Income and the demand for complementary health insurance in France

Michel Grignon, Ph.D [1,2,3] and Bidénam Kambia-Chopin, Ph.D [4]

1: McMaster University, department of Economics and department of Health, Aging, and Society, Hamilton, Ontario, Canada
2: Center for Health Economics and Policy Analysis, McMaster University, Hamilton, Ontario, Canada
3: Associate member, IRDES, Paris, France
4: Junior scientist, IRDES, Paris, France

We want to thank Marc Perronnin (IRDES), Christine Meyer (FNMF) for their help and advice.

Abstract:

Income and the demand for complementary health insurance in France

In this study we examine the demand for complementary health insurance in France and, more specifically, the relationship between income and the quantity of coverage individuals are willing (or able) to purchase on the non group market.

This study will allow us to investigate a set of issues which have been developed in the case of the US market for health insurance:

1. Why are so many Americans not covered by health insurance? Several, not mutually excluding, determinants have been suggested:
    a. Affordability (Bundorf and Pauly, 2006): health insurance is not a necessity of life and individuals buy it when its purchase leaves them with enough to live (i.e. purchase the true necessities of life); income per consumption unit would then be the main determinant of non coverage.
    b. Over-insurance (Gruber, 2008): insured individuals buy too much coverage, which increases the price of insurance contracts and, as a result, some individuals decide not to purchase these contracts and to remain uninsured. This over-insurance happens mostly on the group (employer sponsored) market where a tax exemption distorts demand. The main determinant of non coverage would be a supply side one: low cost insurance packages are not supplied on the market.
    c. Non actuarial pricing and crowding out (Gruber, 2008, Thomas, 1995): due to a lack of competition on the insurance market private insurers are able to charge a unit cost of coverage beyond actuarial pricing, therefore discouraging the demand of a portion of the potential market (a standard monopoly pricing); simultaneously, individuals know they can get health care at almost no cost (except waiting time) in public hospitals. The cost of time relative to willingness to pay for over-priced units of insurance would explain non coverage.
    d. Attitudes (Cutler et al. 2008, Monheit and Primoff Vistnes, 2006, Newhouse, 2006): insurance requires a degree of risk aversion as well and foresight; as a result, those with a preference for risk (e.g. smokers) or a high preference for

the present might end up not buying insurance. Also, insurance might be seen as a commitment device rather than as a pure financial device (Newhouse 2006): individuals buy health insurance to make sure they will buy "enough" health care (mostly preventive). A variant of the commitment theory is the "peace of mind" one, according to which individuals use health insurance as a savings device to make sure they will have enough in the bank to pay for health care (Fuchs, 1998). In such cases, insurance purchasing requires a level of sophistication in attitudes toward the future. Here, education and determinants of behaviors regarding health in general are the determinants of choice of non coverage.

   e. Last, information: individuals do not understand the value of insurance because they do not understand the complexities of the health care market. The bottom line of this argument is that insurance should not be purchased on the non group market.

2. What are the consequences on well-being of this lack of coverage (Gruber, 2008, Monheit and Primoff Vistnes, 2006)? If non coverage stems from supply side issues (determinants (b) and (c) in the list above) or lack of information, individuals might very well end up not buying a good they would be better off buying and the welfare concern is obvious. If, however, affordability or attitudes play a part, welfare consequences are less clear cut: individuals are still making the best choice when not buying insurance from a welfare perspective.
3. What combination of price subsidy and means test would be necessary to substantially increase the rate of coverage (Marquis and Long 1995, Auerbach and Ohri, 2006) in the population and at what cost for the public purse (Glied, 2001)?
4. More broadly what are the motivations for and policy tools (free coverage with a public plan, subsidy to purchase private plans on the non group market, tax credit to increase offerings of employer sponsored plans) to increasing complementary coverage (Glied 2001, Swartz, 2001, Zelenak, 2001)?

The French case is of interest because it offers a situation comparable to the US – some are not insured while others may be over-insured – but in a context where the pure financial insurance mechanism of risk reduction seems to be isolated from the complex issues of adverse selection, access to physicians and hospitals, carve-outs, and impact of insurance on health status pervading the US health insurance market. The key difference between the French and American situation is that individuals in France already benefit from a universal, compulsory, and socially funded health insurance scheme that covers a substantial share of their expenditures. The choice of coverage is therefore a choice to buy complementary coverage to cover the cost-sharing of the universal scheme. We go back below to the reasons that make the French context an interesting case and provide some context.

In this study we use a dataset providing information on the type of complementary health insurance coverage (none, group, and non-group), the amount paid for on the non group market (it is a population survey, hence information on the portion of premiums paid for by employers is not reliable and, as a consequence, we do not use it), income, socio-demographics and attitudes toward risk and health in general, as well as the level of actual user charges during the same year (based on a linkage of our survey to administrative data on claims). We model the

demand for complementary health insurance as a simplified trade off between two goods (complementary health insurance and a composite good reflecting all other consumptions): individual consumers can reach the same level of utility with a variety of combinations of CHI and the composite good. We add two hypotheses: first, there is a minimum level of the composite good below which life is not sustainable (even an infinite level of CHI could not compensate for a consumption level of the composite good below that minimum); second, the "minimum" level of health insurance (the level for which they want to receive an infinite level of the composite good to be compensated and keep the same level of utility) is negative for some individuals. It does not mean they are happy with no CHI or even a level of insurance below what the social fund reimburses but it does not jeopardize their level of satisfaction.
A natural way of estimating the observed demand resulting from such an underlying utility maximizing behavior is the Tobit estimator: we use all the information available on the non group market, including individuals without any CHI (zero quantity) that we treat as censored negative quantities. We cannot observe quantity directly but rather have information on consumption (quantity multiplied by unit price, which is the premium paid by the individual) and we estimate a Tobit where consumption of CHI is our dependent variable. We control for age and the number of persons covered by the contract, two elements that are of common use in underwriting of CHI contracts in France and we enter income as well as a list of motives for purchasing CHI (e.g. risk reduction) or attitudes toward insurance (e.g. risk aversion) as our independent variables. This will not allow us to estimate a price elasticity of the demand for CHI in France, but, we will model the relationship between income, tastes, and demand for CHI.
We find that the main motivation for purchasing CHI in France is protection against a financial risk (risk aversion). We also find a very strong income effect: individuals below €700 per month and consumption unit are very unlikely to buy an "appropriate" quantity of CHI even if the unit price was heavily subsidized. Beyond that income level, most consumers would buy the appropriate level even with a small subsidy. These findings suggest that subsidizing the purchase of CHI might not be the most efficient policy: targeted individuals will no buy anyway and the 'bang for the buck' will always be very low (those who already buy CHI without subsidy will benefit from a windfall profit that will be very costly to the public purse).

The main reason why the context is simpler and clearer in France than in the US to study the demand for private health insurance is the fact that the market for health insurance in France is a market for complementary health insurance only: all legal residents of France are covered by a social scheme (Sécurité sociale) financed out of ear-marked income tax (so-called social contribution). The scheme is basically a first Euro coverage (some deductibles were recently introduced but they do not compare with the average deductible in the US) with users fees (some coinsurance and over-billing), and a stop-loss on these fees for the patient (coinsurance is waived for high cost treatments so that very sick individuals benefit from full coverage for their treatment). As a result there is an inverted "tunnel" in the social scheme where low levels of spending are fully covered as are high levels, leaving a medium range of spending with users fees, representing in some cases as much as 90% of total cost. Voluntary health insurance covers these users fees and, for that matter, is classified as complementary rather than supplementary health insurance (Thomson and Mossialos, 2004, for a detailed presentation, see Couffinhal and Franc, 2008).

Complementary plans work within the frame of rules and regulations devised by the social scheme to select the services and goods they cover and even benefit from the prices negotiated at the national level for all coinsurances: e.g. there is a national retail price for prescription drugs, the social scheme reimbursing a given rate (which can be as low as 20%) and the complementary scheme complementing the reimbursement to 100% without excluding any drug that is on the social scheme's formulary, and including a marginal number of drugs not reimbursed by the social scheme. There is no competition over quality in terms of coinsurance since all CHI schemes provide full coverage.

Quality differentiation (and the quantity of complementary coverage purchased) takes place with over-billing: some plans cover 100% of over-bill within a limit, while other plans cover a fraction of any over-bill and leave a coinsurance payment to the patient, and still others do not cover over-billing at all (see Bocognano et al, 1998, Couffinhal et Perronnin 2004). Over billing is rare for GP services (only 12% of GP over bill, Fennina and Geffroy, 2007), can be frequent (38% of specialists) but always limited in value (€27 on average, EcoSante, IRDES, 2007) for some ambulatory care specialties (ENT, eye specialists, dermatologists), very frequent and of a different order of magnitude for surgeons in private clinics (the social scheme reimburses a fee but private surgeons charge €75 on average above it), and very frequent and highly variable for dental prostheses and prescription glasses. However, here again, complementary schemes mostly reimburse patients without any attempt at selecting procedures or providers, or at organizing care using the tools of managed care: providers are regulated by the social scheme, the government, or public agencies and not, or to a much lesser extent only, by complementary schemes. To summarize CHI in France is comparable to Medigap plans, without their managed care component and applying to all ages.

Overall, approximately 78% of total health care expenditures are covered by the social scheme, with 13% covered by CHI and 9% out-of-pocket (Fennina and Geffroy, 2007, Couffinhal and Franc, 2008). Individuals without CHI still have access to medical care and the social scheme covers catastrophic expenditures. However, as described in more details below, the amount of coinsurance and over billing any given individual may be facing in any given year is €421 on average (estimation by the authors based on a representative sample of administrative data), substantial if not catastrophic, and these users' fees not covered by the social fund are highly concentrated on a small number of individuals.

In 1999 84% of the population had complementary health insurance; a means tested free plan (offering full coverage and prohibiting over-billing[1]) and known as CMU-C (Couverture Maladie Universelle-Complémentaire) was introduced in 2000 and covers approximately 7% of the population. Because the cut-off income excluded all the elderly (the minimum income benefit increases at age 65 in France and the cut-off income level for the free plan lie between the two values of the benefit) concerns were raised about the 9% of the population who remained uninsured as well as about some under-coverage of user charges (according to Franc and Perronnin, 2006, 1.5 million individuals are covered by low quality CHI plans). In the French policy debate the rationale for full coverage of the population and better quality of

[1] As a result of the prohibition of over-billing some specialists, mostly dentists, tried not to treat beneficiaries of the CMU-C. Since care denial is forbidden in France, these doctors use a variety of techniques to get rid of unwanted patients (Desprees and Naiditch, 2006).

insurance is mostly a paternalist concern for redistribution in kind toward the poor or the ill-informed to allow them access to decent quality medical care. On top of these two arguments also found in the US another rationale for helping the poor purchasing complementary insurance in France is that those with complementary coverage buy more and better quality care that is partially paid for by the social fund; if the poor are less likely to purchase complementary insurance they will also use fewer resources paid by for the social fund and this can be seen as unfair (there might be some inverse redistribution where the near poor contribute a fund they are prevented to use by users fees).

All these reasons have motivated the introduction in 2005 of an income tested subsidy for the purchase of good quality complementary health insurance. The subsidy, known as ACS (aide à la complémentaire santé), never really took off, even though it was quite generous.
The benefit works as a voucher: any eligible individual uses the voucher to get a rebate on the purchase of a non group complementary health insurance contract[2] and the supplier of the contract gets reimbursed by the government. The voucher amounts to €75 per individual below age 25, €150 per individual ages 25 to 59, and €250 per individual ages 60 and older, to individuals living in households above the income cut-off for CMU-C and below 115% of the cut-off (120% since January 2007). The expected target was 2 million people (approximately 3.5% of the population), but only 240,000 had taken it up in November 2006 (and 330,000 overall after the increase in the cut-off income to 120%, according to the Fonds CMU).
The average subsidy amounts to almost 40% of the average premium paid by ACS beneficiaries (Franc and Perronnin, 2007), and represents 25% of the average premium on the non group market (ACS vouchers are used to purchase lower quality contracts).

In the present study we investigate the motivations for purchasing non group complementary insurance and the reasons why the near poor seem so price insensitive. We start with stylized facts on complementary health insurance in France: the nature, average cost, and distribution of coinsurances and over-billings a plan might insure as well as a brief description of the population without complementary insurance, according to age, income, education, occupation and region of residence. We then review the motivations for purchasing health insurance found in the literature and suggest a theoretical model accounting for some of the stylized facts presented in section 2. Section 4 details the data and our estimation strategy (and how it differs from almost all previous studies), section 5 presents the results and we then discuss and conclude on the welfare and policy implications of our findings.

Section 2 – stylized facts on complementary health insurance and the uninsured population

Aggregate data show a loading fee of approximately 20% on average for CHI in France (figure for 2003, latest year available, comparing total contributions to total outlay), which is somewhat higher than what is observed in the US (12% according to Gruber, 2008) and might indicate a lower level of competition as well as too many small firms in the business. Out of what is paid to individuals, we estimate that approximately 80% goes to reimburse users' fees

[2] Almost all individual market contracts are eligible: minor restrictions apply to make sure the contract follows the general rules implemented by the public fund, namely a GP gatekeeper.

of the social scheme (the remaining being comprised of paying for care outside of the formulary such as in vitro fertilization or alternative medicines)[3].

Despite the stop-loss on catastrophic spending user's fee is concentrated on some individuals over the year. Based on our sample of individuals (described below) and administrative claims for reimbursement to the social scheme, we are able to describe the distribution of the costs left to patients by the social scheme, as well as the distribution of costs for a variety of services (hospital, GP, specialists, drugs, dental care, prescription glasses, transports). For all types of services and for the whole population (with and without CHI) we find that the 20% top spenders represent 60% of total users charges. The average yearly user charge in the top 20% is €1,327, versus €182 among the remaining 80%. Estimated on the population without coverage we still find the same concentration (20% top spenders accounting for 80% of total user fees), and lower averages (1,235 and 109 respectively). User charge is more concentrated on hospital, dental and glasses: over these three types of service, the 10% top spenders account for 72% of charges, with an average of €782.

****here, table with concentration (p% top spenders accounting for X% total spending), average spending among p% top spenders and (1-p)% others, for each type of service.******

Service	Probability (% top spenders)	Share of total	Average D for top spenders (in €)	Average D others (in €)
Hospital	0.05	77%	985	7
Dental Prostheses	0.05	79%	287	1
Prescription glasses	0.05	67%	356	3
Drugs	0.20	58%	330	29
Over billing Specialists	0.20	69%	123	7
Over billing GP	0.20	60%	64	11
Other	0.20	71%	404	11

From these observations it seems clear that reducing the financial risk stemming from the social scheme user charges is an important motivation to purchasing CHI.

As is the case in the US, individuals can access CHI through an employer sponsored contract or on the non group market. Self-report measures (ESPS 2004, un-weighed, available on IRDES website) indicate that 39% of contracts are through an employer and 2% through a pool for self-employed. Another 39% are obtained on the non group market, and 15% are mixed: these are contracts subscribed by retirees as maintaining their coverage through their previous occupation (insurers cannot deny coverage and cannot increase premiums by more than 50%). The non group market is more important in France than in the US because individuals over the age of 65 are still willing to purchase private insurance. In France as in the US contributions paid for directly by employers to a CHI contract are not taxed (even though they could be

[3] The estimation is as follows: the average user fee is €421 in 2004 and 60% of user fees are paid for by CHI. Multiplying 60% of €421 by 60 million residents of France yield a total paid on reimbursing user fees of 15.156 billion € for the year 2004. Over the total outlay from CHI in the Comptes de la Santé for the same year (18.966 billion €) this yields a ratio of 80%

considered in-kind wages) but there is no tax credit for individuals purchasing CHI on the non group market or on the employee's share of the contribution in the group market.

Who are the non-covered for CHI in France? Some stylized facts:
Based on our dataset for 2004 (see presentation below in the data section), we compare the 13% of the population who are not covered to the covered population on household income, age, and region. The mean income per consumption unit of the non covered is €844 per month, compared to €1,382 among those who buy CHI. Among those with an income per unit below €1,000, the proportion of non covered is 24%, versus 4% only among those with an income with more than €1,900. However, 25% of the non covered live with more than €1,000 per unit, implying that income is not the only cause of non purchase of CHI (some individuals do not buy even though it is affordable). Living in Paris is a main factor of non coverage: 19% of Parisians do not purchase CHI, versus 7% of individuals in rural areas. Age is not a major factor of non coverage, with 15% of those younger than 30 being non-covered, versus 11% among the 65 and over.

Section 3 – theoretical models

The main plausible motivations for purchasing a CHI contract are:

- reducing the financial risk generated by medical expenditures that are not covered by the social scheme,
- accessing better quality care,
- committing oneself to spend more on health care,
- a willingness to protect decisions regarding health care from financial considerations (the "peace of mind" described by Victor Fuchs).

Risk reduction: two main theories have been proposed, the expected utility theory and the prospect theory.
Expected utility theory: Under the assumption that the amount spent on medical care in a given year is a random variable (conditional on age, gender, and health status) individuals with a concave utility of wealth are better off with full coverage and are therefore willing to pay a certain premium to reduce the uncertain loss generated by user charges. In this standard expected utility framework the poor are more willing to purchase insurance (under the standard assumption that the utility function is of the decreasing absolute risk aversion type).
Another model of risk reduction is the prospect theory (Khaneman and Tversky, 1978): according to that theory the value of risk reduction is independent of income and increases at a decreasing rate with the value of D (damage). We enter it in our demand equation as follows: we use the administrative data to calculate expected values of D over various sub-populations defined by health status that we impute to individuals according to their health status. We enter these terms as well as their interactions with variables indicating attitudes toward risk in the right hand side of our demand equation.

Barsky et al (1997) and Monheit and Primoff Vistnes (2006) have demonstrated that attitudes toward risk and preferences regarding insurance are important determinants of the purchase of

group insurance (searching for jobs offering employer sponsored insurance and enrolling in their employer's plan).

Access motive: Nyman (1999) suggests that individuals might be willing to pool resources in order to access to treatments that they would never be able to afford with their income or even their accumulated savings and credit. Such a motive seems unlikely in the case of CHI in France because individuals in need of a very expensive treatment get full coverage through the social scheme. Another motivation could be if providers screened patients and selected those with a good plan (to increase certainty of payment). However there does not seem to be very likely since, in the French case, doctors are in over supply and compete for patients.

Commitment to spend on health care: individuals bind themselves into consuming health care (e.g. dental prostheses) that will be beneficial in the long run but is not needed in the short run. They anticipate that they will need to spend on dental care or prescription glasses and they use the CHI as an ear-marked saving device. The main reason for such a costly behavior (they have to pay the 20% loading fee on top of medical costs) is that they do not trust themselves in spending the money on these goods or services (e.g. if they had saved ahead of time). To account for such a motive we enter the individual amount of user charges during the calendar year of the interview in the right hand side of our demand equation[4].

Peace of mind: this would be a psychological motivation for delegating financial relationships with doctors and hospitals to a third party. Such an attitude would certainly be increasing with income and we do not have any variable in the survey that could represent it.

Barriers to purchase CHI are: affordability and lack of information or ability to understand the insurance mechanism. That there is some information problems looks plausible since some individuals who are in the income range eligible to receive ACS and who already are covered by a non group CHI did not try to take advantage of the voucher (which would have meant a rebate by approximately 40% on the price of their insurance).

We model a demand for CHI with affordability issue as follows:
Individuals maximize utility over two goods, CHI (of which they consume a quantity x) and a composite consumption of which they consume a quantity c, under a budget constraint based on current income (they are liquidity constrained).

Max U(c; x)
s.t. π.x + c = y
(no savings, no borrowing, c is the numéraire, π is the relative price of CHI)

We model the utility function such that the iso-utility curves cross the "c" axis (say it is the horizontal one) but not the "x" (vertical) one: this means that we cannot do below a given G level but we can with no CHI at all. Such a hierarchy of need (where CHI would come last) has been suggested by Maslow (1970) and could be re-worded as follows: families become risk-averse when other needs are satisfied. It receives empirical support from the findings in Starr-

[4] We also plan to enter attitudinal variables based on questions regarding inconsistencies in time preferences available in the survey (inconsistent individuals might be willing to commit themselves)

McCluer, (1996) that uninsured households save less on average than insured ones, other things being equal, and even controlling as far as possible for selectivity (behavioral selection), therefore suggesting that risk is not the main determinant of coverage and savings and affordability explains both savings and insurance behaviors.

In our model, the iso-utility curve crosses the axis when the slope is greater than the price line at low income levels but after at higher income levels (so that there are only corner solutions below a given income level and inner ones above it):

$$U(c;x) = \left[\max(0;(c-\overline{G})\right]^{\alpha}(x+x^0)^{1-\alpha}$$

(to account for the decreasing marginal utility of wealth this should be elevated to the power γ=0.5 – for simplicity sake we leave it as is since the power does not change the relationship between x* and the iso-utility level v or the income level y).

Where:
G is the minimum necessary to survive – we need at least G once x is purchased, a concept sometimes referred to as "left to survive" (Murray et al. 2000, Bundorf and Pauly, 2006).

$-x^0$ is a level of coverage below the current level offered by the public mandatory scheme (Sécurité sociale) that would have to be reached to decrease utility to 0 (or that would require an infinite level of c to be compensated for in utility terms. This does not mean the mandatory scheme covers "too much" in any sense simply that it is above and beyond the sheer minimum. Introducing that threshold below the public scheme is the main input of our model and the main rationale for being non insured even though the poor benefit more from insurance.

A competing story accounting for the gap between no coverage at all and some coverage (rather than a continuous increase in coverage) would be that of fixed costs (or transaction costs) and suppliers not being able to sell less than a given amount of coverage x.

We could add something to reflect the saturation effect that beyond a given income threshold there is no increase in x. One way of doing it could be to introduce a power γ greater than 1 to the utility derived from the consumption of x ($U(c;x) = \left[\max(0;(c-\overline{G})\right]^{\alpha}(x+x^0)^{\gamma(1-\alpha)}$). That would be formally correct but would introduce the awkward notion of increasing marginal utility of insurance which is baseless. One other way of reproducing the stylized fact would simply be to introduce a direct saturation (utility cannot increase beyond a given level of x, $U(c;x) = \left[\max(0;(c-\overline{G})\right]^{\alpha}\left[\min((\overline{x}+x^0),(x+x^0))\right]^{1-\alpha}$
Going back to the initial utility function we derive the iso-utility curves:

$$U(c;x) = v, c > \overline{G} \Leftrightarrow (c-\overline{G})^{\alpha} = v(x+x^0)^{\alpha-1} \Leftrightarrow c = \overline{G} + \left[v(x+x^0)^{\alpha-1}\right]^{\frac{1}{\alpha}}$$

Hence: $\left.\frac{dc}{dx}\right|_{U=v} = \frac{\alpha-1}{\alpha} v^{\frac{1}{\alpha}}(x+x^0)^{-\frac{1}{\alpha}}$

Measured at x=0 the slope of the iso-utility curve is therefore:

$$\left.\frac{dc}{dx}\right|_{U=v} = \frac{\alpha-1}{\alpha}\left(\frac{v}{x^0}\right)^{\frac{1}{\alpha}}$$

The optimum value of x, x*, is given by:

$$\left.\frac{dc(x^*)}{dx}\right|_{U=v} = -\pi \Leftrightarrow \frac{1-\alpha}{\alpha} v^{\frac{1}{\alpha}} (x^*+x^0)^{-\frac{1}{\alpha}} = \pi \Leftrightarrow x^* = \left[\frac{\pi\alpha}{1-\alpha}\right]^{-\alpha} v - x^0$$

There is a value $v\_$ for v below which x*(v) < 0: $v_- = x^0\left[\frac{\pi\alpha}{1-\alpha}\right]^{\alpha}$

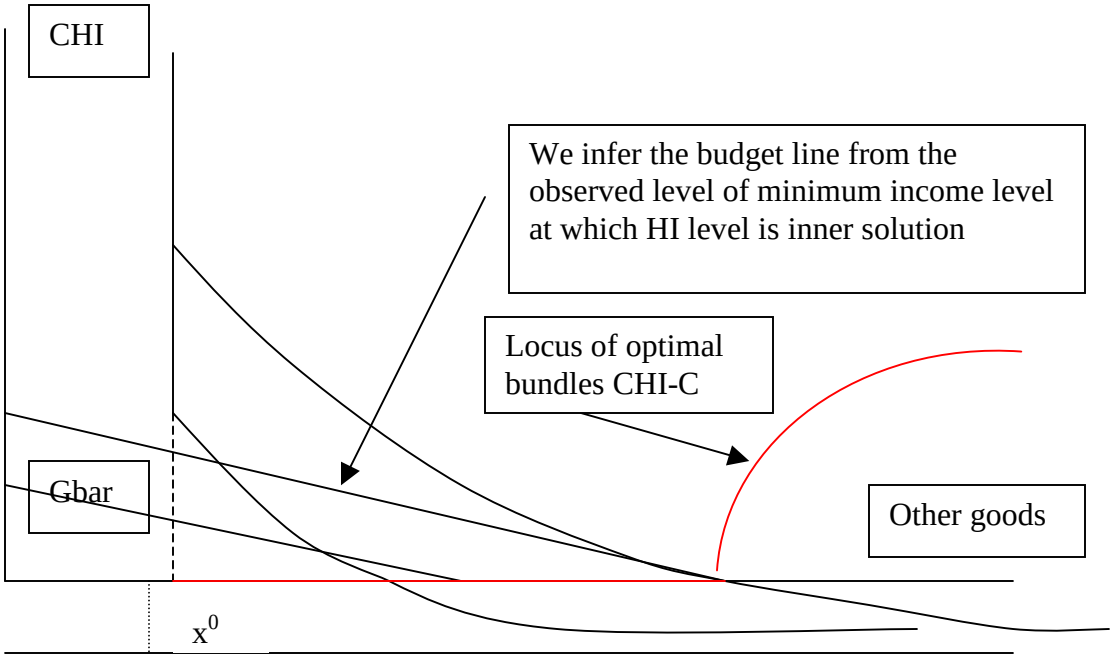
The relationship between x* and y is straightforward, and we will use it to evaluate the parameters of interest $\{\pi,\alpha,x^0\}$:

Substituting c = y – πx in $U(c;x) = k(c-\overline{G})^{\alpha}(x+x^0)^{1-\alpha}$ yields:
$k(y-\pi x-\overline{G})^{\alpha}(x+x^0)^{1-\alpha}$

Maximizing over x:
$$-\pi k\alpha(y-\pi x-\overline{G})^{\alpha-1}(x+x^0)^{1-\alpha} + (1-\alpha)k(y-\pi x-\overline{G})^{\alpha}(x+x^0)^{-\alpha} = 0$$
$$\Leftrightarrow \frac{x+x^0}{y-\pi x-\overline{G}} = \frac{1-\alpha}{\pi\alpha} \Leftrightarrow x^* = \frac{1-\alpha}{\pi} y - \left[\frac{1-\alpha}{\pi}\overline{G} + \alpha x^0\right]$$

G is given by the CMU-C cut-off income, the coefficient for y (income) in the econometric equation provides the ratio $(1-\alpha)/\pi$ and, assuming that α is universal (the same over all individuals) and x^0 varies across categories (it is a need and taste shifter and it varies with the main taste shifters entered in the equation) we will use the non income terms estimated in the econometric equation to calculate these two parameters (α,x^0)

The demand curve (price – quantity locus) is simply: $x^* = (y-\overline{G})(1-\alpha)\frac{1}{\pi} - \alpha x^0$. It is a hyperbola crossing the vertical axis (x=0) for the price $[(y-G)/x^0][(1-\alpha)/\alpha]$. Based on the demand curve, we can calculate the bang for the buck of various subsidy levels (and various income cut-offs).


CHI
We infer the budget line from the observed level of minimum income level at which HI level is inner solution
Locus of optimal bundles CHI-C
Cbar
Other goods
x^0

Section 4 – data and methods

The typical model of demand of non group health insurance (Marquis and Long, 1995, Auerbach and Ohri, 2006, Saliba and Ventelou, 2007 for CHI in France) is based on the regression of a dummy variable taking the values 1 for individuals with a non group contract, and 0 for individuals without any contract.
In the US, the population study is the population non eligible to a group plan or to a public plan (Medicare or Medicaid or SCHIPP); Marquis and Long study families only whereas Auerbach and Ohri study singles only.
On the right hand side of the equation are found: income, taste shifters (education, health status), and a price variable.
US studies construct the price variable as a premium for a standard plan with $1,000 deductible (Auerbach and Ohri, 2006). The premium is imputed on individuals based on their individual (age, gender, health status) and state characteristics (medical price index and policies affecting community rating). Auerbach and Ohri find a price elasticity of -0.6 overall and of -0.9 among the poor. They also find a strong positive income effect on the probability to be covered.

Saliba and Ventelou (2007) identify a premium effect but it is not clear exactly how it is calculated and they do not present any elasticity result. They also find that the decision to be covered is positively linked to age, income, retirement, and a dummy indicating some spending on dental prostheses or glasses in the previous year, and negatively to household size, benefiting from the stop-loss program of the social scheme (ALD), and unemployment.

We use a different strategy to model the demand for CHI. Following the model developed by Thomas (1995) we want to model the quantity of coverage demanded rather than the probability of being uninsured. This is close to estimating the latent variable underlying the binary choice of being insured or not. However, it puts emphasis on other dimensions of the demand function: in the binary choice models, “price” is measured as the premium paid by an individual with a given level of risk for a standardized contract (and level of coverage). The price elasticity reflects mostly the underlying risk of the individual, and, less importantly any local (state) regulation affecting rating (community rating aimed at compressing the risk adjustment of premiums). As a result the price variable influences demand in two opposite directions: as any price of a normal good, a higher premium yields a lower demand; but, simultaneously, since a higher premium reflects a higher “need” (the level of risk of an individual positively correlates with the need for coverage) a higher premium yields a higher level of demand. Econometrically, the price variable is not exogenous in these models.
We follow in the steps of Thomas for whom the true price of insurance is the loading fee (premium divided by expected benefit) and demand is the quantity of coverage (expected benefit given the parameters of the plan such as deductibles and co-insurance rates). As shown in Thomas’ table 2, equating all loading fees to 1 (actuarially fair premium) would increase the probability to buy private insurance by 20 percentage points for individuals between 125% and 200% of the federal poverty line, a much larger effect than the eight percentage points increase for a subsidy of 50% of the premium paid by individuals below 200% of the poverty line estimated based on the price elasticity in the above mentioned models.

Moreover, in the French case, the proportion of individuals with CHI is higher and it is of greater interest to understand the quantity demanded rather than the probability of having any coverage.

In the present study we cannot replicate Thomas's strategy: we do not know the detailed parameters of the plan each individual buys and, as a result, we cannot calculate the expected benefit. We use the premium paid per person covered by the contract as our dependent variable (for the measurement of the variable see below): as a result we model the consumption of insurance (unit price by volume) rather than the quantity.
One consequence is that we do not have any real price variable: we do not observe the loading fee at the individual level. We use proxies based on the risk adjusters of CHI operators (mostly age, gender, and family size) and dummies for regions (to control for variations in medical and dental prices) to control for variations in the unit price of coverage charged to the individual[5].
We will estimate the price elasticity of the demand for CHI based on our calibration of the utility function: the econometric equation will yield values for the iso-utility curves and the budget line which will allow us to calculate the slope of the demand line (quantity-price response).

If we do not observe the parameters of the plan and, as a result, cannot estimate the expected benefit the data set we use in our study allows us to link the consumption of coverage with a set of variables that are rarely observed in the same dataset: health care expenditures, income, demographics (education, occupation, health status) and a series of behavioral attitudes toward risk and time preferences.

Our dataset is a survey on health, health care, and health insurance linked to administrative claims data on expenditures on health care for each type of service (hospital stays, visits, dental care) The survey was conducted in 2004, and administrative claims data covers the period January to December of 2004.
For each type of services administrative claims data indicate the total amount spent during the year by the individual, as well as the share reimbursed by the social scheme. Hence, we know the total amount of user's charges paid by the individual or their complementary insurance.

The survey suffers from a non response bias --

We drop all individuals with CHI obtained through their employer from our study sample and restrict our population to: those with a non group contract (including retirees) and those with no CHI at all. This means we neglect the selection process in the group market and assume all individuals offered some employer sponsored contract (either directly or as spousal benefits) took it up. Those without CHI are therefore on the market for non group contracts. This is certainly a strong assumption if one believes individuals may reject an employer plan they

[5] There is no information on the quantity of coverage in the 2004 survey but some questions on the amount of coverage where asked in the 2000 survey. Because the survey is partially a panel we used the set of respondents with information relating to 2000 and 2004 to estimate a model of premium on quantity (this is an approximation since the premium is for 2004 and quantity for 2000), showing that, for a given level of quantity, the premium varies with age and the number of persons covered but not with individual income or the level of education. Therefore it is reasonable to assume that, for a given age and number of persons covered, the amount paid increases with the quantity of coverage purchased.

deem too generous and expensive, or select jobs according to their offering good quality employer sponsored CHI. There is no data available to decide on this issue, but we make the assumption that individuals will tend to take up an employer's plan which is almost certainly cheaper than any non group coverage, and will not base their job selection too much on the amount of CHI that it offers, at least not as much as workers might do for (first dollar) health insurance in the US. Moreover, it may not be too much of an issue from a policy perspective, if one wants to design an incentive to make sure individuals on the non group market buy the appropriate level of CHI.

Another issue with the data is that not all respondents who reported some non group coverage answered the questions on CHI, income, or health. We treat missing values on the independent variables in two different ways: for continuous variables (such as income) we run a regression excluding all observations with a missing value and a regression where the continuous variable is categorized, one category being "missing". For categorical variables (education or health status) we always use the second strategy. For the dependent variable (premium paid on CHI) we must exclude 721 observations with missing values (who did not provide a value for the premium paid) out of 3,762 observations with a non group CHI (or 19%) or 4,762 observations with a non group CHI or no CHI at all (15% exclusions). As detailed below we control the impact of these exclusions based on a sample selection model.

We categorize income (per consumption units, using the CMU equivalence scale, which is similar to the OECD one, or 1 for the first individual in the household, .5 for the second one, .3 for the third and fourth ones, and .4 thereafter) as follows: our first category (ACS) is income below €700 per month which is the cut-off for ACS, and we use bandwidth of €300 until 2200 and over, which is the reference category: the category inc700 designates income between 700 and 999.

We calculate the value of risk reduction according to the expected utility theory as follows:
We introduce the risk reduction motive in our demand equation as the risk premium:
$P(Y) = Y - U^{-1}[(1-p)U(Y)+pU(Y-D)]$ with Y the income (wealth) of the individual, p the probability to be in the top spenders population, and D the average amount of spending within that population. Following our estimation in section 2 we use 0.2 for p and 1,235 for a value of D. We model U as $Y^{1/2}$ in our baseline scenario.

Table: sample size and exclusions

Non group market (including individuals with no CHI):	4,762
Non group market with some CHI:	3,762
Non group market, incl. no CHI, non missing premium:	***4,041***
Non group market with CHI, non missing premium:	***3,041***
Non group market, incl. no CHI, non missing premium and income:	***3,392***
Non group market with CHI, non missing premium and income:	***2,658***

We use these variables to estimate the demand for CHI on the non group market as a function of income and the value of risk reduction, commitment to health care, attitudes toward risk and time, ability to use information, and calibrate the theoretical model outlined above.

We estimate the following model (equation [1]):

$$\pi = F(age, age^2, Female, Covpers, Covpers^2, R, R^2, Y, Y^2, Y^3, Smoke, \text{Re}gions, Health, Expected\ Risk, Education)$$

Where Covpers is the number of persons covered by the contract, R is the value of expenditures (user fees), Y is income per consumption unit, smoke is a dummy variable taking the value 1 for current or former smokers, and expected risk captures the prospect theory valuation of risk.

Calculation of the premium: in most cases (98%), the calculation is straightforward. The individual is covered by one contract only and we know how many individuals are covered by that non group contract (these are members of the same household). We calculate the value of CHI consumed by that individual as total premium paid divided by the number of persons covered. Some cases are trickier though, when the same individuals is covered by several contracts. In such a case we calculate the value of insurance per person in the contract for each of these contracts and we sum these values to measure the total value of consumption of CHI by that individual. We exclude individuals with at least one ESI therefore we calculate the total value of non group CHI per individual. In these cases the value of the variable Covpers in the model is the average over all contracts (usually two) of the number of individuals covered by each contract. The average total premium on the non group market is €527 per year.

We use several specifications to estimate model [1]:

- We start with an OLS on the 3,041 observations with CHI and available information on premium, income being categorized, and on the 2,658 observations with CHI and available information on premium and income.
- We re-run these two OLS with the natural logarithm of the premium as our dependent variable
- We run the same OLS with two variables reflecting the value of risk reduction, according to expected utility theory and according to prospect theory. Since the value of risk reduction uses income the specification with continuous income is used only.
- We add a two step sample selection (Heckman) model to control for the non response bias on premium in the equation where premium is the dependent variable (we run two versions depending on how income is included, categorical or continuous)
- We run a Tobit estimate on the 4,041 observations with non group CHI and available information on premium or no CHI at all (premium is therefore 0), as well as on the 3,392 observations with non group CHI and available information on premium and income or no CHI at all and available information on income. Because we want to model a demand function with unobserved (censored) negative utilities, the Tobit is the best suited estimator and will be our preferred strategy. It assumes, however, that the same determinants are at play for the selection process (to buy or not a CHI) and conditional consumption (once the decision has been made, how much of CHI to

purchase). It could be imagined though that individuals anticipating higher premiums are deterred from seeking CHI in the first place, and, as a result, some characteristics, such as age would have a negative impact on the probability and a positive one on conditional consumption. It is not very likely in the case of CHI in France since we observe that individuals who pay higher premiums (elderly) are also more likely to be covered.

Section 5: results

(i) OLS, dependent variable in €, categorical income:

Variable	Estimate	Pr > |t|
Constant	608.33553	***
Social scheme user charge	27.94395	**
User charge squared	-1.35915	
Age	-0.13072	
Age squared	0.05923	***
Number covered persons	-75.31256	***
Covered persons, squared	5.05116	*
Income (ref = 2100 and +)		
Income below ACS cut off	-184.69186	***
Income 700 to 999	-181.91331	***
Income 1000 to 1299	-171.13694	***
Income 1300 to 1599	-151.99652	***
Income 1600 to 1899	-115.18654	***
Income 1900 to 2099	-75.23214	**
Income unknown	-122.53323	***
Observations	3041	
Adjusted R2	0.2740	

This simple OLS regression shows the following:

The commitment motive (RAC) is significant but its effect is limited: the variable is measured in 1,000€, hence each supplementary € in user charges is associated with 0.03€ in supplementary consumption of CHI.
Gender is not significant and is not included in the regression.
Consumption of CHI increases as age squared: for an individual aged 60 the premium is increased by €213, or 37% of the average.
It decreases with the number of individuals in the contract: this seems to be observed as well in the US (Gruber, 2008) and stems from a cross subsidy of large families by single individuals (insurers do not charge the same fee on families). There is no clear explanation for such a cross-subsidy.
Last the income effect is strong: compared to the richest category an individual below €1000 demands €182 less CHI, or 32% less than the average consumption.

(ii) OLS with continuous income:

Variable	Estimate	Pr > |t|
Constant	324.75898	***
Social scheme user charge	30.37197	**
User charge squared	-1.62414	
Age	-0.71569	
Age squared	0.06655	***
Number covered persons	-72.36516	***
Covered persons, squared	4.96699	*
Income/1000	134.06	***
Income/1000, squared	-17.22	***
Income/1000, cubic	0.52	***
Observations	2658	
Adjusted R2	0.2767	

We observe the same effects of commitment, age and number of beneficiaries within the contract. The income effect is cubic (all three coefficients are significant at the 1% level).

(iii) OLS with dependent as logarithm and categorical income

Variable	Estimate	Pr > |t|
Constant	6.02962	***
Social scheme user charge	0.06705	***
User charge squared	-0.00395	
Age	0.00159	
Age squared	0.00010060	***
Number covered persons	-0.03698	
Covered persons, squared	-0.01277	***
Income (ref = 2100 and +)		
Income below ACS cut off	-0.29321	***
Income 700 to 999	-0.26625	***
Income 1000 to 1299	-0.24954	***
Income 1300 to 1599	-0.22962	***
Income 1600 to 1899	-0.17929	***
Income 1900 to 2099	-0.17630	***
Income unknown	-0.18495	***
Observations	3041	
Adjusted R2	0.3988	

All coefficients remain significant at the same level, the relationship better fits the data with a share of variance in the model of 40% compared to 27% when the dependent variable is in natural units.

We now add proxies for the motivations of risk reduction, and attitudes toward risk

(iv) OLS with risk premium – we present here the estimations where the expected utility motive is the only risk reduction motivation included because none of the other variables (based on prospect theory or attitudes such as being a smoker) had a significant effect at reasonable levels.

Variable	Estimate	Pr > |t|
Constant	232.54	***
Social scheme user charge	28.37576	**
User charge squared	-1.41709	
Age	-0.87263	
Age squared	0.06826	***
Number covered persons	-70.60673	***
Covered persons, squared	4.60560	
Income/1000	189.63	***
Income/1000, squared	-25.02	***
Income/1000, cubic	0.796	***
Risk premium	6.87104	***
Observations	2645	
Adjusted R2	0.2790	

The risk premium is positive and significant. Since it increases when income decreases the pure income effect is now larger. This OLS regression clearly indicates that the poor benefit more from being covered but are deterred from purchasing CHI by affordability effects.

(v) Sample selection model (non response bias on premium)

In the first step, we model the probability that a respondent to the survey who reports being covered by a non group contract will not answer the question on the premium paid for that contract. We use the following variables: age, gender, education, self-assessed health, and locale (rural, urban lower than 200,000, urban larger than 200,000, Paris).

The second step is an OLS with the same independent variables as in (iv), plus the inverse Mill's ratio to control for the selection bias.

Variable	Estimate	Pr > |t|
Constant	372.55	***
Social scheme user charge	26.65	*
User charge squared	-1.27	
Age	-1.34	
Age squared	0.078	***
Number covered persons	-68.42	***
Covered persons, squared	4.36	
Income/1000	183.12	***
Income/1000, squared	-24.41	***
Income/1000, cubic	0.779	***
Risk premium	6.65	***
IMR	-421.92	**
Observations	2641	
Adjusted R2	0.28	

The IMR is significant indicating that, among respondents, not providing information on the premium paid is systematically linked to the value of insurance consumed. The coefficients on income are slightly different when this bias is controlled for but qualitative results are the same as in (iv). This is the main conclusion we draw from this estimate: even though the selection mechanism of non reporting on the premium is systematically linked to the level of the

premium, not accounting for it biases the coefficients on other determinants (mostly income) only minimally. As a result, we will use a simple version of the Tobit estimator without correcting for the non reporting bias.
We also tried with a first step where the non response bias on premium is controlled for a dummy variable taking the value 1 for individuals who refused to provide information on their income. This improves substantially the fit of the first step but leaves the coefficients on income unchanged in the second step.

(vi) Tobit model

Variable	Estimate	Pr > |t|
Constant	-589.61	**
Social scheme user charge	78.6550	***
User charge squared	-5.8872	***
Age	2.3365	**
Age squared	0.0555	***
Number covered persons	426.6754	***
Covered persons, squared	-64.9339	***
Income/1000	206.8737	***
Income/1000, squared	-27.8531	***
Income/1000, cubic	0.9411	***
Risk premium	3.2447	*
Observations	3369	
Log Likelihood	-19835.63764	
Scale	342.67	

As expected, the slope of the income – premium relationship is steeper when the Tobit estimator is used (the 0 demand observations are now seen as negative ones). The quadratic age function is significant and the impact of the number of persons is increasing from 1 to 2 and decreasing thereafter at an accelerated pace. The risk premium has a lower impact on the demand for insurance.

A specification where only half of observations with non CHI are entered (drawn at random) to account for the fact that individuals with CHI are under-weighted due to the non response bias on the premium variable and there is no qualitative difference.

(vii) Tobit model with a weight of 1.305 for individuals who reported a premium (they are inflated to account for non response relative to those with no CHI)

Variable	Estimate	Pr > |t|
Constant	-513.114	***
Social scheme user charge	74.3947	***
User charge squared	-5.4812	***
Age	2.0437	**
Age squared	0.0576	***
Number covered persons	378.1739	***
Covered persons, squared	-57.9812	***
Income/1000	205.5692	***
Income/1000, squared	-27.6367	***
Income/1000, cubic	0.9291	***
Risk premium	3.3302	**
Observations	3369	
Log Likelihood	-25786.04814	

Scale	338.1276	

Because the origin of censoring might come from a supply side issue (the transaction costs of supplying a low level of CHI might be too high) as well as from the demand side issue tested so far, we re-estimate the demand function with a censoring threshold at 200 instead of 0 (it appears that very few contracts are worth less than €200 per year and per person in our dataset). The findings are not qualitatively changed: the slope for income is slightly steeper as is the impact of going from 1 to 2 persons covered. In the simulations below we use the weighted Tobit with a threshold at 0 as our preferred estimate.

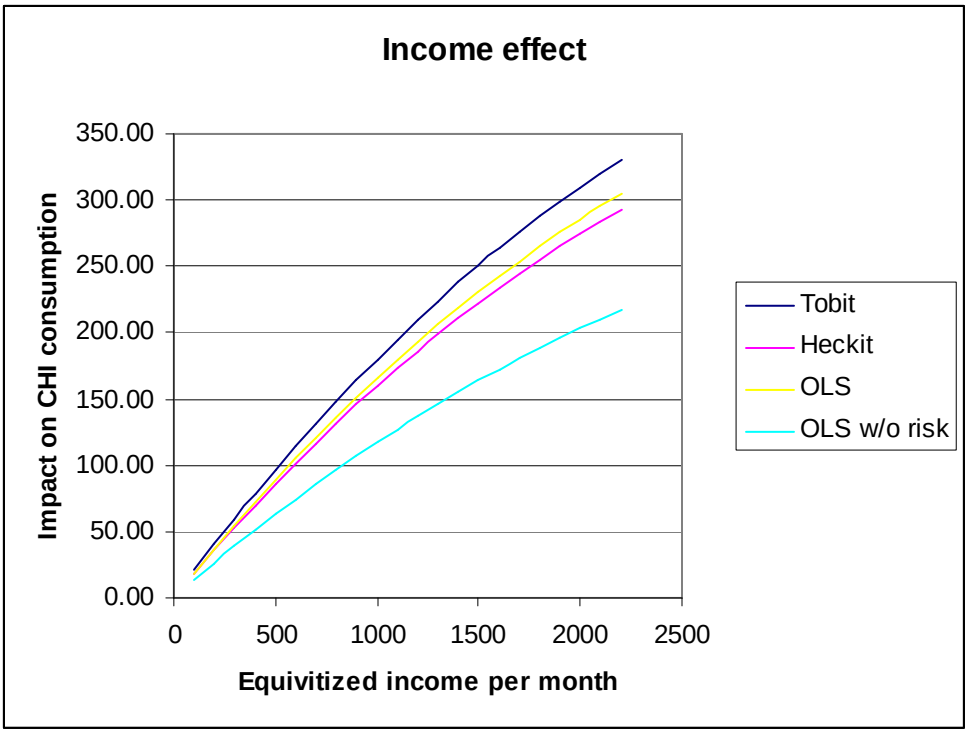
Section 6: interpretation

Our main findings are as follows:

1. The main determinants of demand for CHI in France seem to be linked to a reduction of the financial risk left by the basic social scheme – this is context specific and has to do with the fact that very high levels of spending, as well as decisions on the quality of care received are not likely to be part of the decision to buy CHI.
2. As observed by Gruber on the US market, the price per person covered decreases with the number of persons in the contract (with the Tobit estimator, we get an increase from 1 to 2 and then a decrease at an accelerated pace). This could be the result of two causal mechanisms: insurers use family size as a selection tool (assuming larger families are healthier on average) or a process individuals use to spread the financial risk of paying for health over the life cycle (the very young and very old would then agree to pay a premium in exchange for a discount when they are middle aged and with children).
3. Income is a strong determinant of the demand for CHI. We now turn to the relationship between income and demand with an aim at simulating the effect of various subsidizing mechanisms on the purchase of "appropriate" contracts of CHI.

Here plot with the five income curves, with and without Risk premium, plus Heckit and the two Tobit

Effect of income on the reported premium paid for non group CHI (0 if no CHI) according to various models (for the Tobit we report model (vi) only and for the latent variable; for the Heckit, we report the second step with the control for IMR).

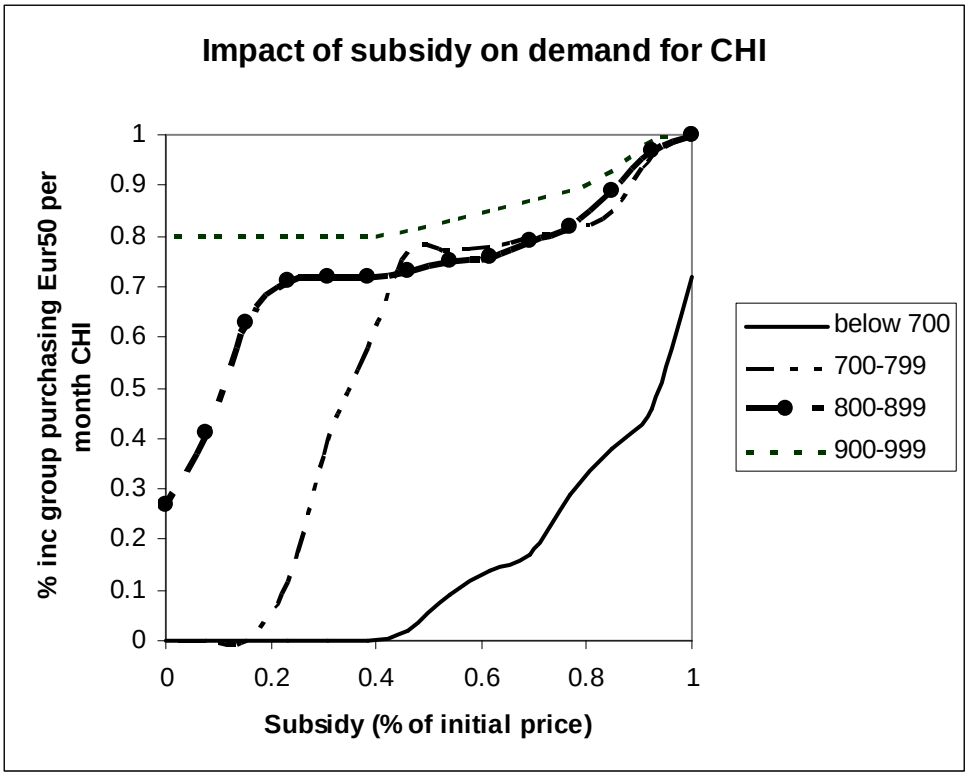


The slope around 1000 is approximately 0.14. Hence $\pi = (1-\alpha)/0.14$.
Here we assume $\pi = 1.3$ (aggregate data indicate a loading fee of 20% on all group and non group contracts; since non group are usually more expensive, we use 30% as our proxy for the price of each unit of coverage, understood as the cost beyond actuarial).
These parameters yield $\alpha = 0.82$, which is plausible.

For each individual, the negative value of "minimum" CHI is given by:
$x^0 = (-\text{Tobit(i)} -0.14*G)/0.82$

Where Tobit(i) is the predicted value from the model neutralizing the effect of income (but including the random value from the residual) for the individual i. For each individual in our sample we draw a random number in a normal distribution with a mean of 0 and a standard deviation of the Scale parameter from the tobit. We use the predicted deterministic values for the un-censored demand for CHI (the latent variable) and the random number to generate these Tobit(i) for each observation i.
We then run the simulations as follows: once we know x^0, we can calculate the demand for CHI as a function of its price π ($x = \frac{(1-\alpha)(y-\overline{G})}{\pi} - \alpha x^0$), and, given a target consumption of CHI (the 'appropriate' level the government wants to encourage, x*), the implicit price that CHI should be charged to make sure individuals will buy it: $\hat{\pi} = \frac{(1-\alpha)(y-\overline{G})}{x^* + \alpha x^0}$
We run two sets of simulations, one using a target level (appropriate quantity of insurance) x* = 50, meaning €600 per year and person, somewhat higher than the €527 average of non group premiums, and the second one based on a monthly premium of €44 (or €528 per year).

Findings are as follows for the 50 target:



Among those with less than €700 per month (close to the ACS cut-off income threshold at 675[6]), 54% would buy less than x* with a price as low as 0.1 (meaning a subsidy of 1.2/1.3 = 92%), and still 38% would be in the same situation with a price of 0. Above the cut-off threshold and below €800, a price of 0.8 would deter 42% of consumers to buy the target level of CHI, but a price of 0.7 would convince 77% of them; the gain is almost flat after that (with 80% reaching the appropriate level for a price of 0.4) until 0.1 where it goes up to 96%. Subsidizing the cost of CHI by approximately 50% (0.7/1.3) seems to be efficient in that income bracket. Between 800 and 900 per month, the efficient level of price is 1.0 (no loading fee at all, meaning a subsidy of 1/1.3 = 23%), where 71% reach the appropriate level (up from 63% with a price of 1.1).

Below the ACS cut-off income threshold, older customers (65+) might be easier to convince: with a price of 0.2 (subsidy of 85%) 54% of them buy the appropriate level (versus 30% only

[6] It must be noted that some individuals in our sample report incomes that would make them eligible to CMU, i.e. below 587 per month, even though they do not state they actually benefit from it. We have no way of deciding whether they under-report their income, are eligible to CMU but did not claim it, or failed to report their being covered by it. As a result, we decided to include these observations in our study and simulation (we have excluded all individuals reporting they are covered by CMU, however).

among the young and adults). Similarly, with a price of 0.7, 93% of the 65+ in the income bracket 700-799 buy the target level of CHI. One has to keep in mind, however, that, since insurers charge more for elderly individuals, any proportional subsidy will be more costly to the public purse when targeted on the elderly.

With a target at €44 instead of 50, no much changes below the ACS threshold; however, the efficient price for the 700-799 income bracket is now 0.8 (38% subsidy) and 1.2 (8% subsidy) for the 800-899 income bracket.

References

Auerbach D. and S. Ohri, 2006, "Price and Demand for Non-Group Health Insurance", *Inquiry*, 43, 122-134.

Barsky R. B. et al, 1999, Preference Parameters and Behavioral Heterogeneity: An Experimental Approach in the Health and Retirement Study, *Quarterly Journal of Economics* 112(2): 537-579

Bocognano A., A. Couffinhal, S. Dumesnil et M. Grignon, 1998, "La couverture maladie en France : qui bénéficie de quels remboursements. Résultats de l'Enquête Santé et Protection Sociale 1998", Rapport IRDES 2000/10.

Bundorf K. and M. Pauly, 2006, "Is health insurance affordable for the uninsured?", *Journal of Health Economics*, 25, 650-673.

Couffinhal A. and C. Franc, 2008, Private Health Insurance in France, draft

Couffinhal A. et M. Perronnin, "Accès à la couverture maladie en France : une comparaison des niveaux de remboursement. Enquête ESPS 2000-2002", Rapport IRDES 2004/04.

Cutler D. and R. Zeckhauser, 2001, "The Anatomy of Health Insurance", in Cuyler and Newhouse, eds., *Handbook of Health Economics*, vol IA, Amsterdam: Elsevier, 563-643.

Cutler, D., A. Finkelstein, and K. McGarry, 2008, Preference heterogeneity and insurance markets: Explaining a puzzle of insurance, NBER WP13746

Despres C. and M. Naiditch, 2006, *Analyse des attitudes de médecins et de dentistes à l'égard des patients bénéficiant de la Couverture Maladie Universelle – Une étude par testing dans six villes du Val-de-Marne*, Fonds de financement de la protection complémentaire de la couverture universelle du risque maladie, Paris, Ministère de la santé et des solidarités.

Fennina, A. and Y. Geffroy, 2007, Comptes nationaux de la santé, DREES, Ministère de la Santé

Franc C. and M. Perronin, 2007, "Aide à l'acquisition d'une assurance maladie complementaire : une première évaluation du dispositif ACS ", *Questions d'économie de la santé*, 121, IRDES.

Fuchs, V. 1998, *Who Shall Live? Health, Economics, and Social Choice* – Economic Ideas Leading to the 21st Century, vol. 3, World Scientific

Glied, S. 2001, Challenges and Options for Increasing the Number of Americans with Health Insurance, *Inquiry*, 38: 90-105

Gruber J., 2008, "Covering the insured in the U.S.", NBER Working Paper 13758.

Kahnemann D. and A. Tversky, 1979, "Prospect theory: an analysis of decision under risk", *Econometrica*, 47, 263-291.

Marquis S. and S. Long, 1995, "Worker Demand for Health Insurance in the Non-Group Market", *Journal of Health Economics*, 14, 47-63.

Maslow, 1970, *Motivation and Personality*, Harper, New York

Monheit, A. and J. Primoff Vistnes, 2006, Health Insurance Enrollment Decisions: Preferences for Coverage, Worker Sorting, and Insurance Take-Up, NBER, WP12429

Murray CJL, Knaul F, Musgrove P, Xu K, Kawabata K. Defining and measuring fairness in financial contribution to the health system. Global Programme on Evidence for Health Policy Discussion Paper Series: No. 24. World Health Organization.

Newhouse, J. 2006, Reconsidering the moral hazard-risk avoidance trade-off, *Journal of Health Economics*, 25: 1005-1014

Nyman, John A. "The Value of Health Insurance: The Access Motive," *Journal of Health Economics*, vol. 18, no. 2, April 1999, pp. 141-152.

Pudney, **S.**, 1989, *Modelling Individual Choice: the econometrics of corners, kinks, and holes*. Blackwell, Oxford and New York

Saliba B. and B. Ventelou, 2007, "Complementary health insurance in France: Who pays? Why? Who will suffer from public disengagement?", *Health Policy*, 81, 166-182.

Starr-McCluer, M. 1996, Precautionary savings and health insurance, *AER*, 86(1): 285-295

Swartz, K., 2001, Markets for Individual Health Insurance: Can We Make Them Work With Incentives to Purchase Insurance, *Inquiry*, 38: 133-145

Thomas K., 1995, "Are subsidies enough to encourage the uninsured to purchase health insurance? An analysis of underlying behavior", *Inquiry*, 31, 415-424.

Thomson S, Mossialos E. Private Health Insurance and Access to Health Care in the European Union, *Euro Observer: Newsletter of the European Observatory on Health Systems and Policies* 2004; 6(1):1-4

Zelenak, L. 2001, A Health Insurance Tax Credit for Uninsured Workers, *Inquiry*, 38: 106-120

Wooldridge J., 2002, "Econometric Analysis of Cross Section and Panel Data", MIT Press.