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1. Introduction

The only certainty about one's future health is that it's uncertain. It is therefore unsurprising that insurance mechanisms are present in most developed economies. However, there is a large variety of insurance systems around the world. One can find a rich array of institutions, regulatory regimes, and market arrangements even in countries with similar economic situations and cultures. The common denominator is to ensure a minimum degree of healthcare provision to the general population.

At one extreme, there is the so-called *pure* "national health service" (pure NHS henceforth), a term that is taken from the UK but is actually only observed in Denmark, Norway, and Sweden.¹ In such a system a single supplier of healthcare services exists² that is almost fully financed through general taxation. (A usual exception is the out-of-pocket expenditure required to obtain most pharmaceutical drugs.) This results in equal access to a large portfolio of healthcare services for the

whole population. At the other extreme, there is the *pure* “private health insurance” system (pure PHI henceforth), where each individual chooses among health plans offered by private insurers at a price that is usually referred to as “premium”. Private insurers compete to attract insurees by either offering a richer portfolio of services and/or requesting smaller premia than their competitors. This is the system in the US, for example, except for those over 65 years of age or with incomes below a given threshold. It is also the system in Switzerland.

Between these two extremes, there are the so-called “national insurance systems” or “statutory health insurance” systems where individuals choose their preferred plan but, instead of paying for it directly, they contribute to a common fund that is then used to pay insurers for each enrollee. The individual contribution usually depends on income only, just like income taxation. The payment that the insurer receives from the common fund is referred to as the “capitation rate”. This is the system in place in the Netherlands, in the US for individuals aged 65 or older, and for those civil servants in Spain who have opted out of the NHS.

This classification is a rough one, based only on the answer to two questions: (1) Can individuals choose their insurance plan? (2) Do individuals pay the insurer for their insurance plan *directly*? In a pure NHS, the answer to both questions is no, while in a purely PHI system the answer is yes to both questions. In statutory health insurance the answer is yes to the first question and no to the second. I very briefly comment on this mixed system in Section 9.³

The two extreme systems described above have their advantages and their inconveniences. A general discussion of the pros and cons of pure

PHI can be found in Simon (2014). Here, I concentrate on pros and cons of PHI systems that operate side-by-side with a NHS. I will focus on their vertical and horizontal equity in healthcare access as well as on the financial viability of the NHS. Vertical equity stands for equal access to healthcare services at the same contribution for individuals with different health conditions. It entails the notion of “cross-subsidization” in the sense that individuals with high health risks contribute less than their expected future costs, while individuals with low health risks contribute more than their expected future costs. Horizontal equity, less demanding, stands for equal access to healthcare services at equal contribution for individuals with the same risks. It is quite clear that a pure NHS implements both sorts of equity, whereas (at least vertical equity) is compromised in countries with a PHI running alongside a NHS sector. Financial viability of the NHS becomes a concern when the PHI attracts the individuals with lower healthcare costs.

In the next section, I compare the pure NHS and the pure PHI systems. In Section 3, I describe three different ways of combining NHS and PHI, called substitutive, duplicative, and supplementary PHI. In Sections 4 and 5, I report the findings of the theoretical literature for the substitutive and duplicative systems. In Section 6, I explain the difficulties one encounters in trying to empirically test these theoretical predictions. In Sections 7 and 8, I review three empirical studies: two for the duplicative system (UK and Australia) and one for the substitutive system (Germany). I also discuss whether the empirical results are consistent with the predictions of the theory. In Section 9, I briefly consider the statutory health insurance system. I provide some concluding remarks in Section 10.

2. Pure NHS vs. pure PHI

Before going into these pros and cons, I need to distinguish between two scenarios: one where individuals have privileged information about their future expected health costs, or “asymmetric information” scenario, and one where insurers and insureds have the same information, or “symmetric information” scenario.

2.1 Issues with pure PHI systems in the symmetric information scenario

The first characteristic of a pure PHI system under symmetric information is that individuals with a worse health status may end up paying a larger premium for the same insurance package. An example of this is if insurers only offer older individuals the same benefits as younger individuals at a higher price. The same happens if two individuals with the same age have different health status due to reasons outside their responsibility and end up paying different premia. More generally, as insurance premia may depend on health status, some individuals will be classified as “unhealthy” by insurers and then face a larger premium.

Another characteristic of pure PHI is, as individuals decide on their insurance packages, that poor individuals may end up purchasing insurance packages that, albeit cheaper, may fail to ensure adequate care for some health conditions.

2.1.1 Regulating the PHI sector

Due to these issues, health authorities have regulated PHI markets in two ways. One is to impose the so called “community rating”, whereby insurers are not allowed to condition their premia on some observable variables, such as age, gender, or past expenditures. This policy becomes the

more stringent the more variables are banned as possible basis for price differences. For instance, in Australia, insurers are forced to set the same premium for all individuals.

2.1.2 Circumventing community rating

Once premia cannot be adjusted to risk (or to variables correlated with it), PHI may circumvent the legislation by a strategic choice of the coverage of their plans. For instance, they may offer the same premia to everybody but restrict access to some treatments through waiting lists or copayments, deny treatment for pre-existing conditions, or exclude some specific treatments. These strategies would reduce or even eliminate demand by individuals with higher risk. As a result, health authorities often regulate the coverage of health plans also. For instance, the last strategy can be avoided by requiring that insurance contracts cover a pre-specified set of treatments. Even before “Obamacare” (the Patient Protection and Affordable Care Act of 2010 in the United States) was established, most states in the USA imposed such legal mandates for health insurance in the individual and small group insurance markets. In general, I refer to such policies as “minimum coverage legislation” (McFadden, Noton and Olivella, 2015).

Combining community rating and minimum coverage legislation implies that some individuals will be paying a premium that does not cover their expected future treatment costs, for instance the elderly. This may induce insurers to try to avoid such individuals, a phenomenon that is referred to as “risk selection based on observables”. Once premia and coverage are regulated, insurers will seek other ways to avoid such individuals. Several methods of selection have been documented (Doiron, Jones and Savage, 2012). For instance, PHI insurers may target their offers to younger individuals. A more subtle (and hence harder to reg-

ulate) way to avoid individuals with high health risk is to decrease the quality of, or the access to, those services that are more likely to attract individuals with high expected future costs. This strategy is referred to as “service-level selection” (Ellis and McGuire, 2007).

Such service-level selection can be implemented without the need to condition coverage on individuals’ observable characteristics. For instance, if it is known that older individuals or women in child-bearing age are more prone to need certain services then insurers can distort the quality of, or the access to, these services. Such risk selection strategies by insurers are hard to regulate as the actual quality and access conditions of a health plan may be very hard to observe by the regulator.

2.2 Issues with pure PHI systems under asymmetric information

Let us start with an example. Take two 35-year old males, Hugh and Louis, who have not used any healthcare services in the last three years. However, Hugh is (for some reason) likely to be using healthcare services in the next three years, and he knows this. Louis is not, and again he knows this. Suppose that insurers cannot tell which of the two has the higher likelihood of requiring healthcare services. However, insurers are allowed to offer *the same* “menu of contracts” to Louis and Hugh. This menu contains a “bronze contract”, which is cheap but includes benefits that are not very generous, and a “platinum contract”, which is expensive but generous. If the menu is correctly designed, it will manage to “screen” these two individuals, which means that the menu will result in Hugh picking the platinum contract and Louis picking the bronze contract (Hugh and Louis will “self-select” into different contracts). It turns out that the existence of such menus is the only possible prediction in an unregulated market of PHI

under asymmetric information (Rothschild and Stiglitz, 1976).⁴ This turns out to be true in any insurance market: automobile, fire, annuity, and so on. It is also true that the existence of such menus entails some degree of inefficient risk-sharing: Louis would be willing to purchase additional coverage but he is not allowed to. The reason is that slightly increasing coverage and premium would break the screening power of the resulting menu.⁵ Notice that vertical equity is compromised by the existence of menus that screen individuals.

Finally, the fact that some individuals self-select into different contracts is sometimes referred to as “selection based on unobservables.” If an insurer specializes in offering the bronze contract, such self-selection results in the insurer ending up with a propitious selection of the population.

2.3 Issues with pure NHS systems

Let us turn now to the inconveniences of having a purely public NHS, where all citizens have similar access to the same package of health services. Obviously, equity ceases to be an issue. However, the system may be characterized by a so-called “lack of responsiveness”. Individuals may have different preferences for health and may prefer to be able to choose a given package of services and not another, rather than having to enjoy a uniform package. For instance, some people may be willing to wait more if that wait ensures a higher quality treatment.

Another issue usually associated to NHS systems is that incentives to contain costs may be weaker than in purely private systems. This has to do more with the cost and benefits of *final* healthcare provision than with efficient risk-sharing. In any case, if a private insurer contracts health services with a hospital and this contract is similar to the contract signed between the NHS and the

same hospital, then cost containment incentives should be the same in the two cases. A different issue is whether NHS systems tend to subcontract state-owned hospitals while private insurers usually subcontract private hospitals. Whether this is so or not is an empirical matter. Similarly, whether publicly-owned hospitals and private hospitals are run in different ways is also an empirical question. Answering these questions would take us very far from the focus of this survey.

Notice that I have not distinguished here between the symmetric and asymmetric information scenarios. This is because a pure NHS entails uniform benefits and compulsory contribution. Whether the health authority has information on the true tendency of using healthcare services for each individual becomes irrelevant: that information is simply not used.

3. Combining PHI and NHS

We have seen that both having a pure NHS and having a pure PHI system (even if it is regulated) may lead to undesired results. Therefore, it may not be a bad idea to combine both systems.⁶ That is, let a NHS exist that provides basic healthcare to the general population, which ensures some minimal equity, and let a private insurance sector run side-by-side with it to ensure some degree of responsiveness.

There are at least three ways to do this. The first one is to require that the PHI system offer the same package of services as the NHS and at the same time have individuals still pay their taxes in full (part of which goes to finance the NHS). This is the current set-up in Spain, UK, and Australia, for example. Consistent with the received literature, I will refer to this framework as the “du-

plicative PHI system”. Individuals who decide to purchase PHI are, *de facto*, doubly insured for the same package of services: they still have access to NHS services after having purchased PHI. I will rationalize such a decision in Section 5.

The second arrangement is to still have private insurers offer the same package of services as the NHS, but allow individuals who decide to purchase PHI to stop contributing and opt out of NHS services. This is the current system in Germany and Chile, for example.⁷ I refer to such an arrangement as “opt-out PHI system” (also referred to as “substitutive PHI”).⁸

The third possibility is to have the PHI cover either (i) services not provided by the public sector, or (ii) the copayments that are prevalent in the public sector, as in France. Examples of (i) are some types of dental care or aesthetic treatments, rehabilitation, or superior amenity services (enjoying a single room, for example). Such insurance is usually referred to as “supplementary PHI” and I will not consider it here.

When both the PHI system and the NHS are available, the main question is who decides to purchase PHI. As mentioned in the introduction, we care about this for two reasons: equity and financial burden at the NHS. Let us start addressing these issues in the opt-out PHI system first, since both become more poignant there.

4. The theory of substitutive (or opt-out) systems

As I did in preceding sections, I distinguish between the symmetric information and the asymmetric information scenarios. An important feature of the substitutive PHI system is that individuals

remaining in the NHS will be the only ones contributing to that system. Moreover, within the NHS, individuals contribute according to their income and not their future healthcare costs. Hence a large degree of cross-subsidization exists within the NHS. As a consequence, high risks that do not opt out end up contributing an amount that is below their expected future costs.

4.1 Symmetric info and free rating

Suppose that private insurers are allowed to condition their premium on a large set of observable personal characteristics. If an individual shows a configuration of characteristics that implies a low premium, he is confronted with two options: (i) generous and cheap coverage in the private sector and (ii) contributing to a NHS where the low risks subsidize the high risks. It is quite obvious that such an individual will opt out. Hence the prediction is propitious selection into PHI.

4.2 Asymmetric info and free rating

Let us go back to the example involving Hugh and Louis. Recall that premium cannot be made to depend on their propensity to use healthcare services, as it is unobservable. Hence private insurers will have to resort to menus of contracts in order to screen them. Now Louis is confronted with three (instead of two) options: (i) accept a generous but expensive platinum plan in the private sector, (ii) accept a less generous but cheaper bronze plan in the private sector, or (iii) remain privately uninsured (resort to the NHS-provided services). Louis will discard option (i), since he is unlikely to use health services anyway. However, deciding between options (ii) and (iii) is not at all trivial. On the one hand, he incurs some *ex-ante* payment in both options: an income-based contribution in option (iii) and a premium in option (ii). On the other hand, both may entail similar bene-

fits. It is hard to predict which of the two Louis is going to choose. Take now Hugh, who faces the same three options as Louis. He will discard option (ii) since menus are designed to screen him out of the bronze contract. He will just compare the increased but expensive coverage in the PHI (the platinum contract in option (i)) and the less generous (but subsidized) coverage in the NHS. It is again unclear which his best option is. Hence theory does not give us a sharp prediction here. In Section 5, I will argue that these complex trade-offs disappear in a duplicative PHI system.

Several other stumbling blocks come in the way when trying to predict selection in this framework. First, the degree to which coverage and premium are reduced in the bronze contract in order to avoid attracting a high risk depends on how risks differ among individuals. As I will discuss below, it is often hard to estimate true risk. Second, the presence of market power in the private insurance sector may also come into play: the less competitive this sector is, the more premia may involve some degree of cross subsidization in the PHI sector (Jack, 2006; Olivella and Vera-Hernández, 2007).

All these difficulties can be in part overcome by going to the data, a discussion that is relegated to Section 6.

4.3 Community rating in Opt-out systems

It turns out that no work exists studying the effects of community rating in opt-out systems. It is also true that no such arrangement can be found in the real world. All countries that allow individuals to opt out of the NHS also allow private insurers to choose their pricing policies freely. The reason might be that having community rating in a substitutive PHI sector would just mimic the cross-subsidization already accomplished in

the NHS. Another possible reason is that having community rating in a private sector would create powerful incentives for risk selection against the NHS. If such a selection were limited by law, insurers would still try to avoid the less healthy by offering very limited benefits in their insurance plans. In this case, responsiveness of the PHI would be severely curtailed.

5. The theory of duplicative systems

The first question that comes to mind is why would someone who has already contributed to finance a NHS be willing to pay again for the same services now provided by PHI. There are various possible reasons for this, but the most straightforward one is the belief that the services provided through PHI (or at least some of them) are of better quality than those provided by the NHS. I use “quality” here in the most general sense. Quality may include, for instance, a shorter wait (Jofre-Bonet, 2000), or direct access to a specialist (without the need of a previous referral by a general practitioner). Other aspects of actual or perceived quality include enjoying improved hotel services in the PHI hospitals (single room, allowing a member of the family to stay overnight, and so on). In some cases, treatment under the PHI may be perceived to be of better *clinical* quality.⁹ Since the individual must contribute to the financing of the NHS independently of whether he will be using it or not, the only reason to purchase PHI is to either obtain higher quality in some dimension, faster access, or better ancillary services. Notice that if quality of coverage was equal or better in the NHS in all dimensions, then the private sector would become unviable in a duplicate system. The mere existence of an active private sector provides direct evidence that coverage in the public sector must be (at least

for some individuals) of inferior quality. As for who are the individuals purchasing PHI, Olivella and Vera-Hernández (2013) show that the answer crucially depends on whether information is symmetric or asymmetric.

5.1 Symmetric information and free rating

Under symmetric information and free rating, individuals with a lower tendency to use health-care services will receive generous cover and pay a lower premium in the PHI sector. The reason is that insurers do not need to offer menus of contracts to screen applicants. Hence these individuals are the ones that will purchase PHI, given the lower quality of the services provided by the NHS. I insist that “quality” must not be understood here as medical quality (or at least not only), but to include many other aspects like absence of waiting or better hotel services when hospitalization is required. Hence, one should observe propitious selection into PHI.

5.2 Asymmetric information and free rating

Under asymmetric Information, individuals have privileged information on the likelihood that they will require (or demand) health services. Since private insurers do not have this information, they are forced again to screen applicants by offering a menu of contracts. Hugh and Louis face, again, three options: (i) accept a generous but expensive platinum plan in the private sector, (ii) accept a less generous but cheaper bronze plan in the private sector, or (iii) remain privately uninsured and resort to the NHS for free, as contributing to the NHS is unavoidable. Since the private sector is active, either Louis or Hugh is purchasing PHI. Given their respective propensity to use healthcare services, Hugh will be the one purchasing duplicative PHI. Hence, theory gives us a clear prediction: Individuals adversely select

into PHI under asymmetric information. Interestingly, it is exactly the opposite prediction to the one we obtained under symmetric information.

5.3 Community rating in duplicative PHI

In Australia, healthcare is provided through a NHS along with a duplicate PHI. Also, risk rating is severely limited in the PHI sector. This implies that both selection based on observables and selection based on unobservables can only be implemented through distortions in the benefits. If such distortions are also banned through minimum coverage legislation and intense monitoring of the quality and access in all services, it may seem surprising that a viable PHI sector exists. Cross-subsidization is already present in the NHS and moreover individuals contribute to its financing independently of whether they purchase PHI or not.

As argued above, the mere existence of an active PHI sector directly implies that quality and access at the PHI must be superior. This being so, premia in the PHI should be quite steep. For these reasons, the prediction is that only individuals in worse health status would purchase PHI. This is precisely what Doiron et al. (2008) find in their empirical study of the Australian case (subsection 7.2).

Notice that one can think of the NHS and the PHI as a menu of contracts. The former involves less generous benefits (for instance waiting times may be long for certain procedures) at no extra premium. The latter offers improved benefits (no waiting time) at a high premium. If Louis and Hugh lived in Australia, Hugh would be the one purchasing PHI.

6. Duplicative and substitutive PHI: Some common difficulties in understanding selection

There are two fundamental difficulties in addressing selection that are common to duplicative and opt-out systems. The first one is that, even using rich data sets and state-of-the-art empirical techniques, it is hard to predict the future costs (or “true risk”) that a given individual brings with him or her. The second one is that it is also difficult to predict whether an individual will decide to purchase PHI, since that decision may be based on “universally unobserved” variables. I discuss these difficulties in turn.

6.1 Difficulties in estimating future healthcare costs

One of the main difficulties in analysing insurance markets is the fact that some reasons to purchase PHI may entail effects of opposite sign on future costs. For instance, if an individual perceives his health to be worse than it really is, he may demand more health services. However, these demands may not be met because referrals (e.g., to a specialist's services) are based on his true health condition. Hence, even if these variables could in principle increase the tendency to purchase PHI, they may not induce higher costs for the PHI sector. Similarly, take an individual that cares a lot for his health. He might be more prone to purchase PHI. At the same time, precisely because of his preference for health, he may be in better health status than average. Here is where more direct observation of utilization (say hospitalization or number of doctor visits) comes in handy, although it does not fully resolve the problem. Let me explain why.

Individuals who have already purchased PHI may enjoy better access to healthcare services. This being so, they may end up using the system more. For instance, if visits to a specialist do not require a previous referral from a general practitioner, then more visits to specialized care will be observed. Economists refer to this phenomenon as “*ex-post* moral hazard”. Hence, observing more visits for individuals with PHI than for individuals without PHI leads us to overestimate the presence of adverse selection: the so-called “moral hazard bias”.

Another possibility in the same direction is that easier access to healthcare services may induce an individual to engage into less safe life habits. Economists refer to this second phenomenon as “*ex-ante* moral hazard”. This second type of moral hazard changes the probability of *needing* healthcare services.

For example, how often individuals visit doctors, probably reflects both *ex-ante* moral hazard and *ex-post* moral hazard. There are some health services that are less prone to *ex-post* moral hazard. For instance, hospitalization is usually prescribed by a doctor and should be less subject to an agent’s demands. However, more hospitalization may be a reflection of individuals engaging into less safe life habits and hence be a source of *ex-ante* moral hazard bias.

6.2 Separating adverse selection from moral hazard

A direct way to separate adverse selection from moral hazard is to observe an individual’s usage of healthcare services before and after purchasing PHI when such change in insurance status comes from exogenous reasons. This would eliminate the adverse selection effect. However, such an observation is usually unavailable because individuals do not frequently change from non-privately-in-

sured status to privately-insured status (and *vice versa*). And when they do, it is usually due to a personal decision that is likely to entail a self-selection effect.

Another strategy is to avoid comparing individuals with different access to healthcare services. For instance, one can compare individuals who chose to purchase PHI with those who obtained PHI as a perk in their employment contract (the so called “employer-provided” PHI). Under the assumption that employer-provided PHI and individually purchased PHI entail the same access to healthcare services (same waiting time, same distance from home, same copayments, and so on), variations in the use of healthcare services becomes an indicator of variations in underlying risk that is free from the moral hazard bias.

A more direct strategy to avoid the moral hazard bias is to try eliciting an individuals’ true health risk by observing information correlated with health status. For instance, we may observe whether the individual can climb stairs, do his own laundry, or walk for an hour without the need of a cane.

Another strategy is to exploit survey data on self-assessed health status. The problem of this strategy is that such reports provide subjective appraisals that may be inherently biased. Moreover, self-assessed health status may be affected by other personality traits that may be negatively or positively correlated with future costs, and yet determine the decision to purchase PHI. I will elaborate on this below when reporting the findings for the Australian case.

6.3 “Universally unobservable” variables

Individual choices are affected by a range of additional factors that are very difficult to observe

for the econometrician. Good examples are the personal opinion of the public sector, a more or less intense preference for high-quality ancillary services, misperceptions on one's actual health status, risk tolerance, and preferences for health itself, to name a few. These factors may determine both the decision to purchase PHI and the likelihood of using services in the future.¹⁰

7. Duplicate PHI systems: UK vs. Australia

7.1 UK and the role of employer-provided PHI

Olivella and Vera-Hernández (2013) use two of the strategies explained above to investigate whether the PHI in the UK attracts more risky individuals. The first strategy is to use individuals with employer-provided PHI as a control group. The second strategy is to use a particular form of self-assessed health status. As for the former strategy, Olivella and Vera-Hernández compare utilization (hospitalization and general practitioner visits) of those who decided to purchase PHI on their own (or “deciders”) with those who got it as a perk from their employer (“non-deciders”). We find that deciders are more likely to be hospitalized than non-deciders, which is consistent with adverse selection. Specifically, deciders were 2.9 percentage points more likely to have any hospitalization than non-deciders. This is a very sizeable difference as only 4.9% of individuals in the sample had been hospitalized in the reference period.

As for the second strategy, Olivella and Vera-Hernández estimate the effect of health status on the likelihood of purchasing PHI. We estimate health status using information on the number of health issues that the individual declared to suffer from. Surprisingly, we find no statistically signifi-

cant differences in the health issues reported by deciders and non-deciders. A possible explanation for this is that insurers in the UK are able to condition premia on variables that are good predictors of health status. Higher premia for individuals in worse health status would have discouraged them from purchasing PHI. A more direct explanation would be the ability of insurers in the UK to exclude pre-existing conditions from the benefit package. Notice that both explanations point to a lesser degree of asymmetric information related to these variables.

Olivella and Vera-Hernández also have information on whether individuals considered health to be very important for them. The answer to this question can be seen as directly related to attitudes towards health and indirectly related to attitudes towards medical treatment. For instance, individuals who give more importance to their health might be less likely to adopt a “wait and see” strategy when they start suffering from symptoms. Interestingly, Olivella and Vera-Hernández find that deciders are more likely to answer that their health is very important to them than non-deciders.

In a nutshell, the estimates of Olivella and Vera-Hernández are consistent with the idea that the source of adverse selection is asymmetric information on preference for health rather than true health status. It is unlikely that insurers are able to condition their contracts on such preferences.

The findings of Olivella and Vera-Hernández raise a question for future empirical research. We have seen that individuals with an intense preference for health are more likely to be hospitalized. This suggests that these individuals will on average bring higher healthcare costs in the future. However, perhaps these same individuals have taken better care of their health all along than individuals less concerned about health. In that

case, individuals with an intense preference for health may bring lower costs per hospitalization. Whether this effect is sufficiently strong to compensate their higher propensity to be hospitalized remains to be understood.

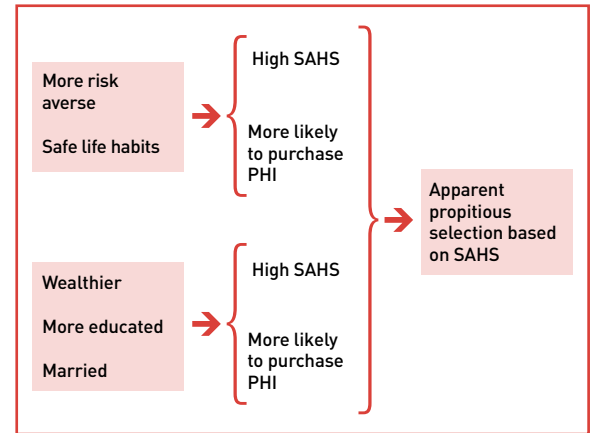
7.2 Australia, more on the role of self-assessed health status

The healthcare system in Australia has been deemed to have features that allow for more direct identification of sources of adverse and propitious selection into PHI. The PHI sector is large and the law imposes strict community rating in the PHI sector. As argued above, this could in principle lead to more adverse selection if health plans do not engage in service level selection.

Doiron et al. (2008) use two measures of risk to estimate the sign of selection into PHI in the Australian system: self-assessed health status and the existence of chronic conditions. The results they obtain seem, at first glance, to reverse the sign of selection that Olivella and Vera-Hernández (2013) obtain for the UK. However, this turns out not to be the case.

The first exercise of Doiron et al. is to relate the likelihood of purchasing PHI to self-assessed health status. This exercise, in the absence of conditioning on other observables, indicates that individuals reporting better health status are in fact more prone to purchase PHI. This would point towards the presence of advantageous selection into PHI. As a second step, Doiron et al. show that such evidence becomes less significant as the number of other explanatory variables included in the analysis increases. Figure 1 may help understand what is going on. The authors find that there are a number of variables that explain both high self-assessed health status and high propensity to purchase PHI. I have grouped them in two broad

Figure 1. Self-assessed health status (SAHS) and selection into private health insurance (PHI)



categories. In the first category, I list variables that could be good predictors of future health costs: risk aversion, preference for health, and safe life habits (no smoking, for example). In the second category, I include variables that seem less related to future costs: wealth, education, and marriage status. These variables all have in common that they predict high self-assessed health status and high probability of PHI purchase. As a result, omitting them in the empirical analysis may induce a spurious positive correlation between self-assessed health status and PHI. In any case, one would need to find evidence that the variables in the second category truly predict lower future costs before one can speak of advantageous selection into PHI. However, there is no clear empirical evidence that this is so in the literature (nor do Doiron et al. perform this exercise).

Another exercise that Doiron et al. perform is to include variables that are more evidently correlated with future costs, like the existence of chronic conditions. Due to community rating, private

insurers are not allowed to condition premia on the existence of such conditions. Hence, theory would predict adverse selection into PHI based on these variables. This prediction would be reinforced if insurers in Australia are intensely monitored to avoid non-price selection devices, like the aforementioned service level selection. In any case, once these conditions are included as explanatory variables, the authors obtain adverse selection into PHI (although they do not study the correlation between high costs and the presence of chronic conditions).

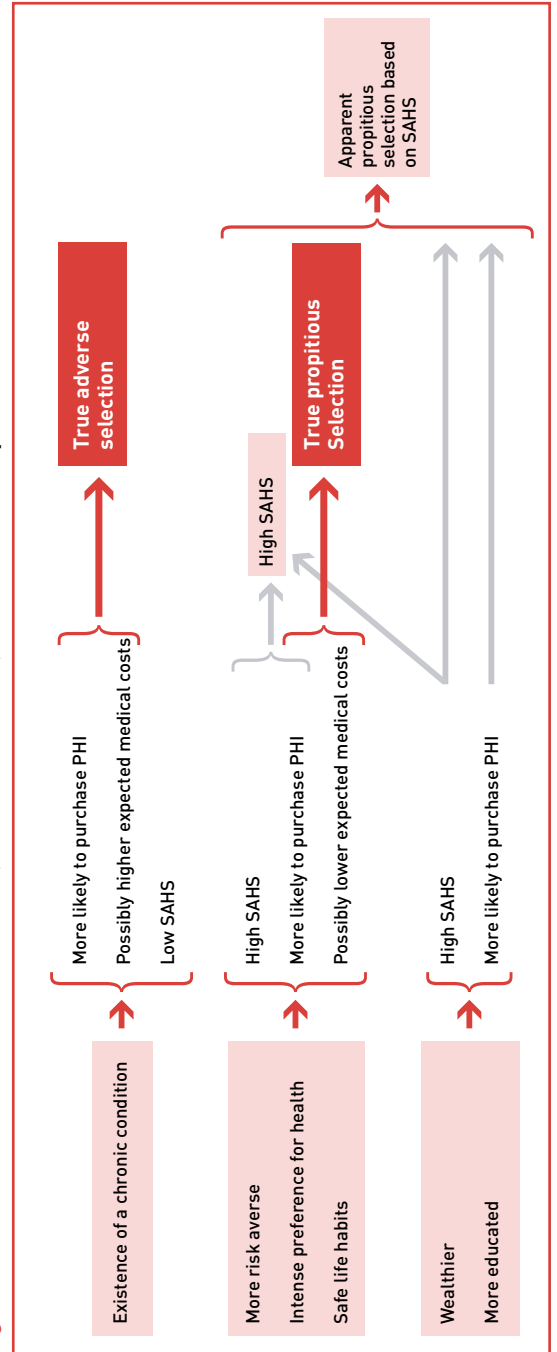
In Figure 2, I expand Figure 1 to explain the different effects (and to illustrate the complexities involved in the insurance literature). I have added chronic conditions in the set of variables that determine the likelihood of purchasing PHI. Chronic conditions are inversely related to self-assessed health status, as expected. I have also added some appraisal (based on the received empirical literature) of what different variables may imply as for the prediction of future healthcare costs. These appraisals are not empirically proven in Doiron et al. so I have included them with a cautious “possibly” in front. This helps further illustrate the concepts of propitious and adverse selection.¹¹

To sum up, the results in Doiron et al. establish that (i) the data is consistent with the presence of adverse selection into PHI based on chronic conditions, whereas (ii) the data is consistent with the presence of propitious selection into PHI based on safe life habits.

8. Opt-Out PHI system: Germany

Germany does not exactly fit the description of a substitutive PHI system. The public option is not a NHS like in Spain or the UK but a public

Figure 2. Self-assessed health status (SAHS), chronic conditions, and selection into private health insurance (PHI)



(statutory) health insurance, which means that public coverage is provided by a set of sickness funds. However, the public sector *de facto* acts as a NHS due to several reasons. First, the public sickness funds are not-for-profit. Second, the public system is financed through income-related taxes (as in a NHS). Third, the portfolio of services is heavily regulated, so it is unlikely that the public sickness funds compete in the generosity of coverage. Hence, although the individual chooses his or her health insurance provider (if he or she has not opted out), there are very few differences among the health plans offered. In contrast, the private sector is allowed to engage in risk-rating. Moreover, risk-rating is based on several indicators very much correlated with future health costs: height and weight, existence of chronic diseases, ambulatory treatments and pharmaceuticals in the last three years, disability status, and so on. Private insurers also enjoy a large degree of flexibility in the generosity of coverage: they can offer several benefit packages and deductibles at different premia. Hence, one can observe menus of contracts being offered to individuals with the same characteristics. It is also important to mention that in Germany only individuals above a predetermined income floor are allowed to opt out. Hence, income is a direct and exogenous source of selection in this country. As mentioned above, whether this selection is favourable or unfavourable for the private sector depends on whether income is a good predictor of future health costs.

Panthofer (2015) uses hospitalization as a measure of risk. As mentioned above, this measure is an unbiased indicator of expected future costs if hospitalization is independent of access conditions, that is, if hospitalization is not over-observed due to moral hazard. The author finds clear evidence that the likelihood of not opting out (that is, the likelihood of public coverage) and the likelihood of hospitalization are simultaneously large

er for individuals with (i) chronic conditions, (ii) previous doctor visits, and (iii) older age. Hence, propitious selection for the PHI system seems to be present for these variables. This is consistent with theory in the symmetric information scenario (see Subsection 4.1). Less clear evidence of such propitious selection is found for previous hospitalization, married status, disability status, and females in child-bearing age. On the other hand, the author finds propitious selection into the public option based on the presence of children and being self-employed: both having more children and being self-employed makes the individual less likely to opt out and reduces the likelihood of hospitalization, which would go against the theoretical predictions.

Panthofer also finds selection based on unobservables. As mentioned above, this type of selection is achieved by offering a menu of contracts that gets individuals to self-select according to unobservable characteristics. Recall that theory does not make a precise prediction here (see Subsection 4.2). By employing a technique proposed by Chiappori and Salanié (2000), Panthofer finds that out of the total propitious selection into PHI, one third is due to risk selection based on observables and two thirds to adverse selection based on unobservables.

Panthofer also uses a procedure proposed by Finkelstein and Poterba (2014) to estimate the selection based on two specific unobservables. The idea is that there may be variables that the econometrician observes but insurers do not use in rating their premia. These are called “unused variables”, and in Germany they include risk aversion and self-assessed health status. Interestingly, Panthofer finds that selection on these two variables is of opposite sign. Namely, more risk tolerant individuals tend to opt out and at the same time are hospitalized more often (adverse selection

into PHI). In contrast, individuals reporting higher self-assessed health status are also prone to opt out but at the same time are also hospitalized less often (propitious selection into PHI). This directly implies that there must be other variables that are unobservable (or unused) to both the econometrician and the insurers.

Finally, Panthofer is also able to estimate the effect of income on the tendency to purchase PHI. Income is another unused variable since German legislation does not allow insurers to use it to rate premia. He finds that income does not explain hospitalization, which would suggest that income is neither a source of adverse nor propitious selection.

9. A word on statutory health insurance

Recall that in a statutory health insurance system, private health insurers compete to attract individuals. However, private health insurers do not compete by setting lower premia but rather by providing more generous benefits than their rivals. Individuals do not pay their premia directly but contribute to a common fund depending on their income (just as with income taxation). Insurers then receive a payment (“capitation”) per enrollee (“*per capita*”). Importantly, this capitation is adjusted to cover the expected future costs of each individual. The most advanced statistical techniques are employed to perform this adjustment. In an ideal world, this system kills three birds with one stone. First, efficiency is assured since in order to attract an individual the insurer should subcontract the most efficient services (remember that the capitation is paid *ex-ante*, that is, it is independent of the actual costs generated by the individual). Second, insurers do not have an

incentive to dump individuals with higher health risks because the common fund pays out more when such individuals are enrolled. Third, the responsiveness of the health system is assured because different sets of insurers (or different contracts within the same insurer) will compete for the individuals with different health needs or preferences. As mentioned in the introduction, this is the system in the Netherlands and in part of the Medicare sector in the USA.

Although the scope of this survey does not include such systems, it is important to point out that some theoretical analyses (partly corroborated by empirical studies) suggest that they do give rise to “service level selection”. Even within a well-adjusted capitation system, some variability may remain within each class of individuals. For example, even if the capitation is adjusted to age, there are young individuals with higher future healthcare costs than average due to the existence of a mental health problem. It is then beneficial for insurers to lower quality in the provision of mental health services in order to drive away individuals with such condition. This would cease to be a problem in two circumstances: either (i) individuals are unaware of the existence of their mental health problem and therefore do not respond to this lower quality (“lack of predictability”); or (ii) the increase in future overall health costs due to the presence of a mental health problem is negligible (“lack of predictiveness”). But if both predictability and predictiveness are strong for mental care services, then theory suggests that such services would be prone to important downward distortions in quality. Evaluating the importance of predictability and predictiveness at each healthcare service is, once more, an empirical issue.¹²

10. Conclusions

We have seen that to understand why people buy private health insurance in the presence of a public option one needs to consider three main factors. First, does the individual purchasing PHI still finance the public provision? Second, are private insurers allowed to condition premia on personal characteristics? Third, do the individual and the insurer have the same information on the individual's future health costs?

Theory makes clear predictions on whether it is individuals with higher or lower expected health costs who should purchase PHI, except for the case where information is asymmetric and the individual ceases to finance public healthcare when opting out. Empirical work testing the predictions of theory has to confront several difficulties. Some concepts used in the theoretical analysis are difficult to translate into data. For instance, measures of future health costs are hard to come by or may suffer from several biases. Still, empirical work has provided support for some of the theoretical predictions and new insights when theory was insufficient.

This survey is not meant to provide arguments for or against each system of organizing dual health insurance and provision, nor does it explain why some countries have adopted one particular system.¹³ Rather, one should read it as an analysis of the sign of selection for a given system. In this sense, one could see this survey as one with an accent on the “short run”.

Notes

(1) In these countries, the private health insurance sector only covers some very specific services not provided by the NHS, or is almost inexistent (less than 1% of the population is covered). See Mossialos et al. (2015).

(2) More precisely, a single purchaser contracts out healthcare services with private and public providers (general practitioners, laboratories, hospitals, and so on).

(3) The remaining combination of answers is never observed. It would be strange if different individuals are assigned health plans with different premia and yet individuals are obliged to pay premia out-of-pocket.

(4) See Glazer and McGuire (2000) for the relationship between such menus and the service-level selection phenomenon.

(5) Diverse forms of regulation may partially correct this inefficiency. See for instance Crocker and Snow (1985) or Encinosa (2001), but menus will remain in most of the cases.

(6) The literature has proposed other reasons to establish PHI alongside a NHS: improving healthcare provision and alleviating the financial burden that the NHS faces. These are also important issues, but they spread over the long run, and would take us very far. Moreover, there is little evidence that these other objectives have been fulfilled at all. See Goulao and Perelman (2014) for a survey.

(7) In Germany, only individuals with income above some floor are allowed to opt out. We extensively discuss this case below. In Chile, in contrast, all self-employed may opt out independently of their income (de la Mata et al., 2016).

(8) An intermediate case is one where the individual purchasing PHI still contributes to the NHS but obtains a tax rebate partly compensating the premium paid for his private plan. Access to the NHS may be mixed in the following sense: the individual is operated in a NHS hospital but the PHI pays for his privilege to enjoy a private room.

(9) The opposite seems to be true as for major interventions in Spain, see Spanish Ministry of Health, Social Services and Equality, 2015.

(10) Costa-Font and Jofre-Bonet (2006).

(11) Notice that age does not appear in Figure 2. This may be surprising, but the fact is that Doiron et al. do not find a clear correlation between age and the likelihood of purchasing PHI.

(12) Ellis and McGuire (2007) estimate predictiveness and predictability for several services in the context of Medicare in the USA. They find that hospice care and home healthcare are services most prone to underprovision, whereas eye procedures and magnetic resonance imaging would be overprovided in order to attract individuals with overall lower costs.

(13) Some researchers have used the tools of political economy to shed light on this question (Goulao and Perelman, 2014).

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