clear what a squared term in age would have allowed us to measure in the context of our model. Increased age means a depreciation in health stocks, so that speedier attention through preferred providers would be welcome. But rising age produces a fall in income, so that access to (more expensive) preferred providers is more restricted. Thus the effect of increasing age on the probability of choosing preferred providers is difficult to interpret.

²⁷ Monetary income is composed of earnings from principal job, state subsidies and pensions.

together, i.e. they share a home and a common food budget. Each household may also comprise different kinds of family units. A unit includes some members of the household and consists of a couple, whether married or co-habiting, with single children, whether or not economically dependent on the couple, and who are not part of another unit. The unit may also include other young people under 18 who are economically dependent on the couple or the head of the family acknowledged as such by the unit but who have no direct family ties.

This definition of household thus seeks to cover a diversity of forms of co-habitation, and this makes it difficult to identify a single decision-maker. Each household may have more than one decision-maker, depending on the number of heads of units involved. In practice decisions can be taken independently by different individuals within a single household, and it is therefore not clear what part is played by the household income factor.

The second group of variables was intended to capture the individual's family composition. We included the number of children (individuals under 15 years) and the number of adults (individuals above 15 with income above zero).

Three variables were used to describe the access to medical attention: zone of residence, relative cost of medical consultations, and waiting time. By including zone of residence we sought to identify differences in access among individuals living in urban and rural areas. This variable was defined as a dummy taking the value 1 if the individual resided in an urban area and 0 if in a rural area.

The relative cost of medical consultations and waiting time reflect providers' attributes and were included to capture the individual's access to effective care. This cost was measured as the difference in the value of co-payments between preferred providers and the IHCS (see Figure 2.2).²⁸ Basically, we matched each individual with the co-payment that should have been made under both alternatives (IHCS and preferred providers).

²⁸ Clearly the value of co-payments only represents the monetary cost of medical consultations. Travel time and waiting time also represent important costs, which can be even more relevant for some individuals when the out-of-pocket payments for medical care are low (see Acton, 1975).

The figures to construct the relative cost of medical consultations were obtained directly from *Fonasa*. (*Casen* 1992 did not ask the interviewed about the value of the co-payment made or the price level rating of the preferred provider visited). From the patients' perspective, therefore, the relative cost of medical consultations was exogenous. Using this approach the endogeneity problem that usually arises when price information is collected from respondents was avoided.

However, an additional point had to be solved. Considering that individuals under the preferred provider option can choose among three price levels and no information in this respect was recorded, we assumed price level rating III for each observation. This assumption is supported by the fact that nearly 70 percent of all preferred providers are registered at that level.

No specific assumption was made for the IHCS option because, given the income classification and the value of the medical consultation, it is possible to assign each individual an exact co-payment value.

Finally, to capture the effect of waiting time on individuals' choice, we used the reported waiting time at public health centres. This was possible because *Casen* 1992 specifically asked individuals about this aspect of their experiences with public health centres. The question is relevant because most general medical consultations provided under the IHCS are delivered at public health centres, the port of entry to the public health system. Waiting time was recorded in minutes, and nearly 82 percent of the interviewed with non-missing records reported waiting more than 60 minutes. However, many respondents included in the remainder 18 percent are believed to misreport the waiting time by reporting only the minutes the doctor spent in checking them. The Ministry of Health recommends public doctors to spend a minimum 15 minutes per patient, which proceeds from a technical norm of four patients per hour. Clearly, this does not correspond to waiting time. Waiting time is related to the time spent in a queue to collect a numbered ticket for attention (usually the most important component of total waiting time), plus the time waiting to be seen by the doctor. Therefore, we assigned to all those who reported a waiting time of less than 15 minutes the mean

waiting time of their respective municipal district (given that public health centres are organised at local level). Descriptive statistics are given in Table 2.3.

Table 2.3 *Descriptive statistics* (N=1,904)

Variables	% of obs.=1	Mean	St.Deviation
<i>Dependent variable:</i>			
<i>Option</i>	41.07		
<i>Explanatory variables:</i>			
<i>Age</i>		49.88	19.02
<i>Female</i>	60.24		
<i>No education</i>	10.29		
<i>Primary school</i>	56.56		
<i>Primary and secondary school</i>	28.46		
<i>Professional training</i>	1.57		
<i>University degree</i>	3.09		
<i>Employment status</i>	36.71		
<i>Income</i> ^a		54,820.51	92,867.83
<i>Number of children</i>		1.00	1.19
<i>Number of adults</i>		1.96	1.07
<i>Urban</i>	67.96		
<i>Relative cost of medical consultations</i> ^a		1,276.48	270.78
<i>Waiting time</i> ^b		142.76	76.12

^a Reported in Chilean pesos (Ch.\$).

^b Reported in minutes.

2.6 Empirical results

Before looking at the results, a couple of comments about the potential problem of selection bias. This, also known as sample selection bias, typically refers to problems where the dependent variable is only observed for a restricted, non-random sample and leads to biased and inconsistent estimates.²⁹

Although in our study we restrict the analysis to a particular population group, we are confident there is no serious problem of sample selection. The sample used is highly representative of the composition of Chilean health system users, where two-thirds of all users belong to the public insurance sector (*Fonasa*). In all, since we have not tested statistically for the existence of sample selection, the interpretation of the results must be applied only to the sample used in the estimation.³⁰ In other words, the findings discussed below should not be freely extrapolated to the entire population of Chilean health system users.

Nevertheless, even bearing in mind this precaution and the inevitable limitations of the data, the estimated model is particularly useful for it sheds light on the demand for one of the most frequently-used health services among public sector customers –the general medical consultation. In fact, this type of consultation represents 33 percent of all types of medical services rendered by the public health system and 31 percent of total expenditure in health services. Preferred providers provide 23 percent of all medical consultations and account for 30 percent of total expenditure in such a service.

On the other hand, there is no other study available that evaluates empirically the role of individual characteristics, composition of family and access to health care through a process like the one reviewed in this chapter, where public insurance customers must choose between two modes of care.

²⁹ The issue of sample selection bias can be dealt with using some of the estimation techniques suggested in the relevant literature [see Maddala (1983, ch.9)].

³⁰ If sample selection is a serious problem, but is not tested statistically, one should (at least) clearly state that the parameter estimates are *after* sample selection and that they are conditional on the other regressors used in the equation.

2.6.1 Logit estimates

Estimates of the logit model of the probability of choosing preferred providers are reported in Table 2.4. It must be noted that the parameters, like those of any non-linear model, do not necessarily have the partial derivative interpretation [see Greene (1997)]. In a binary model, the marginal effect of a change in a particular variable is simply a positive constant (the density function of the appropriate cumulative distribution function) times the relevant coefficient. Following Hopkins and Kidd (1996), the sign and relative size of the coefficients are informative.

The model presents a relatively good fit as indicated by the Pseudo- R^2 of 0.35. As a whole, the model confirms the *a priori* expectations. Among the variables reflecting individual's attributes, age, sex, employment status and income are positive and well-defined. The pattern of coefficient signs for the set of dummies accounting for education are those expected, but less well-defined. The two variables for the individual's family composition are also well-defined. The negative coefficient obtained for the number of children was as predicted in the respective hypothesis.

The variables accounting for the individual's access proved relevant determinants of choice. As we expected, the relative cost of medical consultations has a negative effect on the choice of preferred providers. On the other hand, the unexpected negative coefficient for waiting time could be indicating some level of captivity of the publicly insured to public sector provision under the institutional health care scheme. In what follows we analyse the results for each group of variables separately.

Table 2.4. Logit estimates for the choice of preferred providers

Number of observations = 1,904 $\chi^2[13] = 907.95$
 Prob > chi2 = 0.000 Log Likelihood = -835.25
 Pseudo R² = 0.35

	Coefficients	Std. Errors	z	P> z
<i>Constant</i>	7.4137*	.6497	11.410	0.000
<i>Age</i>	0.0087**	.0042	2.062	0.039
<i>Female</i>	0.6569*	.1415	4.639	0.000
<i>Primary school</i>	-0.0498	.2060	-0.242	0.809
<i>Primary & secondary school</i>	0.6244**	.2428	2.571	0.010
<i>Professional training</i>	0.9726	.6019	1.616	0.106
<i>University degree</i>	1.1374**	.4704	2.418	0.016
<i>Employment status</i>	0.5933*	.1615	3.674	0.000
<i>Income</i>	3.45e-06*	1.04e-06	3.334	0.001
<i>Number of children</i>	-0.2200*	.0595	-3.697	0.000
<i>Number of adults</i>	0.1033***	.0561563	1.840	0.066
<i>Urban</i>	0.2361***	.1359326	1.737	0.082
<i>RCMC^a</i>	-0.0069*	.0003861	-18.116	0.000
<i>Waiting time</i>	-0.0016**	.0008200	-2.015	0.044

^a Relative cost of medical consultations.

* Significant at 1 percent.

** Significant at 5 percent.

*** Significant at 10 percent.

L(0): - 1,289.2317

L(β): - 835.2577

-2[L(0) - L(β)] = 907.95 (22.36)

Where L(0) and L(β) are the log-likelihood values for a model with an intercept only and the intercept and all covariates respectively.

The individual's attributes

To characterise each individual we used two demographic variables, age and sex, and three socio-economic variables, education, employment status and income. According to Hershey et al. (1975) demographic attributes do not have a clear theoretical place in utilisation models (whatever be the measure of utilisation). However, they have proved to be important factors in many of the studies focused on the choice of health care providers [Dor, Gertler and van der Gaag (1987), Gertler, Locay and Sanderson (1987), Gertler and van der Gaag (1988)]. On this background and on the discussion of section 2.3, we supported the inclusion of the individual's demographic attributes in our analysis.

As we hypothesised in section 2.3, there is a positive and statistically significant correlation between the choice of preferred providers and age. This fact can be explained by both the relatively higher opportunity cost of time during the most productive years and the increased time spent consulting doctors as medical needs increase with age (usually from the 60s onward).³¹ In the first case, the prospect of having to queue long hours in person for a consultation certainly has a higher opportunity cost, so the possibility of jumping the queue by choosing preferred providers should be attractive. In the second case, even though the opportunity cost of time decreases (as individuals retire to live on a pension they face a lower income), the medical needs and time spent consulting doctors increase. As before, the prospect of queuing long hours for attention at an advanced age is not likely to be welcome. In this context, it would be reasonable to expect the individuals to choose to avoid the long queues found in public facilities and opt for preferred providers.

The positive and strongly statistically significant coefficient of female clearly indicates that women are more likely than men to choose preferred providers. As many studies have shown, women tend to demand more health

³¹ Grossman (1972a, 1972b) introduced a model where health is considered as a stock that depreciates as age increases. As the stock of health diminishes, individuals must invest more time and resources to partly avoid depreciation.

services than men, and thus spend more time consulting doctors. According to Lewis and Lewis (1977), women make 1.5 times more visits to doctors than men do. Furthermore, women not only must spend time consulting for themselves but also spend time visiting doctors with their children. These facts suggest that women should be relatively more concerned about queuing for attention than men. This argument, which is open to debate, certainly goes against the presumed higher opportunity cost for men. Two elements are usually invoked to substantiate this presumption: first, the higher participation rate of men in the labour market and, second, their higher wages. However, since Becker (1965) it has been suggested that women would not be active in the labour market at the same rate as men because their opportunity cost of time out of the labour market (typically at home caring for children and producing other goods) would be higher than the market wage rate. Following this reasoning, it cannot simply be assumed that men have a higher opportunity cost of time than women, so women could quite possibly be more concerned about queuing for medical attention³²

The pattern of coefficient signs and significance of the dummy variables accounting for education level as a whole tend to confirm the hypothesis that more educated individuals would be more likely to choose preferred providers. Education probably has both a direct and indirect effect on the choice of providers.³³ The direct effect can be related to the notion that more educated individuals could put a higher value on being offered more information about their medical condition and its treatment (one of the attributes associated with a more consumer-oriented environment, from preferred providers). The indirect effect of education is its impact on income. According to the human capital theory, education and income are positively correlated. A higher income increases the

³² However after controlling for income and education, greater or less willingness to queue may be just a matter of preference.

³³ The role of education in health decision-making has been well documented by Grossman (1972a, 1972b) and Muurinen (1982).

opportunity cost, which would make less attractive long queuing to consult a public doctor and more attractive the chance to use preferred providers.

Education could obviously become more relevant depending on the type of medical services considered. We developed the analysis using general medical consultations, which are commonly initiated by the individual according to his/her own perception and knowledge of the health problem detected. However, education should be less important in the case of follow-up visits and other health services like hospitalisation and surgery. Doctors induce most follow-up visits, while their opinions and recommendations are the relevant information for hospitalisation and surgery.

Employment status and income reflect the opportunity cost of time for the individual. While unemployed and low-income individuals could be prepared to spend more time queuing, the employed and high-income individuals could put a higher value on time and thus seek to avoid queuing by choosing preferred providers.

Our estimates for employment status and income show that both employed and high-income individuals are more likely to choose preferred providers. The income estimate is particularly interesting because one could argue that the positive effect of income on the choice of preferred providers is simply the result of the co-payment structure presented in Table 2.1.

Clearly the relative cost of medical consultations decreases as income increases. However individuals' monthly monetary income and the relative cost of medical consultations present a low partial correlation (- 0.12). This would indicate that the income ranges used to classify the publicly insured do not necessarily represent their relative position in the overall income distribution. This fact could be the result of a deliberate government policy to ensure low co-payments for most of the publicly insured.

The individual's family composition

To capture the effect of the individual's family composition on the choice of preferred providers we included two variables: number of children and number of adults. Both are statistically significant. The negative coefficient for the number of children was as expected. *Ceteris paribus*, as the family size increases each family member should be less likely to choose preferred providers and their associated higher cost. This probably reflects the equivalent income effect, in the sense that larger households may have a lower standard of living than smaller ones with the same income. Given that we assumed no differences in the quality of treatment between alternatives, the choice of the IHCS should become more likely as the family size increases. Conversely, the positive sign for the number of adults indicates that, *ceteris paribus*, individuals in families with more adults supporting the family budget should be more likely to choose preferred providers. However, the positive sign in this case says nothing about the differences in access that can emerge within the household, depending on the importance that the family assigns to the breadwinners. If breadwinners are considered more important, the family could be willing to let other members queue.

The individual's access to medical attention

The main determinants of the individual's access to medical attention affecting the choice of preferred providers were hypothesised to be represented by zone of residence, the relative cost of medical consultations and waiting time. Zone of residence was included because most of preferred providers are located in urban areas,³⁴ so urban residents would be more likely to choose them than rural residents. Our result confirms this presumption. Indeed, the location of preferred

³⁴ Scarpaci (1988) analyses the spatial distribution of doctors offering services as preferred providers in Greater Santiago. He found they tended to cluster in Central Santiago, the heart of the urban area of the capital.

providers follows from the fact that most of the population and private hospitals, private clinics and private health centres are concentrated in urban areas.

The relative cost of medical consultations, measured as the relative value of co-payments, was intended to capture the relative cost of getting medical care from preferred providers. The negative sign and strong significance of the coefficient for *RCMC* (relative cost of medical consultations) in Table 2.4, clearly show that the higher the relative value of co-payments the lower the probability of choosing preferred providers. This result is not surprising given the structure of co-payments prevalent in the preferred provider system. Taking as a reference Table 2.1 in section 2.2, the lower possible co-payment to be paid for general medical consultations under preferred providers (corresponding to price level rating I) is 1.76 times higher than the higher co-payment to be paid under the IHCS (paid by individuals classified in income group D). This notorious difference in co-payments acts as a deterrent to the choice of preferred providers. Although we only used general medical consultations in the analysis, the extension to other medical services is likely to produce the same result. If the relative higher cost of a relatively affordable medical service like general medical consultations constitutes a deterrent to the choice of preferred providers, one should expect the same for more expensive medical services. A clear indicator of this presumption is given by the greater number of medical services of each type delivered under the IHCS (see Table 2.B in Appendix 1 for the relevant figures).

Finally, as noted in 2.5.2, *Casen* 1992 included a specific question to evaluate public health centres performance in terms of waiting time. Individuals were asked about the time waited the last time they visited such a centre. Unlike other questions in the health module, this particular question did not refer to a specific period of time. Basically, the aim was to capture individuals' past experiences with public health centres independently of whether they reported having visited a preferred provider shortly before the survey. The reported waiting time at a health centre was therefore used to estimate the effect of the higher waiting time prevalent under the IHCS on the choice of preferred providers. The

negative sign for the coefficient of waiting time in Table 2.4 was unexpected. However, from this result emerges an important point that has been studied, among others, by Propper (1993): the possibility of captivity. Basically, it is recognised that a subset of individuals may not have choice of all possible options because of, say, geographical location, lack of resources, or other reasons. Such individuals are described as captive to a particular option. In our model, and given the result obtained with waiting time, one could tentatively suggest that individuals who are willing to spend long hours queuing to consult a doctor could have either a lower opportunity cost or, alternatively, could be captive to the public sector. Certainly, captivity could be more likely in the case of health services not available from preferred providers (notably emergencies). Clearly, the existence of a dominant public supplier implies that the services offered by preferred providers are largely delimited by the activities of the public provider. Thus, one could expect captivity would vary depending on the type of health services demanded. Although captivity is an interesting element to be considered in explaining the negative sign for the coefficient of waiting time, the data used in our study do not permit us to test this point.

2.6.2 *Sensitivity analysis*

Tables 2.5 and 2.6 report the effect of changes in the explanatory variables on the probability of choosing preferred providers. This analysis was undertaken to complement the results of Table 2.4. Changes for each regressor were introduced holding the rest of the variables at their mean values. Table 2.5 shows the effects on probability of changes in individual and household attributes. Table 2.6 presents the effects on probability of changes in access variables.

In Table 2.5 we can see that the probability of choosing preferred providers increases with age. An individual of 30 has a 0.41 probability of choosing preferred providers. This rises to 0.45 for an individual aged 50 and to 0.50 for one aged 70. As age increases, individuals seem less likely to be willing

to queue for a medical consultation and more likely, accordingly, to be willing to pay the higher cost of preferred providers in order to avoid queuing.

Table 2.5 *The effects on probability of changes in individual and household attributes.*

Predicted percentage choosing	0.41
Age (years):	
30	0.41
40	0.43
50	0.45
60	0.48
70	0.50
Female	0.52
Male	0.36
Education:	
No education	0.23
Primary school	0.45
Primary & secondary school	0.56
Professional trainee	0.68
University degree	0.71
Employment status:	
Employed	0.55
Not in the labour market	0.40
Income (Chilean \$):	
40,000	0.44
80,000	0.48
160,000	0.54
320,000	0.67
640,000	0.86
Number of children:	
0	0.51
1	0.45
2	0.40
3	0.35
4	0.30
Number of adults:	
1	0.43
2	0.45
3	0.48
4	0.51
5	0.53

The result for the condition female/male shows females are 1.44 times more likely than males to choose preferred providers. This makes clear that the notion of a higher opportunity cost of time for males is not necessarily applicable in the context of the demand for medical care. Females tend to use more medical services and more time consulting doctors than males. Therefore, females should also tend to put a higher value on the time committed to obtaining medical attention.

The individual's education level significantly affects the probability of choosing preferred providers. While the probability for individuals with no education is 0.23, individuals with professional trainee and university degree have probabilities of 0.68 and 0.71, respectively. The well-documented positive correlation between education and income helps explain why individuals with higher education levels are better-placed to seek consultations from the relatively more expensive preferred providers.

The set of probabilities for employment status and income confirms that employed and high-income individuals have a higher probability of choosing preferred providers. The employed have a 0.55 probability, while for those not in the labour market the probability is 0.40. At the same time, the probability of choosing preferred providers increases from 0.44 for individuals with a current monthly monetary income of Ch.\$40,000 to 0.86 for those with a current monthly monetary income of Ch.\$640,000.

The number of children and the number of adults have opposite impacts on the probability of choosing preferred providers. As the number of children in the household increases, the probability of choosing preferred providers decreases. Individuals belonging to households with no children have a probability of 0.51, while those belonging to households with three and four children have a probability of 0.35 and 0.30, respectively. Conversely, as the number of adults increases, the probability of choosing preferred providers increases. The probabilities range from 0.43 for individuals belonging to households with one adult to 0.53 for individuals belonging to households with five adults.

On the other hand, Table 2.6 shows that individuals living in rural areas and those who have experienced long hours queuing at public health centres are less likely to demand preferred providers. In the first case, the tendency of preferred providers to cluster in urban areas turns out to restrict access for individuals living in rural areas. Likewise, those who queued long hours at public health centres could also be those with a lower opportunity cost, or they may be captive to public sector provision. They thus face a lower chance of switching from public provision to preferred providers. In this context, the higher relative value of co-payments constitutes an important deterrent to accessing preferred providers. This can be appreciated in Table 2.6 where the probability of choosing preferred providers strongly decreases from 0.99 to 0.22 as the relative value of co-payments increases from Ch.\$380 to Ch.\$1,430, respectively.

Table 2.6 *The effects on probability of changes in access variables*

Predicted percentage choosing	0.41
Urban	0.47
Rural	0.41
<i>RCMC (Chilean \$) ^a :</i>	
380	0.99
630	0.98
880	0.93
930	0.90
1180	0.62
1430	0.22
<i>Waiting time (in minutes):</i>	
30	0.50
60	0.49
120	0.46
180	0.44
240	0.41
300	0.39
360	0.37

^a Relative cost of medical consultations.

2.7 Conclusions

The analysis developed in the previous sections was intended to provide empirical evidence on the determinants in the choice of preferred providers among the publicly insured in Chile. Little if any evidence was available about the role of income and other variables reflecting the individual's attributes, family composition and access to medical care in this decision process. We examined these factors and estimated a model involving the expected utility gain that an individual could derive by demanding medical care from preferred providers.

From the results four aspects are particularly worth mentioning. First, the positive correlation between income and the probability of choosing preferred providers would suggest a level of segmentation in the preferred provider "market".³⁵ This segmentation is likely to be the result of the coexistence of two systems with a different structure of co-payments. While health care services are guaranteed at a reasonable cost for all those publicly insured through the public facility network, the access to preferred providers is limited by the higher value of co-payments. A system where a minimum package was guaranteed and additional services could be purchased freely would probably reflect more appropriately the solidarity principle on which the Chilean public health system is based.

A second important point derives from the effect of the relative value of co-payments on the choice of preferred providers. If, as we mentioned before, there is no difference between the available options in terms of efficacy of treatment, the lower cost of medical attention in public facilities constitutes a strong incentive to seek public provision. The government, on the other hand, has significantly reinforced this behaviour by reducing the percentage of co-payments according to income.³⁶ This policy, which could be consistent with the view that

³⁵ The existence of a level of segmentation in the preferred provider "market" is suggested not only by our estimates but also by statistics on the choice of the IHCS and preferred providers among the publicly insured by income deciles (see Table 2.C in Appendix 1).

³⁶ Since 1990 co-payments have been reduced by 60 percent for the publicly insured in income groups C and D. The scope of this reduction, accompanied by a positive real adjustment in price level rating I (the base for calculating co-payments under the IHCS), has produced an increment in the relative cost of medical consultations, making public provision more attractive.

the publicly insured have a reduced ability to pay, would be inconsistent with the offer of a preferred provider system. In fact, if the publicly insured in income groups C or D are believed to have difficulties covering the reduced value of co-payments under the IHCS, then they should find it even harder to afford the higher co-payments found in the preferred provider system, *ceteris paribus*.

The third point is associated with the effect on individual's choice of the rationing of health services via waiting time. Most of the opinion polls conducted among the publicly insured to evaluate their perception of public system performance, have shown users are extremely critical of what is seen as excessive waiting time, particularly at public primary health centres.³⁷ As we made clear in the introduction, we focused our analysis of the choice of those publicly insured on general medical consultations, which are provided at public health centres under the IHCS. In this context, if the negative sign of the coefficient for waiting time at such centres is seen as an underlying response to a degree of captivity of the publicly insured in public provision, the issue of waiting time should prove more important, as many public users have no real chance of opting for the preferred providers offered under the Chilean public health insurance system.

Finally, although many studies involving health care demand have treated the individual's maximising process in isolation, we followed a different approach by introducing some attributes of the family in the model. Several authors have suggested this approach. This strategy recognises that many of the restrictions faced by individuals are better understood in the context of the family. Families with more children appear less likely to choose preferred providers, probably reflecting the equivalent income effect that larger households may have a lower standard of living than smaller ones with the same income.

³⁷ This pattern of criticism is different to what may be found in countries like England where public opinion is mainly concerned at the length of waiting lists.

Appendix 1

Table 2.A. *Income ranges by income groups (1992)**

Income Groups	Income Ranges 1992 (Chilean \$)**
B	≤ 43,634
C	43,635 – 68,177
D	> 68,177

* Income group A not included.

** The average referential (*observado*) exchange rate for 1992 was Ch\$362.58 = US\$ 1.0.

Table 2.B. *Health services delivered by provider per 100 insured (1994).**

Health Services	IHCS	Preferred Providers	Total
Medical visits ^a	245.59	55.98	301.57
Diagnostic exams	330.25	60.02	390.27
Clinical procedures	8.25	35.29	43.54
Surgery procedures	9.13	1.01	10.14
Hospitalisation	80.28	6.95	87.23
Other services	84.96	0.10	85.06

* No figures available for 1992.

^a Includes medical visits in patients' domicile, medical visits to hospitalised patients and medical visits in public health centres.

Source: *Boletín Estadístico 1993-1994. Fondo Nacional de Salud (Fonasa). Chile*

Table 2.C. Choice of provider by income deciles: percentages by columns (1992).

Income deciles	IHCS	Preferred providers
1	73.88	26.12
2	75.18	24.82
3	61.36	38.64
4	62.20	37.80
5	64.23	35.77
6	49.62	50.38
7	45.73	54.27
8	31.96	68.04
9	31.03	68.97
10	22.22	77.78

Source: Author's calculations from the National Socio-economic Characterisation Survey, *Casen* 1992 (*Encuesta de Caracterización Socioeconómica Nacional*).

Appendix 2

Identification of public health insurance affiliation

A critical aspect faced by *Fonasa* has been the definition of the number of affiliates and beneficiaries, and particularly the segment of indigents. As explained previously, indigents have free access to the public health system and are classified as group A in *Fonasa's* system of income categories. In 1992 they represented 20.8 percent of all beneficiaries (about one million people).

Social workers in the municipalities have traditionally had the task of evaluating the condition of indigence or scarce resources of individuals domiciled in their locality, and providing them with identification to give them free access to health and other benefits.

Unfortunately many of those with public and private insurance and sufficient resources abused the public health system, passing themselves off as indigent. Such individuals used the emergency services in the public hospitals, which do not demand identification before they attend the patients. The result was a heavy financial burden for *Fonasa*.

To deal with this problem the information systems were re-designed and special attention paid to the issue of identifying beneficiaries. The new systems made it possible to raise its levels of beneficiary identification from 38 percent in 1995 to 90 percent in 1997, bringing the total of affiliates, dependants and indigents to 7.9 million. The new systems also made it possible to block access for about 2.5 million people who had had free access to the public service without being indigents. These measures allowed *Fonasa* to make savings of US\$2.2 million in 1998.

Cleaning up *Fonasa's* beneficiary data base and particularly dealing with the identification issue, has made it possible to develop and orient its services with more precision, thus helping substantially with structuring specific programmes focussed on the most vulnerable sectors of the population.

Appendix 3

Sample and population data

A comparison of the sample and population data in terms of age, income and health status is provided in the following tables. In Table 2.D we observe that the sample data concentrate a greater proportion of men and women over 55 years. This higher concentration can be explained by the fact that the sample is composed of men and women who reported being ill in the three months previous to the survey, and the probability of illness increases with age. Table 2.E, on the other hand, shows that the percentage of men and women by zone of residence is quite similar, and that the population is strongly concentrated in the urban zone.

Table 2.D *Population by age and gender (% by column)*

Age	Sample			Full data		
	Male	Female	Total	Male	Female	Total
15-24	81 (10.7%)	133 (11.6%)	214	13103 (25.2%)	12682 (24.4%)	25785
25-34	124 (16.4%)	142 (12.4%)	266	11858 (22.8%)	11362 (21.8%)	23220
35-44	97 (12.8%)	177 (15.4%)	274	9139 (17.6%)	9573 (18.4%)	18712
45-54	110 (14.5%)	219 (19.1%)	329	6445 (12.4%)	6083 (11.7%)	12528
55-69	182 (24.0%)	280 (24.4%)	462	7895 (15.2%)	6664 (12.8%)	14559
70 & +	163 (21.5%)	196 (17.1%)	359	3509 (6.8%)	5711 (11.0%)	9220
Total	757	1147	1904	51949	52075	104024

Source: Author's own calculations from *Casen* 1992.

Table 2.E *Population by gender and zone of residence (% by column)*

	Sample			Full data		
	Male	Female	Total	Male	Female	Total
Rural	267 (35.3%)	343 (29.9%)	610	15080 (29.0%)	14161 (27.2%)	29241
Urban	490 (64.7%)	804 (70.1%)	1294	36869 (71.0%)	37914 (72.8%)	74783
Total	757	1147	1904	51949	52075	104024

Source: Author's own calculations from *Casen* 1992.

Average monetary income by age, gender and income quantiles for both the sample and the population is presented in Table 2.F. With few exceptions, the *vis-a-vis* comparison by age group and income quantiles shows no significant differences in the average income of males and females in the sample data (see the upper part of Table 2.F). The same applies at population level (see the lower part of Table 2.F).

However, a cross comparison between the sample and the population data shows the average income for both males and females is higher in the latter, but only from the third to the fifth quantiles. This occurs because the sample data includes only *Fonasa* insured, whose average income is lower than the average income of both *Isapres* insured and beneficiaries of the armed forces insurance systems, who were excluded from the analysis.

Table 2.F Average monetary income by age, gender and income quantiles *

Age	Sample									
	Male					Female				
	Five quantiles of monetary income					Five quantiles of monetary income				
	1	2	3	4	5	1	2	3	4	5
15-24	19,420	41,019	52,324	71,598	362,865	19,006	41,523	51,858	75,662	149,795
25-34	22,038	41,431	52,659	73,365	163,601	27,795	41,199	52,592	69,853	132,500
35-44	22,326	41,495	52,990	74,263	263,318	13,733	40,951	51,854	72,399	213,548
45-54	26,705	41,561	52,852	78,988	185,268	20,745	40,215	51,222	73,199	182,340
55-69	21,573	43,058	51,724	76,321	230,031	21,546	42,968	52,148	74,230	198,657
70 & +	24,563	43,910	50,676	74,310	230,311	22,679	43,796	52,073	70,534	194,733

Age	Full data									
	Male					Female				
	Five quantiles of monetary income					Five quantiles of monetary income				
	1	2	3	4	5	1	2	3	4	5
15-24	16,360	41,036	61,814	86,187	227,665	14,214	41,072	61,586	93,382	226,375
25-34	19,303	41,681	64,391	91,103	311,977	17,520	41,297	60,616	94,011	305,403
35-44	19,194	41,956	62,631	100,929	367,824	16,598	41,158	58,050	100,469	262,597
45-54	17,970	42,180	62,032	103,070	330,570	17,814	40,870	61,983	95,411	333,125
55-69	19,421	40,010	64,738	94,893	307,390	18,422	41,943	61,355	94,647	286,362
70 & +	18,908	44,412	67,006	94,501	388,156	17,773	40,218	58,671	101,498	248,457

Source: Author's own calculations from Casen 1992.

* Individual monthly monetary income in Chilean pesos (Ch\$). The average referential (*observado*) exchange rate for 1992 was Ch\$362.58 = US\$ 1.0.

Turning now to health status, we use three measures to compare the sample and the population data: the condition of being ill, the number of general medical consultations and days of hospitalisation.

Table 2.G shows the number and percentage of individuals who reported ill at the time of the survey, by gender and age. As noted previously, the sample data concentrate a greater proportion of individuals above 55 years, so the percentage of individuals who reported being ill in these age groups is higher in the sample data, especially with respect to males. On the contrary, among the younger age groups the percentage of individuals who reported ill is relatively higher at population level.

Table 2.G *Individuals reported ill by age and gender (% by column)*

Age	Sample			Full data		
	Male	Female	Total	Male	Female	Total
15-24	81 (10.7%)	133 (11.6%)	214	2127 (22.6%)	2096 (14.4%)	4223
25-34	124 (16.4%)	142 (12.4%)	266	1343 (14.2%)	2745 (18.8%)	4088
35-44	97 (12.8%)	177 (15.4%)	274	2208 (23.4%)	2274 (15.6%)	4482
45-54	110 (14.5%)	219 (19.1%)	329	1022 (10.8%)	2125 (14.6%)	3147
55-69	182 (24.0%)	280 (24.4%)	462	1299 (13.8%)	2494 (17.1%)	3793
70 & +	163 (21.5%)	196 (17.1%)	359	1430 (15.2%)	2855 (19.6%)	4285
Total	757	1147	1904	9429	14589	24018

Source: Author's own calculations from *Casen* 1992.

Looking at general medical consultations by age and gender, we observe a rather similar picture to that found in Table 2.G. In fact, Table 2.H shows that this type of consultations is higher among the older age groups in the sample, compared to the full data. It is also worth noting that the common statement that women make more consultations than males cannot be directly inferred from the figures. It must be remembered, however, that general medical consultations do not include obstetrical care, one of the health services most required by women.

Table 2.H *General medical consultations by age and gender (% by column)*

Age	Sample			Full data		
	Male	Female	Total	Male	Female	Total
15-24	136 (9.2%)	294 (11.7%)	430	2541 (31.0%)	1179 (11.9%)	3720
25-34	217 (14.7%)	263 (10.5%)	480	1076 (13.1%)	1406 (14.2%)	2482
35-44	234 (15.8%)	387 (15.4%)	621	1349 (16.5%)	1461 (14.8%)	2810
45-54	223 (15.1%)	532 (21.2%)	755	947 (11.6%)	1836 (18.6%)	2783
55-69	341 (23.0%)	614 (22.4%)	955	1295 (15.8%)	2115 (21.4%)	3410
70 & +	330 (22.3%)	425 (16.9%)	755	984 (12.0%)	1892 (19.1%)	2876
Total	1481	2515	3996	8192	9889	18081

Source: author's own calculations from *Casen* 1992.

Finally, the percentage of days in hospital by age and gender follows, again, the same general pattern found with the other measures of health status (see Table 2.I). In this case, the older groups in the sample data show the higher percentage of days in hospital, thus reflecting a more ageing structure.

Table 2.I Hospitalisation -number of days- by age and gender (% by column)

Age	Sample			Full data		
	Male	Female	Total	Male	Female	Total
15-24	47 (3.3%)	37 (3.4%)	84	696 (10.2%)	1137 (15.5%)	1833
25-34	141 (9.8%)	72 (6.7%)	213	870 (12.7%)	1450 (19.7%)	2320
35-44	125 (8.7%)	144 (13.3%)	269	1227 (17.9%)	1205 (16.4%)	2432
45-54	213 (14.8%)	205 (19.0%)	418	922 (13.5%)	958 (13.0%)	1880
55-69	480 (33.4%)	268 (24.8%)	748	1879 (27.5%)	1442 (19.6%)	3321
70 & +	433 (30.%)	354 (32.8%)	787	1245 (18.2%)	1156 (15.7%)	2401
Total	1439	1080	2519	6839	7348	14187

Source: author's own calculations from *Casen* 1992.

References

Acton, J.P. (1975). "Nonmonetary factors in the demand for medical services: some empirical evidence". *Journal of Political Economy* 83: 595-614.

Akin, J.S., C. Griffin, D.K. Guilkey, and B.M. Popkin (1985). *The Demand for Primary Health Services in the Third World*. Rowan and Allenheld. Totowa, N.J.

Becker, G.S. (1965). "A theory of allocation of time". *Economic Journal* 75: 493-517.

Boletín Estadístico 1993-1994. Fondo Nacional de Salud. Chile

- Dor, A., P. Gertler, and J. van der Gaag (1987). "Non-price rationing and medical care provider choice in Côte d'Ivoire". *Journal of Health Economics* 6: 291-304.
- Gertler, P., and J. van der Gaag (1988). "Measuring the willingness to pay for social services in developing countries". *LSMS Working Paper* 45. World Bank. Washington, D.C.
- Gertler, P., L. Locay, and W. Sanderson (1987). "Are user fees regressive?" *Journal of Econometrics* 36: 67-88.
- Green, W.H. (1997). *Econometric Analysis*. Prentice-Hall, Inc.
- Grossman, M. (1972a). "The demand for health: a theoretical and empirical investigation". *Occasional Paper* 119. National Bureau of Economic Research. New York.
- . (1972b). "On the concept of health capital and the demand for health". *Journal of Political Economy* 80: 223-255.
- Hershey, J.C., H. Luft, and J. Gianaris (1975). "Making sense out of utilisation data". *Medical Care* 13 (10): 838-854.
- Hopkins, S., and M.P. Kidd (1996). "The determinants of the demand for private health insurance under Medicare". *Applied Economics* 28: 1623-1632.
- Leopold, J.R., and K.M. Langwell (1978). "The demand for health care with special emphasis on cost containment: a review of the literature", in *National Commission on the Cost of Medical Care, 1976-1977*. vol. 3. American Medical Association. Chicago.

- Lewis, C.E., and M.A. Lewis (1977). "The potential impact of sexual equality on health". *New England Journal of Medicine* 297 (16): 863-869.
- Lindsay, C., and B. Feigenbaum (1984). "Rationing by waiting lists". *American Economic Review* 74 (3): 404-417.
- Maddala, G. (1983). *Limited Dependent and Qualitative Variables in Econometrics*. Cambridge: Cambridge University Press.
- McFadden, D. (1981). "Econometric models of probabilistic choice", in C. Manski and D. McFadden (eds.), *Structural Analysis of Discrete Data: With Econometric Applications*. Cambridge, Mass.: M.I.T. Press.
- Muurinen, J.M. (1982). "Demand for health: a generalised Grossman model". *Journal of Health Economics* 1: 5-28.
- Propper, C. (1993). "Constrained choice sets in the U.K. demand for private medical insurance". *Journal of Public Economics* 51: 287-307.
- . (1989). "An econometric analysis of the demand for private health insurance in England and Wales". *Applied Economics* 21: 777-792.
- Scarpaci, J.L. (1988). *Primary Care in Chile: Accessibility Under the Military Rule*. University of Pittsburgh Press.
- Sindelar, J.L. (1982a). "Differential use of medical care by sex". *Journal of Political Economy* 90: 1003-1019
- van de Ven, W., and B. van Praag (1981). "The Demand for deductibles in private insurance: a probit model with sample selection". *Journal of Econometrics* 17: 229-252.

CHAPTER 3

Chapter 3

Private Health Insurance and Utilisation of Health Services

Abstract

This chapter analyses the choice of private health insurance and how this relates to the utilisation of health services. The results show the importance of some demographics on the insurance decision, particularly age, gender and marital status. Socio-economic factors such as education, income, employment status and zone of residence, all influence the probability of purchasing private insurance. The relevance of these determinants is confirmed using a simulation analysis with four representative decision-makers. This simulation also provides evidence of a positive selection into private insurance, although this would be driven by the different criteria used to set premiums under private and public insurance schemes.

The potential linkage between utilisation of health services and private health insurance is examined using a simultaneous two-equation framework. Two measures of utilisation are estimated: outpatient health services, and length of stay in hospital. A number of explanatory variables, selected on the basis of previous findings, were used to estimate these two dependent variables, and self-assessed health status and long-term activity limitations emerge as important factors in explaining utilisation. Private health insurance coverage positively affects only one of the two measures of utilisation: outpatient health services. This provides evidence of the moral hazard effect pointed out by Arrow (1963).

Key words: pre-paid health insurance plans, premium, health plan (policy), coverage.
JEL Classification: I11, I18.

3.1 Introduction

Although in Chile private pre-paid health insurance plans have offered an alternative to the publicly-provided health insurance since 1981, only two previous studies have looked at the factors underlying the choice of health insurance, and little (if any) empirical evidence exists of the relationship between this choice and the utilisation of health services.

Sapelli and Torche (1998) estimate a simple dichotomic model of insurance choice based on the 1990 and 1994 versions of the National Socio-economic Characterisation Survey, known as *Casen* (*Encuesta de Caracterización Socioeconómica Nacional*). According to this study, the most significant determinants of individual choice are income, age and zone of residence, but no evidence is provided on the effect of health insurance on utilisation. Sanhueza and Ruiz-Tagle (2002), using *Casen* 1996, estimate jointly a linear probability model (for the demand for health services) and a probit model (for health insurance), taking a utilisation index as a proxy for the demand for health services. They conclude that in the short-term there may well be a positive correlation between the holding of private insurance and the utilisation of health services.

We extend the previous studies in various directions. First, we provide a detailed description of the health insurance system, where private pre-paid health insurance plans compete with the public insurer in a publicly regulated scheme. This conceptual framework is important as the choice of health insurance itself depends on the institutional context in which the insurance system operates. Second, we carry out an in-depth analysis of the determinants in the choice of private health insurance making use of a more comprehensive set of variables drawn from *Casen* 2000.¹ The relevance of these determinants is further assessed using a simulation analysis with four representative decision-makers.

¹ This version of the *Casen* series covers a larger number of households and provides information not previously recorded on individual health status and functional limitations. It also records more detailed data on the utilisation of health services.

Finally, we examine the way in which private health insurance affects the utilisation of health services. To disentangle the health insurance effect, we take health services utilisation and private health insurance in a joint framework. We specify two measures of utilisation: *outpatient health services* and *length of stay in hospital*. As these measures are censored at zero and health insurance is assumed to be endogenous, we estimate a tobit censored model jointly with a probit model for the insurance equation.

Arrow (1963) suggests that the decision to purchase health insurance and the utilisation of health services are intertwined. Since insurance reduces the effective price of medical care, those insured would tend to use more health services (the moral hazard problem). Also, although individuals cannot perfectly predict their future demands, they are likely to have information about their health that could lead them to anticipate higher use of health services. Thus, not only do the levels of utilisation depend on the individual's health insurance coverage, but the level of coverage may also depend on anticipated utilisation (the adverse selection problem).²

A number of explanatory variables, selected on the basis of previous findings, are used to estimate utilisation. We also assess the influence of some factors hypothesised to be specific determinants of outpatient health services and length of stay in hospital, including: number of doctors per thousand population, number of public and private beds per thousand population and frequency of physical activity. The data for the number of doctors and public and private beds per thousand population were gathered from records maintained by the Ministry of Health. The information was structured by municipal districts and assigned to each observation in the estimated sample.

² According to Wilcox-Gök and Rubin (1994), if individuals anticipate a need for medical care and the decision to purchase private health insurance is affected by this anticipated need, then private health insurance coverage is determined simultaneously with the demand for medical care.

3.2 The health insurance system³

Since the inception of private pre-paid health insurance plans (known in Chile as *Isapres*, *Instituciones de Salud Previsional*) in the early 1980s, the number covered by private insurance has increased radically, to almost 20 percent of the population today. Nearly 67 percent of Chileans receive health benefits through the public insurer, the National Health Fund, known as *Fonasa*.⁴

Health insurance is compulsory, but individuals can freely opt for *Fonasa* or one of the *Isapres*. Whatever the option chosen the individual must contribute to financing the cost of insurance. This contribution currently stands at 7 percent of taxable income, although the privately insured can supplement this percentage to purchase a more comprehensive health plan. Health insurance is thus not a benefit provided by employers (corporate insurance), but a legal responsibility imposed by the state on all employees, and met from their pockets.

The public option offers complete coverage (on a standard quality base), and no class of exclusions or risk selection is applied. Indigents and low-income individuals are automatically covered by public insurance. Private insurance, on the other hand, offers higher quality coverage but imposes exclusionary clauses and limitations on pre-existing conditions, which restrict access.

The health insurance decision is not simple due to asymmetric information, most evidently in the private market. An individual requires substantial expertise and time in order to assess the relative costs and benefits of the multiple health plans offered by private providers. Things are simpler in the public sector, where the public insurer offers what we could call a single health plan, making its evaluation easier.⁵

³ This section relies partly on Kifmann (1998).

⁴ Of the remainder, 3 percent receive health insurance through the social programmes of the armed forces, and approximately 10 percent is thought to be self-insured.

⁵ Although purely public provision and preferred providers are available for the publicly insured, both the contribution (7 percent of taxable income) and the level of coverage are administratively fixed and unique under both public schemes. Therefore, we can properly talk of a single health plan under public health insurance.

The choice of private insurance allows individuals to opt out entirely from making contributions to public sector provision.⁶ This characteristic of the system implies that private insurance does not represent a complement (or substitute) for the benefits provided by the state, as in the United Kingdom, Australia or Switzerland, but a supplementary alternative that both provides and finances health care services. Purchase of private insurance does not, however, prevent utilisation of public facilities. Those who are privately insured can also use the public system, but must pay the cost of the services required.⁷

Currently the private health insurance system is composed of 18 *Isapres* and provides insurance to nearly 2.8 million individuals, of whom 1.25 million are policyholders. Using the compulsory contribution rate plus additional premiums, *Isapres* offer subscribers and their dependants both outpatient and inpatient medical care on a cost-sharing basis. Specifically, private insurance gives the insured a choice on hospitals and doctors.

The benefits provided by the *Isapres* are set in a very general form. The law only defines what relates to preventive care and non-medical costs, such as sick-pay benefits. But unfortunately there is no clear legal definition of a minimum benefit package that could be used to benchmark benefits in each individual policy. This, together with the lack of price regulation in the health care market, induces considerable price differences in physicians' fees and hospital charges. In this context, the *Isapres'* response has been to offer a great variety of health plans, each one entailing different arrangements on co-payments, coverage caps and access to specific providers.⁸ This constitutes a sharp contrast with the operation of private insurance markets in other countries. In Britain, for instance, the private market is dominated by a reduced number of firms and the type of

⁶ To some extent, those opting for private insurance continue supporting the public system through general taxes.

⁷ Self-employed can voluntarily purchase private insurance. If they are unable to do so, the public insurer automatically covers them.

⁸ This feature of the Chilean private health insurance system closely resembles the health insurance market in the United States.

contracts offered are broadly similar, with no more than two or three types of policies available. In Ireland, although new legislation has opened up the market to competing insurers, until year 2001 only the British insurer BUPA had entered the market. Insurers are obliged to operate community rating and a risk equalisation fund is to redistribute profits in order to offset the impact of any *cherry-picking* of younger, healthier subscribers.

The great variety of private health plans on offer in Chile is also the result of the compulsory contribution for health insurance. Since individuals must contribute 7 percent of their taxable income, *Isapres* have been forced to offer health plans adjusted to a wide range of specific situations. The plans vary according to the coverage provided and the clients' overall family health risk.

Premiums in the private market are set as community rates by groups, where age, sex and the number of dependants are the only legal factors the *Isapre* may use to estimate them. Basically, premiums are expected to reflect the expected costs of medical consumption. The benefit of a given policy is full or partial reimbursement of the medical costs of the treatments provided, but primary, long-term nursing, psychiatric and geriatric care are not covered by private policies.

Premiums in the public sector are set differently. The public insurer, *Fonasa*, offers a pre-fixed coverage at a single price - 7 percent of taxable income. No additional contributions are required. Benefits are independent of age, sex, health status or number of individuals covered. The mandatory contribution allows every individual, and his/her family group, to receive a fixed benefits package. All household members obtain the same coverage; benefits are independent of the premium. Moreover, the coverage offered by public insurance is not subject to exclusions, whether temporary or permanent, unlike the private system where the *Isapres* have imposed various restrictions on access to medical

care in the form of exclusionary clauses, waiting periods before certain benefits can be demanded, and zero coverage for pre-existing conditions.⁹

Although current regulations forbid the *Isapres* to cancel their contracts with older clients or discriminate against women of reproductive age, their pricing systems limit the entry of older individuals, whose medical care costs tend to be four or five times higher than those of younger age groups. Individuals over 64 not previously affiliated to an *Isapre* find it hard to get accepted as new clients. As a result nearly 70 percent of *Isapres'* clients are under 50, and only 4.3 percent are 65 or older.¹⁰ In the case of women of reproductive age, the premiums are between 1.5 and 4 times higher than for their male counterparts; and for both sexes the risk factors tend to rise exponentially from age 45 onwards.

Restricted coverage for some population groups occurs from the combination of two factors: market skimming and risk selection. From the start the *Isapres* have all aimed to exclude medium and lower income groups (skimming), and have achieved *ex ante* selection by setting high premiums.

Since in practice premiums are virtually fixed in terms of risk (given that only age and sex can be used as discriminating factors), the health plans and their price cannot be adjusted to reflect the specific risks of the individual. But by structuring the price of the programmes on offer, so as to generate profits over anticipated spending on the clients, *de facto* the *Isapres* can select the socio economic groups that offer the best opportunity for earnings.

Like market skimming, risk selection is a virtually inevitable result of the incentives in the model. The fierce competition forces the *Isapres* to concentrate not simply on the high-income end of the market but also on the low-risk categories, so they discourage the entry of clients with higher health risks who are

⁹ Following Propper (1989 pp. 778-779), if an individual applying for private insurance declares a pre-existing medical condition, the contract he/she is offered may exclude or limit the coverage for treatments arising from that condition.

¹⁰ Besides, since the private health plans are reviewed annually, the premium rises each time a client or one of his dependants reaches an age limit related to risk factors. Thus when most *Isapre* clients, including the wealthiest, reach retirement age, they can no longer afford to finance their health plan.

liable to generate higher medical costs. As noted, the *Isapres* may only differentiate premiums on the basis of age and sex, but since they are not obliged to accept any applicant, in practice they can pre-select by refusing applicants who represent higher risks (typically older people and those with chronic conditions). Over time, and by analysing their clients' risk profiles, the insurance companies can identify the levels of risk in their portfolio and re-design their health programmes, thus continuing to reduce their overall risk.

Termination rights are asymmetric in the private market. The *Isapre* cannot unilaterally terminate the contract, thus from their point of view policies run for an unlimited period. Policyholders, however, can end the contract after one year, and there are no restrictions on switching from the private to the public system. Individuals who terminate their contracts with the *Isapre* can immediately claim benefits from the public insurer.

The option to return to the public system has important implications for individuals' behaviour. Although in terms of outpatient benefits the public sector is relatively unattractive, compared with the private sector, the public sector offers satisfactory hospital care. Private insurance is therefore more valuable in the absence of a serious medical event, because it concentrates on relatively less expensive outpatient benefits. But if expensive treatment is needed, policyholders can return to the public system. In practice, this allows some strategic behaviour by individuals, as they purchase private insurance for outpatient health services while holding an implicit free public insurance for expensive inpatient care. As a consequence, the demand for (and offer of) catastrophic coverage in the private market is reduced. This behaviour can be interpreted as the rational response to the fact that most *Isapre* policies set ceilings on coverage for both individual benefits and overall benefits per year, which frequently leads to cases of low private coverage for expensive treatments.

3.3 Determinants of the health insurance decision

Econometric studies examining the choice of health insurance usually estimate the influence of factors frequently found in large-scale multipurpose surveys, such as the *Casen 2000* survey on which we base our study. *Casen 2000* contains satisfactory data on demographics, housing, education, income and employment, and information on individuals health status, including functional limitations and details on utilisation of health services.

We assess the significance of three demographic factors: age, gender and marital status. The inclusion of age derives from the underlying hypothesis that medical needs increase with age. As van de Ven and van Praag (1981) point out, young individuals or families tend to be relatively less well off but healthier, although they may anticipate higher medical expenses due to births and childhood illnesses. Middle-aged families or individuals usually improve their financial position, while the elderly commonly face deteriorating health. So it is reasonable to expect different tendencies in selecting private health insurance as individuals move through their life cycle.

The relevance of gender is in its influence on expected medical consumption. Females make greater use of medical services, particularly during their reproductive years, so they should value more highly the comprehensive coverage offered by private insurers. In Chile, 65 percent of private policyholders are males, since men represent a higher proportion of the labour force and are also lower risk than women. Also, married couples are more likely to have private coverage than single people, which is related to the extension of cover to children.

Three socio-economic variables are incorporated: education, income and employment status. Basically, more educated individuals should be better equipped to evaluate the multiple private health plans available and their differences from the single health plan offered by the public insurer. They would also be more conscious of the benefits of better-quality coverage. A simple cross-tabular analysis of the attributes of those privately insured shows that on average they have higher education levels.

The income of the decision-maker has proved relevant under different institutional arrangements governing health insurance systems [see Propper (1989) for England and Wales, van de Ven and van Praag (1981) for the Netherlands, and Cameron and Trivedi (1988, 1991) for Australia]. In Chile, the compulsory nature of health insurance and its public-private mix has produced some segmentation, as most high-income earners opt for private insurance. Even though low-income earners can access private insurance, they usually demand cheaper policies with lower levels of coverage. Under the public scheme income is not relevant since the coverage is fixed, so higher income does not provide higher benefits.

The influence of employment characteristics on the insurance decision is probably linked to the particular design of the health insurance system. Under universal, tax-financed schemes such as in the United Kingdom and Australia, employment status does not affect the individual's entitlement to medical care. In the United States, on the other hand, the health insurance market is mostly private and not everyone can afford the cost of insurance. Furthermore, an important fraction of health insurance policies are corporate (offered by the employer). Thus the type and characteristics of the employment could play an important role in the health insurance decision made by North Americans.

In Chile health insurance is compulsory, and every Chilean has the right to health coverage from the state. Hence employment characteristics should not play a decisive part in the decision to opt for public insurance. However, employment characteristics could become significant for those deciding to purchase a private health plan. The self-employed, for whom health insurance is not compulsory,¹¹ or those without a permanent job, could be less likely to purchase private insurance.

We also observe the effect of health status, which enters the estimation due to its probable impact on expected medical expenditure. A severe illness or a progressive deterioration of health could imply significant financial costs at some

¹¹ Only individuals who work as employees are obliged to make health insurance contributions. Individuals working independently are not subject to this mandatory scheme, although they can contribute voluntarily.

moment, or permanent outlays during a long period. In situations like these, health insurance becomes essential to help individuals defray treatment costs. Hence the decision-maker should evaluate carefully the cost and coverage of the policies offered by the alternative insurers. As we mentioned earlier, the public option in Chile is relatively unattractive in terms of outpatient care but it provides satisfactory hospital care.

The choice of private health insurance could also be influenced by individuals' attitudes to risk. Self-employed people, for example, could be regarded as less risk averse and therefore less likely to choose private insurance. However, individuals' attitudes to risk should be examined alongside the individual's own risk. More risky (and presumably costly) individuals could well find it harder to get accepted as new subscribers and consequently be less likely to purchase private health insurance.

Where the individual lives may also significantly affect his/her choice. In Chile most of the private providers who offer their services under the *Isapre* system are concentrated in urban areas, so urban residents would be more likely to opt for private insurance.

3.3.1 *Data and econometric estimation*

The data

The data set comes from *Casen 2000*, which is a representative sample of the Chilean population. *Casen 2000* introduced important changes with respect to earlier versions, of which the two most relevant for this study are: it contains information on a larger number of households (65,036 households equivalent to 252,748 individuals), and it provides more detailed information on individual health status and utilisation of health services. In the raw data 19.8 percent of individuals had private insurance, while 61.86 percent had public insurance. These figures are in line with administrative data (20 and 67 percent, respectively).

As the health insurance decision implies a choice between alternatives, we excluded observations describing indigents and very low-income people for whom the State provides free health insurance. We also deleted observations for individuals in the armed forces' health insurance regimes, and for the self-insured.

The data structure allows identification of each family member in relation to the head of household. Following Hopkins and Kidd (1996), one can visualise the household as an income unit consisting of a head plus his/her spouse and family members who depend on the head.

We defined the decision-maker as the head of household or his/her spouse. Three restrictions were imposed: the decision-maker had to be working (employed or self-employed); he/she had to be contributing to the social security system (including health insurance and pension); and he/she had to be at least 18 years old. Individuals under 18 were not considered because they are mostly full-time students living at home, and most are covered through their parents' health insurance plan, whether private or public.

The sub-sample utilised consists of 28,797 observations. Descriptive statistics of the variables included in the estimation, the definition of each variable and the default groups are presented in Tables 3.A and 3.B, respectively, in the Appendix. We shall now describe how we constructed these variables.

The dependent variable, *private*, is 1 if the head of household or his/her spouse declared as privately insured, and 0 if publicly insured. The definition of the dependent variable recognises the joint nature of the health insurance decision within the family where, for instance, cross-income effects can be relevant.

To capture the effect of age we use *age* and *age squared*, the latter being included to observe a possible non-linear effect of age on the probability of purchasing private insurance. We also use a dummy variable (*female*) to identify the individual's sex, which takes the value 1 if female and 0 if male.

To reflect individual's marital status we included a dummy variable, *married*, indicating 1 if the individual was married, and 0 otherwise.

Educational attainment enters the insurance equation as an indicator (0/1) variable, labelled *education*, which takes the value 1 for individuals with complete secondary education or higher at the time of the survey. Complete secondary education regularly implies thirteen years of schooling, which is above the schooling average in the sample. Considering the positive correlation between education and expected income, lower levels of education are presumably associated with the choice of public insurance.¹²

As the decision-maker is defined to be either the head of household or his/her spouse, we included both the income of the head, *income head*, and the income of the spouse, *income spouse*, expressed in Chilean pesos (Ch.\$).¹³ If the spouse is working he/she can be considered as a secondary worker, and the head of household could assume his/her income to be a secondary rent. This fact could induce cross-income effects, which in turn could have an impact on the insurance decision. In our data most heads are males, although a significant proportion of females are in the labour market. Some surveys, like the National Health Survey in Australia, follow the practice of treating the male as the head of household, but this practice is not observed in the *Casen* survey.

Two dummy variables characterise employment status: *self-employed* and *permanent job*. The first of these dummies takes the value 1 if the individual works independently and 0 otherwise. Since health insurance is not mandatory for the self-employed, they could present a different tendency to insure. For example, they could prefer to pay directly for medical treatment at the source of care. The second dummy identifies individuals who were in permanent employment at the time of being interviewed. This variable is included to take into account the importance of employment stability in deciding on a private health plan.

The influence of health status is estimated by including four dummies and one continuous variable. The dummies, *very good health*, *good health*, *bad health* and *very bad health*, account for four categories of self-assessed health status, the

¹² Overall, increases in both income and education would lead to an increased probability of taking out private health insurance.

¹³ The average referential (*observado*) exchange rate in 2000 was Ch\$539.49 = US\$ 1.0.

default being fair health status. These measures can be seen as reflecting a short-term health condition. The continuous variable, *functional limitations*, records the number of physical limitations among household members and is intended to capture long-term health status.

Since *Isapres* are allowed to set premiums by assessing certain observable risk factors, specifically age, sex and number of dependants, an interactive variable labelled *risk* was included in the insurance equation. *Risk* is the result of the interaction between the number of dependants on the head of the household and a continuous score built on the basis of age-sex factors provided by one of the largest *Isapres* in the market.¹⁴ These factors are applied to policyholders (and their dependants) as a means to measure how costly each client is. However, as individual-specific risk is not hundred percent identified off the observable risk factors, adverse selection is a potential problem which must be taken into account.

Finally, since private health insurance gives preferential access to private providers, who tend to cluster in urban areas, we included a dummy, *urban*, taking the value 1 if the individual lived in a major urban centre and 0 otherwise. This variable may reflect the availability of medical services to an individual and therefore may influence his/her insurance decision. Three major urban centres were considered: greater Santiago, greater Valparaiso and greater Concepción, which together account for 60 percent of the population of the country.

Econometric estimation

We model the choice of health insurance as a probabilistic one. Each individual is assumed to choose between private and public insurance after evaluating the difference in expected utility (ΔV) derived from the two options. This difference is hypothesised to depend on the set of variables discussed before.

Therefore, we can write,

¹⁴ The age-sex factors utilised are presented in Table 3.C in the Appendix.

$$\Delta V_i = f_i (\text{age}_i, \text{age squared}_i, \text{female}_i, \text{married}_i, \text{education}_i, \text{income head}_i, \text{income spouse}_i, \text{self-employed}_i, \text{permanent job}_i, \text{very good health}_i, \text{good health}_i, \text{bad health}_i, \text{very bad health}_i, \text{functional limitations}_i, \text{risk}_i, \text{urban}_i) \quad (1)$$

where the subscript i indexes the decision-maker. The general function above can be specified more formally as follows.

$$\Delta V_i = \beta' Z_i + \varepsilon_i \quad (2)$$

with β a $(K \times 1)$ vector of unknown parameters and Z_i a $(K \times 1)$ vector of the exogenous values of each explanatory variable for observation i . ΔV_i is not directly observed, we only observe the outcome 1 if $\varepsilon_i > -\beta' Z_i$ and 0 if $\varepsilon_i < -\beta' Z_i$.

The discrete nature of the health insurance decision suggests the use of a discrete choice model. As is well known, logit and probit models are frequently used to deal with binary dependent variables. Under the logit model, errors (ε) are assumed to follow a logistic distribution, while the normal distribution function is assumed for the errors in a probit model. These two distributions are very close to each other (almost indistinguishable) except at the tails, where the probit approaches extreme values more rapidly. Although we are not likely to get very different results when using either of the two, we opted for a probit model.

Probit estimates are presented in Table 3.1. The goodness of fit, measured by the pseudo- R^2 [McFadden (1974)], is satisfactory considering the qualitative and discrete nature of much of the data utilised in the estimation.¹⁵

¹⁵ Although the coefficients in Table 3.1 are not derivatives of the probability of *private* equalling 1, the signs of the coefficients are consistent with changes in the probability of *private* equalling 1.

Table 3.1 *Probit estimates for the choice of private health insurance*

Number of observations = 28,797
 Prob > chi2 = 0.000
 Pseudo R² = 0.28

Wald χ^2 [16] = 1,600.85
 Log Likelihood = -13,761.32

	Coefficients	Std. Errors	Z	P> z
<i>Constant</i>	-2.9431	0.2564	-11.475	0.000
<i>Age</i>	0.0550	0.0112	4.897	0.000
<i>Age squared</i>	-0.0006	0.0001	-5.332	0.000
<i>Female</i>	-0.2695	0.0717	-3.757	0.000
<i>Married</i>	0.1907	0.0510	3.736	0.000
<i>Education</i>	0.8890	0.0401	22.133	0.000
<i>Income head</i>	8.78e-07	8.60e-08	10.220	0.000
<i>Income spouse</i>	2.00e-06	3.39e-07	5.898	0.000
<i>Self-employed</i>	-0.9310	0.0881	-10.566	0.000
<i>Permanent job</i>	0.6181	0.0619	9.970	0.000
<i>Very good health</i>	0.1336	0.0618	2.162	0.031
<i>Good health</i>	0.0841	0.0377	2.228	0.026
<i>Bad health</i>	-0.2256	0.1438	-1.568	0.117
<i>Very bad health</i>	0.0433	0.4908	0.088	0.930
<i>Functional limitations</i>	-0.0553	0.0267	-2.068	0.039
<i>Risk</i>	-0.0379	0.0029	-12.768	0.000
<i>Urban</i>	0.2893	0.0333	8.685	0.000

From Table 3.1 we observe that the coefficient signs of *age* and *age squared* are consistent with the *a priori* expectations and both are statistically significant. These results are also consistent with administrative data that show that *Isapres* primarily sign up young and middle-aged individuals. Sapelli and Torche (1998), however, point out that age seems to have a rather low influence on the insurance decision, after observing a reduction in the age elasticity of the demand for private insurance between 1990 and 1994.

The differential impact of gender on the probability of choosing private insurance is quite clear. The negative and statistically significant coefficient for *female* tells us that women are less likely to purchase a private health plan. Generally, private insurers charge higher premiums to females of fertile age, since they anticipate higher medical consumption by women. Births and maternity make females more risky from the insurer's point of view, so premiums are adjusted to reflect their associated higher cost. Sample statistics show that of the total number of individuals choosing private health insurance only 34 percent are women.¹⁶

The positive and well-defined coefficient of *married* was as predicted. In essence, it is reasonable to expect that individuals become more risk averse once they get married and this in turn is presumably related to the extension of cover to children. Married individuals may thus give more weight to the quality of coverage from alternative insurance providers.

Educational achievement is highly significant, indicating that better-educated individuals are more likely to choose private insurance.¹⁷ This result confirms the underlying hypothesis that more educated individuals could be in a better position to assess the *pros* and *cons* of the health plans offered by the *Isapres*, which becomes important at the moment of selecting one. The private plans are complex and differ in many dimensions, including magnitude of co-

¹⁶ This figure makes sense if we consider that fewer women work, and that health insurance is compulsory only for those who are employees. On the other hand, married women can be covered by their husbands' insurance policies.

¹⁷ However, and interestingly, Grossman (1972a, 1972b) points out that more educated individuals have a more efficient production function of health, so they would have relatively better health and probably be less prone to contract any type of insurance.

payments, levels of reimbursement, and limits on expenditures *per year*. They also differ among insurers, so the evaluation of a health plan is not an easy matter.

The income variables, *income head* and *income spouse*, present positive and significant coefficients. This is consistent with the general pattern revealed by administrative data, where higher income is linked to an increased probability of being privately insured. Although relatively less important, *income spouse* reflects the positive cross-income effect on the insurance decision. The income of the spouse can supplement the household budget allowing the head to devote more resources to health insurance and other goods. We should note, however, that the coefficients of both *income head* and *income spouse* are small, implying that income has less importance than believed. In other words, we could assume that over the years private insurance has shifted from "luxury" to "essential" good.

Self-employed and *permanent job*, which describe employment characteristics, are strongly significant but with opposite signs. In interpreting results, van de Ven and van Praag (1981) and Propper (1989) have hypothesised that the self-employed would be less risk averse and therefore less willing to choose private insurance. However, under a compulsory health insurance regime like Chile's, this argument does not adequately explain our result for *self-employed*. Rather, the combination of a less secure or regular income flow associated with self-employment and the higher premiums observed in the private market could best explain the self-employed individual's lower probability of purchasing private insurance. Besides, the self-employed could prefer to self-insure and if medical treatment is needed, pay directly for it at point of demand.

The positive coefficient of *permanent job* indicates that employment stability increases the probability of choosing private insurance. Individuals with a permanent job can plan the future with more certainty compared with the self-employed. They should therefore find it easier to contract private health plans that offer them a higher level of coverage, but also higher premiums.

The results for the dummies accounting for self-assessed health status¹⁸ show that individuals who reported being in *very good* or *good health* are more likely to choose private insurance. However, the estimates for *bad* and *very bad health* provide no evidence to support the notion that individuals in poorer health would be more likely to choose public insurance. This is so even though a cross tabular analysis of self-assessed health status by type of health insurance shows that the numbers reporting *bad* or *very bad* health is higher, although only slightly, amongst those with public insurance (see Table 3.D in the Appendix). It must be noted that self-assessment of personal health tends to reflect primarily short-term health status, and could therefore be influenced by what the interviewed perceives is a very good, good, bad or very bad health.

Functional limitations, a proxy for long-term health status, have a negative and significant impact on the choice of private insurance. This result seems to be linked to the anticipated (and usually permanent) higher expenditures derived from physical limitations, and to the well-known fact that *Isapres* impose entry restrictions on individuals with pre-existent health conditions.

The negative and strongly significant coefficient of *risk* was as predicted. Since the factors (age, sex and number of dependants) combined to construct this interactive variable define how risky (costly) an individual is, higher values of *risk* result in higher private premiums (but not higher public premiums), which in turn reduce the probability of choosing private insurance.

Finally, the positive and statistically significant dummy variable *urban*, which defines whether or not an individual lives in a major urban centre, tells us that those who live in such areas have a higher probability of choosing private insurance. Given that most private providers tend to cluster in these centres, and that private coverage gives preferential access to private provision, urban residents are more likely to opt for private insurance.

¹⁸ We test for the joint significance of the four dummies for self-assessed health status and the result allowed us to reject the null hypothesis of non-significance at 1 percent level. Therefore, these dummies do belong to the insurance equation.

3.3.2 *Simulation analysis*

To assess the effect of changes in the determinants of the insurance decision on the probability of choosing the private option, we develop here a simulation analysis. The focus is on the impact of personal attributes (including age, sex, marital status, and health status), and income combined with employment characteristics.

Following Hopkins and Kidd (1996), we define a representative decision maker (RDM) as being male, 42 years old, married, with a permanent job, with completed secondary education and with an average income of Ch.\$255,142. His/her spouse has an average income of Ch.\$50,334. Both head and spouse self-report good health, and neither has physical limitations. The predicted probability associated with the RDM is 0.54.

Table 3.2 presents the results for changes in personal characteristics on the probability of choosing private insurance. We observe that as the RDM reaches retirement age (65), his/her probability of being privately insured reduces to 0.38 (a 30 percent decrease). This significant reduction simply reflects the restrictions faced by the elderly who wish to join private health insurance plans.

Likewise, an RDM in bad health has a lower probability of being covered by private insurance. In fact, his/her probability falls to 0.41 (a 24 percent reduction). Functional limitations also reduce the probability of the RDM being privately insured, but slightly (only a 6 percent reduction). These results, in conjunction with the estimates for age, seem to support the existence of a positive selection into private insurance: younger and healthier individuals are more likely to be attracted by private insurance providers.

On the other hand, the probability of choosing private insurance decreases when the RDM is single. We also observe that the results for a female RDM follow the same pattern as for a male RDM, although with lower probabilities.

Table 3.2 *The effect of age, sex, marital status and health status on the choice of private insurance.*

	<i>Probability of choice (%)</i>
Representative decision-maker (RDM)	0.54
RDM is now 65 years old	0.38
RDM is in bad health	0.41
RDM has a functional limitation	0.51
RDM is single	0.46
RDM is now female with all other characteristics as for a male representative decision-maker.	0.43
RDM is female & 65 years old	0.28
RDM is female in bad health	0.31
RDM is female & has a functional limitation	0.41
RDM is female & single	0.36

The simulation results for changes in income and employment characteristics are shown in Table 3.3. We see that as income increases, the probability of choosing private insurance increases significantly (from 0.54 to 0.74), evidencing the segmentation prevalent in the private health insurance market. The higher cost of private insurance and the higher quality coverage offered are a more attractive combination for high-income individuals. The *Isapres* have accordingly aimed most of their sales efforts at young, high-income individuals, who are frequently over-insured. Confirming the importance of cross-income effects, the probability of choosing private insurance increases (from 0.54 to 0.68) when the income of the RDM's spouse increases. This provides evidence of the collective (family-related) character of the health insurance decision.

Table 3.3 *The effect of income and employment characteristics on the choice of private insurance.*

	<i>Probability of choice (%)</i>
Representative decision maker (RDM)	0.54
RDM's income increases by 1 standard deviation	0.74
RDM's spouse's income increases by 1 standard deviation	0.68
RDM without a permanent job	0.30
RDM is now single	0.46
RDM is single & income increases by 1 standard deviation	0.67
RDM is single, without a permanent job	0.24
RDM is now female with all other characteristics as for a male representative decision-maker.	0.43
RDM is female & income increases by 1 standard deviation	0.58
RDM is female & spouse's income increases by 1 standard deviation.	0.64
RDM is female, without a permanent job	0.21
RDM is female & single	0.36
RDM is female, single & income increases by 1 standard deviation.	0.50
RDM is female & single, without a permanent job	0.16

The nature of employment also plays an important role in individuals' choice. An RDM without a permanent job is significantly less likely to choose private insurance; his/her probability falls to 0.30 (a 44 percent reduction) when compared with RDM's probability. The fact of not having a permanent job has a similar effect on the probability of choosing private insurance for each of the RDMs considered in Table 3.3. Those who work sporadically or in jobs subject to seasonal variations cannot contribute regularly, and although this does not affect their entitlement to public coverage it impedes them from taking out private policies. As before, we observe that the results for a female RDM follow the same pattern as for a male RDM, but with lower probabilities.

3.4 Private health insurance and utilisation of health services

Against the background of the previous section, we turn now to examine the linkage between private health insurance and the utilisation of health services. This relationship has been widely researched, and several studies show that health insurance coverage plays a significant role in the decision to use health services.¹⁹

Since the purchase of private health insurance in Chile is a choice, the potential endogeneity emerging from this decision must be taken into account. We use a two-stage procedure suggested by Maddala (1983) to estimate the influence of private insurance on two measures of utilisation: *outpatient health services* and *length of stay in hospital*.²⁰

The separate estimation of these two measures of utilisation is motivated by an essential fact: the substitution between outpatient and inpatient health care²¹ has been part of a deliberated public policy in Chile. Since the late 1980s the health authorities began to re-direct the health care model from hospital-based to ambulatory, health centre-based services. Thus, from the early 1990s there has been a decline in the average number of days in hospital with a rise in the number

¹⁹ See Harmon and Nolan (2001), Chiappori et al. (1998), Holly et al. (1998), van de Ven (1987).

²⁰ Descriptive statistics and the definition of these two variables are presented in Tables 3.A and 3.B, respectively, in the Appendix.

²¹ From a theoretical standpoint, there are a number of possible mechanisms for the substitution of outpatient care for inpatient services. One of these mechanisms is the prevention, or early detection, of illnesses that can be treated in primary care facilities, which may avert the need for inpatient or specialty care. Another is the prevention, or delay, of the need for inpatient care by the management of chronic health conditions, including routine monitoring/testing, medication management, and patient education that promote self-management. This substitution mechanism is likely to be more pronounced for patients with serious chronic illnesses and worse health status; although it will only be applicable for disorders that can be managed in the primary care setting effectively. A third substitution mechanism is the gatekeeping policy, which requires enrollees to obtain a referral from their primary care provider before their health plan will provide access to or pay claims for specialty visits. If primary care providers receive financial or other incentives from the health plan to maintain low referral rates, gatekeeping policies should reduce visits to specialist, although recent empirical evidence indicates that gatekeeping policies do not necessarily reduce the utilisation of specialty services. Alternatively, there are several possible mechanisms by which primary care could be a complement with other types of health services. One of these mechanisms is the utilisation of services that are truly supplemental or ancillary to primary care treatments, such as diagnostic laboratory tests. Another is the detection of illnesses discovered in routine screening in primary care (e.g., cancer, mental illness, etc.) that are not appropriately treated in primary care facilities or that should be co-managed with a specialist.

of discharges, while the percentage of use remains relatively constant. The results can be explained partly by the more detailed examination of patients in the ambulatory centres before they get to tertiary level (hospitals), a situation which is common in the private sector, and which makes it possible to take decisions faster.

Although there are no conclusive indicators to show how far health care has been made ambulatory, it has been possible to observe some effects. For example, there has been a rise in specialist consultations in relation to discharges, given that more problem-solving at primary and secondary levels reduces the need for hospitalisations. There has also been a rise in the number of elective surgery, given that pre-operation tests have been speeded up, thus reducing the waiting lists for hospital surgery.

The model to be estimated can be formalised simply as follows:

$$Y_1 = \alpha_1 X_1 + \beta_1 Y_2 + \varepsilon_1 \quad (3)$$

$$Y_2^* = \alpha_2 X_2 + \varepsilon_2 \quad (4)$$

where,

$$Y_2 = 1 \quad \text{if} \quad Y_2^* > 0$$

$$Y_2 = 0 \quad \text{otherwise}$$

Equation (3) describes utilisation of health services (Y_1) as a function of a vector (X_1) of explanatory variables²²; a dummy variable (Y_2), the realised value of the latent variable Y_2^* , which captures the propensity of individuals to buy private health insurance; and a random error term (ε_1). The latent variable Y_2^* is a function of X_2 and ε_2 (a random error term). The column vector X_2 contains the same set of explanatory variables previously estimated in section 3.3.1. X_1 includes a subset of the exogenous variables in X_2 plus some specific factors influencing only outpatient health services or length of stay in hospital.

²² Several variables included in X_1 have also been used in other empirical and theoretical studies on health services utilisation. For a summary of the empirical results of some studies see Leopold and Langwell (1978 pp. 53-58).

It must be noted that the model defined by equation (3) and (4) is identified even if the error terms (ε_1 and ε_2) are not independent and X_1 includes all the variables in X_2 .²³ However, some variables included in the first stage insurance equation were omitted in the second stage utilisation equation. We excluded those variables thought to be specific to the choice of health insurance: *self-employed*, *permanent job* and *risk*. *Income head* and *income spouse* were also excluded. Instead, we used only one measure of individual income (the monthly monetary income) labelled simply *income*. We also included a variable hypothesised to influence only outpatient health services, *doctor*, which accounts for the number of doctors per thousand population. Likewise, five specific variables were included in the equation for length of stay in hospital: *private beds*, *public beds* and three dummies, *sport1*, *sport2* and *sport3*. These variables stand for the number of private and public beds per thousand population, and the frequency of physical activity undertaken by individuals in the last month, respectively.²⁴

The two-stage procedure suggested by Maddala (1983)²⁵ implies the following: in a first stage a probit regression is used to generate a predicted value for the choice of private health insurance, which provides a correction for endogeneity. This predicted value, labelled *private-hat*, is then used as a regressor in the second stage estimation for utilisation. Since the two measures of utilisation are censored at zero, we use a tobit censored model in the second stage.

The results for both equations are shown in Table 3.4. It is worth noting that given that we use a generated regressor (*private-hat*), the standard errors are not strictly correct. Therefore, we compute bootstrap estimates for the standard errors of the coefficients (see Tables 3.E and 3.F, in the Appendix). According to Efron (1982), when the estimated bias is less than 25 percent of the standard

²³ For details, see the discussion of *Model 5* in Maddala (1983, pp. 120-121).

²⁴ Descriptive statistics and the definition of the new variables included in the equations for utilisation are shown in Table 3.A and Table 3.B, respectively, in the Appendix.

²⁵ Maddala (1983) describes this procedure in the context of a series of models in line with the larger class of models discussed by Heckman (1976, 1978) and further extended by Lee (1976).

errors, bias should not be a serious concern. In the outpatient equation, the estimated bias, as a percentage of the standard errors, fluctuated between 1% and 13 %, while in the length of hospital stay equation it ranged between 3% and 25%. Thus, the estimated biases in this case are nothing to take note of.

Table 3.4 *Tobit second-stage coefficient estimates of outpatient health services and length of stay in hospital.*

	<i>Outpatient health services</i>		<i>Length of stay in hospital</i>	
	Coefficients	Std. Errors	Coefficients	Std. Errors
<i>Private-hat</i>	1.0814 ^a	0.2003	1.4711	1.1551
<i>Age</i>	0.0186 ^a	0.0072	-0.2185 ^a	0.0416
<i>Age squared</i>	0.0003 ^a	0.00007	0.0032 ^a	0.0004
<i>Female</i>	1.9782 ^a	0.0502	5.2575 ^a	0.2952
<i>Married</i>	0.3512 ^a	0.0533	3.3721 ^a	0.3075
<i>Education</i>	0.2549 ^a	0.0683	0.5764	0.3891
<i>Income</i>	1.59e-07 ^a	5.60e-08	4.69e-07	3.04e-07
<i>Very good health</i>	-1.1615 ^a	0.1181	-1.9284 ^a	0.6805
<i>Good health</i>	-0.8434 ^a	0.0539	-0.8065 ^a	0.3072
<i>Bad health</i>	3.1661 ^a	0.1065	9.7508 ^a	0.5668
<i>Very bad health</i>	4.6858 ^a	0.2908	15.115 ^a	1.4403
<i>Functional limitations</i>	0.1351 ^a	0.0254	0.2840 ^b	0.1413
<i>Doctor</i>	0.6816 ^a	0.0806		
<i>Sport1</i>			-2.0712 ^a	0.7454
<i>Sport2</i>			-2.7150 ^a	0.4485
<i>Sport3</i>			-1.1011	0.8666
<i>Public beds</i>			1.1600 ^a	0.2112
<i>Private beds</i>			-0.0898	0.2860
<i>Urban</i>	0.2867 ^a	0.0752	-0.4069	0.3906
<i>Constant</i>	-7.6234 ^a	0.1692	-36.8221 ^a	1.0931

a: significant at 1%; b: significant at 5%; c: significant at 10%.

We observe that private health insurance has a strong positive impact on the use of outpatient health services, but has no significant effect on the length of hospital stay. Basically, the elements that influence the choice of private insurance correlate positively with usage of that insurance in outpatient health services. Although moral hazard could be influencing this particular result, we think that a reasonable explanation for the differential impact of private insurance on the two measures of utilisation relies on two main facts: first, while in terms of outpatient benefits the public sector is relatively unattractive, it offers satisfactory hospital care. Second, the legal framework governing the public option allows privately insured patients to return to the public system if expensive treatment is needed. Private insurance is thus more attractive in the case of outpatient care, as it concentrates on relatively less expensive ambulatory benefits.²⁶

Age proves to be an important determinant in both equations, although the pattern of influence is different. In interpreting the results, we find that outpatient health services seem to be part of the normal life, so individuals require these services steadily as they move through their life cycle. In contrast, the offsetting impact of age squared on age in the length of stay equation indicates that even though hospitalisations can occur at any age, the length of stay increases as individuals get older, when the stock of health depreciates.

Utilisation is also higher among females, consistent with the well-documented fact that women generally make greater use of the health system. Sindelar (1982a) shows that when utilisation is measured in monetary expenditure or physical quantity, women on average use more total medical services and more of each type, even after controlling for gynaecological and obstetric care and severity of illness.

Marital status has a significant impact on both measures of utilisation, in line with other empirical studies [Sindelar (1982b), Laroche (2000)]. Education, on the other hand, is positive in both equations but is well-defined only for outpatient health services. This last result is consistent with the hypothesis that

²⁶ This fact is also in line with administrative data, which show that privately insured tend to use relatively more outpatient health services than publicly insured.

better educated individuals would value more highly the benefits of using health services. But it differs from the view that higher education levels correlate with medical knowledge, so that more highly educated people would be capable of caring for their health more efficiently and therefore tend to make less use of health services.

Utilisation is also responsive to individual income. Both measures of utilisation increase as income increases. We observe, however, that the magnitude of the coefficient of income is rather low in both equations. This result is akin to that obtained by Cameron and Trivedi (1991), who find that income appears to be more crucial in determining health insurance choice than in explaining the utilisation of health services.

The pattern of coefficient signs and the significance of the four dummies accounting for individuals' self-assessed health status clearly show that a poorer health condition increases both the use of outpatient health services and the length of hospital stay. Conversely, better health conditions allow individuals to reduce the use of outpatient health services and the number of days in hospital.

The significant impact of self-assessed health status on the utilisation of health services contrasts with its rather low incidence in the insurance decision. In the utilisation equations self-reported health status seems to effectively capture the individual health condition, but it appears to be more closely related to risk in the insurance equation.

Functional limitations, on the other hand, significantly increase the use of outpatient health services and positively affect the number of days in hospital.

The positive and well-defined coefficient of *doctor*, a regressor specific to the outpatient health services equation, indicates that utilisation increases as the number of physicians increases. There is probably relatively more specialisation in areas where physicians are more numerous, so for a given number of potential patients each doctor would attend fewer cases, propitiating the so-called induced demand by physicians [see Pauly (1978)].²⁷

²⁷ Pauly (1978) deals in some detail with a model in which physicians manipulate the demand curve for their services in the presence of imperfect information.

The frequency of physical activity, described by the three dummies *sport1*, *sport2* and *sport3*, has a negative effect on the length of stay in hospital. This means that, once hospitalised, individuals who practice some physical activity on a regular basis tend to spend fewer days in hospital, providing evidence of the importance of sporting activities in improving individual health status.

On the other hand, length of stay increases with the number of public beds per thousand population, and decreases (but not significantly) with the number of private beds per thousand population. These results are consistent with sample data that show the average length of stay in public hospitals is 9.2 days, while in private hospitals it is 5 days.²⁸ Two main factors could help explain these results: first, the cost per day of public beds is far lower than the cost of private beds. Second, the absence of pre-surgical hospitalisation days in private compared to public hospitals, where in the latter patients may spend two or three days before the operation. This probably reflects the fact that patients in the private sector arrive with an established diagnosis, while public patients need to be re-diagnosed.

Finally, the dummy accounting for the condition urban/rural residence is statistically significant only in the outpatient health services equation. The positive sign of its coefficient indicates that urban residents tend to use more outpatient health services than rural ones. This result seems to indicate that where the supply of health services is regular and not subject to geographic or seasonal restrictions (as usually occurs in rural areas), the utilisation of outpatient health services is greater.

²⁸ The average length of stay by cause of hospitalisation and type of health insurance is presented in Table 3.G, in the Appendix.

3.5 Summary

In this chapter we looked at the choice of private health insurance and its relationship with the utilisation of health services. The study was based on the eighth version of the *Casen* survey series, *Casen* 2000. This large-scale multipurpose survey has been conducted by the Chilean government since 1985 to gather information to characterise the population in both demographic and socio-economic terms, to monitor social programmes, and to assess public policies.

We developed an in-depth analysis of the determinants of individual's choice and discussed the impact of private health insurance on the utilisation of health services. The results show the importance of some demographics on the insurance decision, particularly age, sex and marital status, and other factors such as education, income, employment status, risk and health status.

The estimates for age and self-assessed health status revealed a positive selection into private insurance (younger and healthier individuals are more likely to choose private insurance), although better measures of health status are required to test this point more precisely. It must be noted, however, that selection is driven by the different criteria used to set premiums under both insurance schemes: while private premiums are risk-adjusted, public premiums only reflect individual income level. This has been identified as a major structural problem that could be solved if the public insurer sets premiums contingent on its clients' risk, providing direct subsidies only to those who cannot afford the cost of insurance.

Since the utilisation of health services was hypothesised to depend, among other factors, on the type of health insurance, we estimated a two-equation model using a two-stage procedure suggested by Maddala (1983). Two measures of utilisation were analysed: outpatient health services and length of stay in hospital.

Empirical data from the Rand Health Insurance Experiment show that insurance groups with free ambulatory care had a non-significantly higher number of inpatient admissions than enrollees facing a US\$ 1.50 deductible for ambulatory

care. This, according to Phelps (1992), would suggest a trend toward a complementation effect between ambulatory and inpatient health care.²⁹

Interestingly, our results showed that individuals covered by private insurance tend to use more outpatient health services, but do not present longer stays in hospital. The first of these results seems to derive from the fact that private insurance provides better outpatient health services (usually less expensive compared to hospitalisation), while the public option offers satisfactory hospital care. Probably the restrictive policies implemented by private insurers prevent individuals who anticipate the use of expensive health services (like those generated by inpatient services) from purchasing private insurance, as they are unlikely to be accepted as new clients. Individuals who anticipate greater utilisation presumably also expect high out-of-pocket outlays, and if they cannot afford the higher cost of better quality coverage offered by private providers, they will probably select the less expensive option of public insurance.

Whether over-utilisation of outpatient health services by the privately insured is due to pure moral hazard, induced demand by physicians, or the result of the rationing of services prevalent in the public sector, is an empirical challenge that with the current available data is not possible to undertake. What is clear, however, is that over-utilisation has at least two important economic implications. First, private insurers usually respond to over-consumption by increasing premiums. Second, over-consumption commonly implies over expenditure in non cost-effective health services.

To tackle the moral hazard problem, some have argued that private insurers should complement copayments with deductibles. Of course, the potential benefits of such a policy depend on the effectiveness of deductibles in reducing excessive utilisation. If moral hazard is an important feature of health expenditure,

²⁹ Empirical findings from analyses of aggregate data have been mixed: some studies have found a substitution effect [Bindman et al. (1985)], while others do not [Goodman et al. (1997), Ricketts et al. (2001)]. Likewise, observational analyses of disaggregated patient-level data seem to provide strong evidence for a substitution effect [Falik et al. (2001)], while others do not [Gill et al. (2000), Petersen et al. (1998)].

then not only deductibles are socially acceptable, but they improve welfare. However, according to Chiappori et al. (1998), imposing to everyone some minimum deductible is inefficient because it reduces the scope of mutually beneficial insurance contracts, without any gain in terms of aggregate risk.

The long-term viability of the private market clearly relies on the possibility of both controlling opportunistic behaviour and skimming the market. The latter, however, will turn to be increasingly difficult as the *Superintendencia de Isapres* (the regulator) is currently introducing several modifications in the legal framework governing private insurance, which will impede *Isapres* from discriminating individuals on the basis of factors other than age and sex.

Appendix

Table 3.A *Descriptive statistics* (N=28,797)

	% of observations = 1	Mean	St. Deviation
Dependent variables:			
<i>Private</i>	26.15		
<i>Outpatient health services</i>		0.58	1.98
<i>Length of stay in hospital</i>		0.41	2.70
Explanatory variables:			
<i>Age</i>		42.17	10.97
<i>Female</i>	26.73		
<i>Married</i>	75.26		
<i>Education</i>	48.11		
<i>Income head</i> ^a		255,142	617,584
<i>Income spouse</i> ^a		50,334	184,535
<i>Income</i>		162.529	443.246
<i>Self-employed</i>	7.25		
<i>Permanent job</i>	85.64		
<i>Risk</i>		4.73	7.39
<i>Very good health</i>	5.95		
<i>Good health</i>	31.33		
<i>Bad health</i>	1.47		
<i>Very bad health</i>	0.15		
<i>Functional limitations</i>		0.13	0.76
<i>Doctor</i>		0.84	0.38
<i>Sport1</i>	4.03		
<i>Sport2</i>	14.71		
<i>Sport3</i>	2.80		
<i>Public beds</i>		1.98	0.66
<i>Private beds</i>		0.56	0.56
<i>Urban</i>	21.73		

^a Reported in Chilean pesos (Ch\$).

Table 3.B *Variable definitions*

Dependent variables:	
<i>Private</i>	Dummy: 1=private insurance, 0=public insurance
<i>Outpatient health services</i>	Number of outpatient health services demanded in the last three months. This includes general consultations, consultations to specialists, consultations due to emergencies, laboratory exams and x-rays exams.
<i>Length of stay in hospital</i>	Nights spent in hospital in the last year by those who entered hospital.
Explanatory variables:	
<i>Age</i>	Individual age in years
<i>Female</i>	Dummy: 1=female, 0=male
<i>Married</i>	Dummy: 1=married, 0=otherwise
<i>Education</i>	Dummy: 1=the individual has completed secondary education or above, 0=otherwise.
<i>Income head & income spouse</i>	Monthly monetary income of the head of household, and his/her spouse expressed in Chilean <i>pesos</i> (Ch\$).
<i>Income</i>	Monthly monetary income of the individual expressed in Chilean <i>pesos</i> (Ch\$).
<i>Self-employed</i>	Dummy: 1=the individual works independently, 0=otherwise.
<i>Permanent job</i>	Dummy: 1=the individual has a permanent job, 0=otherwise.
<i>Risk</i>	Interaction variable that measures individual risk. It was built using an index based on age and sex, multiplied by the number of dependants.
<i>Very good health, good health, bad health, very bad health.</i>	Dummies accounting for individual self-reported health status. The default category is <i>fair</i> health status.
<i>Functional limitations</i>	Number of functional limitations among household members.
<i>Doctor</i>	Number of doctors per thousand population
<i>Sport1 – Sport3</i>	Set of three dummy variables accounting for frequency of physical activity: (1) very frequently, (2) frequently and (3) occasionally. The omitted category is (4) never.
<i>Public beds</i>	Number of public beds per thousand population
<i>Private beds</i>	Number of private beds per thousand population
<i>Urban</i>	Dummy variable: 1=individual lives in a major urban area, 0=otherwise.
<i>Private-hat</i>	Predicted value for the probability of being privately insured.

Table 3.C Age-sex factors

Age group*	Policyholder		Dependants	
	Male	Female	Male	Female
0-1	0.8	2.56	0.92	0.79
2-5	0.8	2.56	0.84	0.71
6-20	0.8	2.56	0.37	0.56
21-25	0.8	2.56	0.37	0.97
26-30	1.0	3.17	1.5	1.19
31-35	1.0	3.17	1.5	1.19
36-40	1.0	2.93	1.5	1.08
41-45	1.0	2.76	1.5	1.08
46-50	1.36	2.76	1.5	1.08
51-55	1.36	2.75	1.5	1.21
56-59	1.96	2.75	1.5	1.21
60-64	1.96	4.13	3.5	1.86
65-99	3.92	4.13	3.5	1.86

* Factors for the age groups 0-1 and 2-5 (and partly those applied to ages below 15) constitute an administrative requirement established by the *Superintendencia de Isapres*.

Table 3.D Population distribution by type of health insurance and self-assessed health status (percentages).

Type of health insurance	Self-assessed health status				
	Very good	Good	Fair	Bad	Very bad
<i>Public</i>	9.7	58.05	28.3	3.4	0.3
<i>Private</i>	16.3	68.7	14.4	1.2	0.2

Source: Author's own estimates obtained from the sample data, *Casen* 2000.

Table 3.E Bootstrap statistics: outpatient health services equation

Variable	Observed Coefficient	Bias	Std. Error	[95% Conf. Interval]		
<i>Private-hat</i>	1.081418	.0069813	.1868323	.7059643	1.456871	N
				.7714884	1.448788	P
				.7714884	1.448788	BC
<i>Age</i>	.018602	.0002093	.0070247	.0044853	.0327187	N
				.0069276	.0335526	P
				.0069276	.0397387	BC
<i>Age squared</i>	.0003137	-7.71e-07	.0000726	.0001678	.0004596	N
				.0001777	.0004323	P
				.0001777	.0004323	BC
<i>Female</i>	1.978277	-.0027352	.0549466	1.867857	2.088696	N
				1.883827	2.070258	P
				1.883827	2.083183	BC
<i>Married</i>	.351256	-.0030293	.0519808	.2467967	.4557152	N
				.2604321	.428677	P
				.2604321	.428677	BC
<i>Education</i>	.2549363	.0040131	.0628795	.1285752	.3812973	N
				.1193906	.4002748	P
				.1193433	.4002748	BC
<i>Income</i>	1.59e-07	7.93e-09	6.20e-08	3.39e-08	2.83e-07	N
				4.43e-08	2.83e-07	P
				1.13e-08	2.77e-07	BC
<i>Very good health</i>	-1.161553	.0030959	.1294393	-1.421671	-.9014353	N
				-1.34953	-.8578193	P
				-1.34953	-.8578193	BC
<i>Good health</i>	-.8434877	-.0044194	.0544951	-.9529997	-.7339756	N
				-.9270409	.7602074	P
				-.926503	-.7437856	BC
<i>Bad health</i>	3.166198	.0027574	.1100321	2.94508	3.387316	N
				2.985139	3.374569	P
				2.965039	3.374569	BC
<i>Very bad health</i>	4.685832	.0108592	.4291095	3.823504	5.54816	N
				4.01875	5.462162	P
				3.976445	5.384478	BC
<i>Functional limitations</i>	.135103	-.0035995	.0298885	.0750399	.1951662	N
				.065792	.189895	P
				.065792	.1965394	BC
<i>Doctor</i>	.6816426	-.0008719	.0873033	.5062001	.8570851	N
				.5344408	.858408	P
				.5452478	.8744665	BC
<i>Urban</i>	.2867317	-.0091927	.0692617	.147545	.4259184	N
				.1683512	.3907648	P
				.1723509	.3993684	BC

N = normal, P = percentile, BC = bias-corrected

Table 3.F Bootstrap statistics: length of hospital stay equation

Variable	Observed Coefficient	Bias	Std. Error	[95% Conf. Interval]		
<i>Private-hat</i>	1.471146	-.0957531	.9790719	-.4963727 -.4480074 -.4480074	3.438665 3.097635 3.712802	N P BC
<i>Age</i>	-.2185924	.0019876	.0468486	-.3127382 -.3127777 -.3290548	-.1244465 -.1290799 -.1290799	N P BC
<i>Age squared</i>	.0032036	-.0000295	.0004494	.0023004 .0022994 .0022994	.0041068 .0040863 .0041313	N P BC
<i>Female</i>	5.257538	.0080687	.2650316	4.724937 4.785659 4.352704	5.790139 5.688996 5.660018	N P BC
<i>Married</i>	3.372118	.0239987	.3295546	2.709853 2.642194 2.642194	4.034383 3.99398 3.99398	N P BC
<i>Education</i>	.57646	0.0352897	.3059025	-.0382741 .0297335 -.0187879	1.191194 1.124712 1.122906	N P BC
<i>Income</i>	4.69e-07	-4.36e-08	2.34e-07	-1.43e-09 -3.09e-08 2.18e-08	9.40e-07 7.73e-07 1.12e-06	N P BC
<i>Very good health</i>	-1.928448	-.0415101	.5993046	-3.132796 -3.228251 -2.936841	-.7241006 -.8488153 -.2846493	N P BC
<i>Good health</i>	-.8065105	.0516244	.2736684	-1.356468 -1.240602 -1.52255	-.2565533 -.2138578 -.3289705	N P BC
<i>Bad health</i>	9.750882	.0336912	.6797783	8.384817 8.344883 8.083352	11.11695 10.81794 10.81794	N P BC
<i>Very bad health</i>	15.115	-0.1286134	1.646873	11.80549 12.12641 12.12641	18.42452 17.6837 17.6837	N P BC
<i>Functional limitations</i>	.2840275	-.0259626	.1237418	.0353591 .039786 .0760743	.5326959 .4953442 .5042887	N P BC
<i>Sport1</i>	-2.071258	-.0102567	.7763474	-3.631386 -3.699136 -4.046338	-.5111294 -.7895854 -.8806403	N P BC
<i>Sport2</i>	-2.715068	-.0946002	.3658531	-3.450277 -3.561649 -3.561649	-1.979859 -2.213953 -2.205231	N P BC
<i>Sport3</i>	-1.101127	-.1899809	.8413717	-2.791926 -2.916913 -2.778215	.5896729 -.0569668 -.0021314	N P BC

<i>Public beds</i>	1.160069	-.0316289	.2231599	.711613 .6646659 .8898992	1.608526 1.597487 1.68455	N P BC
<i>Private beds</i>	-.0898787	-.0071638	.2448602	-.5819437 -.4749837 -.4749837	.4021863 .398724 .5840049	N P BC
<i>Urban</i>	-.4069578	-.0783802	.4103062	-1.231499 -1.298752 -1.137781	.4175834 .2403799 .3133628	N P BC

N = normal, P = percentile, BC = bias-corrected

Table 3.G *Length of stay (days) by cause of hospitalisation and type of health insurance.*

Type of health insurance	Length of stay by cause of hospitalisation			
	Operation	Delivery	Medical treatment	Total
<i>Public</i>	9.6	4.4	11.9	9.2
<i>Private</i>	4.7	4.0	6.6	5.0

Source: Author's own estimates obtained from the sample data, *Casen 2000*.

References

- Arrow, K.J. (1963). "Uncertainty and the welfare of medical care". *American Economic Review* 53: 941-973.
- Bindman, A., K. Grumbach, D. Osmond, M. Komaromy, K. Vranizan, N. Lurie, J. Billings, and A. Stewart (1995). "Preventable hospitalizations and access to health care." *Journal of the American Medical Association* 274 (4): 305-11.
- Cameron, A.C., and P.K. Trivedi (1991). "The role of income and health risk in the choice of health insurance. Evidence from Australia". *Journal of Public Economics* 45: 1-28.

- Cameron, A.C., F. Milne and J. Piggott (1988). "A microeconomic model of the demand for health care and health insurance in Australia". *Review of Economic Studies* 55: 85-106.
- Chiappori, P-A., F. Durand, and P-Y. Geoffard (1998). "Moral hazard and the demand for physician services: first lesson from a French natural experiment". *European Economic Review* 42 (3-5): 499-511.
- Efron, B. (1982). *The Jackknife, the Bootstrap and other Resampling Plans*. Society for Industrial and Applied Mathematics. Philadelphia.
- Falik, M., J. Needleman, B. Wells, and J. Korb (2001). "Ambulatory care sensitive hospitalizations and emergency visits: experiences of medicaid patients using federally qualified health centers." *Medical Care* 39: 551-61.
- Gill, J. , A. Mainous III, and M. Nsereko (2000). "The effect of continuity of care on emergency department use." *Archives of Family Medicine* 9: 333-8.
- Goodman, D., E. Fisher, T. Stukel, and C. Chang (1997). "The distance to community medical care and the likelihood of hospitalization: is closer always better?" *American Journal of Public Health* 87 (7): 1144-50.
- Grossman, M. (1972a). "The demand for health: a theoretical and empirical investigation. *Occasional Paper* 119. National Bureau of Economic Research, New York.
- . (1972b). "On the concept of health capital and the demand for health". *Journal of Political Economy* 80: 223-255.
- Harmon, C., and B. Nolan (2001). "Health insurance and health services utilization in Ireland". *Health Economics* 10: 135-145.

- Heckman, J. (1978). "Dummy endogenous variables in a simultaneous equation system". *Econometrica* 46: 931-959.
- . (1976). "The common structure of statistical models of truncation, sample selection and limited dependent variables and a simple estimator for such models". *Annals of Economics and Social Measurements* 5: 475-492.
- Holly, A., L. Gardiol, G. Domenighetti, *et al.* (1998). "An econometric model of health care utilization and health insurance in Switzerland". *European Economic Review* 42 (3-5): 513-522.
- Hopkins S., and M.P. Kidd (1996). "The determinants of the demand for private health insurance under Medicare". *Applied Economics* 28: 1623-1632.
- Kifmann, M. (1998). "Private health insurance in Chile: basic or complementary insurance for outpatient services?". *International Social Security Review* 51: 137-152.
- Laroche, M. (2000). "Health status and health services utilization of Canada's immigrant and non-immigrant populations". *Canadian Public Policy-Analyse de Politique* 26 (1).
- Lee, L.F. (1976). *Estimation of Limited Dependent Variable Models by Two-Stage Methods*. Ph.D dissertation. University of Rochester.
- Leopold, J.R., and K.M. Langwell (1978). "The demand for health care with special emphasis on cost containment: a review of the literature", in *National Commission on the Cost of Medical Care, 1976-1977*. vol. 3. American Medical Association. Chicago.

- Maddala, G. (1983). *Limited Dependent and Qualitative Variables in Econometrics*. Cambridge: Cambridge University Press.
- McFadden, D. (1974). "The measurement of urban travel demand". *Journal of Public Economics* 3: 303-328.
- Pauly, M.V. (1978). "Doctors and their workshops: physician influences on the use of medical resources". Unpublished manuscript.
- Petersen, L., H. Burstin, A. O'Neil, E. Orav, and T. Brennan (1998). "Nonurgent emergency department visits: the effect of having a regular doctor." *Medical Care* 36: 1249-55.
- Phelps, C. (1992). *Health Economics*. New York: HarperCollins.
- Propper, C. (1989). "An econometric analysis of the demand for private health insurance in England and Wales". *Applied Economics* 21: 777-792.
- Ricketts, T., R. Randolph, H. Howard, D. Pathman, and T. Carey (2001). "Hospitalization rates as indicators of access to primary care." *Health & Place* 7: 27-38.
- Sanhueza, R., and J. Ruiz-Tagle (2002). "Choosing health insurance in a dual health care system: the Chilean case". *Journal of Applied Economics* 1: 157-184.
- Sapelli, C., and A. Torche (1998). "El seguro previsional de salud: determinantes de la elección entre seguro público y privado, 1990-1994". *Cuadernos de Economía* 106: 383-406. Pontificia Universidad Católica de Chile.

Sindelar, J.L. (1982a). "Differential use of medical care by sex". *Journal of Political Economy* 90: 1003-1019.

_____. (1982b). "Behaviorally caused loss of health and the use of medical care". *Economic Inquiry* 20: 458-471.

van de Ven, W. (1987). "An econometric model for the simultaneous estimation of the demand for medical care and the demand for health insurance". *Economic Letter* 24: 299-303

van de Ven, W., and B. van Praag (1981). "The demand for deductibles in private insurance: a probit model with sample selection". *Journal of Econometrics* 17: 229-252.

Wilcox-Gök, V., and J. Rubin (1994). "Health insurance coverage among the elderly". *Social Science and Medicine* 38 (11): 1521-1529.

CHAPTER 4

Chapter 4

Time Prices and the Demand for Primary Health Care in Chile

Abstract

In this chapter we study the demand for primary health care in Chile. In particular, we examine the demand for *preventive care* using a sample of urban children resident in the Metropolitan Region. Following Acton (1975), we assess the influence on demand of time prices and other demographic and socio-economic factors. Although not significant at conventional levels, the negative coefficient of *travel time price* would indicate that this non-monetary factor (and potentially other sources of time not controlled for in this study) could act, under certain circumstances, as a money price in discouraging demand. The magnitude of the *travel time price* elasticity is consistent with the range of time price elasticities found in high-income countries.

The greatest impact on the probability of demand proves to be associated with food collection, the child's nutritional status and prescription of medicines. Among the nutritional conditions, under-nourishment is the most important. The working status of the mother and economic variables such as earned and non-earned income, have no relevant impact on demand.

Key words: primary health care, preventive care, nutritional status, time prices.

JEL Classification: I10.

4.1 Introduction

This chapter focuses on primary health care demand for children. In particular, it examines the demand for preventive care¹ using a sample of 5,807 children resident in the urban area of the Metropolitan Region. This population group represents an important target from a policy perspective, and parents are strongly encouraged to monitor their children's health status on a regular basis.² Incentives operate in the form of food supplements, which can be collected by parents only if the child's health check card is up to date.³

Two previous analyses of primary health care demand (fully describe in the next section) have been carried out in Chile. The first, by Aedo (1995), concentrated on the determinants of rate and frequency of medical visits by children and adolescents in the three main regions of the country.⁴ He concluded that eligibility for nutritional programmes, age and nutritional status were the most relevant factors to explain demand. The second, by Makhlouf (1996), explored the effects on primary health care demand of non-monetary factors and other socio-economic and demographic variables using a sample of individuals under 18 years. Broadly speaking, her results were in line with Aedo's.

The empirical work in both studies was based on the third National Socio-economic Characterisation Survey, *Casen* (*Encuesta de Caracterización Socioeconómica Nacional*), for 1990.⁵ We use the same data source, but restrict the sample to individuals aged under 15. This restriction is conceptually important, as we work with children who, in paediatric terms, correspond to individuals between the ages of 0 and 14.

¹ The concept of preventive care refers here to regular health check-ups under well-child care activities. Thus, we use preventive care and health check-ups indistinctly along this chapter.

² It is widely recognised that inadequate paediatric care at an early stage of development is likely to have a particular detrimental influence on the child's current and future health.

³ The health check card contains records of health check-ups and the vaccination programme.

⁴ Under the umbrella title "medical visits", Aedo (1995) included ambulatory services, preventive care and medical visits due to accidents and illnesses. However, the demand for these different types of health services is likely to rely on a rather dissimilar set of theoretical assumptions.

⁵ *Casen* is the main source of socio-economic information on the Chilean population available for research purposes in Chile. The characteristics of this survey were discussed in chapter 2.

The main contribution of our work is the introduction of time prices into the analytical framework. We analyse whether the opportunity cost of travel time (measured by market wages) acts as a money price in discouraging demand.⁶ Market wages are derived from the Greater Santiago Employment and Unemployment Survey (*Encuesta de Ocupación y Desocupación del Gran Santiago*), an external source of information not previously used for similar purposes in Chile.

Among other factors examined, we also evaluate (on a disaggregated basis)⁷ the impact of the nutritional status of children on demand, as well as the empirical relevance of earned and non-earned income on the decision of parents to demand preventive care for their children. Furthermore, we assess whether parents who depend largely on state provision (public subsidies) are more likely to demand preventive care, given the existence of food incentives. Additionally, we examine the effect on demand of the number of primary health centres.

The chapter is organised as follows. Section 4.2 reviews two empirical articles on primary health care demand for children in Chile. Section 4.3 describes the Chilean primary health care sector. In section 4.4 we briefly discuss the role of time prices, taking into account various studies on health care demand. Section 4.5 introduces the underlying theoretical model of demand utilised in the study. In section 4.6 we describe the empirical implementation of the model and the data, and discuss the variables examined in the estimation. In section 4.7 we comment on the empirical results, including marginal effects and relevant elasticities. The summary and implications are presented in section 4.8.

⁶ Money prices can be defined in terms of the out-of-pocket outlays on medical attention plus the monetary cost of transport.

⁷ Aedo (1995) controlled for the nutritional status of the child using a dummy (1=non-normal nutritional status, 0=normal). We control instead, for the three non-normal nutritional conditions defined by the Ministry of Health: at risk of under-nourishment, undernourished and obese; the default being normal nutritional condition.

4.2 Two previous studies: Aedo (1995) and Makhoul (1996)

As noted before, Aedo (1995) focused on the determinants of rate and frequency of medical visits by children and adolescents in three regions of the country. The central hypothesis in this study is that demand and frequency for consultations and check-ups are affected by the family's socio-economic conditions and by the restricted access to nutritional programmes.

The conceptual framework in this study derives from the economics of household production theory developed by Gary Becker in the mid 1960s. Becker's approach argues that consumers derive satisfaction from the consumption of commodities produced by combining market goods and one's own time. In Becker's view, each household is considered a small factory that makes choices not just about standard consumption but also about production.

The implication of Becker's approach in Aedo's work is that health check-ups and consultations represent inputs used by members of the household to produce the commodity "state of health". These inputs are endogenous to the household, as is the quantity of protein and calories consumed daily, the children's educational level, the time given by the mother to the production of health, and so on. Other inputs would be exogenous, such as the parent's educational level.

For his empirical analysis Aedo uses a sample of 9,612 children and adolescents between 0 and 17 years from the urban and rural areas of Santiago, Valparaíso and Concepción. From the sample he estimates two equations: attendance at check-ups and medical visits, and the frequency of these, in both cases using a logit binomial model. The main problem with the first equation is that the concept of "medical visits" includes ambulatory services, preventive care and consultations required because of accidents and illnesses, but the demand for these different types of health services is likely to rely on a rather dissimilar set of theoretical assumptions.

The estimated equations incorporate a series of demographic and socioeconomic variables, including age, gender, number of children/adolescents in the household, relationship to head of household, nutritional condition, household

income and residential zone (urban/rural). He also incorporates a dummy variable indicating whether the child is over six years, in order to register the fact that from seven upwards children are no longer eligible for state food aid.

The econometric results show the probability of attendance is higher among men, reduces with the number of children/adolescents in the home, increases when the child presents nutritional problems, increases with the level of household income, reduces as the children's ages increase, and is higher among those in urban areas.

According to Aedo (1995) the higher probability of attendance among men is due to their relevance as the household workforce, which makes their health state crucial. Of all the variables analysed, nutritional condition has the highest impact on the probability of attendance.

In the estimates of frequency, as well as the previous variables, the schooling level of the head of household is included. Overall, both the sign and the significance of the coefficients are similar to those obtained for the attendance equation, although the significant negative coefficient for the variable head of household's educational level was unexpected. Aedo (1995) believes this result must be understood taking into account that the study also controls for household income. Thus if we take two children/adolescents of similar characteristics, including household income, but where the heads of household present different educational levels, the child from the household with the more educated head will show less frequent attendance for check-ups and visits.

Aedo's only policy recommendation derives from the positive impact of food supplements on children's health. The author proposes that a way of increasing the probability of attendance at check-ups and medical visits would be to expand the coverage for food supplements to children over six, which would have a positive effect on nutritional state and overall child health.

The second study, by Makhlouf (1996), explores the effects on primary health care demand of non-monetary factors and a set of socio-economic and demographic variables. Like Aedo, this work uses a model of dichotomic choice to estimate the probability of attendance at health check-ups. The empirical

analysis is based on a sample of 11,601 children and young people from 0 to 17 years living in the urban and rural zones of the metropolitan region. Unlike Aedo, Makhlouf (1996) uses only health check-ups and estimates two equations: one for those living in urban zones and one for those living in rural zones.

The results for the urban zone show that the probability of attendance at medical check-ups reduces as the child grows, as the number of children in the home between 6 and 17 increases, as the distance from medical centres increases, and where the mother works outside the home. The probability increases: if the child is eligible for food supplements, as the number of children in the household between 0 and five rises, as per capita income and permanent wealth increase, if there is domestic help, and (unlike Aedo's results), where the head of household has a higher educational level.

In the equation for rural areas, the sign and significance of the estimated parameters for the variables of age, collection of food supplements, number of children between 0 and 5 and between 6 and 17, distance from medical centres, family wealth (measured by home ownership), and mother's employment are similar to those in the urban zone model.

In discussing the impact of the variables in the two estimated equations for probability of attendance at check-ups, Makhlouf (1996) concludes that the possibility of food supplements and the child's age are the most important factors in the families' choices.

In the light of these results, Makhlouf (1996) recommends considering extending the coverage of food programmes to children over six, given the well-established impact of good nutrition on present and future health.

Both Aedo and Makhlouf thus recommend extending the coverage of food supplements (currently restricted to children under six). But such an extension would have high economic costs and, as we shall argue in this chapter, would not have a positive impact in the health of children over six. Indeed, experts have argued for reducing the coverage to children under four, although it is unlikely the authorities would be willing to pay the political cost of such a measure.

4.3 Primary health care in Chile: outline

Chile's well-established primary health care network is managed locally by municipal governments. Central funds and local budgets support the operation of this network. The Ministry of Health, through its Health Services Areas (HSAs), monitors the provision of medical services and ensures the local medical centres meet the technical standards established centrally. Funding of the municipal health centres is based on a system of payment per capita according to the population of each municipality, its socio-economic characteristics (rurality and poverty), and the volume of services effectively provided.

The current model of primary health care is the result of the reforms introduced in the early 1980s and early and mid 1990s. In this period, social policies were redefined following severe macroeconomic adjustments, structural reforms and state retrenchment. The orientation of social expenditure changed from universal coverage to programmes focused on the most vulnerable and deserving groups. In the health sector, priority was given to expanding primary health care, so investments shifted from hospitals in favour of primary health care facilities. As a result, the number of primary health centres increased in urban and rural areas, extending the coverage of basic health and nutritional programmes throughout the country, particularly for maternal and child health.

*Primary health care sector reforms*⁸

One of the key reforms in the health sector introduced in the early 1980s was the decentralisation of primary care from central to municipal level. This “*municipalisation*” process began in 1981 with the handover of the primary health care centres to local government. It occurred in two stages, from 1981 through

⁸ Here we provide only brief information. Details can be found in the Appendix of chapter 1.

1982, and in 1987⁹. The municipalities now took responsibility for providing primary health care programmes, with technical help from the HSAs.

An additional important reform was the change in the mechanisms used to transfer resources from the central level to the primary health care centres. Since 1978 the municipal-run primary health care network had been financed on a facility-specific basis for the amount and type of services provided. The mechanism, a retrospective one, consisted of a fee-for service system for reimbursement called *Fapem*. It included 15 categories of primary health care services, with precise levels of reimbursement per service within each category. *Fapem* transfers were expected to cover the costs of all goods, services, personnel and maintenance expenditures incurred in the process of providing medical care. However due to an explosion in costs a ceiling was established in 1983 for each municipality on a case-by-case basis.

The *Fapem* system and the cost ceilings introduced in 1983 created serious flaws in resource allocation. Basically, the reference prices used to calculate fund transfers, which were supposed to cover the full costs, were under-estimated and did not reflect the real value of the services provided; and the ceilings were not adequately adjusted for inflation and rising medical costs. As a result the municipalities began to be under-reimbursed, and their own spending levels rose progressively, reaching 34 percent of total primary health care costs in 1993.

On the other hand the *Fapem* system did not include incentives to improve service quality or contain costs. And since most preventive and promotional activities were not reimbursed, the emphasis was placed on curative rather than preventive health care. In the light of these flaws, *Fapem* was replaced in 1997 with a payment per capita system, based on the registered population of each primary health centre.

⁹ As a result of Chile's serious economic recession from 1982 to 1985, the handover of the medical centres was not completed until end 1987.

Preventive care and health promotion

Preventive and promotional activities such as vaccination, health and nutritional education and breast-feeding promotion, along with the distribution of food products, are administered at local (municipal) level under the Ministry of Health supervision. They form part of a national policy to deal with the twofold problem of poor health and malnutrition among high-risk groups.

The most important preventive intervention is the National Supplementary Feeding Programme, *PNAC*. Under this programme, powdered milk is distributed free for children between 0 and two years, and to pregnant and nursing women, conditional on attending to regular health check-ups. A milk-cereal dry mix is also distributed for children between two and five years. Children at risk of malnutrition receive a rice supplement in addition to the milk-cereal mixture.

The resources devoted to food supplements under primary health care are not negligible. Currently, *PNAC* costs about US\$43 million, almost 9 percent of total public health expenditure. It is argued, however, that the economic burden is economically less relevant than its expected biomedical benefits on the health of target groups. Moreover, the political visibility of *PNAC* makes most efforts to curb costs almost impossible.

Undoubtedly, the impact of preventive, nutritional and health promotion activities on target groups like children has been remarkable. Infant and child health have improved substantially, with deaths in the under-14 age group dropping from 48 percent of total mortality in 1960 to 5 percent in 1998 (10 in 1,000 live births). However, although the results for target groups may partly be explained by the success of specific public programmes carried out by the Ministry of Health, public investment in education, potable water and sanitation has also helped reduce the incidence of malnutrition and communicable diseases.¹⁰

Certainly, complementary public policies in relation to food programmes, access to health services and education are vital to the final goal – to increase

¹⁰ A detailed discussion of the influence of these factors can be found in Castañeda (1985).

human capital among the most needy groups. Mexico offers an interesting example with its *Progres/Oportunidades*, a programme for education, health and nutrition begun in 1997 to encourage the development of human capital in rural sectors of extreme poverty. The underlying premise of the programme is that investment in nutrition, health and education, focused on those most in need, will make it possible to break the inter-generational poverty cycle.

Progres provides health services and food supplements for children and women, and cash aid to the beneficiary families. Like the Chilean *PNAC*, the Mexican programme are dependent on the entire family complying with a calendar of vaccinations, pre-natal, post-natal and children's health check-ups, preventive check-ups for all the household, and obligatory attendance at educational sessions on health and nutrition.

Experts' assessments have demonstrated *Progres*'s positive impact in the areas of interest, that is, education, health and nutrition.¹¹ In terms of education, the programme has brought a significant rise in the number of children registering for school, both boys and girls, particularly for secondary education. The projections suggest this increase will result in an additional 0.7 years of schooling and an estimated 8 percent increase in income over the children's lifetime. In terms of health, both children and adults showed significant improvements. The child beneficiaries have 12 percent lower levels of illness compared with the control group, and the adults recorded a 19 percent fall in days lost for sickness. In relation to nutrition, *Progres* has significantly lowered the probability of low height for age among children from 12 to 36 months, and has increased calorie consumption and a better balanced diet.

The importance of the *Progres* results is to validate a design of social intervention that can act as a guide for reformulation or re-directing the different social programmes in much of Latin America.

¹¹ A summary of the impact of *Progres* can be seen in Skoufias (2000).

4.4 The role of time prices: evidence from the literature

Since the seminal work of Becker (1965), the role of time on individual decisions has been extensively examined, and analysis of the impact of time prices on the demand for health care has been of special interest.

Initially, the demand for a given health service was hypothesised to depend on its price, the prices of alternative services, household income, and tastes. These first formulations did not consider measures of time costs associated with the use of medical services, or individual characteristics such as age and education.

Acton (1973a, 1973b, 1975), Phelps and Newhouse (1974), Goldman and Grossman (1978), and Colle and Grossman (1978) modified those earlier models to allowing the inclusion of time and demographic variables. These authors also recognised the discrete nature of the decision process involved in demanding health care, thereby changing the econometric approach to the problem.

Acton (1975), in his empirical study on the effect of non-monetary factors on health care demand conducted in New York, used a utility-maximising framework but including into the budget constraint the Becker (1965) argument that there are time costs linked to consumption activities. He focused analysis on the role of time prices as a rationing device when insurance or public expenditure programmes reduce the out-of-pocket cost of medical care. In this context, non-monetary factors should assume an increasingly important role in determining individual demand. The results supported his major prediction: non-monetary factors such as travel distance would work just like prices in discouraging demand. Given this prediction, Acton (1975) argued that users of free medical services would be more sensitive to waiting and travel time than paying users. He found a travel-distance elasticity of -1.4 for outpatient services, which falls in the range of money price elasticities (between -0.2 and -2.1) found by Rosset and Huang (1973) and Newhouse and Phelps (1974, 1976).

Phelps and Newhouse (1974) superimposed a model of the demand for health insurance on the household production model to study the impact of the

coinsurance rate and the price of time on the demand for medical services. The empirical evidence they presented clearly rejected the assertion that coinsurance would be irrelevant in the decision process. Further, they showed the effect of coinsurance varied systematically across medical services, depending on the time price of the service. The predictions derived from this work were similar to that of Acton's (1975): goods with proportionally high-time price components and nearly complete insurance coverage should show relatively small money-price and coinsurance elasticities. Conversely, goods with a proportionally small time price and poor insurance coverage should be more sensitive to money-price or insurance coverage changes.

Goldman and Grossman (1978) took an hedonic approach to study the demand for paediatric care in two health districts in New York. They argued that quality differences were a distinguishing feature of the market for physicians' services. Accordingly, they estimated two demand equations: one for visits and one for quality. The effect of time was captured by costing the distance travelled by users to the health centre. To value the opportunity cost of travel time these authors used Fuchs's (1968) calculations of hourly wage rates of women aged 20 to 34 by race and years of formal schooling. Travel cost was not significant in the visit equation but was well-defined in the quality equation. An uncompensated (compensated) fixed travel-cost elasticity of -0.71 (-0.62) was found in this study.

Using a similar theoretical framework, Colle and Grossman (1978) analysed the determinants of paediatric care use in a national sample of American children between the ages of one and five. They focused on four measures of utilisation: the probability of a physician visit, the probability of obtaining preventive care, the number of office visits to private physicians, and the average quality of these visits. The theoretical justification for the inclusion of time variables in their model derived from the assumption that parents' time would be an important input in the production function of children's health. The relevant price for medical care should therefore contain both a money price component and a time price component. An interesting result in this study was that the time cost of a visit for mothers working outside the home at the time of the survey, had a

negative and statistically significant effect on the probability that a child obtained preventive care. Time cost elasticities were not reported.

The empirical estimations in the studies described were based on samples of individuals in high-income countries (specifically, the United States), but conditions in low-income countries can be substantially different. It has been argued, for example, that time prices should play a more relevant role in low-income countries since health care is usually provided at zero cost at point of demand. However, a first group of studies, including the work of Heller (1982), Akin et al. (1985, 1986) and Birdsall and Chuhan (1986), found very small and statistically insignificant price effects. Heller (1982) found low sensitivity to time and money prices for total annual preventive visits in a rural Malaysian sample. Akin et al. (1986), on the other hand, found travel distance and money prices were not nearly as important demand determinants for medical services in a rural region of the Philippines as had been assumed. The study by Mwabu (1994) in rural Kenya showed similar findings for the effect of travel distance. In fact, he found travel-distance elasticities of -0.079 for government facilities, -0.3 for mission health facilities and -0.24 for private health facilities.

Conversely, a second group of studies by, among others, Dor, Gertler and van der Gaag (1987), Gertler, Locay and Sanderson (1987), and Lavy and Germain (1994) concluded that time prices played an important role in the decision to demand health care services. The results for arc travel-time elasticities obtained by Dor, Gertler and van der Gaag (1987) in rural Côte D'Ivoire and by Gertler, Locay and Sanderson (1987) in Peru showed the important rationing effect derived from the location of health facilities in these two countries.

From the results described above, the time prices effect does not appear straightforward. Wherever health care is provided at zero or nearly zero cost at point of consumption, the conventional role of demand rationing is likely to be assumed by time prices. But the extent to which time prices effectively accomplish this function will depend on factors such as the organisation of the health system, particularly with respect to the spatial distribution of health care facilities, and the type of health services considered.

4.5 Model

What we describe here is a simplified version of the model developed by Goldman and Grossman (1978) to study the demand for paediatric care.

Since the sample we use is composed of children (individuals under 15 years), the incorporation of parents' utility into the analytical framework is highly appropriate. In this sense, it is assumed that parents maximise utility (U) over child health (h) and consumption of a composite good (m).¹² Thus,

$$U = U(h, m). \quad (1)$$

It is also assumed that child health is produced through a production function whose main inputs are given by preventive care (c) and a vector (z) of regressors that captures, among other factors, the age of the child, child's nutritional status, mother's schooling¹³ and mother's employment status. Hence,

$$h = h(c, z). \quad (2)$$

After replacing (2) into (1) we obtain the parents' derived utility function (V),

$$V = V(c, z, m). \quad (3)$$

Since parents' time is required to produce health and obtain medical care, the relevant price in the demand function for care contains both a money price component (p) and a time price component (wt), where w stands for the hourly wage rate and t is a measure of travel time. Defining I as the monthly monetary

¹² The composite good (m), the *numeraire*, has its price normalised to 1.

¹³ Colle and Grossman (1978) argue that parents' schooling is an obvious example of a home environmental factor in the production function of children's health.

income of the family and N as the non-earned income of the household, the budget constraint can be written as,

$$m + (p + tw)c = I + N. \quad (4)$$

Full family income ($I + N$) is exhausted in purchasing other goods and in financing preventive care. A family's monthly monetary income (I) includes the monetary earnings of the head of the household plus his/her spouse's earnings.

By solving for m in (4) and replacing it in (3), we obtain,

$$V = V[c, z, I + N - (p + tw)c]. \quad (5)$$

As demand equations are derived from the parents' utility function, the choice of the functional form in (5) is important. Many functional forms have been experimented but not all are consistent both with empirical health care demand patterns and with the rules of rational choice.¹⁴ Basically, estimation requires a stable utility function, which implies a functional form compatible with the behavioural axiom of preference maximisation.

Utility functions linear in health-related variables and quadratic in income, and utility functions linear in both health-related variables and income, but in which income interacts with provider-specific attributes, have proved to be stable. In our model all the (continuous) regressors enter the analysis in a simple linear form. Non-linearities in age were accounted for by including age squared.

Assuming that is not in the interest of doctors to induce preventive care, the relevant decision to be analysed is that of attendance/non-attendance. This decision is bounded between 0 and 1 so a limited dependent variable technique is used in the estimation. This technique allowed us to control for some of the variables frequently utilised to explain health care demand as well as for a set of other factors thought to be related to the demand for preventive care in Chile. All the regressors in the estimation are discussed in the next section.

¹⁴ See Mwabu et al. (1994).

4.6 Empirical formulation, data and variables in the estimation

4.6.1 Empirical formulation

The simplified model described before yields a system of demand equations in which the binary outcome attendance/non-attendance for preventive care is the variable to be explained. We use a logit procedure (based on a maximum-likelihood estimator) to estimate the probability of attendance (P_a) by the child population.

The probability of attendance is given by,

$$P_a = \frac{1}{(1 + e^{-bx})},$$

where b is a vector of logit coefficients and x a linear function of the following independent variables,

$x = x(\text{child's age, food supplements eligibility, child's nutritional status, availability of domestic help, family size, earned income, non-earned income, mother's schooling, mother's working status, money price, time price, prescription of medicines, eligibility for other public subsidies, primary health centres per thousand population by municipal district}).$

Many of the regressors above are dummies, so, a word of caution: basically, the use of binary variables in a regression framework makes it possible to work with a more flexible functional form. Following Aigner et al. (1975), if the underlying regression relationship is non-linear, the potential benefits from using dummies are clear, but not costless. However if the true relationship is linear, not only are there costs due to losses in degrees of freedom but also the fitted dummy function will represent a direct loss of information.

4.6.2 Data and variables in the estimation¹⁵

The data utilised in the estimation come from the *Casen* series. We made use of the third survey, *Casen* 1990. This version collected information from a random and stratified sample of 25,793 Chilean households, totalling 105,189 individuals in the 13 administrative regions of the country. We used a sub-sample of 33,886 urban individuals in the Metropolitan Region, which includes the capital Santiago. Since we were interested in the child population, we restricted the analysis to the 9,750 individuals aged below 15.¹⁶ The final sample, discounting missing values, was composed of 5,807 observations with a fair balance between females and males.¹⁷

The dependent variable, *preventive*, is defined as a dummy (0/1) that captures whether children in the sample attended regular health check-ups in the three months prior to the interview. This type of health care for children is provided at primary health centres and forms part of a set of preventive activities, including maternal check-ups, well-adult check-ups and health check-ups for individuals suffering from chronic diseases like hypertension and diabetes.

Most preventive action for children is provided to pre-schoolers, i.e. between 0 and six years. This group constitutes an important health policy target given its relatively greater vulnerability. Thus all children under seven have the right to receive free milk or other food products (depending on nutritional status), conditional on their attending regular health check-ups, as a means of reducing the possible malnutrition and its undesirable consequences.

The set of explanatory variables corresponds to those included in the linear function x (see previous subsection). Following the same order we have first the *age* of the child. The basic hypothesis here is that as the child grows older, the

¹⁵ A summary with the definition of each variable and the usual descriptive statistics are provided in Tables 4.A and 4.B, respectively, in Appendix 1.

¹⁶ See Lohr et al. (1986, chapters 4 and 5) for a detailed discussion of the different nature of the demand for physician visits for children and adults.

¹⁷ Since each individual in the sample population did not have equal probability of selection, each observation was weighted by the reciprocal of its probability of selection (probability weight) to obtain more efficient estimates.

parents' incentive to demand preventive care diminishes. We also included *age squared* in the estimation, as this diminution may be non-linear. As noted, only children up to six are eligible for food supplements, hence, we could expect a decline in the demand for preventive care per child once he/she has passed the six-year threshold.

On the other hand, since food supplements constitute an incentive for parents to take their children for health check-ups, we included a dummy (0/1) which accounts for *food collection*. The idea is to assess the impact of food supplements on the disposition of parents to demand preventive care for their children.

The child's nutritional status is another important factor considered in the analysis. *Casen* 1990 asked each household in the sample about the nutritional status of the children, following the classification provided by the Ministry of Health (i.e. normal, at risk of under-nourishment, undernourished, and obese). The percentage response to this question is quite high since the information is easily attainable. After each health check-up parents are provided with a record of the child's anthropometric measurements (weight, height and head growth) and his/her nutritional condition. To capture the effect of this biomedical factor we use three dummies: *biorisk1* for at risk of under-nourishment, *biorisk2* for undernourished, and *biorisk3* for obese, with the default being normal nutritional status. Children with nutritional problems are expected to be more likely to demand preventive care.¹⁸

We also observed the effect of the availability of domestic help on preventive care demand. Since mothers are generally responsible for taking children to health check-ups (a very time-consuming activity in Chile), and given that they are also usually in charge of most domestic chores, the possibility of some kind of domestic support could make the attendance at health check-ups more probable. A dummy (0/1), *domestic help*, takes account of this factor.

¹⁸ In turn, the child's nutritional status depends on a complex set of intervening factors. Popkin (1974) and Popkin and Solon (1976) discuss this point in detail using a sample of children from Cebu Island in the Philippines.

Family characteristics, frequently incorporated in many studies on health care demand, are also empirically examined in this study. We use *family size* to control for the fact that, *ceteris paribus*, larger families may be subject to a negative income effect so could be less prone to demand a voluntary (non-induced) health service such as preventive care.¹⁹

To control for the effect of income on parents' decisions we use two income categories: *earned* and *non-earned income*. These two continuous variables are measured in 1990 Chilean *pesos* (Ch.\$).²⁰ The first, which enters the estimation in per capita terms, includes all resources obtained from participation in the labour market: income from principal job, pensions, public subsidies, in-kind transfers, and others. The second, also defined in per capita terms, derives from sources other than the labour market: house rental, savings, shares, bonds and others. If preventive care is assumed to be a normal good, one should expect a positive correlation with non-earned income. The effect of earned income is not clear, because it depends on the time intensity of preventive care relative to other goods and services. In any case, since preventive care is provided free of charge earned income should work more like an income effect [see Acton (1975) pp.609].

Several studies have remarked the relevance of mothers' schooling as a positive factor affecting the efficiency in producing healthy children.²¹ Basically, a mother with a higher level of education is assumed to be better equipped to assess the benefits of meeting a regular programme of health check-ups for her children, and of providing them with healthy food (e.g. breast-feeding at an early stage) and a healthy home environment. In this context, we included the continuous variable *mother's schooling*, which stands for the years of formal schooling completed by mothers.²²

¹⁹ *Ceteris paribus*, as the family size increases a reduction in income per person may be verified and, therefore, a reduction in the use of medical services. For instance, according to Colle and Grossman (1978), an increment in the number of children in a family increases the cost of raising their average level of health and lowers the quantity of health care demanded.

²⁰ The average referential (*observado*) exchange rate during 1990 was Ch.\$309.4 = US\$ 1.0.

²¹ See for example Kessner (1974), Inman (1976), Edwards and Grossman (1977), Friedman and Leibowitz (1975), and Slesinger (1976).

²² In Chile eight years of schooling represent full primary education, 12 years imply completed secondary education, and 18 years of education mean a completed technical or university degree.

Another relevant factor in the analysis is the mother's employment status. Following Popkin and Solon (1976), the mother's working status and other time household constraints affect the use of health, nutrition and other welfare-related social services. The essential point is that mothers who work outside the home may have less time available to take their children to health check-ups. Preventive care in Chile is generally provided during the mornings from Mondays to Fridays under a restricted timetable, so mothers in the labour market may find it hard to comply with the programme of visits recommended by doctors. A dummy (0/1) variable, *mother at work*, is included in the estimation to account for the mother's working status.

Due to data restrictions, the money price (p) of preventive care was set to zero for all the observations in the sample.²³ However this obligatory procedure is consistent with the fact that preventive care is provided free to those in the public health insurance system. Private health insurance plans, on the other hand, allow their affiliates at least two free health check-ups per year as part of the benefits.²⁴ The privately insured can also access public health facilities paying a very reduced fee. In our sample 78 percent of the children who attended preventive care had public insurance coverage and 14 percent were children whose parents were covered under private health insurance plans. The remaining 8 percent was composed of children whose parents had no health insurance and for children whose parents were members of the armed forces. Children with no health insurance can access primary health care at zero cost in public facilities, while children whose parents belong to the armed forces are completely covered by the welfare programmes of the respective services.

As noted in the introduction, an important objective of this study is to assess the effect of time prices on the demand for preventive care. As Coffey (1983 pp.412) points out, the value of time in an activity is the opportunity cost of time in alternative activities. Thus, the value of market time, given by the wage

²³ As indicated in footnote 6, the money price of medical care also includes the cost of transport. Therefore, in setting p equal to zero we assumed, implicitly, that transport costs were zero.

²⁴ On average, the number of health check-ups fluctuates between one and two per person per year.

rate, is usually taken as a reference for the value of non-market or consumption time. For individuals who do not participate in the labour market the reservation wage should be utilised, i.e. the wage that would attract them to take a job in the labour market.

Casen 1990 asked each individual the time (in minutes) travelled to the closest health centre. On the assumption that mothers are typically responsible for the child, we defined the opportunity cost of travel time in terms of the mother's wage rate (w). Unfortunately *Casen* 1990 does not record information on individual wages, so we took wage indicators from the Greater Santiago Employment and Unemployment Survey for June 1990 (This survey has been conducted quarterly since 1960, and collects information on the employment status and wages of individuals resident in the greater Santiago, along with socio-demographic attributes such as age, sex and level of schooling). From this data set we calculated the average hourly wage rate of females by age and years of schooling completed. We used nine age categories (excluding females between 0 and 13 years of age who are not allowed by law to participate in the labour market) and four educational categories: none (zero years of schooling), primary (eight years of schooling), secondary (12 years of schooling) and post-secondary (more than 13 years of schooling).²⁵

Casen 1990 identifies each individual in the sample according to his/her relationship with the head of the household, thus we were able to assign each mother the corresponding average wage rate. As Goldman and Grossman (1978) observed, even if women did not work in the labour force, this procedure would be justified if the value of non-market time depended on age and years of formal schooling. Finally, we constructed the variable *travel time price* by multiplying the average hourly wage rate by the reported travel time (transformed to hours). This variable entered the estimation in logarithmic terms.

²⁵ As seen in section 4.4, Goldman and Grossman (1978) used the same strategy. In fact, they used Fuchs's (1968) calculations of hourly wage rates of women aged 24-34 by race and years of formal schooling completed.

The last three variables in the linear function x are prescription of medicines, eligibility for other public subsidies, and the number of primary health centres per thousand population in the respective municipal district. We included a dummy (0/1) accounting for *prescription of medicines* because there is some evidence that people assign a high level of importance to the fact of receiving a prescription. Scarpaci (1989) points out that a careful examination from the doctor and the prescription of medicines constitute the most relevant factors influencing Chilean users' perception of the quality of medical care.

Being eligible for other public subsidies is introduced to observe whether parents who depend largely on state provision are more likely to demand a free health service like preventive care. We used a dummy (0/1), *welfare*, which takes the value 1 if parents are beneficiaries of any kind of public subsidies (other than food supplements), and 0 otherwise.

Finally, we incorporated the continuous variable *health centres* to account for differences in access to primary health care. This variable records the number of primary health centres per thousand people operating in each municipal district. Since the location and number of these facilities depend to a large extent on the political will of the government, the potential risk of simultaneity in the interaction between demand and supply forces is not likely to be present.²⁶

Logit estimates of the probability of attendance for preventive care by the sample of urban children in the Metropolitan Region, along with marginal effects and elasticities, are presented and discussed in the next section.

²⁶ Colle and Grossman (1978) followed a different strategy and included in the empirical equation the number of physicians per hundred population interacted with the size of place of residence. Basically, they tried to estimate the size of the *availability effect* in the market for paediatric care. Pauly (1978) argued that the *availability effect* would be due in part to demand manipulation by physicians in the presence of imperfect information.

4.7 Empirical results

Before discussing the results we wish to comment on two issues that are relatively common in econometric studies. The first relates to the problem of sample selection bias, which results in biased and inconsistent estimates. Such bias is unlikely in our study because the sample used is highly representative of the population of children between 0 and 14 years of age. In fact, children in this age range in the urban area of the Metropolitan Region represent 43 percent of the urban national total. And although the study covers only the urban population there are no significant differences in the frequency of attendance for medical check-ups in urban and rural areas. However, given that we did not test statistically for the presence of sample selection, the interpretation of the coefficients can only be applied to our sample.

The second, related issue derives from the inclusion in the model of a potentially (endogenous) choice variable correlated with unobservables relegated to the error term. In our model the variable "food collection" could be seen as suspect. This variable is a dummy which captures two effects: the collection of food by the families, and, indirectly, the eligibility for nutritional programmes, since food is only provided to children under seven whose health check card is up to date. However, food collection is not properly speaking a choice since it is tied administratively to attendance for health checks, and is verified on the same day as the health check. These are therefore not two independent events that could be subject to separate decisions by the families²⁷, so the potential endogeneity of "food collection" can be discounted.

We believe that "food collection" has merely an intercept effect on the probability of attendance. Thus, the appropriate model includes the "food collection" dummy as a right-hand variable and a pool of the entire sample of

²⁷ The possibility could exist that families attend for check-ups but do not collect food. But figures from *Casen* 1990 show that approximately 65 percent of children between 0 y 6 who attend for check-ups collect their food entitlements.

children between 0 and 14 years of age. Because the entire sample is utilised, there are no sample selection issues here.

If one believes that “food collection” is endogenous and in some way or another children (in practice their families) self-select into the choice “collecting or not collecting” food,²⁸ then one should instrument for “food collection”. In this case, the “food collection” coefficient would answer the following question: “conditional on the X’s, what is the average effect of “food collection” on the probability of attendance”

But if one believes that the dummy “food collection” is endogenous and that it has not only an intercept effect but also a slope effect, then a sample selection model is called for. In this case, one should proceed to split the sample into children below and above 6 years of age and estimate the two equations accounting for the fact that each sample is a non-random sample of children below 15 years of age.

4.7.1 *Logit estimates*

Estimates of the logit model are presented in Table 4.1. As expected, both *age* and *age squared* are significant at 5 percent. The negative and positive signs of the coefficients of these two variables, respectively, confirm that the probability of attendance for preventive care is not linear in age. One could advance at least two possible explanations for this quadratic relationship. First, from a biomedical point of view, children become less vulnerable as they grow, so free health check-ups and food supplements become less effective. Furthermore, since the effectiveness of such public interventions decreases with age they are normally restricted to children under seven, thus reducing the access for older children.

²⁸ Self-selection does not only occur when individuals are in position to make a choice. It can also occur when, for example, the assignment of individuals to any type of welfare programme is made by a programme administrator on the basis of a given screening variable correlated with one (or some) of the X’s in the model.

Second, as parents become more knowledgeable and experienced in coping with the common medical problems affecting their children, their dependence on preventive and other sources of medical care is to some extent lessened. As a result, they would tend to demand relatively less health care for their children.

Table 4.1 *Probability of attendance for preventive care by children*

Number of observations = 5,807
 Prob > chi2 = 0.000
 Pseudo R² = 0.275

Wald χ^2 [16] = 663.97
 Log Likelihood = -2,015.10

	Logit Coefficient	Robust Std. Errors	Asymptotic t-ratio	P> t
Constant	-0.1381	0.3592	-0.385	0.701
<i>Age</i>	-0.3673	0.0463	-7.927	0.000
<i>Age squared</i>	0.0079	0.0038	2.095	0.036
<i>Food collection</i>	0.7926	0.1242	6.382	0.000
<i>Biorisk1</i>	-0.2288	0.2590	-0.883	0.377
<i>Biorisk2</i>	0.7899	0.2554	3.092	0.002
<i>Biorisk3</i>	0.2046	0.2848	0.718	0.473
<i>Domestic help</i>	0.8156	0.2554	3.193	0.001
<i>Family size</i>	-0.0850	0.0414	-2.050	0.040
<i>Earned income</i> ^a	6.65e-07	7.18e-07	0.927	0.354
<i>Non-earned income</i> ^a	4.04e-06	7.45e-06	0.543	0.587
<i>Mother's schooling</i>	0.0396	0.0162	2.444	0.015
<i>Mother at work</i>	-0.1638	0.1191	-1.375	0.169
<i>Travel time price</i> ^b	-0.0969	0.0596	-1.626	0.104
<i>Prescription of medicines</i>	1.1686	0.1322	8.838	0.000
<i>Welfare</i>	0.1817	0.1046	1.737	0.082
<i>Health centres</i>	-1.9761	3.6775	-0.537	0.591

^a Reported in Chilean pesos.

^b Chilean pesos per hour (in logarithmic terms).

The impact of food supplements on the probability of attendance for preventive care is clear. The positive and statistically significant coefficient of *food collection* shows the distribution of powdered milk to children under two and a milk-cereal mix to children in the two to five age group (and rice supplements to children at risk of malnutrition), constitutes a powerful incentive for parents to demand preventive care for their children.²⁹ Indeed this result is consistent with that obtained for age. Since children are eligible for food supplements only up to six years, it is reasonable to have found a negative tendency to demand preventive care as children grow older.³⁰

From the set of three dummies accounting for the nutritional status of the child, only *biorisk2* (which stands for undernourished) proved significant.³¹ This particular result was expected, since mothers of children facing malnutrition are strongly encouraged to follow a strict calendar of periodic visits in order to monitor their children's nutritional evolution. On the other hand, in explaining the low significance of *biorisk3* (obese children) one could invoke both technical and intuitive reasons. First, the calendar of visits recommended by doctors for obese children is less intensive; second, parents do not always associate obesity with an illness.³² This lack of awareness could reduce even further the frequency of health check-ups by this population group.

The positive effect of *domestic help* on the probability of demanding preventive care is confirmed by our results. To some extent the availability of some kind of domestic support provides a substitute for mothers' own time on domestic chores and child care. On this basis, mothers could have more time to take advantage of free preventive care and food supplements. Although the

²⁹ A detailed analysis of the impact of food supplements on pre-school children in Santiago can be found in Muchnik and Vial (1990).

³⁰ Breakdowns by age (0-2, 3-5 and 6-14) show the probability of attendance is greater for the first group (0-2), declines slightly in the second (3-5), and falls significantly in the third (6-14).

³¹ Although *biorisk1* and *biorisk3* were not statistically significant, they (including *biorisk2*) proved to be jointly significant at 5 percent. $\chi^2[3]=11.05$; $p>\chi^2[3]=0.0115$.

³² Lately several studies have reported an increasing prevalence of obesity among Chilean children. This new nutritional context should suggest a careful revision of the National Supplementary Feeding Programme, *PNAC*.

number of women willing to work in domestic service has declined in recent years in Chile, households can still obtain domestic help at a reasonable cost.

The result for *family size* was as predicted *a priori* and is consistent with findings in similar studies [see, e.g., Wedig (1988)]. The negative effect of larger families probably lies in its impact on per capita income.³³ In this context, a larger family may reduce medical consumption per person. Furthermore, even though preventive care is provided free at point of demand total out-of-pocket expenditure is likely to be positive, due to transport costs. The presence of these costs, not recorded by our data, could make access to medical care more difficult for members of larger families.

The two categories of income, *earned and non-earned income*, are unimportant determinants in the probability of attendance for preventive care. Since we assumed preventive care as a normal good, the positive coefficient of *non-earned income* was expected. However, the low significance and low magnitude of this coefficient indicate that income from sources other than the labour market plays a small role in the decision of parents to demand preventive care for their children. By the same token, the positive but not statistically significant coefficient of *earned income* gives partial support to the hypothesis that when medical services like health check-ups are provided free of charge, earned income would work more like an income effect on individual consumption.³⁴

The mother's years of formal education, captured by *mother's schooling*, influence positively (and significantly) the probability of demanding preventive care. Undoubtedly, these free medical services, along with information campaigns directed at mothers, represent explicit recognition of the importance of prevention

³³ The use of *family size* allowed us to observe the income effect of larger families on the probability of demand. Other studies have used family composition and examined the effect of the number of adults and children on the probability of demand. For example, Dor and van der Gaag (1987) conclude that more adults in the family can reduce the probability of demanding medical care, since adults normally provide home care.

³⁴ In contrast, Lohr et al. (1986) found that, among children, a higher income had a significant positive effect on the probability of seeking medical care for two preventive services: vision examination and general medical examination.

in child health. However the degree to which mothers are more or less conscious of this well-documented fact presumably depends on their educational level.

The dummy accounting for the working status of mothers (*mother at work*) proved to be not statistically significant at conventional levels. However, it is worth noting the potential impact of mothers' time taken away from household activities on the health and nutritional status of the child. Basically, when mothers participate in the labour market the amount of time available for household activities (particularly for very time-consuming ones such as child care and breast-feeding) is likely to decline. Likewise, mothers who spend large hours working outside the home are frequently less able to collect food on a regular basis from food programmes. Indeed, and following Popkin and Solon (1976), the magnitude of the effects derived from the mother's labour participation on the nutritional status and health of the child, will be determined by the extent to which her job is compatible with child care, by the quality of child care available from substitutes, and by the availability and quality of both social services and market-purchased goods, which provide substitutes for mothers' time.

An important objective of this study was to examine the effect of time prices. In particular, the value of travel time was hypothesised to act as an alternative mechanism to regulate demand, given the absence of money prices [see Acton (1975)]. This presumption is partly supported by our results. In fact, from Table 4.1 we observe that, although negative, the coefficient of *travel time price* is not statistically significant (at least for significance levels below 10 percent). Two factors could help explain this result. First, the reported travel time (in minutes) presented a relatively low variance across observations. This low variance probably reflects the policy of locating primary health centres close to users' home. Second, our procedure of assigning a wage rate to females (mothers) who were outside the labour market based on age and years of schooling, could be inadequate to capture appropriately their reservation wages. For example, if the reservation wage falls during pregnancy or during the breast-feeding period, the wages assigned to mothers in these conditions could overestimate their relevant reservation wages. To account for this possibility, it would have been necessary to

control for the pregnant (or breast-feeding) status of females in the original data on wages (Greater Santiago Employment and Unemployment Survey). Unfortunately, this survey does not record information on these conditions.

The well-defined coefficient of *prescription of medicines* conforms to *a priori* expectations. The high significance of this variable tells us that parents assign great value to the fact of receiving prescriptions for their children when taking them to health check-ups. This is so even though medicines are not free for all. On the other hand, the positive result for *welfare* (although less well-defined), indicates that parents who are recipients of public subsidies are more likely to demand preventive care for their children. The gratuity of preventive care seems to constitute a strong incentive for parents who depend largely on state provision. Colle and Grossman (1978) obtained the same effect for their dummy accounting for welfare programmes' recipients in the particular case of preventive care. However, they made clear that beneficiaries of welfare programmes could find substantial barriers to seeing specialists or to making a relatively large number of paediatric visits to physicians.

Although not statistically significant, the result for *health centres* deserves a couple of comments. First, the availability of primary health centres appears to play a small role in the decision of parents to take their children to preventive care. Second, the negative coefficient of this variable is likely to reflect the rather complex nature of the relationship between supply and the demand behaviour of individuals. Municipal districts with a relatively higher number of primary health facilities probably face a greater pressure for the different types of medical attention provided under primary health care. This pressure usually results in large queues, so parents facing excessive waiting time could be less willing to demand preventive care for their children from their local health facilities.

4.7.2 Marginal effects and elasticities

Marginal effects and estimates of elasticities are shown in Table 4.2.³⁵ The empirical equation used to estimate elasticities was specified the same way as that of Table 4.1. We calculated marginal effects because they allow us to observe the impact of changes in the explanatory variables on the probability of attendance. The greatest impact is produced by *food collection*, the condition of being undernourished (*biorisk2*), *domestic help* and *prescription of medicines*.

The delivery of food supplements increases the probability of attendance by 7.5 points. Aedo (1995) obtained a similar result, and as a policy recommendation suggested extending the eligibility for food supplements beyond the threshold of six years. However, the potential impact of a policy like this is moot. Basically, food supplements are intended to cover food requirements during children's most vulnerable years, and this is consistent with the current threshold. Furthermore, the impact of this measure on costs would probably make it unaffordable for a middle-income country like Chile.

The impact of malnutrition on the probability of attendance is quite strong. While being at risk of under-nourishment (*biorisk1*) increases the probability of attendance by 2.1 points, being undernourished (*biorisk2*) increases this probability by 7.5 points. These results support the hypothesis that the more severe the nutritional condition of the child, the higher the probability of demanding preventive care.

The availability of *domestic help* increases the probability of demand by 7.7 points. As we noted before, taking children to health check-ups is a very time-consuming activity, which to some extent competes with other household duties. The possibility of some kind of domestic support can thus alleviate the pressure on mothers' time, making it possible for them to comply with regular health check-ups for their children.

³⁵ The derivation of the formula to calculate elasticities is presented in Appendix 2.

Table 4.2 *Marginal effects from logit and elasticity of change in probability*

Number of observations = 5,807
 Prob > chi2 = 0.000
 Pseudo R² = 0.275

$\chi^2[16]$ = 1,005.05
 Log Likelihood = -2,015.10

	Marginal Effect	Elasticity of Change in Probability (at the mean)
<i>Age</i>	-0.0349	-1.8983
<i>Age squared</i>		
<i>Food collection</i>	0.0754	0.1511
<i>Biorisk1</i>	-0.0217	-0.0057
<i>Biorisk2</i>	0.0751	0.0152
<i>Biorisk3</i>	0.0194	0.0055
<i>Domestic help</i>	0.0776	0.0147
<i>Family size</i>	-0.0080	-0.2986
<i>Earned income^a</i>	6.33e-08	0.0164
<i>Non-earned income^a</i>	3.85e-07	0.0078
<i>Mother's schooling</i>	0.0037	0.2686
<i>Mother at work</i>	-0.0155	-0.0384
<i>Travel time price^b</i>	-0.0092	-0.2976
<i>Prescription of medicines</i>	0.1112	0.1067
<i>Welfare</i>	0.0172	0.0805
<i>Health centres</i>	-0.1880	-0.0393

^a Reported in Chilean pesos.

^b Chilean pesos per hour (in logarithmic terms).

Prescription of medicines has a significant impact on demand. In fact, if parents are given prescriptions for their children the probability of attendance increases by 11.1 points. This result was highly foreseeable because both public and private health insurance offer very limited coverage for costs derived from prescriptions.

In examining the magnitude of the elasticities we observe that the probability of demanding preventive care appears to be inelastic with respect to

the nutritional status of the child. A similar conclusion applies to *domestic help*, *earned* and *non-earned income*, working status of the mother (*mother at work*) and the fact of being recipient of public subsidies (*welfare*).

Our result for the *earned-income* elasticity differs substantially from those observed in low-income countries. Chile, however, is a middle-income country so many of the circumstances prevalent in low-income countries do not strictly apply in this context. The magnitude of the *earned income* elasticity found in our study (0.016) approaches more closely the results for income elasticities observed in high-income countries (values between 0.2 and 0.3).

On the other hand, the demand for preventive care seems to be relatively elastic with respect to age. This result derives from the fact already noted that the eligibility for food supplements is associated with children's age.

Finally, a rather similar range of elasticities is observed for the variables *family size* (-0.29), *mothers' schooling* (0.26) and *travel time price* (-0.29). The magnitude of the *travel time price* elasticity is highly consistent with the relatively low value obtained for the *earned income* elasticity (following the relationship between price and income elasticity derived from the Slutsky decomposition) and with the range of price elasticities found in high-income countries (-0.2 to -2.1).

4.8 Summary and implications

As noted by Bitrán and McInnes (1993), analysis of preventive care demand requires a rather complex, yet mostly unexplored, set of assumptions about individual behaviour. Considering this theoretical shortcoming, we used a simplified version of the utility maximisation model developed by Goldman and Grossman (1978) to study the demand for paediatric care.

Besides the common set of variables utilised in previous empirical studies on demand for children's primary health care in Chile, the equation model estimated here included several explanatory variables not previously examined. Particular importance was given to time prices, captured by the opportunity cost of travel time. Other relevant controls incorporated were food collection, the

nutritional status of children (analysed on a disaggregated basis), family size and earned and non-earned income. We also assessed the effect of prescription of medicines, the condition of being recipient of public subsidies and the number of health centres, on the probability of demand.

The results shed light on some interesting points. First, given the spatial distribution of health centres, travel time would not be a relevant determinant in the decision to demand preventive care. Measurements of waiting time would probably be more appropriate to capture the role of time. Since waiting time has been recognised as a major problem by users, its potential contribution to the non-monetary cost of medical care could be significant. Unfortunately *Casen* 1990 did not collect information on this particular source of time.

From a policy perspective a second important point derives from the combined effect of age and food collection. Since the demand for preventive care is quite sensitive to age, and given that food supplements have been found to be more effective at an early stage of child growth and development, it would make sense to consider a reduction in the age threshold for food supplement eligibility.^{36, 37} A measure like this would allow the authorities to focus resources (food and physician hours at primary health centres) on the children most vulnerable to nutritional deficits.

A reduction in the age threshold for food eligibility could imply, in turn, a reduction in the rate of preventive care for older children. However, this indirect effect could be overcome by providing free (or reduced price) prescriptions to users. The empirical support for a policy like this comes from the positive correlation found between medicine prescription and probability of demand. Of course the costs of such a policy could be substantial, but probably lower than the political costs of reducing the age threshold without a complementary measure.

³⁶ The study by Torche et al. (1995) supports this recommendation. They concluded that the impact of the National Supplementary Feeding Programme, *PNAC*, is greater in children under three years.

³⁷ Since the coefficient on food collection is in fact a coefficient on the interaction of eligibility for food supplements and receipt of these, it cannot be freely inferred from this what the impact of a change in food supplement policy would be, except for the group who are currently eligible.

A third and potentially relevant aspect in the results in Table 4.1 comes from the negative, although not statistically significant, coefficient of health centres. If, as discussed in the previous section, a higher number of health centres is associated with higher demand, parents facing problems in getting timely medical attention for their children could consider transferring their demand to other municipal districts creating a new focus of potential congestion. In a policy perspective, therefore, the number and spatial distribution of health centres should not depend, even partly, on the political will of the authorities. Instead, they should respond to demand criteria and resources constraints.

Appendix 1

Table 4.A. *Variable definitions*

Variables	
<i>Dependent variable:</i>	
<i>Preventive</i>	Dummy variable: 1=children have attended regular health check-ups in the three months preceding the survey, 0=otherwise.
<i>Explanatory variables:</i>	
<i>Age</i>	Continuous variable accounting for the age of the child in years.
<i>Food collection</i>	Dummy variable: 1=parents collected food supplements, 0=otherwise.
<i>Biorisk1-Biorisk3</i>	Set of three dummies reflecting child's nutritional status: <i>biorisk1</i> for at risk of under-nourishment, <i>biorisk2</i> for undernourished, and <i>biorisk3</i> for obese. The default is normal nutritional status.
<i>Domestic help</i>	Dummy variable: 1=the household has some kind of domestic support, 0=otherwise.
<i>Family size</i>	Continuous variable indicating size of family group.
<i>Earned income</i>	Per capita monthly monetary income of the family, expressed in 1990 Chilean <i>pesos</i> . It includes income from main job, pensions, public subsidies and in-kind transfers.
<i>Non-earned income</i>	Income derived from sources other than participation in the labour market. Expressed in 1990 Chilean <i>pesos</i> , and includes: house rental, savings, shares, bonds, etc.
<i>Mother's schooling</i>	Continuous variable standing for years of formal schooling completed by the mother.
<i>Mother at work</i>	Dummy variable: 1=mother working in the labour market, 0=otherwise.
<i>Travel time price</i>	Natural logarithm of the variable resulting from multiplying the reported travel time by the average hourly wage rate (Chilean <i>pesos</i> per hour).
<i>Prescription of medicines</i>	Dummy variable: 1=children received prescription, 0=otherwise.
<i>Welfare</i>	Dummy variable: 1=recipient of public subsidies other than food supplements, 0=otherwise.
<i>Health centres</i>	Continuous variable standing for the number of public health centres per thousand population in the respective municipal district.

Table 4.B *Descriptive statistics* (N=5,807)

Variables	% of observations = 1	Mean	St. Deviation
<i>Dependent variable:</i>			
<i>Preventive</i>	18.92		
<i>Explanatory variables:</i>			
<i>Age</i>		6.94	4.27
<i>Food collection</i>	25.62		
<i>Biorisk1</i>	3.34		
<i>Biorisk2</i>	2.58		
<i>Biorisk3</i>	3.61		
<i>Domestic help</i>	2.42		
<i>Family size</i>		4.72	1.34
<i>Earned income^a</i>		33,123.94	56,676.54
<i>Non-earned income^a</i>		2,593.63	6,102.01
<i>Mother's schooling</i>		9.11	3.91
<i>Mother at work</i>	31.58		
<i>Travel time price^b</i>		4.1276	0.8769
<i>Prescription of medicines</i>	12.27		
<i>Welfare</i>	59.53		
<i>Health centres</i>		0.0267	0.0247

^a Reported in Chilean pesos.

^b Chilean pesos per hour (in logarithmic terms).

Appendix 2

Derivation of elasticities in a logit model

Under discrete choice models the usual formula to calculate elasticities, defined as the percentage change in variable Y with respect to a percentage change in another variable X , is given in probabilistic terms. Since binary logit is a special case of multinomial logit, the probability of success can be defined as follows,

$$P_j = \frac{e^{\beta'x_j}}{1 + e^{\beta'x_j}}. \quad (1)$$

where β is the parameter vector and x a vector of regressors. Subscript j identifies the alternative associated to success (in our particular case, the attendance for preventive care). A general expression for the elasticity (ε) can be therefore expressed as,

$$\varepsilon = \frac{\partial P_j}{\partial x_k} \frac{x_k}{P_j}. \quad (2)$$

The partial derivative in the right hand side of (2) corresponds to the marginal effect of variable k of vector x on the probability of success. Using (1) the marginal effect is given by,

$$\frac{\partial P_j}{\partial x_k} = \frac{(1 + e^{x'\beta})(e^{x'\beta})\beta_k - e^{x'\beta}(e^{x'\beta})\beta_k}{(1 + e^{x'\beta})^2} = \frac{e^{x'\beta}}{(1 + e^{x'\beta})} \frac{1}{(1 + e^{x'\beta})} \beta_k. \quad (3)$$

Replacing the expression for P_j shown in (1) in (3), the marginal effect reduces to,

$$\frac{\partial P_j}{\partial x_k} = P_j(1 - P_j)\beta_k. \quad (4)$$

The elasticity is obtained simply by completing the expression in (2) using (4). Doing this we finally get,

$$\varepsilon = (1 - P_j)\beta_k x_k. \quad (5)$$

The formula in (5) may be calculated using the means of the variables in vector x and the predicted probability (P_j), or as an average of all individual elasticities. We opted for the first method.

References

- Acton, J.P. (1975). "Nonmonetary factors in the demand for medical services: some empirical evidence". *Journal of Political Economy* 83: 595-614.
- . (1973a). "Demand for health care among the urban poor with special emphasis on the role of time". *Memorandum R-1151-OEO/NYC*. Rand Corporation. Santa Monica, CA.
- . (1973b). "Demand for health care when time prices vary more than money prices". *Memorandum R-1189-OEO/NYC*. Rand Corporation. Santa Monica, CA.
- Aedo, C. (1995). "Determinantes de la tasa de consultas de salud del niño y del adolescente". *Revista de Análisis Económico* 10 (1): 53-70. Ilades/Georgetown University.

- Aigner, D.J., A.S. Goldberger, and G. Kalton (1975). "On the explanatory power of dummy variable regressions". *International Economic Review* 16 (2): 503-510.
- Akin, J.S., C. Griffin, D.K. Guilkey, and B.M. Popkin (1986). "The demand for primary health care services in the Bicol region of the Philippines". *Economic Development and Cultural Change* 34 (4): 755-782.
- . (1985). *The Demand for Primary Health Services in the Third World*. Rowan and Allenheld. Totowa, N.J.
- Becker, G.S. (1965). "A theory of allocation of time". *Economic Journal* 75: 493-517.
- Birdsall, N., and P. Chuhan (1986). "Client choice of health treatment in rural Mali". Population and Human Resources Department, World Bank. Washington, D.C.
- Bitrán, R., and D.K. McInnes (1993). "The demand for health care in Latin America: lessons from the Dominican Republic and El Salvador". Economic and Development Institute, World Bank. Washington, D.C.
- Castañeda, T. (1985). "Determinantes del descenso de la mortalidad infantil en Chile: 1975-1983". *Cuadernos de Economía* 66: 195-214. Pontificia Universidad Católica de Chile.
- Coffey, R. (1983). "The effect of the time price on the demand for medical care services". *Journal of Human Resources* 3: 407-424.
- Colle, A.D., and M. Grossman (1978). "Determinants of pediatric care utilisation". *Journal of Human Resources* 13 (supplement): 115-158.

- Dor, A., P. Gertler, and J. van der Gaag (1987). "Non-price rationing and medical care provider choice in Côte d'Ivoire". *Journal of Health Economics* 6: 291-304.
- Dor, A., and J. van der Gaag (1987). "The demand for medical care in developing countries. Quantity rationing in rural Côte d'Ivoire". *LSMS Working Paper 35*. World Bank. Washington, D.C.
- Edwards, L.N., and M. Grossman (1977). "An economic analysis of children's health and intellectual development". *Working Paper 180*. National Bureau of Economic Research. Inc.
- Friedman, B., and A. Leibowitz (1975). "The bequest motive in human capital and the health care of children". Unpublished paper.
- Fuchs, V. (1968). *The Service Economy*. National Bureau of Economic Research. New York. Columbia University Press.
- Gertler, P., L. Locay, and W. Sanderson (1987). "Are user fees regressive?" *Journal of Econometrics* 36: 67-88.
- Goldman, F., and M. Grossman (1978). "The demand for pediatric care: an hedonic approach". *Journal of Political Economy* 86: 259-280.
- Heller, P.S. (1982). "A model of the demand for medical and health services in peninsular Malaysia". *Social Science and Medicine* 16: 267-284.
- Inman, R.P. (1976). "The family provision of children's health: an economic analysis", in Richard Rosset (ed.), *The Role of Health Insurance in the Health Services Sector*. National Bureau of Economic Research. New York.

- Kessner, D.M. (1974).). "Assessment of medical care for children". *Contrasts in Health Status* vol. 3. Institute of Medicine. National Academy of Sciences. Washington, D.C.
- Lavy, V., and J. Germain (1994). "Quality and cost in health care choice in developing countries". *LSMS Working Paper* 105. World Bank. Washington, D.C.
- Lohr, K., R.H. Brook, and C.J. Kamborg et al. (1986). "Use of medical care in the Rand Health Insurance Experiment: diagnosis and service analyses in a randomised controlled trial". *Medical Care* 24 (9) [supplement].
- Makhlouf, K. (1996). "Factores no monetarios en la demanda por servicios de salud: el caso de los controles preventivos en Chile". *Revista de Análisis Económico* 11 (2): 125-154. Ilades/Georgetown University.
- Muchnik, E., e I. Vial (1990). *Impacto del PNAC en Preescolares de Santiago*. INTA, Universidad de Chile.
- Mwabu, G. (1986). "Health care decisions at the household level: results of health survey in Kenya". *Social Science and Medicine* 22 (3): 313-319.
- Mwabu, G., M. Ainsworth, and A. Nyamete (1994). "Quality of medical care and choice of medical treatment in Kenya". *Journal of Human Resources* 28 (4): 832-862.
- Newhose, J.P., and C.E. Phelps (1976). "New estimates of price and income elasticities of medical services", in R.N. Rosett (ed.), *The Role of Health Insurance in the Health Services Sector*. National Bureau of Economic Research, Conference Series 27. New York.

- _____. (1974). "Price and income elasticities from medical services". *Paper R-1197-NC/OEO*. Rand Corporation. Santa Monica, CA.
- Pauly, M.V. (1978). "Doctors and their workshops: physician influences on the use of medical resources". Unpublished manuscript.
- Phelps, C.E., and J.P. Newhouse (1974). "Coinsurance, the price of time, and the demand for medicals". *Review of Economics and Statistics* 56: 334-342.
- Popkin, B.M. (1974). *Vitamin A Deficiency in the Philippines: The Development and Analysis of Alternative Interventions*. Unpublished thesis. Cornell University. Ithaca, New York.
- Popkin, B.M., and F. Solon (1976). "Income, time, the working mother and child nutriture". *Journal of Tropical Paediatrics and Environmental Child Health* 22: 156-166.
- Rosset, R.N., and L-F Huang (1973). "The effect of health insurance on the demand for medical care". *Journal of Political Economy* 81: 281-305.
- Scarpaci, J.L. (1989). *Salud y Regimen Militar*. Imprenta La Unión, Chile.
- Skoufias, E. (2000) ¿Está dando buenos resultados PROGRESA?: informe de los resultados de una evaluación realizada por el IFPRI. PROGRESA Report 2000. IFPRI). Washington, D.C.
- Slesinger, D.P. (1976). "The utilisation of preventive medical services by urban black mothers", in David Mechanic (ed.), *The Growth of Bureaucratic Medicine: An Inquiry into the Dynamics of Patient Behavior and the Organisation of Medical Care*. Wiley-Interscience. New York.

Torche, A., H. Amigo, E. Atalah, E. Muchnik, e I. Vial (1995). *Estudio de Evaluación Económica del Programa Nacional de Alimentación Complementaria, PNAC*. Ministerio de Salud y Banco Mundial.

Wedig, G.J. (1988). "Health status and the demand for health. Results on price elasticities". *Journal of Health Economics* 7: 151-163.

CHAPTER 5

Chapter 5

Summary

5.1 The research

This thesis focussed on several aspects of the provision and financing of health care in Chile. As we have seen, the Chilean health system operates on the basis of a public-private scheme where individuals face different health care and financing options. We examined these options and estimated econometrically the factors underlying the decisions made by consumers.

We first tackled the choice of preferred providers. Preferred providers offer the publicly insured faster access to health care and amenities such as better hotel services, but at a higher cost. We explore here the way in which demographic, socioeconomic and access variables influence this decision process.

We then analyse the determinants of the health insurance decision, and how this relates to the utilisation of health services. Although there is ample literature on this topic, little evidence was available in Chile about the role of income, education, employment and health status in the choice of health insurance provider. Empirical evidence on the existence of adverse selection and moral hazard in the private health insurance market was also scarce. We therefore analysed the potential presence of these two well-documented economic problems in order to assess their magnitude.

Finally, we focused on the demand for preventive care for children. As part of a long-standing public policy, the government strongly encourages parents to take their children to health check-ups, and provides incentives in the form of food supplements, which can be collected by parents only if the child's health-check card is up to date. Here we estimated the influence of income, education, health status, time prices and other factors not considered in previous empirical studies.

In what follows we briefly summarise the main findings and some policy issues that can be drawn from the study of these important aspects of the Chilean health system.

5.2 Main findings and policy issues

We present here a brief summary of the findings and policy issues, but first a word of caution. We based the econometric estimations on samples drawn from a large multipurpose survey (*Casen*). The presence of sample selection bias, which produces biased and inconsistent estimates, was therefore a potential problem to be taken into account. However, this bias was unlikely in our study because the samples used were highly representative of the respective population groups under study. But since we did not test statistically for the presence of sample selection, we suggest not to extending the interpretation of the coefficients, and findings derived, to the whole population.

The choice of preferred providers

Preferred providers were introduced to offer more freedom to individuals covered by public insurance and also (although this motive was not widely recognised) to reduce the pressure on public facilities. These objectives have been only partially achieved; in fact, only 20 percent of all health services co-financed by *Fonasa* are delivered through preferred providers. On the other hand, although the coverage offered by the two public routes is in principle the same, the rationing of services -by queues and waiting lists- under purely public provision negatively affects both the efficiency and the quality of the services provided.¹

The econometric estimation showed that the choice of preferred providers was significantly related to the individual's income, to co-payments and to some attributes of the provider. The expected positive effect of income, which we hypothesised would be associated with some degree of segmentation in the public sector, would induce the relatively high-income publicly insured to opt for the more consumer-oriented (and expensive) option. Income segmentation would not

¹ Opinion polls conducted by public and private agencies have consistently shown that the timing of medical attention is one of the most relevant attributes that public beneficiaries associate with the *quality* of the provision of health care services.

be a serious problem if the quality of services under the two options was similar. This, however, is not the case.² But, whether the positive effect of income reflects segmentation, or a deliberated strategy to alleviate the pressure on public facilities (mainly in ambulatory care), is an issue we were unable to clarify in the present study.

Co-payments proved a significant deterrent in the choice of preferred providers. Our estimated equation considered only general medical consultations, a relatively affordable health services, but one would expect co-payments to produce a similar effect on other ambulatory health services. This result, in line with empirical evidence found in other countries in Latin America, suggest that changes in the level of co-payments must be evaluated with care, to avoid increasing the gaps between the three price-level ratings currently in place. Although cost-sharing can help make consumers more conscious of the cost of providing health care and serve (under certain circumstances) as a mechanism for cost recovery, we believe that co-payments in the preferred providers system are unnecessarily high and work against the objective of providing more freedom to consumers, since high co-payments restrict access.³ Of course, when “prices” are too low consumers are forced into all sorts of irritating situations. They must learn, for instance, how to cope with queues and how to handle shortages of drugs.⁴ On the other hand, when “prices” are too high clients may decide to use competing sources of care, substitute other goods for health facility visits, or drop out of the market for health services altogether.⁵

² In fact, the public insurer limits the quality of the health care services provided under the IHCS (purely public provision), which is inconsistent with the latter being a normal good.

³ Future analyses should focus on how co-payments affect the access to health care of different age groups, in particular the elderly. This is important since the public sector concentrates the greater proportion of individuals aged over 65, which more frequently use (and need) health care services.

⁴ Besides, when prices are too low the quality of services is driven down by the lack of resources and costumers begin to seek differential access to the service based on personal connections, employment position, etc.

⁵ In the extreme only people with high incomes may have the means to purchase health services, whereas the poor might be excluded by high prices. Alternatively, even the poor people may end up paying the high prices, but only after a long delay that has made them desperately ill or has permanently damaged their health.

The effect on the individual's choice created by the rationing of health services via waiting time was another important point tested in our study. Our results showed that low-income individuals are least likely to exit the queue by purchasing health care from preferred providers, which would force them into public provision. We interpreted this as a certain level of captivity, by which individuals have no real choice of opting for alternative providers. Similar results in other empirical studies have led the authors to suggest the existence of a pro-poor bias as a consequence of this rationing mechanism.

Rationing by waiting is seen as the most common consequence of establishing health care prices near to zero. The literature has observed that rationing by waiting is a pure deadweight loss unless there is some gain in terms of targeting resources to a particular favoured group. When a queue is used as an allocation device for medical care, people must be physically present to pay the "time price" of waiting to get service. The main economic problem with this allocation mechanism is that it is based on a physical entity that cannot be traded or borrowed. Therefore, waiting for health care is an efficient use of time. This is so because waiting patients are giving up their time to see providers, but the provider's budget or income is not affected, that is, people in line are giving up something of value (their time) to get service, but the provider cannot use it to finance service delivery. Besides, queues tend not to differentiate among severity of needs very well. A severely ill person might be willing to pay a substantial amount of cash to see a doctor, while someone with a headache might be willing to spend almost nothing. When the cash price is at or near zero, the price is right for both types of patients, and they will both tend to be in queue (particularly if the person with headache is unemployed or for some other reason has a low value of time). Those with slight problems, such as headaches, may clog up the system and reduce its effectiveness in reaching the seriously ill or other target groups who require more aggressive service delivery efforts.

In all, reducing the waiting time in public facilities should constitute an important policy target as this limits the quality of health care available, an issue over which consumers are extremely sensitive.

The health insurance decision

The empirical analysis revealed that personal characteristics, including health-related conditions and employment status are the main factors determining the probability of taking out private insurance. The estimates for age and sex, the only factors private insurers can use to discriminate among individuals, showed that younger men are more likely to take out a private policy. Privately insured clients also seem to enjoy better health and to suffer fewer physical limitations than their publicly insured counterparts. These results support the hypothesis of a positive selection into private insurance, where insurers primarily target younger and healthier men. This situation does not seem to be driven by a deliberate strategy on the part of the private insurers, but triggered by the weak design of the regulatory framework for the health insurance system.

The design is weak for at least two reasons. First, there are no theoretical arguments for excluding independent workers from the mandate (the legal obligation to take out health insurance), and there is at least one good reason to include them, namely that when they get ill they usually obtain medical care from public facilities, paying reduced fees. This occurs because the public insurer provides virtual free insurance not only for independent workers who lack foresight or simply prefer not to be insured, but also for private policyholders who face financial difficulties as a result of expensive medical events such as catastrophic illnesses. To prevent this opportunistic behaviour ("free riding"), health insurance should be made compulsory for both types of workers. Second, the mandate is inadequate because it compels individuals to purchase health insurance for 7 percent of taxable income (as a minimum), but does not specify the type and composition of the insurance policy they must buy. This, combined with the free (implicit) insurance provided by the public insurer, induces individuals to take out private policies where coverage is heavily concentrated in outpatient care (less expensive, but highly probable), rather than in catastrophic care (more expensive, but highly improbable).

To disentangle the health insurance effect on the utilisation of health services we used a two-stage procedure. Two (left censored) measures of utilisation were estimated: number of outpatient health services and length of stay in hospital. The second-stage tobit estimates showed self-assessed health status and physical limitations strongly influence utilisation.

Moral hazard seems to affect only ambulatory care, since the condition of holding private insurance was significant only in the outpatient health services equation. To tackle moral hazard, some analysts have argued that private policies should mix co-payments with deductibles. However the potential benefits of such a policy depend on the effectiveness of deductibles in reducing excessive utilisation. Of course, if moral hazard markedly distorts health care consumption, then deductibles are not only socially acceptable, but they improve welfare.

On the other hand, the ample literature on moral hazard points out that over-utilisation has at least two economic implications: first, it commonly implies over-expenditure in non cost-effective health services and second, it makes insurers raise their premiums. Although moral hazard can certainly derive in a higher cost per affiliate, there is no empirical evidence to show this behavioural factor is increasing the cost of private insurance in Chile. Annual increases in premiums are normally justified by *Isapres* in terms of cost adjustments derived from changes in the age-sex factors applied to policyholders and changes in the medical price index.

The demand for preventive care for children

A chief objective here was to assess the role of time prices and other factors not considered in previous studies. Unexpectedly, the opportunity cost of the mothers' time (measured by costing the minutes mothers spend travelling to the nearest health centre) proved to be statistically insignificant at conventional levels. Its negative sign, however, indicates that time prices [as anticipated by Acton (1975)] can act as money prices in discouraging demand. Better measures

of time costs should thus be used to assess the impact of non-monetary factors on demand.

Access to free food supplements was found to be an important factor in the probability of the parent demanding preventive care for a child. Previous studies, based on the positive impact of food supplements on the child's nutritional status, have suggested extending the age threshold beyond the current six years. However, as noted in chapter 4, the impact of a policy like this is moot since food supplements are intended to cover food requirements only during the most vulnerable years. We argue instead that the age threshold should be reduced to three years, as other food programmes, like the *Programa de Almuerzo Escolar, PAE*, administered by the Ministry of Education, cover an increasing number of children over 4 years of age. These programmes provide most of the recommended nutritional requirements for this population group, but overlap with the benefits provided by the *Programa Nacional de Alimentación Complementaria, PNAC*. Taking into account the well-documented fact that food supplements are more effective at an early stage of child growth, we therefore suggested that the state should continue increase the coverage for preschoolers via *PAE*, but simultaneously reduce the age threshold for eligibility for *PNAC* products.

Of course, as the food collection variable used in our econometric estimation captures both the collection of food and eligibility, the recommendation made for a change in the food supplement policy must be examined only for the group of children currently entitled.

Other important factors that influence the decision of parents to demand preventive care for their children were the child's nutritional status and prescription of medicines. Among nutritional conditions, under-nourishment emerged as the most significant, showing that parents of children at biomedical risk tend to comply regularly with the visits suggested by doctors, probably linked to the fact that free food is handed out only if the child's check card is up to date.

Recent research has shown, however, a small prevalence of malnutrition among preschoolers,⁶ but an increasing prevalence of obesity.

Prescriptions of medicines appear to play a significant role in the decision of parents to take their children to health check ups. This result deserves further analyses as drugs and other less sophisticated medicines are not free for all public users. What is more, only indigents and very low-income individuals receive free prescriptions. Certainly, the increasing cost of pharmaceuticals does not allow the government to provide free prescriptions to everyone. However, since most individuals highly value the simple fact of being prescribed medicines, independent if they can get them for free, the government could evaluate the possibility of extending public insurance coverage to partly cover pharmaceuticals, helping in this way to reduce out-of-pocket payments.

Although the mother's market force participation proved not to be statistically significant, it certainly plays a crucial role in the health and nutritional status of the child.⁷ From a policy perspective, the allocation of mother's time between income earning activities and work within the household has important implications for the selection and design of nutrition intervention programmes. For example, there is some evidence that in poor households there tends to be a negative relationship between mother's participation in the labour market and the health and nutritional condition of the child. This would suggest that low-income households with mothers engaged in market labour constitute a significant group to be considered in designing social service programmes. The importance of analyzing the special needs of this group is highlighted by evidence that households with working mothers face problems in deriving benefits from many conventional nutrition intervention programmes. Besides, the literature shows that

⁶ Only 1 percent of Chilean children aged below 6 show malnutrition; the smallest prevalence in Latin America.

⁷ Among other things, it is well recognised that social deprivation plays a major role in the mental development of the child and the physical activity of the child as stimulated by the mother and other household members may enhance his/her physical development.

while total household welfare appears to increase with the mother's market labour force participation, child welfare has been found to suffer [Popkin (1974)].

References

Acton, J.P. (1975). "Nonmonetary factors in the demand for medical services: some empirical evidence". *Journal of Political Economy* 83: 595-614.

Aedo, C., and C. Sapelli (1999). "El sistema de salud en Chile: readecuar el mandato y reformar el sistema de seguros". *Estudios Públicos* 75: 189-227.

Departamento de Economía, Facultad de Ciencias Económicas y Administrativas, Universidad de Chile (1997). *Estudio Técnico de la Reforma a la Seguridad Social de Salud*. Mimeo.

Popkin, B.M. (1974). *Vitamin A Deficiency in the Philippines: The Development and Analysis of Alternative Interventions*. Unpublished thesis. Cornell University. Ithaca, New York.

Sapelli, C. (1999). "Mandatory health insurance in Chile: issues of design in theory and in practice". Paper submitted to the IHEA Second World Conference, The Netherlands.

General References

General references

- Acton, J.P. (1975). "Nonmonetary factors in the demand for medical services: some empirical evidence". *Journal of Political Economy* 83: 595-614.
- _____. (1973a). "Demand for health care among the urban poor with special emphasis on the role of time". *Memorandum R-1151-OEO/NYC*. Rand Corporation. Santa Monica, Ca.
- _____. (1973b). "Demand for health care when time prices vary more than money prices". *Memorandum R-1189-OEO/NYC*. Rand Corporation. Santa Monica, Ca.
- Aedo, C., and C. Sapelli (1999). "El sistema de salud en Chile: readecuar el mandato y reformar el sistema de seguros". *Estudios Públicos* 75: 189-227.
- Aedo, C. (1995). "Determinantes de la tasa de consultas de salud del niño y del adolescente". *Revista de Análisis Económico* 10 (1): 53-70. Ilades/Georgetown University.
- Aigner, D.J., A.S. Goldberger, and G. Kalton (1975). "On the explanatory power of dummy variable regressions". *International Economic Review* 16 (2): 503-510.
- Akin, J.S., C. Griffin, D.K. Guilkey, and B.M. Popkin (1986). "The demand for primary health care services in the Bicol region of the Philippines". *Economic Development and Cultural Change* 34 (4): 755-782.
- _____. (1985). *The Demand for Primary Health Services in the Third World*. Rowan and Allenheld. Totowa, N.J.

Arrow, K.J. (1968). "The economics of moral hazard: further comment". *American Economic Review* 58 (3): 537-538.

_____. (1963). "Uncertainty and the welfare of medical care". *American Economic Review* 53: 941-973.

Becker, G.S. (1965). "A theory of allocation of time". *Economic Journal* 75: 493-517.

Bindman, A., K. Grumbach, D. Osmond, M. Komaromy, K. Vranizan, N. Lurie, J. Billings, and A. Stewart (1995). "Preventable hospitalizations and access to health care." *Journal of the American Medical Association* 274 (4): 305-11.

Birdsall, N., and P. Chuhan (1986). "Client choice of health treatment in rural Mali". Population and Human Resources Department, World Bank. Washington, D.C.

Bitran, R., and D.K. McInnes (1993). "The demand for health care in Latin America: lessons from the Dominican Republic and El Salvador". Economic and Development Institute, World Bank. Washington, D.C.

Bocognano, A., A. Couffinhal, S. Dumesnil, and M. Grignon (2000). *Which coverage for whom? Equity of access to health insurance in France*. Paris, CREDES.

Boletín Estadístico 1993-1994. Fondo Nacional de Salud. Chile

Buchanan, J.M. (1964). "The inconsistencies of the National Health Service". *Occasional paper 7*. Institute of Economics Affairs. London.

- Cameron, A.C., and P.K. Trivedi (1991). "The role of income and health risk in the choice of health insurance. Evidence from Australia". *Journal of Public Economics* 45: 1-28.
- Cameron, A.C., F. Milne and J. Piggott (1988). "A microeconomic model of the demand for health care and health insurance in Australia". *Review of Economic Studies* 55: 85-106.
- Cardon, J., and I. Hendel (2001). "Asymmetric information in health insurance: evidence from the National Medical Expenditure Survey." *RAND Journal of Economics* 32: 408-427.
- Castañeda, T. (1985). "Determinantes del descenso de la mortalidad infantil en Chile: 1975-1983". *Cuadernos de Economía* 66: 195-214. Pontificia Universidad Católica de Chile.
- Caviedes, R. (1995). "Las Isapre en el sistema de salud Chileno", in J.Giaconi y R.Caviedes (eds.), *Las Isapres: Hacia la Modernidad en Salud; Realidades, Perspectivas y Desafíos del Sistema*. Asociación de Isapres A.G. y Cieddes, Chile.
- Coffey, R. (1983). "The effect of the time price on the demand for medical care services". *Journal of Human Resources* 3: 407-424.
- Colle, A.D., and M. Grossman (1978). "Determinants of pediatric care utilisation". *Journal of Human Resources* 13 (supplement): 115-158.
- Cutler, D. (1996). "Public policy for health care". *NBER Working Paper* 5591.
- Chiappori, P., and B. Salanie (2000). "Testing for asymmetric information in insurance markets". *Journal of Political Economy* 108 (1): 56-79.

- Chiappori, P-A., F. Durand, and P-Y. Geoffard (1998). "Moral hazard and the demand for physician services: first lesson from a French natural experiment". *European Economic Review* 42 (3-5): 499-511.
- Ching-To, A., and M. Riordan (2002). "Health insurance, moral hazard, and managed care". *Journal of Economics and Management Strategy* 11 (1): 81-107.
- Departamento de Economía, Facultad de Ciencias Económicas y Administrativas, Universidad de Chile (1997). *Estudio Técnico de la Reforma a la Seguridad Social de Salud*. Mimeo.
- Dor, A., P. Gertler, and J. van der Gaag (1987). "Non-price rationing and medical care provider choice in Côte d'Ivoire". *Journal of Health Economics* 6: 291-304.
- Dor, A., and J. van der Gaag (1987). "The demand for medical care in developing countries. Quantity rationing in rural Côte d'Ivoire". *LSMS Working Paper 35*. World Bank. Washington, D.C.
- Edwards, L.N., and M. Grossman (1977). "An economic analysis of children's health and intellectual development". *Working Paper 180*. National Bureau of Economic Research. Inc.
- Efron, B. (1982). *The Jackknife, the Bootstrap and other Resampling Plans*. Society for Industrial and Applied Mathematics. Philadelphia.
- Ettner, S. (1997). "Adverse selection and the purchase of Medigap insurance by the elderly". *Journal of Health Economics* 16: 543-562.

- Falik, M., J. Needleman, B. Wells, and J. Korb (2001). "Ambulatory care sensitive hospitalizations and emergency visits: experiences of medicaid patients using federally qualified health centers." *Medical Care* 39: 551-61.
- Faulkner, E. (1960). *Health Insurance*. New York.
- Fisher, R. (1995). "Perspectivas futuras del sistema Isapre", in J.Giaconi y R.Caviedes (eds.), *Las Isapres: Hacia la Modernidad en Salud; Realidades, Perspectivas y Desafios del Sistema*. Asociación de Isapres A.G. y Cieddes, Chile.
- Friedman, B., and A. Leibowitz (1975). "The bequest motive in human capital and the health care of children". Unpublished paper.
- Fuchs, V. (1968). *The Service Economy*. National Bureau of Economic Research. New York. Columbia University Press.
- Gardiol, L., P-Y. Geoffard, and Ch. Grandchamp (2003). "Selection and incentive effects in health insurance". Mimeo. Institute for Health Economics and Management. University of Lausanne.
- Gertler, P., and J. van der Gaag (1988). "Measuring the willingness to pay for social services in developing countries". *LSMS Working Paper 45*. World Bank. Washington, D.C.
- Gertler, P., L. Locay, and W. Sanderson (1987). "Are user fees regressive?" *Journal of Econometrics* 36: 67-88.
- Gill, J. , A. Mainous III, and M. Nsereko (2000). "The effect of continuity of care on emergency department use." *Archives of Family Medicine* 9: 333-8.

- Gnecco G. (1999). "Making a commitment to quality: development of the quality assurance programme in Chile, 1991-1999". *International Journal for Quality in Health Care* 5: 443-445.
- Goldman, F., and M. Grossman (1978). "The demand for pediatric care: an hedonic approach". *Journal of Political Economy* 86: 259-280.
- Goodman, D., E. Fisher, T. Stukel, and C. Chang (1997). "The distance to community medical care and the likelihood of hospitalization: is closer always better?" *American Journal of Public Health* 87 (7): 1144-50.
- Green, W.H. (1997). *Econometric Analysis*. Prentice-Hall, Inc.
- Grossman, M. (1972a). "The demand for health: a theoretical and empirical investigation". *Occasional Paper* 119. National Bureau of Economic Research. New York.
- _____. (1972b). "On the concept of health capital and the demand for health". *Journal of Political Economy* 80: 223-255.
- Harmon, C., and B. Nolan (2001). "Health insurance and health services utilization in Ireland". *Health Economics* 10: 135-145.
- Heckman, J. (1978). "Dummy endogenous variables in a simultaneous equation system". *Econometrica* 46: 931-959.
- _____. (1976). "The common structure of statistical models of truncation, sample selection and limited dependent variables and a simple estimator for such models". *Annals of Economics and Social Measurements* 5: 475-492.

- Heller, P.S. (1982). "A model of the demand for medical and health services in peninsular Malaysia". *Social Science and Medicine* 16: 267-284.
- Hershey, J.C., H. Luft, and J. Gianaris (1975). "Making sense out of utilisation data". *Medical Care* 13 (10): 838-854.
- Holly, A., L. Gardiol, G. Domenighetti, *et al.* (1998). "An econometric model of health care utilization and health insurance in Switzerland". *European Economic Review* 42 (3-5): 513-522.
- Hopkins, S., and M.P. Kidd (1996). "The determinants of the demand for private health insurance under Medicare". *Applied Economics* 28: 1623-1632.
- Inman, R.P. (1976). "The family provision of children's health: an economic analysis", in Richard Rosset (ed.), *The Role of Health Insurance in the Health Services Sector*. National Bureau of Economic Research. New York.
- Jaramillo, I. (1997). La descentralización en Colombia. Project report, "Descentralización y transformación de sistemas de salud". Ministerio de Salud/OMS/Harvard/FESCOL.
- Jiménez, J., and T. Bossert (1995). "Chile's health sector reform: lessons from four reform periods". *Health Policy* 32: 155-166.
- Jiménez, J., y M.Gili (1991). "Municipalización de la atención primaria en salud", in J. Jiménez (ed.), *Sistemas de Salud en Transición a la Democracia*.
- Kessner, D.M. (1974). "Assessment of medical care for children". *Contrasts in Health Status* vol. 3. Institute of Medicine. National Academy of Sciences. Washington, D.C.

- Kifmann, M. (1998). "Private health insurance in Chile: basic or complementary insurance for outpatient services?". *International Social Security Review* 51: 137-152.
- Laroche, M. (2000). "Health status and health services utilization of Canada's immigrant and non-immigrant populations". *Canadian Public Policy-Analyse de Politiques* 26 (1).
- Lavy, V., and J. Germain (1994). "Quality and cost in health care choice in developing countries". *LSMS Working Paper* 105. World Bank. Washington, D.C.
- Lee, L.F. (1976). *Estimation of Limited Dependent Variable Models by Two-Stage Methods*. Ph.D dissertation. University of Rochester.
- Legros, S., R. Massoud, and O. Urroz (2002). "The Chilean legacy in health care quality". *International Journal for Quality in Health Care* 14 (1) [supplement]: 83-88.
- Legros, S., R. Massoud, O. Urroz, and E. Kelly (2000). "Evaluation of the Chile National QA Program. Evaluation report 1 (3). Bethesda, MD: published for USAID by the Quality Assurance (QA) Project.
- Leopold, J.R., and K.M. Langwell (1978). "The demand for health care with special emphasis on cost containment: a review of the literature", in *National Commission on the Cost of Medical Care, 1976-1977*. vol. 3. American Medical Association. Chicago.
- Lewis, C.E., and M.A. Lewis (1977). "The potential impact of sexual equality on health". *New England Journal of Medicine* 297 (16): 863-869.

- Lindsay, C., and B. Feigenbaum (1984). "Rationing by waiting lists". *American Economic Review* 74 (3): 404-417.
- Lohr, K., R.H. Brook, and C.J. Kamberg et al. (1986). "Use of medical care in the Rand Health Insurance Experiment: diagnosis and service analyses in a randomised controlled trial". *Medical Care* 24 (9) [supplement].
- Maddala, G. (1983). *Limited Dependent and Qualitative Variables in Econometrics*. Cambridge: Cambridge University Press.
- Makhlouf, K. (1996). "Factores no monetarios en la demanda por servicios de salud: el caso de los controles preventivos en Chile". *Revista de Análisis Económico* 11 (2): 125-154. Ilades/Georgetown University.
- Manning, W.G., and M.S. Marquis (1996). "Health insurance: the tradeoff between risk pooling and moral hazard". *Journal of Health Economics* 15: 609-640.
- Marquis, M.S. (1992). "Adverse selection with a multiple choice among health insurance plans: a simulation analysis." *Journal of Health Economics* 11: 129-151.
- McFadden, D. (1981). "Econometric models of probabilistic choice", in C. Manski and D. McFadden (eds.), *Structural Analysis of Discrete Data: With Econometric Applications*. Cambridge, Mass.: M.I.T. Press.
- . (1974). "The measurement of urban travel demand". *Journal of Public Economics* 3: 303-328.
- Ministry of Health, Chile. *Health Care in Chile*. Performance Report 2000.

- Ministry of Health, Chile. *Health Care in Chile*. Performance Report 1999.
- Mossialos, E., and S. Thomson (2002a). *Voluntary Health Insurance in the European Union*. Report prepared for the Directorate General for Employment and Social Affairs of the European Commission.
- Mossialos, E., and S. Thomson (2002b). "Voluntary health insurance in the European union: a critical assessment." *International Journal of Health Services* 32 (1): 19-88.
- Muchnik, E., e I. Vial (1990). *Impacto del PNAC en Preescolares de Santiago*. INTA, Universidad de Chile.
- Muurinen, J.M. (1982). "Demand for health: a generalised Grossman model". *Journal of Health Economics* 1: 5-28.
- Mwabu, G., M. Ainsworth, and A. Nyamete (1994). "Quality of medical care and choice of medical treatment in Kenya". *Journal of Human Resources* 28 (4): 832-862.
- Mwabu, G. (1986). "Health care decisions at the household level: results of health survey in Kenya". *Social Science and Medicine* 22 (3): 313-319.
- Neudeck, W., and K. Podczeck (1996). "Adverse selection and regulation in health insurance markets". *Journal of Health Economics* 15 (4): 387-408.
- Newhouse, J.P., and C.E. Phelps (1976). "New estimates of price and income elasticities of medical services", in R.N. Rosett (ed.), *The Role of Health Insurance in the Health Services Sector*. National Bureau of Economic Research, Conference Series 27. New York.

- _____. (1974). "Price and income elasticities from medical services". *Paper R-1197-NC/OEO*. Rand Corporation. Santa Monica, CA.
- Nyman, J. (2004). "Is 'moral hazard' inefficient? The policy implications of a new theory". *Health Affairs* 23: 194-199.
- OECD. *Proposal for a Taxonomy of Health Insurance*. Study on Private Health Insurance. OECD Health Project (2004).
- Okma, K. (2001). *Health Care, Health Policies and Health Care Reforms in The Netherlands*. International Publication Series Health, Welfare and Sport N° 7.
- Oyarzo, C. (1994). "La mezcla público-privada: una reforma pendiente en el sector salud". *Estudios Públicos* 55: 143-170. Centro de Estudios Públicos. Chile.
- Pauly, M. (1983). "More on moral hazard". *Journal of Health Economics* 2 (1): 81-85.
- Pauly, M.V. (1978). "Doctors and their workshops: physician influences on the use of medical resources". Unpublished manuscript.
- Pauly, M. (1974). "Overinsurance and public provision of health insurance: the roles of moral hazard and adverse selection". *Quarterly Journal of Economics* 88: 44-62.
- Pauly, M. (1968). "The economics of moral hazard: comment". *American Economic Review* 58: 531-537.

- Petersen, L., H. Burstin, A. O'Neil, E. Orav, and T. Brennan (1998). "Nonurgent emergency department visits: the effect of having a regular doctor." *Medical Care* 36: 1249-55.
- Phelps, C.E. (2003). *Health Economics*, 3rd ed. Addison Wesley.
- _____. (1992). *Health Economics*. New York: HarperCollins.
- Phelps, C.E., and J.P. Newhouse (1974). "Coinsurance, the price of time, and the demand for medical services". *Review of Economics and Statistics* 56: 334-342.
- Popkin, B.M. (1974). *Vitamin A Deficiency in the Philippines: The Development and Analysis of Alternative Interventions*. Unpublished thesis. Cornell University. Ithaca, New York.
- Popkin, B.M., and F. Solon (1976). "Income, time, the working mother and child nutrition". *Journal of Tropical Paediatrics and Environmental Child Health* 22: 156-166.
- Propper, C. (1993). "Constrained choice sets in the U.K. demand for private medical insurance". *Journal of Public Economics* 51: 287-307.
- _____. (1989). "An econometric analysis of the demand for private health insurance in England and Wales". *Applied Economics* 21: 777-792.
- Ricketts, T., R. Randolph, H. Howard, D. Pathman, and T. Carey (2001). "Hospitalization rates as indicators of access to primary care." *Health & Place* 7: 27-38.

- Rodríguez, J., and J. Jiménez (1985). *Comparative Analyses of Productivity in Public and Private Chilean Hospitals*. Mimeo. Ilades. Santiago, Chile.
- Rondinelli, D.A. (1981). "Government decentralization in comparative perspective: developing countries". *International Review of Administrative Science* 47 (2).
- Rosset, R.N., and L-F. Huang (1973). "The effect of health insurance on the demand for medical care". *Journal of Political Economy* 81: 281-305.
- Sanhueza, R., and J. Ruiz-Tagle (2002). "Choosing health insurance in a dual health care system: the Chilean case". *Journal of Applied Economics* 1: 157-184.
- Sapelli, C. (1999). "Mandatory health insurance in Chile: issues of design in theory and in practice". Paper submitted to the IHEA Second World Conference, The Netherlands.
- Sapelli, C., and A. Torche (1998). "El seguro previsional de salud: determinantes de la elección entre seguro público y privado, 1990-1994". *Cuadernos de Economía* 106: 383-406. Pontificia Universidad Católica de Chile.
- Scarpaci, J.L. (1989). *Salud y Régimen Militar*. Imprenta La Unión. Santiago, Chile.
- . (1988). *Primary Care in Chile: Accessibility Under the Military Rule*. University of Pittsburgh Press.
- Sindelar, J.L. (1982a). "Differential use of medical care by sex". *Journal of Political Economy* 90: 1003-1019.

- _____. (1982b). "Behaviorally caused loss of health and the use of medical care". *Economic Inquiry* 20: 458-471.
- Skoufias, E. (2000) ¿Está dando buenos resultados PROGRESA?: informe de los resultados de una evaluación realizada por el IFPRI. PROGRESA Report 2000. IFPRI). Washington, D.C.
- Slesinger, D.P. (1976). "The Utilisation of Preventive Medical Services by Urban Black Mothers", in David Mechanic (ed.), *The Growth of Bureaucratic Medicine: An Inquiry into the Dynamics of Patient Behavior and the Organisation of Medical Care*. Wiley-Interscience. New York.
- Spence, M. (1978). "Tacit co-ordination and imperfect information". *Canadian Journal of Economics* 11 (3): 490-505.
- Strassl, W. (1988). *Externe Effekte auf Versicherungsmärkten*. Mohr, Tübingen.
- Torche, A., H. Amigo, E. Atalah, E. Muchnik, e I. Vial (1995). *Estudio de Evaluación Económica del Programa Nacional de Alimentación Complementaria, PNAC*. Ministerio de Salud de Chile y Banco Mundial.
- Urriola, R. (2004). "Cuentas de salud de Chile" (Estimaciones preliminares). *Documento de Trabajo*. Fondo Nacional de Salud. Chile.
- Vargas, J., y A. Sarmiento (1997). "Descentralización de los servicios de educación y salud en Colombia". Unpublished manuscript.
- van de Ven, W. (1987). "An econometric model for the simultaneous estimation of the demand for medical care and the demand for health insurance". *Economic Letter* 24: 299-303.

- van de Ven, W., and B. van Praag (1981). "The demand for deductibles in private insurance: a probit model with sample selection". *Journal of Econometrics* 17: 229-252.
- Wagstaff, A., E. van Doorslaer, H. van der Burg, S. Calonge, T. Christiansen, G. Citoni, Ulf-G. Gerdtham, M. Gerfin, L. Gross, and U. Hakinnen, (1999). "Equity in the finance of health care: some further international comparisons". *Journal of Health Economics* 18 (3): 263-290.
- Wedig, G.J. (1988). "Health status and the demand for health. Results on price elasticities". *Journal of Health Economics* 7: 151-163.
- WHO Regional Office for Europe's Health Evidence Network. *What are the equity, efficiency, cost containment and choice implications of private health care funding in Western Europe?* (July 2004).
- Wilcox-Gök, V., and J. Rubin (1994). "Health insurance coverage among the elderly". *Social Science and Medicine* 38 (11): 1521-1529.
- Wilson, C. (1977). "A model of insurance markets with incomplete information". *Journal of Economic Theory* 12: 167-207.
- World Bank. *Chile: The Adult Health Policy Challenge*. A World Bank Country Study, 1995.
- Zeckhauser, R. (1970). "Medical insurance: a case study of the tradeoff between risk spreading and appropriate incentives. *Journal of Economic Theory* 2:10-26.