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PERCEIVED QUALITY OF PUBLIC SERVICES, LIQUIDITY CONSTRAINTS, AND THE DEMAND OF PRIVATE SPECIALIST CARE

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Abstract In this paper we offer direct evidence on the role of perceived quality differences in publicly provided health care services, in determining the incentive to opt out for private services and, for poor individuals, short-run credit constraints in the access to these services. We concentrate on private specialist care, a category of services for which disparities in the access are highest. We use Bank of Italy - SHIW data to first study the determinants of demand for private and public specialist care, estimating probit and bivariate probit models, and ZIP models. We then apply the Carneiro-Heckman procedure to identify the share of people constrained and study how perceived quality of public services affects the percentage of people short run constrained. Our estimates suggest the presence of large territorial differences, as for the role of income and the quality of public services.

JEL Codes: D31, I10, I31

Keywords: quality of public services, demand of private specialist care, liquidity constraints, opting out, in-kind transfers

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1. Introduction

It is generally accepted, in a theoretical perspective, that in-kind transfers are a powerful redistributive tool in the presence of constraints for governments to redistribute income from the rich to the poor using taxes, stemming for instance from asymmetric information between the government itself and welfare recipients. The mechanism is very simple. As first suggested by Besley and Coate (1991), suppose the government finances the provision of services with a per-capita tax on both the poor and the rich. If it defines the quality of a publicly provided good at a level such that only the poor consume this good, while the rich *opt out* for private services, then redistribution occurs: in fact, the rich subsidise the publicly provided service consumed by the poor.

This theoretical framework opens the room to some intriguing questions. First, one may want to know if there is any empirical evidence of the opting out mechanism and the ensuing redistribution. Second, one is interested in understanding what are the redistributive consequences of defining the level of quality at a very low level, such that also the poor would sometimes prefer to opt out for private services. As for the first question, besides anecdotal evidence, there is limited empirical support on the role of quality in influencing demand for private services. An almost unique example is provided by Costa and Garcìa (2003); they study the demand of private health insurance, and find this to be influenced by the quality *gap* between public and private services. Even more rare are the examples of studies on the redistribution occurring with in-kind transfers. Jacoby (1997) studies for instance a school feeding program in Jamaica, and shows that poorer households and those with a greater number of eligible children are those more likely to self-select into the program. As for the second question, to the best of our knowledge there are no papers explicitly identifying the role of potential liquidity constraints in accessing private services by the poor, whenever quality of publicly provided services is such that they would also like to opt out for private ones. This mechanism can then result in a more unequal consumption of services, than it is commonly predicted by the theoretical mechanism of opting out.

Health care is an important case study in this respect for a number of reasons. First, it is a service that is largely provided in many European countries by the State. Second, there is some evidence that quality differentials between public and private services drive individual choices (e.g., Costa and Garcìa 2003). Third, a large body of

literature has emphasised the presence of large and persistent inequalities in the consumption of health services in different world countries (e.g., Van Doorslaer et al. 2000; Gwatkin 2000). Fourth, there is evidence that liquidity constraints affect demand for private services by the poor.

Indeed, Baldini and Turati (2006) distinguished the role of short-run constraints from the role of long-run constraints in explaining the use of *private* health care services. The former are identified as liquidity (or income constraints), and can be easily removed with cash transfers; on the contrary, the latter (such as the lack of minimal health care knowledge, a poor education and/or family background) cannot be easily removed with such a policy, and influence demand even if income is equalised for all citizens. The authors then applied the procedure proposed by Carneiro and Heckman (2003) to the SHARE database, a survey conducted in a number of European countries (ranging from Scandinavia to the Mediterranean), where State intervention in health care is widespread, involving some 22,000 individuals over the age of 50. The evidence supports the view of constrained individuals in the access to private health care services, both in the short- and in the long-run. In particular, the problem of short-run liquidity constraints appears to be real in countries like Italy, Greece, and to some extent Spain.

That liquidity constraints appear to be important in Mediterranean-style Welfare States is a finding that suggests the potential role of wide *quality* differences in the publicly provided services between different geographical areas of a country. Indeed, people living in areas where the quality of public care is inadequate have one more reason to *opt out* for private care, but their access to these services could be limited by the presence of liquidity constraints. Indirect evidence on this is already available for Italy, where huge territorial differences exist in the quality of services produced by the NHS, and where the low quality of care has been shown to increase health inequalities at the local level (Jappelli and Padula 2003; Jappelli *et al.* 2007).

In this paper we pursue two goals. We first look at the role of (self-perceived) quality of public services as a determinant of the demand for public and private specialist care services, a group of services for which disparities in consumption are the highest according to the available evidence (e.g., Van Doorslaer and Masseria, 2004). We then provide direct evidence on the role of quality differences in publicly provided health care services in determining short run constraints in the access to *private*

specialist care. We consider data from the Bank of Italy – Survey on Households Income and Wealth (SHIW), exploiting a particular issue surveyed in the questionnaire on the quality of public and private services. We first estimate demand models for public and private specialist care services. We then apply the Carneiro and Heckman methodology to identify short- and long-run constraints in the access to private health care services. Our estimates suggest that perceived quality of public services plays a role in the demand for private and public services, which is related to household income. Moreover, there is evidence to support the view of liquidity constraints in the access to private services by the poor. Finally, short run constrained individuals are those who have an inferior evaluation of public services' quality, i.e., those people that should have a greater incentive to opt out for private services, but cannot do so because of liquidity constraints. The regression results suggest that in areas where the quality of public services is perceived as low, people from all income quartiles tend to turn to private services, therefore producing a lower gradient in the demand for private care. In Italy around 10% of households are constrained in their access to private services. While in the Centre-North most of these households do not purchase private services for income constraints, in the South the long run constraints (due to personal and family characteristics) seem to play a somewhat greater role.

The paper is organised as follows. In Section 2, we briefly consider the Italian case study, discussing some institutional details and the available evidence in terms of inequalities in the consumption of services and of quality differentials. Section 3 is devoted to present the empirical exercise: we first estimate demand equations for private services by using different econometric techniques; we then discuss the Carneiro-Heckman approach, and introduce our results. Section 4 discusses our findings and identifies avenues for further research.

2. Setting the stage: the Italian testing ground

The Italian NHS. Total health expenditure in Italy represents about 9% of GDP in 2007. Public expenditure is about 75% of this total expenditure. It refers to expenditure for the *Servizio Sanitario Nazionale*, the Italian NHS introduced by the Law 833/78, which is a universalistic insurance scheme covering a wide array of health care risks. Different

layers of governments are involved in the NHS. On the one hand, the Central government defines "Essential Levels of Care" (or LEA) to be guaranteed in all the different areas of the country, issues framework legislation, and partly finances the system by topping up regional own revenues. The provision of services is mandated at the regional level: regional governments are in charge of managing health care services, by defining the hospital network and the structure of public supply, and to partly finance the system with own revenues.

With respect to the specific object of this study, specialist care is part of the territorial supply of services by regional governments. It can be obtained after referring to a General practitioner, both from public providers and from private ones. The former provide the service almost free of charge, or with a small co-payment. The latter need to be paid out-of-pocket, and the price is definitely higher than the co-payment for publicly provided services. Another important difference – which is often identified as a quality component of the service – is represented by the length of waiting times, which are much shorter when referring to a private provider than when looking for public care (e.g., Lo Scalzo *et al.*, 2009, section 6.2.2; Jofre-Bonet, 2000).

Inequalities in consumption. Considering these institutional details, it does not come as a surprise that consumption of specialist care is particularly unequally distributed in Italy. Early international research studies on health consumption inequalities aimed at comparing different countries typically excluded Italy (e.g., Van Doorslaer *et al.* 2000), whilst the country has been included in second generation studies like Van Doorslaer and Masseria (2004). The authors consider inequities in the use of health care services, computing horizontal inequality indices (HI) for access to General Practitioner services, specialist care, inpatient care, and dental care. Results suggest that Italy fares among the countries where access is more unequally distributed, especially for specialist care and dental care. As for the former type of care, computed HI for Italy is 0.112; Portugal is the country where inequities are estimated to be higher (HI=0.208), followed by Finland (0.136) and Ireland (0.129). As for the latter, estimated HI for Italy is 0.105; among the European countries, Portugal is again the nation where inequalities in access are higher (HI=0.196), followed by Spain (0.137) and Ireland (0.130); crossing the Atlantic, estimated HI is respectively 0.173 for U.S. and 0.126 for Canada. Also inequalities in the access to inpatient care set Italy in top positions, after Mexico and France; but

estimated inequities are of a much lower degree, with HI being 0.033 for Italy, 0.078 for Mexico, and 0.035 for France. Decomposition of computed inequality index to its sources – according to a by now standard procedure introduced in the literature by Wagstaff *et al.* (2003) – suggests that income is particularly important in both Portugal and Finland in explaining health inequalities; moreover, income is particularly important in explaining disparities in specialist care.

The role of quality. Another important (and understudied) potential determinant of inequalities in health consumption is the quality of services. Regional disparities in terms of quality make Italy an interesting laboratory, given the wide differences between the Northern and the Southern part of the country. If one looks for instance at data on patient-assessed quality of health services from various statistical sources, differences are striking, and the story is consistent across different surveys (Table 1 and Fig. 1-3). In particular, Table 1 contains first the average evaluations, in a scale from 0 to 10, of the overall quality of public health services, from two sources: the 1993 Bank of Italy Survey on household income and wealth (SHIW, that we use in this paper), and the 2005 Istat Multiscopo Survey. As for SHIW, average score is 6.2 in the North and just 4 in the South. As for the 2005 Istat Survey, average evaluations are respectively 6.3 and 5.3. Table 1 contains also (last three columns) the most recent values for the three items surveyed in Istat (2008). For medical care, the percentage of people very satisfied in Northern regions is almost twice as high as the same percentage in Southern regions. Differences are even wider when looking at nurses care and hygiene of sanitary fittings. As can be seen from Fig. 1-3, these differences are almost stable or even widening in the last few years.

This "inequality in quality" has been already emphasised, among others, also by Jappelli and Padula (2003) and Jappelli *et al.* (2007). The former paper shows that - even controlling for regional fixed effects - the quality of care affects health outcomes, i.e., that higher (self-reported) quality of care is associated with better health outcomes. The latter paper demonstrates on the one hand a negative relationship between income inequality and the quality of health care, and on the other hand a negative association between health inequality and the quality of health care. For the purposes of the present paper, the wide differences in quality are important as *potential* determinants of a demand for private services which is left unexpressed.

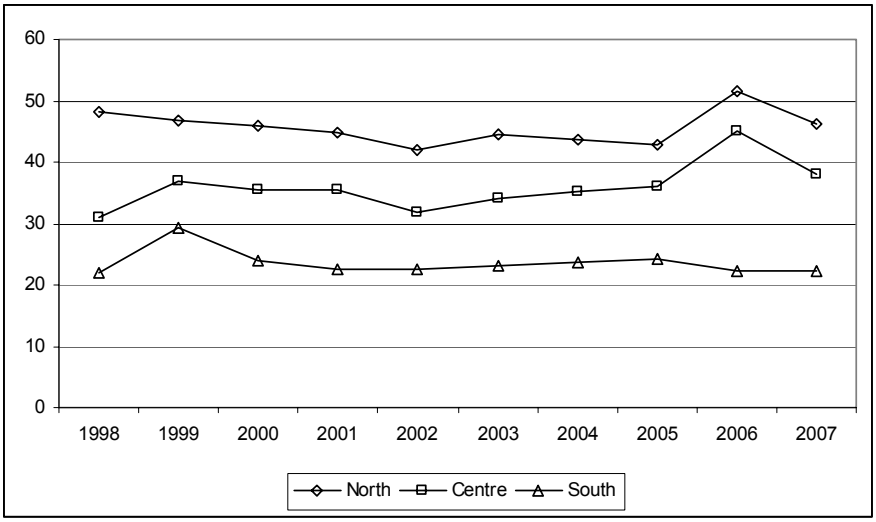
Southern regions are not only characterised by the lowest percentages of people satisfied for the quality of health services, but also by a high concentration of people with low income. An interesting hypothesis is that where the perceived quality of public health care is generally high, access to private health services is mainly regulated by an income gradient, while in areas where the quality of publicly provided health services is generally considered to be modest, people of all income levels may opt out for private producers. However, if – for some individuals - income is not enough to allow the consumption of services, some are left constrained. This is the hypothesis we test in the empirical part of the paper, to which we now turn.

Table 1 Evidence on the Italian "inequality in quality"

	Average evaluation of the quality of public health services (0=very bad, 10=very good)		% of people very satisfied with the following hospital services (Istat, 2008):		
	SHIW 1993	Istat Survey 2005	Medical care	Nursing care	Hygiene of sanitary fittings
North	6.2	6.3	46.2	43.6	39.7
Centre	4.9	5.9	37.9	37.1	30.7
South	4.0	5.3	22.3	19.5	15.1
Italy	5.2	5.9	35.9	33.6	28.9

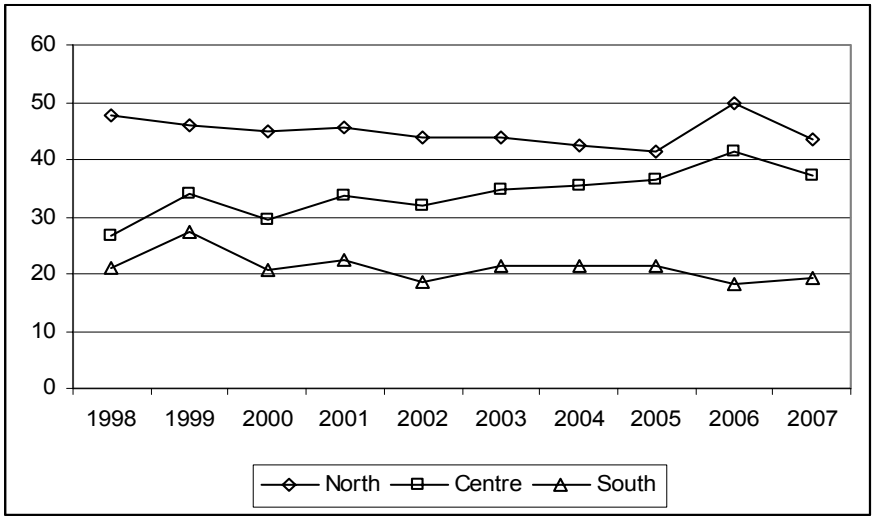
Sources: SHIW (1993); Istat Multiscopo Survey (2005), Istat, Health for all (2008)

Figure 1. People very satisfied with hospital services for medical care



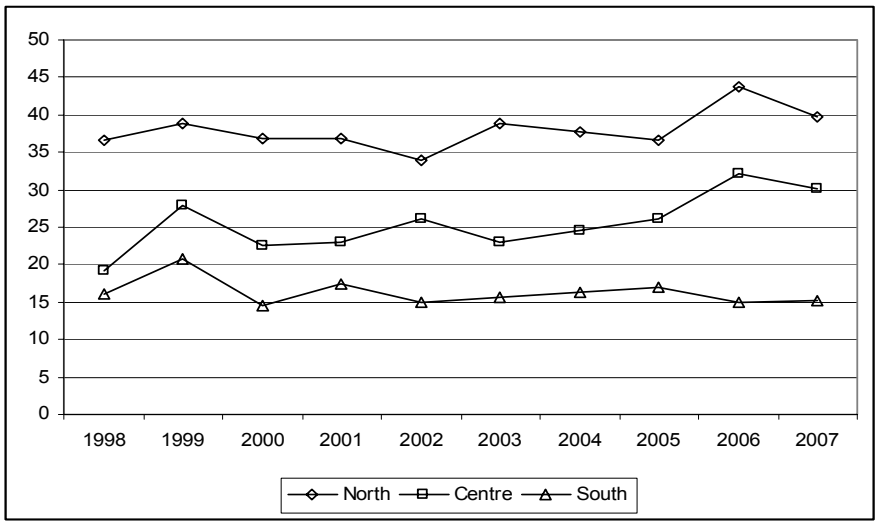
Source: Istat (2008)

Figure 2. People very satisfied with hospital services for nursing care



Source: Istat (2008)

Figure 3. People very satisfied with hospital services for the hygiene of sanitary fittings



Source: Istat (2008)

3. The empirical analysis

In this section we first describe our data, and discuss our estimates of the demand for private and public services, which are instrumental for the subsequent analysis. We then explore the role of quality in determining liquidity constraints: we build on Carneiro and Heckman (2003, CH from now on) to estimate long- and short-run constrained individuals in the consumption of private specialist care, and then discuss our results.

3.1. The data

Since our main interest here is on the role of quality, we use the 1993 wave of the Bank of Italy – SHIW, which contains an entire section devoted to public services and the quality of life, plus the usual information on income, wealth, and personal characteristics of households and individuals. Public and private services surveyed include transportation, health care, child care, schools and universities. For each of these, households are asked whether they did use the service, for how many times, and how much did they spend for it. We measure access (consumption) of *private specialist care* by considering a binary variable *m*, equal to 1 when at least one member of the household actually consumes the service at least once in the year. Notice that the analysis is then carried out at the household level, since the 1993 Bank of Italy survey does not report individual access to care.

Households' heads were asked - using a scale going from 1 (worst mark) to 10 (best mark) - to assess the quality of public services, plus to indicate the availability of parks, shops, museums, but also the presence of micro-criminality (broadly defining an indicator of the quality of life). Following Costa and Garcìa (2003) – which is the only paper so far to study the role of perceived quality in accessing private services - we use the assessment about the quality of publicly provided health care services as a measure for quality (*QUAL*). We also compute an *environmental quality index (EQI)*, by summing up self-evaluations of the following items: quality of tap water, quality of air, availability of green areas, traffic conditions, noisiness and street cleaning (the higher the score, the better the quality of the local environment).

A drawback of using the 1993 SHIW data is that information on the self-assessed health status of interviewed individuals is not available. We then follow Jappelli and Padula (2003), and use also the panel section of the 1995 wave of the Bank of Italy survey, where information on individual health condition is present. We therefore consider all households belonging to the 1993-1995 panel component of the survey for a total of 3381 observations at the household level[1].

[1] Notice that the whole panel component of the survey contains 3582 observations for the period 1993-1995, out of about 8000 households in each of the two cross-sections. We excluded panel observations for which information on health status or quality of public health services were missing. We have made use of the sample weights provided in the survey for all the elaborations of this paper.

The 1995 survey contains three measures of self-assessed health status: whether the respondent feels himself to be in "very bad"/"bad"/"fair"/"good"/"very good" health conditions, whether he/she suffers from the presence of at least one chronic illness, and whether he/she suffers from an invalidity. As the analysis of the demand of health care services is instrumental for the Carneiro and Heckman approach, we summarise this information in just two classes[2]. In particular, we define as being in bad health conditions all persons perceiving a "very bad" or "bad" health status, or having a chronic illness, or declaring to suffer from an invalidity. At the household level, we partition the households according to the following rule: health status is ill (*I*) for all households in which *at least one* person turns out to be in bad health conditions (40% of the sample, see Appendix Table A.1); we define as healthy (*H*) all the remaining households. While it is possible that the health conditions of the households have changed from 1993 to 1995 due to the occurrence of health shocks, the use of information also on long-run health characteristics (like the presence of chronic illnesses and invalidities) should make our measure of health status fairly stable over time for the same household.

Despite being by now rather dated and suffering from different weaknesses, the 1993 SHIW is still useful because it allows to relate data on the use of public and private health services and the evaluation of their quality with household disposable income. The alternative Istat Multiscopo Survey on health conditions, carried out every five years, indeed, contains many more data on health care usage, but the information on disposable income, although present in the questionnaire, is not made available to external researchers, probably because of its low quality. Since the relationship between health care demand and income is central for our analysis, we prefer to keep using the SHIW data. The Istat 2005 Survey shows that consumption of private specialist care is increasing with the level of education and is higher for occupations with typically high incomes; further, as already shown, differences in perceived quality of public health care across areas of Italy are still present in the more recent data. For these reasons, the

[2] Reducing available information on health status in a synthetic index does not have any impacts on our results also on the demand function of health care services. Results on more complete models where information on health conditions is not summarized in a single measure are available upon request from the authors.

hypothesis that the picture emerging from the 1993 SHIW is still relevant today does seem reasonable.

According to the literature on the demand for private care (e.g., Propper 2000; Atella *et al.* 2004; Atella and Deb 2008), we also selected as main determinants of accessing private specialist care a number of other variables including: age of the reference person (*AGE*); a dummy for the household head gender (*H_MAN*); the number of children (*NCHIL*); education, measured by a set of dummies for both the head of the household and the partner, identifying those with lower secondary education (*EDU1, EDU1_P* if a partner is present), secondary education (*EDU2, EDU2_P*) and tertiary education (*EDU3, EDU3_P*)[3]; the type of job - identified by a dummy for being an unskilled worker - for both partners (*UNSK*, *UNSK_P*); household equivalent income (given by disposable income divided by the square root of the number of household members), from which we define – again for having a model consistent with the Carneiro and Heckman approach – a set of four dummies identifying income quartiles (Q^Y, with Y going from 1, the poorest, to 4, the richest); a dummy variable identifying the subscription of a private health insurance (*INS*); a *deprivation index*, defined as home square metres per each component of the household, i.e. an (inverse) measure of overcrowding in dwelling (*DEPR*). We also provide a rough control for differences across geographical areas of the country, by considering a set of macro-area dummies (*NORTH*, *CENTRE*, *SOUTH*).

Descriptive statistics and definitions of all the variables considered in the empirical models are collected in Table A.1 in the Appendix. The average proportion of households who make use of private health care services in the previous 12 months is 33%, quite close to the average proportion of those who make use of public services (34%). In 40% of the cases, at least one member of the household is in bad health. Average age for the household head – who is male in 75 out of 100 cases - is about 52 years. Unskilled workers are 19% of the sample. The average level of education is fairly low for both partners: among the heads, 41% have only a primary education level (and an average age of 61 years in 1993), another 29% do not go beyond lower secondary education (age 46), 23% have completed high school (age 46) and only 7% of household heads have a degree (average age still 46). Finally, notice that 15% of

[3] The reference category for education is primary education, corresponding to Isced level 1.

households have subscribed a private health insurance. Half of the households included in our sample reside in the North. While this may appear to be quite a high percentage, one must remember that the average size of households living in Northern regions is lower than in the rest of the country, so that their share out of the total number of Italian households is greater than the corresponding share of individuals. In the whole SHIW 1993 sample, 44.5% of individuals and 49.3% of households live in the Northern regions.

3.2. Public services quality in SHIW data

Before moving to the empirical analysis, in this section we discuss how individuals in different income quartiles judged the quality of publicly provided health care services. As discussed in Section 2, our working hypothesis is that individuals in the lowest income quartiles will judge (on average) of the lowest quality the publicly provided services, the main reason being that many relatively poor people reside in Southern regions, where the quality of public services is lower. This will create an incentive to opt-out for private services also to the poor; however, liquidity constraints will impede some of them to actually consume private services. Indeed, Table 2 provides no evidence for this hypothesis to be rejected. The table considers the *conditional* means in self-assessed quality of public health care services by income quartiles, health status, and geographical areas. Means are conditioned on the use of publicly provided services. Many different conclusions emerge from the table. First, there is a confirmation of the "inequality in quality" hypothesis: considering the whole sample of ill and healthy people, mean evaluation is 5.9 for the Centre-North area, only 4 for Southern regions (with an average of 5.2 at the national level). Second, by looking at the sub-group of ill households, we do not observe a striking difference in the self-evaluation across income quartiles in the Centre-North, while a relevant gap (0.6) is present in the South. Third, wide differences emerge considering the healthy sub-group: as for the Centre-North, mean evaluation for the 4^{th} quartile (the richest) is 6.2, while for the bottom is 5.8; as for the South, the gradient is much steeper: from 3.7 in the 1^{st} to 4.7 in the 4^{th} quartile. These differences in the evaluations between the richest quartiles and all the three other quartiles are generally statistically significant for the healthy sub-groups, while this is

not true in general for the ill sub-groups. A possible explanation for the difference in the gradients between healthy and ill sub-groups is related to age and education: the ill are – on average – older and less educated than the healthy, hence they probably pay less attention to quality.

Overall, this preliminary evidence supports the idea that people in the lowest income quartiles are those judging public services more of low quality. This evaluation would induce this people to opt-out for private provisions, but their socio-economic status might originate short-run constraints to access services. An important point to be stressed is that differences in evaluation are significant especially for the healthy, hence for people that are presumably looking for preventive care.

Table 2 Average evaluation of the quality of public health services by health status and income quartile (1 = extremely bad; 10 = extremely good)

	Centre-North			**South**			**Italy**		
	Healthy	*Ill*	*Total*	*Healthy*	*Ill*	*Total*	*Healthy*	*Ill*	*Total*
1	5.8*	5.7	5.7**	3.7***	3.5	3.7***	4.5***	4.4***	4.5***
2	5.8**	5.6	5.8**	4.3	4.4	4.4	5.3***	5.2	5.3***
3	5.7***	5.9	5.8**	3.6***	4.4	4.0*	5.3***	5.4	5.4***
4	6.2	5.8	6.1	4.7	4.1	4.5	6.0	5.4	5.8
Total	5.9	5.7	5.9	4.0	4.0	4.0	5.3	5.1	5.2

Note: sig. lev. of t-test on the difference between the 4th quartile and the xth quartile: *** 1%, ** 5%, * 10%.

3.3. The demand for private services

As a first step in the application of the CH approach, in this section we present our demand models for private services and their estimates. We begin our analysis by considering a straightforward probit model:

$$\Pr(m_i = 1 | z_i) = F(z_i, \beta) \qquad (1)$$

where the probability to access private specialist care services m is a function of the set of covariates z defined above, and a corresponding set of parameters β to be estimated; *F(.)* is the standard normal CDF. Estimates of Eq. (1) are reported in Table 3.A. We first run our model on the entire national sample, and then separately on the Centre-North

and the Southern regions sub-samples. These two areas present, as already discussed, a great diversity in the average quality of public health services, so that the mechanisms which lead people to opt out for private health care may reasonably differ. Notice that our reference group is identified as those who either consume only public services or do not consume any health care services. Our choice is again linked to the CH approach (to be discussed in the following section), which aims at identifying constraints impeding households to access the services. More precisely, we are interested in those households that – albeit in need – do not consume any type of care, even if public services are provided (almost) free of charge.

The estimation results largely confirm those already available in the empirical literature. Considering first results on the whole sample, bad health status increases the probability to access private services by 9% and is statistically significant, while age of the household head does not exert any statistically significant effect. The coefficients of education of the head are not statistically significant, and also current occupation does not appear to affect demand for private care. Moreover, as largely expected, the coefficients of the dummies identifying income quartiles are positive and significant: richer households purchase more private services than poorer ones. In particular, belonging to the 4^{th} (richest) quartile increases the probability to access private services by 13% with respect to the lowest quartile, while the distance is about 5-6% for the 2^{nd} and the 3^{rd} quartiles. The coefficient of the index of environmental quality is negative, suggesting that private demand is higher where the quality of local environment is worst. Also the coefficient on the perceived quality of public health services is negative, suggesting that – controlling for other covariates – the probability to access private services is higher where the perceived quality of public health care services is lower. One standard deviation increase in the index of the quality of public services produces a reduction of 3%-5% in the probability of purchasing private health services. An explanation for both these finding is that public expenditures contribute to define the standard of living at the local level: where government intervention is effective in providing good quality services, room for private providers is reduced. The presence of children positively affects the probability of private visits: the addition of a child increases the probability to purchase private services by around 3 percentage points. While the education of the head is generally not significant, that of the partner, if

present, is markedly so. This may depend on the low overall general level of education of our sample, and on the typically high degree of correlation between the education levels of the members of a couple: the presence of a partner with a high level of education is an indicator of very high family income, with respect to both households composed of a single member and to households with a low-education partner. The dummies for the high education of the partner allow for some non linearity in the relationship between private health care and family income. The education dummies of the partner should therefore reduce the magnitude of the income quartile coefficients, but we have verified that excluding these education dummies increases only marginally the importance of household income in the determination of private health expenditure. Finally, the coefficients of the deprivation index and of the subscription of a private health insurance are not statistically significant. A plausible explanation – especially for private health insurance - is that these variables are collinear with income. The limited sample size and the use of dummies for income quartiles makes it difficult to identify the impact of this variable on the probability to purchase private services in the present case, but see below the ZIP results.

Within this national framework, regressions results for the two geographical sub-samples show interesting different patterns, especially for the income quartiles dummies and the variable measuring quality of public care. Considering regression results for households living in the Central and Northern regions, the coefficient on the quality of public services is negative but not significant, while the income gradient is quite evident. On the contrary, in the Southern part of the country the coefficient on the quality of public health care is much greater in absolute value and strongly significant, while the income gradient seems very weak.

Overall, these results provide evidence of a significant difference in the average behaviour of households living in areas characterised by very different standards in public health services: in the North, where public health care is generally good, people demand private care not because of a crowding out effect from the public, but for other reasons. It is reasonable that richer households tend to access more private health care so as to avoid waiting lists. This interpretation is also confirmed looking at the negative coefficient for *EQI*: where quality of life is lower (but quality standards for public care are better than in other areas of the country), people demand less private care. On the

contrary, in Southern regions, where the quality of public health services is on average much lower, the income gradient is less evident, indicating a more general tendency to turn to private services *also by the poor*. These differences in the opting out mechanism hints at a differential role of liquidity constraints in the two areas of the country.

Following the approach suggested for instance by Atella et al. (2004) and Atella and Deb (2008), we also experimented with bivariate probit models, considering also a demand equation for public services. Although the correlation coefficient of the error terms of the two equations turned out to be not statistically significant, we included these estimates here as they provide additional information on the role of quality and income in the two macro-areas of the country (Tab. 3.B). In particular, the coefficient for bad health status is consistently positive and significant, both in the equation for public and in the one for private specialist care. The only exception is represented by public services in the South: consumption of public specialist care appears not to be influenced by health status. Turning to the role of income, as expected given the universalistic nature of the Italian NHS, there seems to be no gradient in the access for public services with the exception of the South, where households belonging to the first income quartile access *less* public services. The income gradient for public health services, present only in Southern regions and only for the poorest quartile, could be due to a significant positive correlation between the "Ill" variable and the income quartiles, which is greater than the same correlation in the rest of the country (15% against 11%). In other words, Southern households in the first quartile are healthier than in the rest of the sample. These different correlations have no impact on the second part of this paper, because in applying the Carneiro-Heckman approach we split the sample between "ill" and "healthy" households.

On the contrary, notice that the income gradient is still observed for private services in the Centre-North. As for the role of the quality of public services (*QUAL*), the pattern observed in the equations for private services is still confirmed: it is negative in the South, where the quality of public services is lower. In the equations for public services, the coefficient for *QUAL* is instead negative (and marginally significant at the 10% level) only considering the whole country, probably picking up the substantial diversity of the two areas of the country (the coefficient is indeed close in magnitude to the one for the Centre-North). Why the low quality of public services does not reduce

the demand for them, besides increasing demand for the private alternative? One may continue to use public services but make an additional demand for more sophisticated private ones; further, some people can express a low evaluation for public services but still use them for lack of private providers or for insufficient personal income. In a context where the general opinion on public services is low, only a few can actually consume more private services.

Finally, we checked the robustness of our conclusion on the role of income and quality by estimating also a Zero-Inflated Poisson (ZIP) model, considering the *number* of private specialist visits. The ZIP is a sequential model in which a regime choice model (here a standard logit) is combined with a count data model (e.g., Cameron and Trivedi, 1998). The regime choice model splits all observations in two groups, one in which the phenomenon cannot be observed, and one in which it can be observed, with the outcome being an integer number ranging from *zero* to *n*. The number of occurrences in this last regime is modelled as a Poisson distribution. More formally, the ZIP model can be represented by the following system of equations:

$$\Pr(m_i = 0 | z_i) = F(z_i, \beta) \qquad (1b)$$
$$\Pr(priv_i = n \mid m_i = 1) = \frac{e^{-\lambda(z_i,\beta)}\lambda(z_i,\beta)^n}{n!}$$

where the first equation models the regime choice (and F is now the logistic distribution, while z and β are defined as before), and the second equation models the number of private specialists visits (*priv*) as a Poisson distribution with parameter λ. Estimates of Eq. (1b) are in Tab. 3.C. Previous conclusions substantially hold. As for the regime choice, health status, income, and the quality of public health care all play the same role as in more simple models. The number of private visits appears to be influenced by education of the head, the household size, and the subscription of a private health insurance. The positive effect of the variable "head male" may be due to its high correlation with the number of family members. However, when looking at geographical sub-samples, other interesting insights emerge. For instance, while in the Centre-North we observe the usual income gradient in influencing the regime choice, in the South there seems to be only a role for income in determining the number of visits purchased from private providers (the coefficient of Q^4 is, in the Southern regions, positive and statistically significant, implying that households in the richest quartile

purchase each year 0.62 more private visits than those in the bottom quartile, ceteris paribus). Now the *QUAL* variable has the expected effect on the demand for private visits (those who do not purchase private services have a better opinion of public health care). As for other variables, the subscription of a private health insurance has now a positive effect on the *number* of visits, but only in the Centre-North, where private insurances are more common: in this area, subscribers of a private insurance purchase 0.63 more private visits than those without private insurance, ceteris paribus.

Table 3. Demand models for private and public specialist health care

3.A) Probit models: only private specialist care

Variable	Italy Private	Centre-North Private	South Private
CENTRE	0.0657**		
	(0.0326)		
SOUTH	-0.0317		
	(0.0289)		
ILL	0.0895***	0.0877***	0.110***
	(0.0247)	(0.0322)	(0.0368)
AGE	-0.00456	0.0000150	-0.0139
	(0.00610)	(0.00792)	(0.00911)
AGE2	0.0000178	-0.0000295	0.000115
	(0.0000564)	(0.0000726)	(0.0000859)
H_MAN	-0.0433	-0.0706*	0.0115
	(0.0301)	(0.0392)	(0.0446)
UNSK	0.00158	-0.0106	0.0275
	(0.0352)	(0.0453)	(0.0537)
UNSK_P	0.0363	0.0280	0.0335
	(0.0494)	(0.0568)	(0.0989)
EDU1	0.0393	0.0679	-0.0107
	(0.0347)	(0.0457)	(0.0486)
EDU2	0.00910	0.0210	-0.00286
	(0.0406)	(0.0520)	(0.0611)
EDU3	-0.0214	-0.0209	0.00970
	(0.0565)	(0.0717)	(0.0940)
EDU1_P	0.0913**	0.0725	0.138**
	(0.0363)	(0.0463)	(0.0571)
EDU2_P	0.180***	0.176***	0.211***
	(0.0424)	(0.0539)	(0.0669)
EDU3_P	0.194***	0.188**	0.208*
	(0.0675)	(0.0835)	(0.118)
Q2	0.0516	0.106*	0.0112
	(0.0360)	(0.0575)	(0.0447)
Q3	0.0643*	0.118**	-0.00800
	(0.0373)	(0.0552)	(0.0526)
Q4	0.130***	0.179***	0.0430
	(0.0425)	(0.0568)	(0.0681)
EQI	-0.00230*	-0.00363**	0.000279
	(0.00121)	(0.00167)	(0.00164)
NCHIL	0.0267**	0.0259	0.0391**
	(0.0129)	(0.0180)	(0.0188)
DEPR	0.000662	0.000408	0.00199**
	(0.000476)	(0.000553)	(0.00085)
INS	0.0211	0.0287	-0.0146
	(0.0348)	(0.0405)	(0.0638)
QUAL	-0.0134**	-0.0114	-0.0241***
	(0.00555)	(0.00722)	(0.00805)
Observations	3381	2122	1259
R-squared	0.06	0.07	0.06

Marginal effects at sample means. White robust standard errors in parentheses.
Sig. lev.: ***p<0.01; ** p<0.05; * p<0.1

3.B) Bivariate probit models: public and private specialist care

Variable	Italy		Centre-North		South	
	Private	Public	Private	Public	Private	Public
CENTRE	.0657**	-0.079***				
	(0.0326)	(0.0302)				
SOUTH	-0.0318	-0.1699***				
	(0.0289)	(0.0289)				
ILL	0.0893***	0.0611**	0.08764***	0.0557*	0.0109***	0.0462
	(0.0247)	(0.0252)	(0.0322)	(0.0328)	(0.0368)	(0.03703)
AGE	-0.000456	-0.0106	0.000032	-0.0093	-0.0139	-0.0138
	(0.0061)	(0.0064)	(0.00792)	(0.0086)	(0.00913)	(0.00937)
AGE2	0.000018	0.0001*	-0.0000296	0.000086	0.000115	0.000145*
	(0.00006)	(0.00006)	(0.00007)	(0.00008)	(0.00009)	(0.00009)
H_MAN	-0.0433	0.0267	-0.0706*	0.01731	0.0113	0.0572
	(0.0301)	(0.03069)	(0.0392)	(0.0403)	(0.04454)	(0.0412)
UNSK	0.00168	-0.0090	-0.0107	-0.0184	0.0284	0.01405
	(0.0352	(0.0365)	(0.0453)	(0.04802)	(0.0537)	(0.0522)
UNSK_P	0.0363	-0.0574	0.0280	-0.08943	0.0327	0.0940
	(0.0495)	(0.0501)	(0.0568)	(0.0573)	(0.0992)	(0.113)
EDU1	0.0393	0.00696	0.0678	0.01106	-0.0104	-0.00541
	(0.0347)	(0.0316)	(0.0457)	(0.04835)	(0.0485)	(0.0489)
EDU2	0.00922	0.0484	0.0210	0.007861	-0.00211	0.0048
	(0.0406)	(0.0428)	(0.0520)	(0.05419)	(0.0612)	(0.0637)
EDU3	-0.0214	0.00455	-0.0210	0.03232	0.0106	-0.0525
	(0.0565)	(0.062)	(0.0716)	(0.0804)	(0.0941)	(0.0802)
EDU1_P	0.0912**	0.03805	0.0725	0.03995	0.1373**	0.0268
	(0.0364)	(0.03775)	(0.0463)	(0.04942)	(0.05713)	(0.0532)
EDU2_P	0.180***	0.0827*	0.1763***	0.066971	0.2104***	0.0766
	(0.0424)	(0.0433)	(0.0539)	(0.0542)	(0.06704)	(0.0697)
EDU3_P	0.194***	0.1319*	0.188**	0.11968	0.208*	0.089
	(0.0675)	(0.0707)	(0.0835)	(0.0871)	(0.118)	(0.110)
Q2	0.0516	0.0673*	0.1060*	-0.01867	0.0109	0.1304***
	(0.0360)	(0.0377)	(0.0575)	(0.0547)	(0.04472)	(0.0480)
Q3	0.0643*	0.0441	0.1182**	-0.02113	-0.0083	0.09657*
	(0.0373)	(0.0398)	(0.0552)	(0.05423)	(0.0525)	(0.0577)
Q4	0.130***	0.08528*	0.179***	0.0130	0.0423	0.1653**
	(0.0425)	(0.0456)	(0.0568)	(0.05732)	(0.0683)	(0.0773)
EQI	-0.00230*	-0.0027**	-0.00363**	-0.00342*	0.000307	-0.0025
	(0.00121)	(0.00135)	(0.00167)	(0.0019)	(0.00163)	(0.0018)
NCHIL	0.0267**	0.04755***	0.0259	0.08302***	0.0391***	0.00943
	(0.0129)	(0.0139)	(0.01798)	(0.020)	(0.01875)	(0.0194)
DEPR	0.000664	-0.00081	0.00041	-0.00048	0.00199**	-0.0014
	(0.00048)	(0.00056)	(0.00055)	(0.00064)	(0.00085)	(0.0009)
INS	0.0210	-0.0462	0.0287	-0.03384	-0.0147	-0.0901*
	(0.0348)	(0.0353)	(0.0405)	(0.04324)	(0.0639)	(0.0546)
QUAL	-0.0134**	-0.0099*	-0.0114	-0.0093	-0.0241***	-0.00303
	(0.00555)	(0.00592)	(0.00722)	(0.00796)	(0.00805)	(0.0079)
Rho		-0.0240		-0.0150		-0.0616
		(0.0429)		(0.0551)		(0.0643)
Observations	3381	3381	2122	2122	1259	1259

Marginal effects at sample means. White robust standard errors in parentheses.
Sig. lev.: ***p<0.01; ** p<0.05; * p<0.1

3.C) ZIP models: only private specialist care

	Italy		Centre-North		South	
Variable	Nr. private services	m=0	Nr. private services	m=0	Nr. private services	m=0
CENTRE	0.0784	-0.297**				
	(0.122)	(0.147)				
SOUTH	-0.223**	0.116				
	(0.108)	(0.143)				
ILL	0.0681	-0.403***	0.0953	-0.385***	0.0547	-0.532***
	(0.0884)	(0.117)	(0.107)	(0.149)	(0.153)	(0.193)
AGE	0.00165	0.0206	0.0138	0.000748	-0.0339	0.0637
	(0.0222)	(0.0299)	(0.0299)	(0.0380)	(0.0259)	(0.0479)
AGE2	-0.0000569	-0.0000780	-0.000176	0.000124	0.000275	-0.000527
	(0.000205)	(0.000280)	(0.000278)	(0.000353)	(0.000243)	(0.000456)
H_MAN	0.229**	0.255*	0.221**	0.352*	0.323*	0.0495
	(0.0916)	(0.145)	(0.103)	(0.180)	(0.179)	(0.252)
UNSK	-0.152	-0.0288	-0.196	0.0265	-0.0313	-0.139
	(0.117)	(0.168)	(0.137)	(0.213)	(0.204)	(0.266)
UNSK_P	-0.0481	-0.168	-0.0398	-0.132	0.203	-0.0856
	(0.143)	(0.227)	(0.167)	(0.258)	(0.238)	(0.462)
EDU1	-0.0114	-0.182	0.0696	-0.297	-0.205	0.0217
	(0.123)	(0.169)	(0.144)	(0.214)	(0.223)	(0.263)
EDU2	0.211	-0.0124	0.228	-0.0668	0.158	0.0399
	(0.143)	(0.196)	(0.181)	(0.244)	(0.231)	(0.315)
EDU3	0.319*	0.143	0.373*	0.126	0.0695	-0.0217
	(0.190)	(0.276)	(0.225)	(0.338)	(0.272)	(0.481)
EDU1_P	-0.0198	-0.428**	-0.155	-0.353*	0.382*	-0.583**
	(0.128)	(0.168)	(0.151)	(0.213)	(0.198)	(0.266)
EDU2_P	0.143	-0.787***	0.128	-0.762***	0.221	-0.933***
	(0.127)	(0.185)	(0.150)	(0.234)	(0.194)	(0.304)
EDU3_P	0.0266	-0.840***	0.0654	-0.791**	-0.130	-0.954*
	(0.203)	(0.281)	(0.232)	(0.344)	(0.335)	(0.535)
Q2	0.270*	-0.179	0.448*	-0.390	0.101	-0.0157
	(0.149)	(0.175)	(0.257)	(0.276)	(0.166)	(0.237)
Q3	0.123	-0.267	0.196	-0.488*	0.253	0.0993
	(0.149)	(0.179)	(0.226)	(0.268)	(0.188)	(0.278)
Q4	0.225	-0.541***	0.278	-0.741***	0.439**	-0.107
	(0.159)	(0.196)	(0.231)	(0.273)	(0.207)	(0.333)
EQI	0.00103	0.0110*	-0.000494	0.0160**	0.00219	-0.000992
	(0.00607)	(0.00578)	(0.00749)	(0.00767)	(0.00722)	(0.00871)
NCHIL	0.0798*	-0.118*	0.154**	-0.105	-0.0694	-0.218**
	(0.0470)	(0.0636)	(0.0611)	(0.0833)	(0.0636)	(0.102)
DEPR	-0.00310*	-0.00433	-0.00183	-0.00258	-0.00623*	-0.0121**
	(0.00183)	(0.00290)	(0.00216)	(0.00301)	(0.00360)	(0.00516)
INS	0.211*	-0.0799	0.294**	-0.102	-0.282	0.0231
	(0.108)	(0.158)	(0.116)	(0.179)	(0.175)	(0.349)
QUAL	-0.00473	0.0640**	-0.000376	0.0563*	-0.000323	0.122***
	(0.0190)	(0.0267)	(0.0234)	(0.0336)	(0.0280)	(0.0430)
Constant	1.018*	0.0936	0.512	0.365	1.890***	-0.141
	(0.555)	(0.819)	(0.710)	(1.071)	(0.728)	(1.229)
Observations	3381	3381	2122	2122	1259	1259

White robust standard errors in parentheses. Sig. lev.: ***p<0.01; ** p<0.05; * p<0.1

3.4. The role of quality in determining liquidity constraints

3.4.1. The Carneiro and Heckman approach

In order to identify the role of income and quality in constraining individuals to access private services, we build on the methodology proposed by Carneiro and Heckman (2003). To present the CH approach we consider a very simple economy, in which the total population of N individuals can be partitioned into sub-groups by health status *S* (the healthy *H* and the ill *I*, that can be driven by very different motivations in purchasing private health care services), and by income *Y* (individuals belonging to income quartiles *Y=1, 2, 3, 4*). Let *m* denote access to *private specialist care*, and assume that people belonging to the fourth income quartile are not constrained *by definition*; this is our key identifying assumption. For each population sub-group of healthy and ill people, we compute "unadjusted gaps", using "unadjusted" (sample) means of our variable of interest *m* in each income quartile:

$$Gap_{4,Y} = \overline{m}_S^4 - \overline{m}_S^Y \qquad (2)$$

In other words, we compare average access to private services of people belonging to the 4th income quartile with average access of people belonging to the other lowest quartiles; we clearly expect all gaps to be positive. According to the CH methodology, we assume these gaps as measures of constrained individuals, both for long- and short-run factors. Short run factors are basically related to insufficient current disposable income, while long run factors refer to all other "structural" elements that may influence the propensity to acquire private specialist care, in particular education, age, area of residence, perceived quality of alternative services. The total shares of constrained individuals can be easily obtained by summing up "gaps" across income quartiles.

For each population sub-group defined by health status *S=(H,I)*, we then estimate using a probit specification the model represented in the following Eq. (3), which replicates previous demand equations:

$$m_i = \alpha_S + \sum \beta_S x + \sum \delta Q^Y + u_i \qquad (3)$$

where the *xs* identify the vector of relevant variables to explain demand for private health care services (like age, gender, education, lifestyles, …), and Q^Y are dummy variables for the first three income quartiles *Y=1,2,3*. Predicted values from Eq. (3) can be interpreted as demands for private care "adjusted" for long-term factors (i.e., for all

the variables included in the demand equation except income) in each income quartile for all population sub-groups by health status:

$$E\left[m_i \mid Q^Y = 0\right] = F(\hat{\alpha}_S + \sum \hat{\beta}_S \bar{x}) = \hat{m}_S^4 \tag{4}$$

$$E\left[m_i \mid Q^Y = 1\right] = F(\hat{\alpha}_S + \sum \hat{\beta}_S \bar{x} + \hat{\delta}) = \hat{m}_S^Y$$

where F represents the standard normal CDF.

To identify "liquidity-constrained" individuals we then measure differences in "adjusted" means with respect to the "reference" quartile (the top quartile), and interpret these "gaps" as proxies for the share of people constrained in the short run. Clearly, we now expect all the *δ's* to be negative. For each population sub-group of healthy and ill people, we hence compute "adjusted gaps", using "adjusted" means:

$$G\hat{a}p_{4,Y} = \hat{m}_S^4 - \hat{m}_S^Y \tag{5}$$

As before, the total shares of constrained individuals can be easily obtained by summing up "gaps" across income quartiles. The share of short-run (liquidity) constrained individuals is finally used to compute, by difference, the share of long-run constrained individuals. In particular, this share is represented by what is left after removing short-run constrained individuals from the total share computed using "unadjusted" means according to previous Eq. (2).

Notice that, as long as we consider a cross-section of individuals, the share of constrained individuals should be considered as a "lower bound" estimate[4]. Had we considered a dataset covering a period greater than one year, the probability to access private services would have been larger for all individuals included in the sample, since it is increasing with the length of period considered.

3.4.2. The results

Figure 1 shows the estimates of the shares of constrained individuals obtained by applying the CH method. For the two groups of ill and healthy households, further divided into quartiles of equivalent disposable household income[5], the figure contains the proportions purchasing private health services, both "unadjusted" (simple averages)

[4] On this point, see also the discussion in Atella and Deb (2008), that - using the Istat Multiscopo Survey - consider data with a 4-week window for the reporting period.

[5] Income quartiles have been computed on the whole sample.

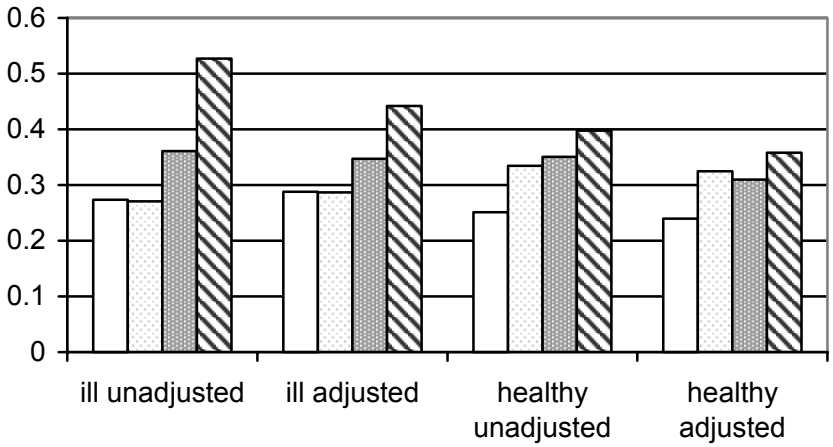
and "adjusted" (i.e., computed using the predicted values from the regressions described in the previous section). The unadjusted data show that the share of households from the richest quartile purchasing private health services is, for the ill group and for Italy as a whole, 30 percentage points higher than for those in the first quartile, while for the healthy groups this difference amounts to 15 percentage points. After controlling for family characteristics, these differences are lower, but remain significant. This is evidence in favour of the presence of short-run constraints, but long run constraints play also a role, even if of secondary importance. The short-run constraints are evident from the differences between the adjusted means. Distinguishing between geographic sub-areas is useful, because a greater role for LR constraints emerges: the "adjusted" columns become more similar among each other, in particular for the healthy groups. Therefore, it seems that both short-run and long-run constraints are playing a role: overall, 7% of the population do not purchase private health services because of lack of sufficient income (Table 4). Another 3.7% is limited by long-run constraints (like the lack of minimal health care knowledge or scarce interest for preventive care), that would not disappear even after a monetary transfer.

Turning to results for the two areas of the country, our estimates suggest that SR constraints are more severe in the Centre-North, while LR constraints are playing a greater role in Southern regions. Indeed, while the percentage of constrained individuals is about 10% in both sub-samples, SR constrained individuals represent 62% of this group in Central-Northern regions and 52% in Southern ones.

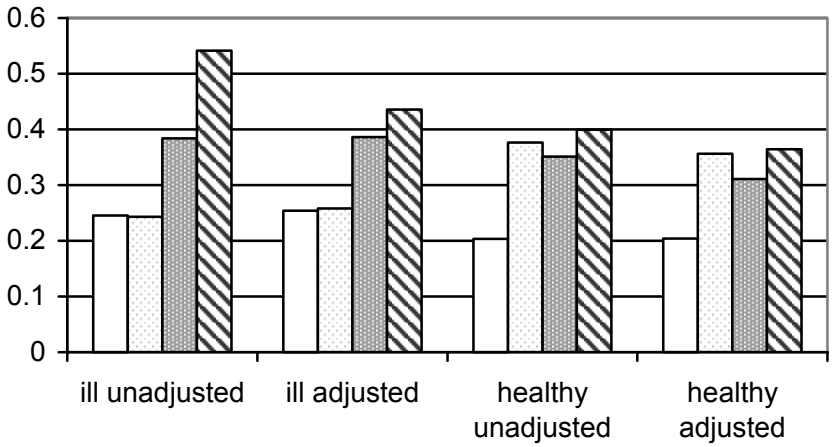
Overall, these results corroborate previous findings on the determinants of the demand for private services. Where quality of public care is (on average) better, demand is driven by income, and poor people do not purchase private services because they lack income. However, good quality public services – though probably plagued by long waiting lists – are available. On the contrary, where the quality of public care is (on average) lower, ill people demand private services *irrespective* of their income; hence, the opting out mechanism *à la* Besley and Coate does not seem to work in this case. Healthy people are instead mostly SR constrained also in the South, but – differently from people in the Centre-North – the quality of publicly provided services is generally quite low, and this can have an impact on their health status via preventive care.

Figure 4 Proportion of households purchasing private health services by health status and income quartile

Italy



Centre-North



South

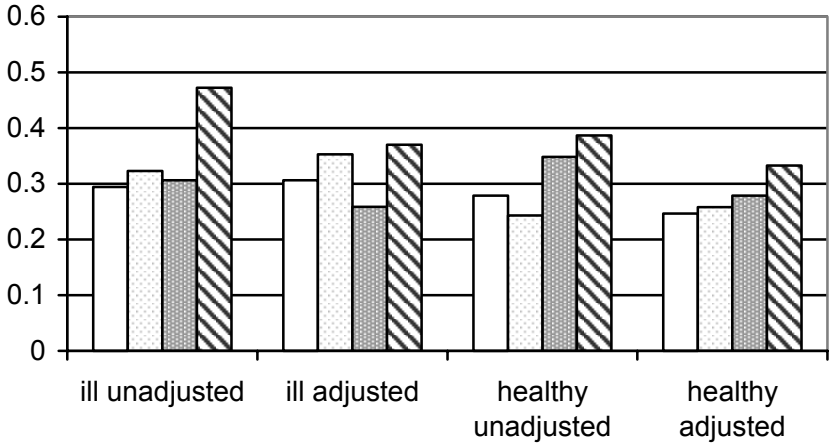


Table 4. Proportion of households constrained in the access to private health care

	% not constrained	Total % constrained (LR and SR)	% SR constrained	% LR constrained	% SR / (%SR+%LR)
Italy					
Ill	81.9	18.1	10.9	7.3	59.9
Healthy	94.1	5.9	4.6	1.3	78.8
Total population	89.2	10.8	7.1	3.7	65.7
Centre-North					
Ill	81.8	18.2	9.8	8.5	53.8
Healthy	95.7	4.3	3.7	0.6	86.0
Total population	90.5	9.5	5.9	3.6	62.1
South					
Ill	85.1	14.9	5.4	9.5	36.2
Healthy	91.0	9.0	6.6	2.4	73.3
Total population	88.4	11.6	6.0	5.6	51.7

4. Conclusions

In this paper we offer direct evidence on the role of perceived quality differences in publicly provided health care services, in determining both the incentive to opt out for private services and, for poor individuals, short-run liquidity constraints in the access to these services. We concentrate on private specialist care, a category of services for

which disparities in the access are the highest according to the available evidence. We use the 1993/1995 waves of the Bank of Italy - SHIW data, which contain information on perceived quality concerning a group of public and private services, besides information on income and personal characteristics of a representative sample of Italian households. As a first step to apply the Carneiro-Heckman approach, we estimate demand models for private specialist services, emphasising the presence of large territorial differences as for the role of income and the quality of public services. In particular, the income gradient plays a role in the Centre-North part of the country, originating a number of people SR constrained. On the contrary, the role of public services quality appears to be important in Southern regions, where people opt out for private services irrespective of their income. Applying the Carneiro-Heckman procedure, we show that – in this part of the country - poor ill people are mostly LR constrained, whereas poor healthy people are mostly SR constrained, but they also lack good quality public services.

These findings cast some doubts on the effectiveness of the opting out mechanism in redistributing income in Southern regions, raising intriguing questions for the dynamics of health inequalities. If poor healthy individuals are not receiving adequate care (in terms of quality) from public providers, and they are short-run constrained in the use of private services, because of their socio-economic status, it can be possible that they will be diagnosed illnesses too late, causing more severe health disparities to appear in the future. This asks for a deeper understanding of health status inequalities stemming from prevention: besides the role of a poor family background (which can limit in itself the access to diagnostic care, because of the lack of a minimal knowledge), one must also consider the role of liquidity constraints, that can arise in the presence of a low quality of publicly provided health care services even in universal health care systems like the Italian NHS.

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Appendix

Table A.1. Descriptive statistics

Label	Definition	n	mean	Sd	min	max
m	1 if household consumed private specialist care in the year	3381	0.33	0.47	0	1
public	1 if household consumed public specialist care in the year	3381	0.34	0.47	0	1
North	Reference category: household lives in northern Italy	3381	0.50	0.50	0	1
CENTRE	1 if household lives in central italy	3381	0.16	0.37	0	1
SOUTH	1 if household lives in southern Italy	3381	0.34	0.47	0	1
ILL	1 if at least one family member is in bad health	3381	0.40	0.49	0	1
AGE	age of reference person	3381	51.91	14.53	22	91
H_MAN	1 if reference person male	3381	0.75	0.43	0	1
UNSK	1 if reference person unskilled worker	3381	0.19	0.39	0	1
UNSK_P	1 if partner unskilled worker	3381	0.09	0.28	0	1
Primary education	Reference category: ref person primary education (Isced lev.1)	3381	0.41	0.49	0	1
EDU1	1 if reference person lower secondary education (Isced 2)	3381	0.29	0.45	0	1
EDU2	1 if reference person secondary education (Isced 3-5)	3381	0.23	0.42	0	1
EDU3	1 if reference person tertiary education (Isced 6-7)	3381	0.07	0.25	0	1
EDU1_P	1 if partner lower secondary education	3381	0.23	0.42	0	1
EDU2_P	1 if partner secondary education	3381	0.17	0.38	0	1
EDU3_P	1 if partner tertiary education	3381	0.05	0.22	0	1
Q1	1 if bottom income quartile by household equivalent income	3381	0.25	0.43	0	1
Q2	1 if second income quartile by household equivalent income	3381	0.25	0.43	0	1
Q3	1 if third income quartile by household equivalent income	3381	0.25	0.43	0	1
Q4	1 if top income quartile by household equivalent income	3381	0.25	0.43	0	1
EQI	environmental quality index (self-evaluations of the following items on a scale from zero to 10 for each one: quality of tap water, quality of air, availability of green areas, traffic conditions, noisiness and street cleaning)	3381	31.47	9.89	6	60
NCHIL	number of children	3381	1.22	1.08	0	7
DEPR	deprivation index (m^2 of dwelling per component)	3381	40.58	28.25	3.5	500
INS	1 if household subscribed private health insurance	3381	0.15	0.36	0	1
QUAL	self-assessed quality of publicly provided health care services	3381	5.23	2.47	1	10

Note: the dummies for the education of partner do not sum to one for two reasons: the reference category has been left out, and all these dummies are zero for households whose head has no partner.