

# **CHILE: Effects of Old Age on Health Services Utilization and Consequences on System Design**

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## **I. Introduction**

This paper analyzes the relationship between age and health services utilization in Chile, using the CASEN survey of 1994. Logistic analysis is performed to determine how the age utilization profiles differ by income, location and system affiliation. The results are used to discuss the consequences of population aging on the health system, detect possible problems and suggest solutions to these problems.

## **II. Summary of Previous Work**

In Chile, the issue of the influence of population aging on health service utilization and the possible problems that could arise due to the increase in demand for health services has been a topic of discussion for at least a decade now. Several empirical studies have discussed the problem of whether old persons would be able to pay for private insurance and whether FONASA (the public insurance system) would concentrate practically all the old population. The analysis performed in these papers concludes that there is no danger that people currently affiliated to private insurance would be unable to finance private insurance when they retire. However, even if the system as it is now structured could survive the aging of the population, there is an issue of investment in new infrastructure that is particularly important in the public sector. In this respect, only a World Bank report discusses the consequences of old age on demands for investment in hospital facilities or technology.

The Centro Latinoamericano de Demografía (CELADE) projects a substantial increase in the population 65 years or older: it will increase from 6.1% of the total population in 1990 to 11% in 2020. This implies a shift in demand from younger to older persons; i.e. to population that makes more use of the health system (that both spends more and uses more services). At issue is whether the Chilean system can adapt to such an increase.

Regarding the potential financial problem of persons currently affiliated to the private insurance system, there are two studies that conclude there is none. A study by CIEDESS (92) shows that while expenditures per person increase with age, the size of the family unit decreases also (from 3.1 persons per family for families with head of household 35-39 years old to 1.6 for families with head of household 60-64 years old) and hence expenditures only increase about 10% per family. Hence expenditures increase only slightly on a per capita basis. What about income? While the pension is less than the income received before retirement, the size of the family is also reduced, and hence income per capita remains about the same. Therefore, there are no problems in either expenditure or income. The study concludes that financial problems may occur only for those not affiliated to the pension system.

Fischer et al (98) conclude something similar. The object of their paper is to determine whether the elderly will be able to finance their contributions to the private health insurance system. They examine medical costs per affiliate age group and compare these costs to estimates of the income profile over their lifetime. Next they estimate an income profile net of health expenditures, which they define as the disposable income of an agent. They chose a benchmark of 30% drop in disposable income to define a problem in financing health care for the elderly in the private health system. They conclude there is no imminent problem, so that there is no need, at this time, to introduce fundamental changes to the private insurance system on this basis.

In the paper they conclude that persons 60 or older spend 3,42 more than persons 18-44 years old. Families where the head of household is more than 60 years old, spend 2,31 times more than families with head of household 18-44 years old. The difference is due to the fact that families of 60 years old are smaller, in line with what CIEDESS argued. However, Fischer et al. find that expenditure doubles; but it does not increase as much as to reduce disposable income by more than 30%.

The conclusions of the latter study have been criticized on the basis that it has projected into the future the past high rates of return of the pension funds, that are likely no to be repeated. The fact that the fall in disposable income is not more than 30% is dependent on the rate of return of the pension funds. With rates of 5 to 6% (those used in the paper) there is no problem in the foreseeable future. However, one cannot rule out lower rates of return, that could change the conclusions.

In any case, the brief literature on the subject concludes that there does not appear to be a risk that the public sector will concentrate all the old people in the future. However, what these studies actually say is that old persons would be able to finance their affiliation to the private sector if they were willing to stay, and the private insurance companies were willing to retain them. On the latter issue, we may expect that ISAPREs will effectively retain their affiliates as they age. That is, in effect, what is currently occurring. To this effect, it is very important that ISAPREs can, by law, vary their premiums with age. Persons 60 and older are charged 4 or 5 times more than young adults (less than 40 years old). Hence ISAPREs are willing to retain and even accept old people (though beyond 65 year old some ISAPREs do not accept new affiliates), and if people mature within the system it is unlikely they will be pushed out.

ISAPRE managers admit that, as people age, the minimum income required to stay in the system increases. For example, while for a young adult with a spouse and kid an income of 250,000 pesos is enough, once this couple ages it would require about 400,000 to stay in the system, if they only spend the mandated 7% in insurance. However, they admit also that as their experience with old persons has increased they have become less fearful of making huge losses with them and have actually decreased the factor by which their premiums are multiplied. And persons who are already affiliated with the ISAPREs do not leave and most receive a discount (some say in the order of 30% on their premiums). The experience of ISAPREs with closed attention plans has also raised their optimism regarding their possibility of handling the demands of older persons adequately. This is also reflected in a gradual change in the structure of plans, in which the most expensive treatments are now

better covered, providing affiliates with better income protection. Currently, ISAPREs are discussing the formation of a reinsurance company that would offer catastrophic insurance to their affiliates.

As was said above, the issue of whether ISAPREs would retain their older affiliates depended both on their attitudes and those of the older affiliates themselves: whether these people would want to stay. The fact that ISAPREs charge according to risk and Fonasa charges according to income implies that for all, except possibly for the rich, there is a level of risk beyond which it becomes attractive to change into Fonasa. Since mid 1998, this is even more so as Fonasa has been providing persons who have been diagnosed certain illnesses (called by them catastrophic), illnesses that are mostly associated with the old, with better coverage (no copayments and preference in queues).

Another development that is important in this respect is the relatively recent capacity of Fonasa to detect those affiliates of ISAPREs that were free riding on the public sector network. Up until a few years ago affiliates of ISAPREs had the option of walking into a public hospital and receive treatment as Fonasa affiliates, since Fonasa did not have the capability of differentiating its own affiliates from those of the private sector. This permitted strategic behavior by ISAPREs affiliates: they could chose between treatment in any of the two systems: whatever was more convenient (whichever offered the cheapest quality adjusted product). The strategic behavior implied that they had to affiliate to Isapre. This strategic behavior is not possible anymore and so could lead to a revision in the decisions of the persons who actually profited from this loophole no closed. Also, it is possible that this led in no small measure to the development of the catastrophic reinsurance alternative by ISAPREs, in an attempt to retain these persons.

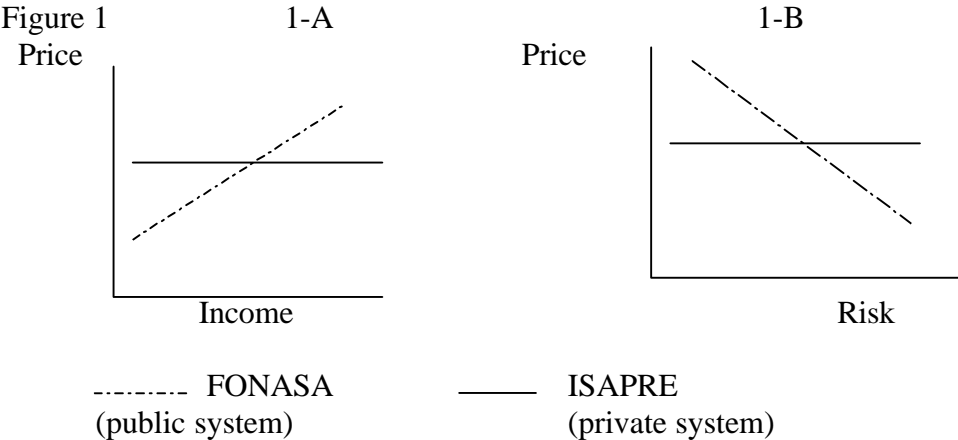
The key to this problem is, as mentioned above, the different pricing systems. Since Fonasa charges only 7% of wages and ISAPREs charge according to risk (age, sex and number of dependent family members), for a given income, once risk raises above a certain threshold, it is convenient to shift from ISAPREs to Fonasa (a person that does this should take, of course, into account the lower quality of care received in Fonasa). This in effect sorts the population according to income and risk, and makes Fonasa more attractive to the poor and high risk population.

This is why Aedo (96) concentrates his proposals to solve the issue of aging in changing the pricing system of Fonasa. Although from Aedo's paper it is not easy to see the connection, this is an issue studied more thoroughly in Sapelli and Torche (98). They provide empirical evidence that the probability of choosing Fonasa increases with age (controlling for income, location, etc.). Given the maximization of utility framework used by Sapelli and Torche, the outcome of the decision is explained as a rational choice in the paper. Aedo and Sapelli (99) argue the same more intuitively (see figures in the next page extracted from their paper). They argue that the concentration of the poor and risky in Fonasa can be explained by the rational choice of affiliates, given the constraints they face, and the explanation of this concentration does not require the assumption of cream skimming behavior by the ISAPREs.

The way premiums and prices are set in both systems provide strong incentives to sort people according to income and risk. Since the public system charges according to income and the private system according to risk (though constrained to use as factors only age, sex, and number of persons), two things will be true: first, for a given risk level, those relatively poor will find the ISAPRE system expensive and the rich will find it cheaper. Second, for a given income level, those with a high risk will find the FONASA system relatively cheap and the ISAPRE system expensive. This is explained below:

- i) As income increases, the premium one has to pay for the package offered by the public system increases. Since the risk of the person has not changed, the expected expenditure has not changed either, implying a higher price for insurance. (actually It is even worse, since benefits decrease for higher income persons). In the private system, when income increases and the mandated premium increases, one is offered a better plan by the ISAPREs. The price paid does not change.
- ii) As health status (or risk) worsens, FONASA continues to charge only the mandated 7% of income. Since expected expenditure rises, this implies that the price of public insurance falls. However, the ISAPREs will increase the premium (with limits) when expected expenditures increase. Hence the insured has to opt between spending more than their 7% or decreasing coverage. Price remains the same.

These two aspects explain why the persons with the most risk and the least income will (rationally) opt for public rather than private insurance.



In Figure 1-A all persons to the left of the intersection of both lines will chose FONASA and in Figure 1-B all persons to the right of the intersection will chose FONASA. Hence the public insurance system generates incentives to attract the poor and the sick (this is without any active inducement from the private insurance system). Another interesting aspect of Figure 1 is that one can see how the level of public sector prices will determine the size of both systems in equilibrium. If we assume that competition between ISAPREs makes them set their prices according to marginal cost, then the variable that will determine the size of the system is the pricing rules of the public sector. If there is an increase in subsidies to FONASA (or if it increases its quality), it will attract a larger percentage of the population. The private system cannot develop unless the implicit price charged by

FONASA is at least similar *on average* to the private sector price (assumed to approximate true social costs).

From all this we can conclude that, even if older persons in the private sector do not face a financial constraint that makes it necessary for them to move to Fonasa once they reach old age, the different pricing systems may be a strong enough incentive to make older people chose Fonasa.

Sapelli and Vial (98) perform a study that is principally oriented to identifying differences in utilization according to income (and that concludes that there are no systematic differences in utilization by income, except for the fifth quintile that utilizes 30% more services). The lack of a relationship between utilization and income implies that we should not expect much difference in utilization by age in the public and private systems or much difference in utilization by age according to income. In effect, their regressions to estimate the standardized probability of utilizing at least one service (where services include all services except dental services), in which they control for health status, show that being 65 years or older increases that probability only in the poorest quintile. The second set of regressions, to estimate conditional utilization (utilization given contact) for the same definition of utilization, shows that conditional utilization is significantly correlated with age, and that the relationship is stronger the poorer the person.

The World Bank's 1994 study concentrates on the changing structure of morbidity as a consequence of population aging and income growth. Until the early sixties, Chile had one of the highest infant mortality rates in the Americas. After that period, child mortality decreased dramatically, with infant mortality rates falling from 109 per thousand in 1960 to 17 per thousand in 1990. The prevalence of moderate and severe malnutrition is now among the lowest in the developing world. The sharp change in mortality is reflected in that, in 1960 infant deaths contributed 36% of total deaths and in 1990 it contributed only 6%. The sharp change in mortality is also reflected in a sharp change in morbidity and hence in the case mix that doctors and hospitals have to deal with.

**Table II-1**  
**Percent of Deaths by Age Group 1960-1990**

	1960	1970	1980	1990
<b>0-1 year</b>	36	25	11	6
<b>1-4</b>	9	4	2	1
<b>5-14</b>	3	2	2	1
<b>15-44</b>	13	13	13	12
<b>45-64</b>	17	20	23	23
<b>65+</b>	23	35	50	57

Source: World Bank (94)

### III. Description of the Survey used in the empirical analysis

The data we used is obtained from the 1994 CASEN survey. This is an LSMS type survey that is currently performed every two years. The survey has a unit of health questions where

families are asked whether members of the family have been ill during the last three months, whether they have sought help and what type of help (and how many times). Whether they have had to pay, and to which system they belong and where they have sought help.

The table in the following page summarizes the data. It shows that about one third of those 71 or older claimed having suffered an illness or an accident during the past three months. This is up from one quarter in persons 60-70 and less than one fifth in persons 45-59. However, due to the size of the age cohorts, of the total number of persons who declare themselves to have suffered an illness or accident, persons 71 and older are only 13% (and persons 60 and older are not more than one third). The percentage of persons demanding at least one service is higher in every age bracket than those that are ill, but the percentage increase is higher for those 71 and older. In effect, about one half of those 71 and older demand at least one service (even though again they are only 13% of the total that demands at least one service).

As can be seen in the table, the percentage of persons in Fonasa increases sharply with age, from 30% to 48% (these numbers include only those actually paying into Fonasa, the poor, who belong to a special Fonasa program are excluded); the percentage in ISAPRES decreases from 19% to 2% (And those in Fonasa A, the Fonasa program for the poor, or without insurance stay at about 50% regardless of age group). The percentage that have to actually pay out of pocket within Fonasa does not vary with age (see table).

The last column shows average imputed expenditure. It can be seen there that due to the structure of demands, average expenditure for those that demand at least one service does not differ much by age (it is only 10% higher for those 71 and older than for those 18-34 years old). However, since the probability of demanding at least one service differs sharply by age, probable expenditure increases sharply by age, from 8.9 for those 18-34 to 30.2 for those 71 and older (the progression is: 8.9; 11.5; 15.9; 25.6 and 30.2). These numbers permit us to explain the different results of the studies described above (CIEDESS and Fischer et al.). Probable expenditures are actually about 3.4 times greater for those 71 and older than for those 18-34. However, actual expenditures for those that utilize at least one service are only 10% different. Hence, the CIEDESS study described above committed the mistake of comparing actual conditional expenditures instead of probable expenditures.

## DEMAND OF SERVICES BY AGE GROUP

Age	Persons with at least one illness or accident (excluding attention not necessary)	Persons that demanded at least one service (except dental services)	Persons with at least one doctor visit	Persons with at least one day in the hospital	Persons with at least one lab exam or X-ray	Persons with at least one surgery	Persons belonging to the public health fund	Persons belonging to the public health fund that pay something	Persons belonging to the private insurance system	Persons belonging to private insurance that pay something	Total number of persons surveyed	Imputed average expenditure
18 - 34	5.435	7.673	6.808	649	2.427	270	15.233	13.864	9.269	8.983	49.805	57.648
35 - 44	3.123	4.134	3.778	281	1.240	159	8.173	7.340	4.499	4.377	23.179	64.446
45 - 59	4.375	6.180	5.785	406	1.840	192	8.916	7.467	3.588	3.450	23.266	59.858
60 - 70	3.065	4.458	4.274	273	1.262	150	5.649	4.365	714	683	12.086	69.615
71 - >	2.427	3.582	3.457	249	890	84	3.603	2.495	174	164	7.535	63.461
<b>TOTAL</b>	18.425	26.027	24.102	1.858	7.659	855	41.574	35.531	18.244	17.657	115.871	62.102

### Percentages of the total population (% by row)

18 - 34	10,91%	15,41%	13,67%	1,30%	4,87%	0,54%	30,59%	27,84%	18,61%	18,04%	100,00%
35 - 44	13,47%	17,84%	16,30%	1,21%	5,35%	0,69%	35,26%	31,67%	19,41%	18,88%	100,00%
45 - 59	18,80%	26,56%	24,86%	1,75%	7,91%	0,83%	38,32%	32,09%	15,42%	14,83%	100,00%
60 - 70	25,36%	36,89%	35,36%	2,26%	10,44%	1,24%	46,74%	36,12%	5,91%	5,65%	100,00%
71 - >	32,21%	47,54%	45,88%	3,30%	11,81%	1,11%	47,82%	33,11%	2,31%	2,18%	100,00%
<b>TOTAL</b>	15,90%	22,46%	20,80%	1,60%	6,61%	0,74%	35,88%	30,66%	15,75%	15,24%	100,00%

### Percentages of the total by event (% by column)

18 - 34	29,50%	29,48%	28,25%	34,93%	31,69%	31,58%	36,64%	39,02%	50,81%	50,88%	42,98%
35 - 44	16,95%	15,88%	15,68%	15,12%	16,19%	18,60%	19,66%	20,66%	24,66%	24,79%	20,00%
45 - 59	23,74%	23,74%	24,00%	21,85%	24,02%	22,46%	21,45%	21,02%	19,67%	19,54%	20,08%
60 - 70	16,64%	17,13%	17,73%	14,69%	16,48%	17,54%	13,59%	12,29%	3,91%	3,87%	10,43%
71 - >	13,17%	13,76%	14,34%	13,40%	11,62%	9,82%	8,67%	7,02%	0,95%	0,93%	6,50%
<b>TOTAL</b>	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%

## IV. Empirical Results

### Methodology

We estimated probits for the probability of being sick, of seeking care, of seeking different types of care, and of having to pay at least something out of pocket. The variables used to explain these probabilities are: age bracket, income quintile, genre, family status and location. All are dummy variables. Finally an OLS regression is performed with the same independent variables to explain utilization valued at private sector prices. The survey does not contain information on expenditure and so we can only work with utilization. We use private sector prices to construct an index of utilization, and then regress that index on the same dummies as described above. We use private sector prices since what is really important in the construction of these indexes are the relative prices and we assume that private sector relative prices are more approximate to real resource use by service.

### Results

The following table includes the probit estimates that are discussed below.

**Table 1: Probit estimates**

Probability of :	Being Sick	seek care if sick	seekdoc if seekcare	hopstay if seekcare	exams if seekcare	IQuir if seekcare	have cost if seekcare	OLS Incost
Variable	Parameter Estimate							
INTERCPT	-1.3740***	0.8201***	1.8703***	-1.1011***	-0.8771***	-1.7987***	-0.9205***	9.974451***
E_35_44	0.1205***	0.0612*	0.0914	-0.1415***	0.0483	-0.0192	-0.0154	0.006452
E_45_59	0.3404***	0.1399***	0.1955***	-0.1047***	0.0861***	-0.0935**	-0.1819***	0.057025**
E_60_70	0.5619***	0.1641***	0.2767***	-0.1094***	0.1174***	-0.0266	-0.2884***	0.082704***
E_71_	0.7653***	0.2502***	0.2150***	-0.0317	0.1167***	-0.1978***	-0.3384***	0.117792***
Q2	-0.00586	-0.0260	0.1324**	-0.0854**	-0.0377	-0.00340	0.3403***	-0.053246*
Q3	-0.00158	0.0263	0.0589	-0.1155***	0.0428	0.0680	0.5910***	-0.024051
Q4	0.0325**	0.0415	-0.0579	-0.0345	0.0776**	0.1750***	0.9849***	0.030279
Q5	0.0129	0.1390***	-0.1016	-0.0578	0.1001***	0.2577***	1.5733***	0.046046
CASADO	0.0166*	0.1310***	-0.0580	0.0310	0.0865***	0.1038***	0.1991***	0.022599
SEXFEM	0.2272***	0.1216***	-0.0187	-0.0646**	0.1907***	-0.0523	-0.1199***	-0.020400
URBGRAND	0.0340	0.7458***	-0.1027	-0.0484	0.0367	0.1150	0.5918***	0.083090
STGO	-0.0426***	0.1295***	-0.1593**	-0.1155**	-0.0480	0.0731	0.5545***	-0.019682
URB MED	0.0280***	0.1749***	-0.1349**	0.00842	0.0761***	0.1193***	0.4232***	0.102219***

Key: \*\*\* implies coefficient significant at the 0.1% level; \*\* implies coefficient significant at the 1% level and \* implies coefficient significant at the 5% level.

### Determinants of the probability of being sick:

The results show that, as age increases, the probability of becoming sick increases. There does not appear to be much relationship between income and the probability of becoming sick (this is compatible with the structure of mortality, that resembles that of a developed country). Married persons appear to have a higher probability of becoming sick. Women become sick more often (this is a standard result found in many studies, it is unclear whether this is an actual difference or is related to cultural traits). The fact that location does determine whether someone declares having been sick shows that in many respects culture could be an issue. People living in the Greater Santiago become sick less.

Persons that are sick can either seek care or not.

*Determinants of the probability of seeking care if sick:*

The older someone is, the more probable it is that he will seek care. It is also more likely that persons in the richest 20% of the population, married people, women, and persons in the urban sector seek care when sick.

Hence old people are not only more likely to become sick, but also if they do, it is more probable that they will seek help.

Persons who seek care can see a doctor, require a hospital stay, exams or surgery.

*Determinants of the probability of seeing a doctor given that one is ill and seeks care:*

The older you are, the more likely you will seek a doctor. People in the rural areas also are more likely to seek a doctor.

*Determinants of the probability of a hospital stay if ill and seek care:*

It is less likely that you will stay at the hospital if you are old, rich, or a woman.

Poor people are more likely to have a hospital stay.

Young people are more likely to have a hospital stay. This result may sound strange, however, it is due to the fact that if young people seek care it is likely to be because of an accident and hence much more probable that it will require either surgery or a hospital stay. As shown above (see table), in the whole population, the percentage of persons of old age having a hospital stay or surgery is higher (three times higher) than for the other age groups. That is, the unconditional probability of requiring surgery is higher for older persons; however, the probability conditional on being ill/having an accident and seeking care is higher for younger people.

*Determinants of the probability of requiring an lab exams or X ray if ill and if seek care:*

Exams are more probable if you are old, rich or a woman.

*Determinants of the probability of requiring surgery if ill and seek care:*

Surgery is more likely if you are young, rich or live in the urban areas.

*Determinants of the probability of paying something if ill and seek care:*

It is more probable that care is free if you are old, poor or in the rural areas (not by chance it is where Fonasa affiliates are).

Finally we run an OLS regression between an index of utilization (which is constructed by using utilization from CASEN and having utilization weighted by private sector prices) and the same independent variables as the previous analysis. We find that utilization is unrelated to income (such as in Sapelli and Vial) and that the only major influence on utilization is age. The differences found are small, but in line with those discussed above. Again, this is due to the fact that we are talking here of a subsample of the population, those that were sick in the last 3 months and sought care, and not the population as a whole. Old people are more likely to be sick and more likely to seek care if sick. However, the care they seek is that which is cheaper (doctors and exams). Since younger people are more likely to face surgery or hospitalization, then that makes total cost of utilization more similar among age groups.

An issue that has not been analyzed above, and that the data in the CASEN survey could be used to shed some light is in what way do queues affect utilization by older patients. We have data on the service provider used by each person, and that data could be used to analyze whether public hospital clients have a different behavior than private hospital clients.

Given these utilization patterns, how can they be used to predict the impact of aging on individuals, the health system and the economy as a whole.

We performed the same probit analysis to try and detect different patterns of utilization in the private and public sectors. For this we include in the probits an interaction variable between age bracket and system. IF this variable turns out to be significant it would be evidence that different age brackets are treated differently in the two systems.

The Table below summarizes the results:

**Table 2: Probit estimates**

Probability of :	Sick	seek care if sick	seekdoc if seekcare	hopstay if seekcare	exams if seekcare	IQuir f seekcare	have cost if seekcare	OLS ln exp
INTERCPT	-1.2793***	0.9661***	1.8208***	-1.0967***	-0.884***	-1.6964***	-0.3481***	9.97***
E_35_44	0.1135***	0.0267	0.1414	-0.0564	0.1171*	-0.0106	-0.1934***	0.0686
E_45_59	0.3317***	0.2186***	0.1909*	-0.1204*	0.1417***	-0.0606	-0.3874***	0.0741*
E_60_70	0.5543***	0.1680**	0.2461**	-0.1043>	0.1747***	-0.0584	-0.4557***	0.1069*
E_71_+	0.7347***	0.2033***	0.2602**	0.000016	0.2295	-0.1789*	-0.5706***	0.1545**
E_35_44Sys	-0.0193	0.1171	-0.1325	-0.1701>	-0.0907	-0.1059	0.7238***	-0.189**
E_45_59Sys	-0.1194***	0.1595	-0.0431	0.0483	-0.0645	0.0264	0.8718***	-0.0248
E_60_70Sys	-0.2050**	0.1864	-0.1145	0.1438	-0.0545	0.2865>	0.9407***	-0.0259
E_71_+Sys	-0.1925>	0.5522	-0.6171*	-0.2701	-0.2520	0.3151	0.9795***	-0.231
Q2	-0.00279	0.0635	0.2004*	-0.1219*	-0.0321	0.00158	0.1745***	-0.0595
Q3	-0.00337	0.0255	0.1319	-0.1751**	0.0438	0.0432	0.4039***	-0.0227
Q4	0.0501*	0.0463	0.0724	-0.1123>	0.1008*	0.0682	0.7238***	0.0032
Q5	0.0319	0.1010	0.0180	-0.1218>	0.1384**	0.2028**	1.1366***	0.0578
Married	-0.0152	0.0774*	-0.0566	0.0121	0.1065**	0.0775	0.0809***	0.0597*
SEXFEM	0.1969***	0.1012**	-0.0325	-0.0415	0.1839***	-0.0528	-0.0863***	-0.0094
UrbanBig_	-0.0509	1.3833***	0.0433	0.0792	0.0614	0.2111	0.5284***	0.1254
Santiago_	-0.0795***	0.00565	-0.2438**	-0.0349	-0.0813>	0.0501	0.4975***	-0.0222
Urbansmall_	0.0109	0.1171***	-0.1789**	0.0279	0.0508	0.1036*	0.3644***	0.0731*

Key:

\*\*\* significant at the 0.1% level

\*\* significant at the 1% level

\* significant at the 5% level

> Significant at the 10% level

Results do not differ substantially from those described above, so we will concentrate only on the significance and signs of the new interaction variable. The first conclusion is that differences are not very important, since only 10 of the 32 variables we added turned to be significant. Persons in the ISAPREs system tend to fall sick less often (this is particularly

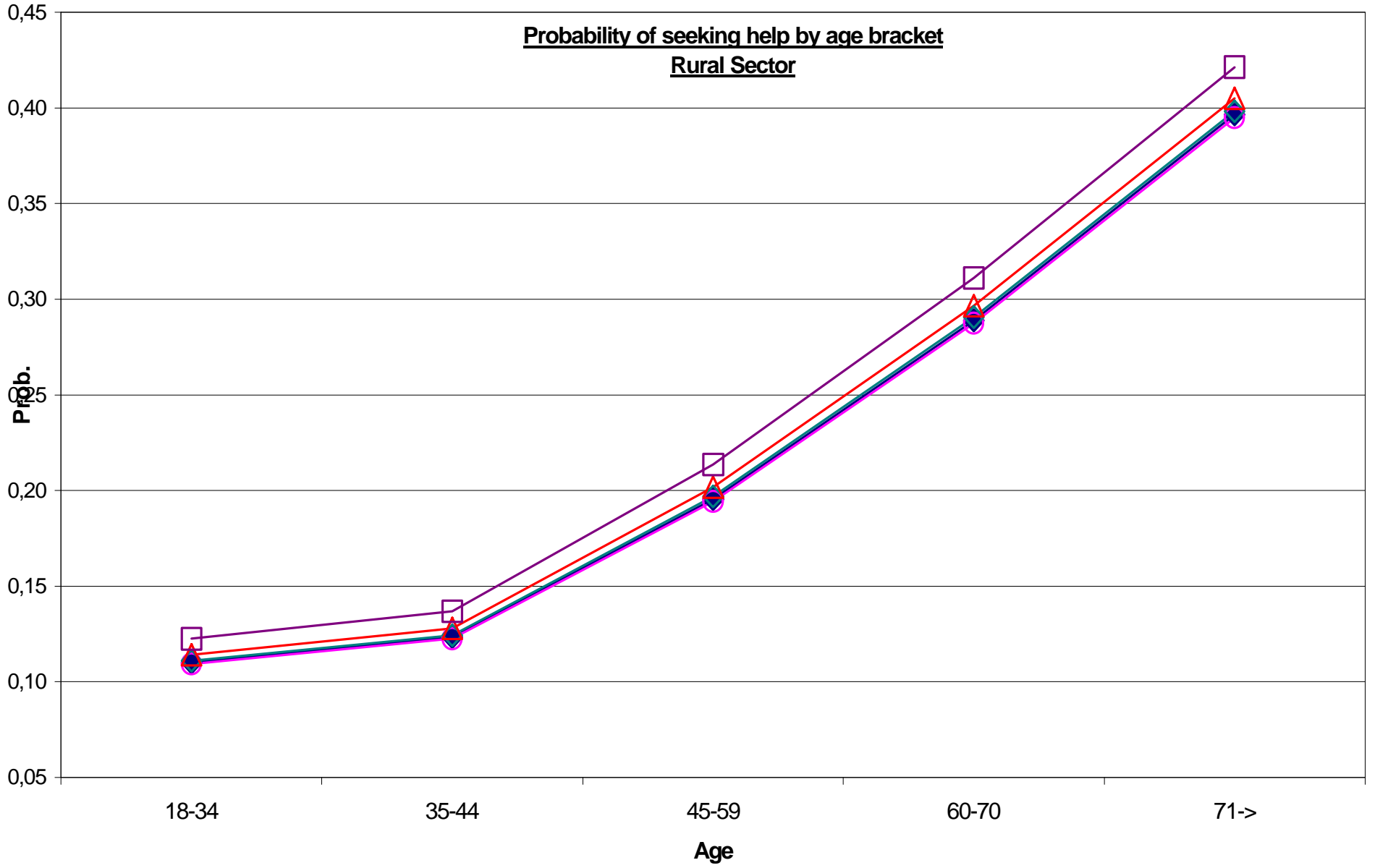
true for those 60 or older). This shows that those with the highest risk are effectively choosing Fonasa, as argued above. However, once they are ill, the probability of seeking care does not differ between persons in ISAPREs or Fonasa (actually at a low level of significance the interaction variables show a higher probability in ISAPREs). The differences in the type of care are asystematic, and not worth mentioning. The other interesting results are for the probability of paying something out of pocket. This probability declines with age in Fonasa (controlling for income). In the ISAPREs system the probability is greater for those 35 and older, than for those 35 or less. However, for those 35 and older the probability declines with age.

The evidence found in the probit estimates can be summarized in the following three figures.

The figures show that the probability of seeking some service increases sharply with age, but that this probability does not differ much by income or location. The probability is about 10% higher (1 to 2 percentage points higher) for the richest quintile than for the rest of the population. Moreover, the probability of seeking care is slightly higher in the rural areas than in the Greater Santiago, independently of age or income. When considering age utilization profiles for the private and public system, we obtain a lower probability in ISAPREs. This probability is estimated from a different probit form those presented above, that is not restricted to those that have had an illness or accident in the last three months. As was explained above this difference is due principally to the fact that people in ISAPREs get sick less often and not because they seek less care when they are sick. As can be seen from the numbers in the descriptive table above, the difference in decision varies significantly with age: about 40% of those that can chose, chose ISAPREs in the 18-34 bracket, but only 5% do so in the 71plus bracket (and 10% in the 60-70 bracket). Hence, the differences in utilization are based on an extremely small sample in the case of ISAPREs.

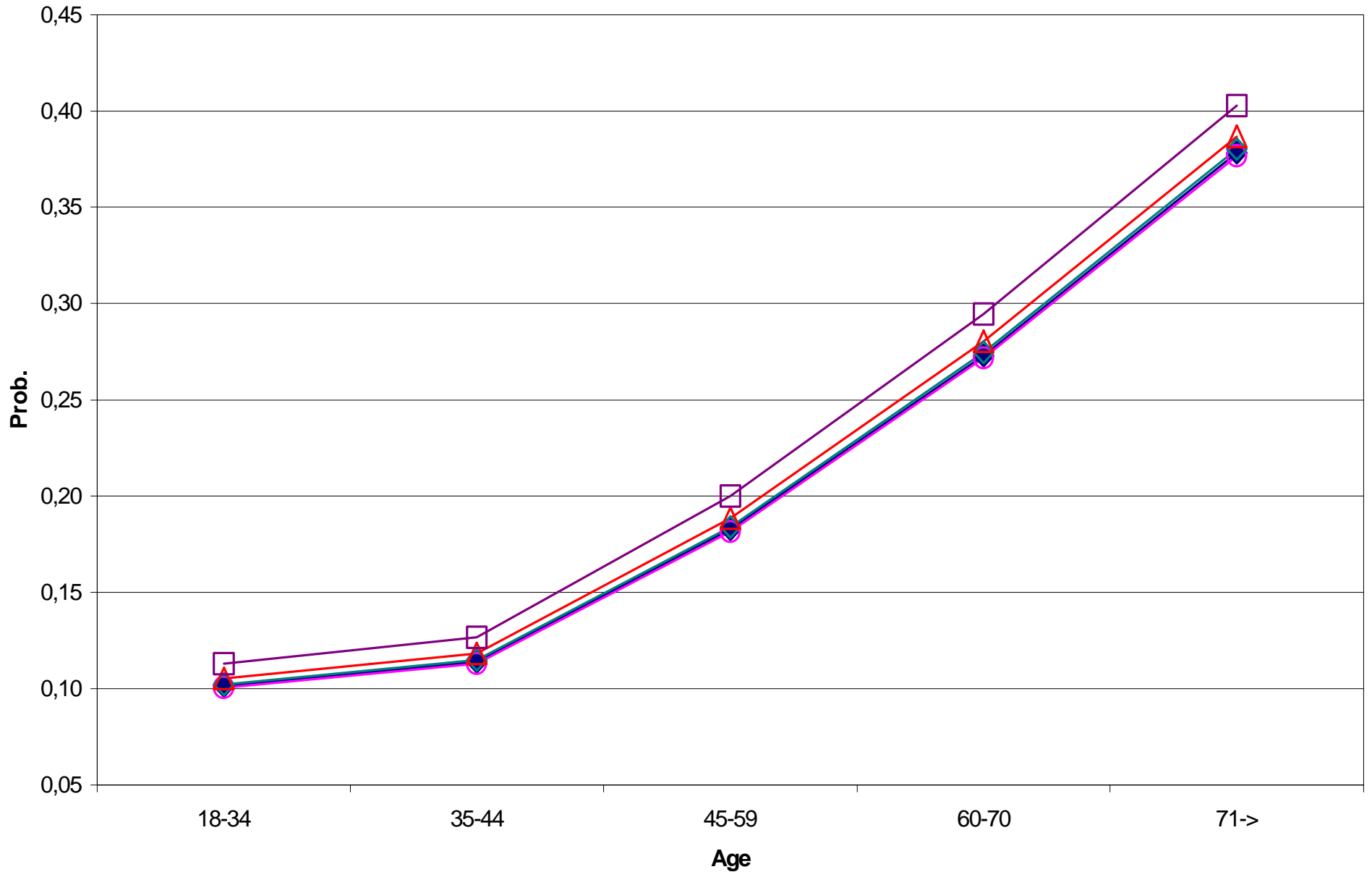
One interesting conclusion from the probit explaining who seek help within the whole population is that the probability of seeking help increases sharply with age. The probability of seeking help increases at a lower rate with age for those that were sick. Therefore, the probability of seeking help increases more sharply with age for those not ill, than for those that are ill.

**Probability of seeking help by age bracket**  
**Rural Sector**



◆ Quintil 1    ○ Quintil 2    ◆ Quintil 3    ▲ Quintil 4    □ Quintil 5

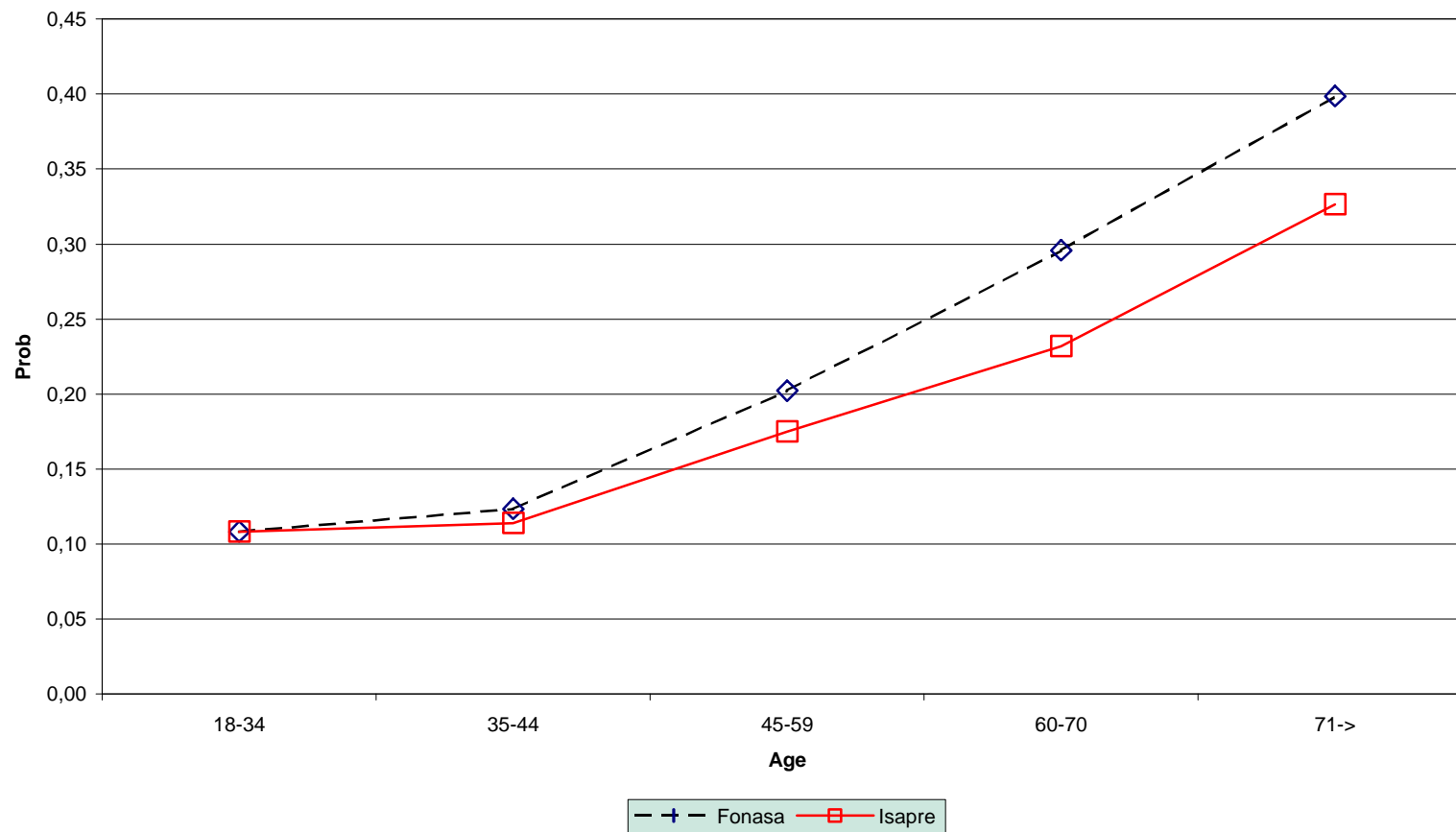
**Probability of seeking help by age bracket**  
**Gran Santiago**



13

◆ Quintil 1    ○ Quintil 2    ◆ Quintil 3    ▲ Quintil 4    □ Quintil 5

**Probability of seeking care by health system**  
**Gran Santiago**



## **Possible future work**

From the analysis performed above there are several questions that remain: for example, what exactly does it imply that there are many old age people in Fonasa whose incomes put them in the richest quintile? Does it imply discrimination (not likely)? Is it a consequence of the lack of facilities in the rural areas? Is it that the combination of cheaper care with lower quality is attractive even to the richest population?

Who use public hospitals? How could a decline in the length of queues affect the system? How would an improvement in technology affect the system? At issue is the problem that improvements in quality in the public sector will attract the riskiest and poorest affiliates from Isapres, who presently did not find the quality of Fonasa attractive. Are old people disproportionately affected by Fonasa's queues?

Comparisons of the 1990 and 1996 surveys with the 1994 survey analyzed here could give answers to these complicated questions. Some further work on comparing quality of private and public hospitals could also contribute to the design of adequate policies.

## **Conclusion**

Older persons have a higher probability of being ill and a higher probability of seeking care if they are ill. Expected utilization is more than three times higher for older persons than for persons 18-34. Most old people currently are affiliates of the public health system. Hence the aging of the population could be expected to be mainly a problem in the public sector. This would imply the need for adjusting infrastructure, etc.. However, as is discussed in the text, this would be the way if the pricing systems of both systems are not reformed. Where they to be changed, and the system of Fonasa made similar to that in Isapres (possibly together with subsidies), then the private sector could handle a substantial portion of the problem, making it more manageable, since the private sector usually can make investment decisions quickly and is much more adaptable. A large injection of funds into the public sector could result in an unexpected shift of affiliates from the public and into the private sector, generating under capacity in the public sector and over capacity in the private sector (since currently Fonasa cannot hire beds in the private sector, another issue that requires change).

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