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EVALUATING THE IMPACT OF HEALTH CARE REFORM IN COLOMBIA: FROM THEORY TO PRACTICE[1]

ALEJANDRO GAVIRIA[*]
CARLOS MEDINA[**]
CAROLINA MEJÍA[***]

Abstract

This article presents an evaluation of an ambitious health reform implemented in Colombia during the first half of the nineties. The reform attempted to radically change public provision of health services, by means of the transformation of subsidies to supply (direct transfers to hospitals) into a new scheme of subsidies to demand (transfers targeted at the poorest citizens). Although the percentage of the population having medical care insurance has notably increased, mostly among the poorest, problems of implementation have been numerous. It has not been possible to achieve the transformation of subsidies to supply into subsidies to demand. At the same time, competition has not made it possible to increase the efficiency of many public hospitals, which continue to operate with very low occupation rates, while receiving hefty money transfers. Subsidies increased demand for medical consultations, but have curbed demand for hospitalizations. Nonetheless, subsidies might have adversely affected female's labor market participation and even household consumption. As a whole, evidence suggests that the health reform has been effective in rationalizing households' demand for health, but not in rationalizing public supply, and neither in increasing the efficiency of service providers.

Keywords: demand subsidies, targeted social services, instrumental variables.

JEL Classification: I1, I11, I18, I38.

LA REFORMA EN SALUD EN COLOMBIA: DE LA TEORIA A LA PRACTICA

Resumen

Este artículo presenta una evaluación de la reforma de salud implantada en Colombia durante la primera mitad de los años noventa. La reforma intentó cambiar la forma de la intervención pública en salud, mediante la transformación de los subsidios a la oferta (transferencias directas a los hospitales) a un nuevo esquema de subsidios a demanda (transferencias focalizadas hacia los más pobres). Aunque el porcentaje de la población con seguro medico ha crecido de manera notable, los problemas de implementación de la reforma han sido numerosos. La transformación de subsidios de oferta a demanda no ha podido completarse. Al mismo tiempo, la competencia no ha logrado incrementar la eficiencia de muchos hospitales públicos, que siguen operando con ocupaciones muy bajas pero recibiendo transferencias cuantiosas. De otro lado, los subsidios han aumentado la demanda por consultas pero han disminuido la demanda por hospitalizaciones. Los subsidios tampoco parecen haber tenido un efecto notable sobre el consumo de los hogares y pueden haber disminuido la participación laboral de las mujeres. En conjunto, la evidencia sugiere que el RS ha sido efectivo para racionalizar la demanda por salud de los hogares, pero no para racionalizar la oferta pública, ni para incrementar la eficiencia de los prestadores.

Palabras clave: subsidios a la demanda, servicios sociales focalizados, variables instrumentales.

Clasificación JEL: I1, I11, I18, I38.

I. Introduction

In 1993, Colombia implemented an ambitious health reform. Since its inception, the reform was considered to have been a great advance in terms of fairness and efficiency and was publicized as a paradigm to be imitated across the developing world. The reform attempted to transform health care provision in a radical way, especially for the poorest population. In essence, the reform attempted to transform public intervention in health care from an scheme of subsidies to supply (direct transfers to public hospitals) to a scheme of subsidies to demand (transfers targeted to poor citizens). To this effect, the reform put into practice a system of vouchers, under the assumption that, after a transition period, efficient public service providers would cover their costs through the sale of services, and that competition would eliminate the prevailing (and large) inefficiencies.

The analysis of the impact of the health reform is not only important in itself; it also offers lessons that go beyond the peculiarity of any particular sector or country. Ultimately, an overview of the Colombian experience helps in understanding the difficulties inherent to any attempt of changing the nature of the provision of a social service (of moving from supply to demand), especially when public supply tends to be mostly determined by factors unrelated to conventional market forces, and when many institutions operate with soft-budget constraints. Furthermore, the Colombian experience also illustrates the complexities of evaluating an integral scheme of subsidies to demand.

This article is divided into two parts. The first describes some institutional aspects of the reform and emphasizes the difficulties found in the transformation of supply into demand. The second part evaluates the impact of subsidies to demand upon the use of services, health outcomes, as well as on household consumption and labor participation. Together, both parts offer an ambiguous balance of the reform. Despite the substantial increase in public expenditure on health care and the increase in the proportion of population with health insurance, many problems persist. On the one hand, the implantation of a scheme of subsidies to demand has not been accompanied by a dismantling of subsidies to supply, which has led to a doubling in expenditure and a multiplication of inefficiencies. On the other hand, the impact of subsidies upon health outcomes and household consumption are questionable, to say the least

In particular, this article seeks to evaluate the impact of the Subsidized Regime (SR) on the three categories of outcomes: (i) on the state of health, subjectively measured through the self-report and objectively measured by the number of days in which the person ceased to perform regular activities; (ii) on the use of medical services (demand for preventive consultations, for medical consultations because of illness and for hospitalizations); and, lastly, (iii) on household consumption of goods and services different from health care and labor force participation.

With the aim of overcoming the endogenous nature of enrollment into SR, a instrumental variables estimation strategy is used. Since just 50% of eligible individuals are enrolled in the program, and given that the enrollment depends on

social and political contacts within municipalities, both the share of the age of the household's head living in current municipality, and his length of residence are used to instrument enrollment into the program. Following are the most important results of the evaluation. There seems to be a positive effect of enrollment upon the reported state of health (subjective measurement) and upon the use of both preventive and illness-related medical consultations. Likewise, enrollment seems to lessen the frequency of hospitalizations. Finally, the SR appears to have an adverse effect on consumption and on labor market participation. The remainder of this document is organized as follows: Section II presents a description of the reform and an analysis of the implementation problems. Section III briefly summarizes the relevant literature, outlines the empiric strategy and presents the results of the evaluation. Finally, Section IV draws some general conclusions.

II. Colombia's health reform: background, assumptions and results

This section presents a description of: (i) the main institutional innovations introduced by the health reform; (ii) the assumptions that underlied the reforming efforts; and, (iii) the results that were finally achieved. As described ahead, the differences between the assumptions of the reformers and the realities of the reform were dramatic; which in turn explains the difference between the results foreseen and those achieved. In the end, the reform to Colombian health care can be construed as a warning against the difficulties, both institutional and political, in the implementation of a radical transformation in the way of providing a social service.

1. Institutional aspects before and after the reform

Prior to the reform, the Colombian healthcare system was segmented into three independent subsystems: the public, the private, and the social security systems. The public system provided medical care to persons in the low and medium-low strata, who were not protected by any kind of medical insurance (about 70% of the total population in 1985). The private sector satisfied the demand of the high-income population (15% of the total population), through direct charges to users or by means of private health insurance plans. The social security system included two types of institutions with different target populations. The Social Security Institute (*Instituto de Seguridad Social*) was targeted at formal workers belonging to the private sector and was financed by payroll taxes; and the Social Benefit Societies (*Cajas de Previsión Social*) were limited to public sector workers and were financed directly by the State.

The system in place prior to the reform had three types of problems: (i) low levels of insurance coverage; (ii) inequities in the access to services, and low levels of solidarity; and (iii) high inefficiency in the public provision. These problems were not exclusive of the Colombian system. On the contrary, they were shared by the majority of healthcare systems in Latin America, which had been consolidated during the fifties and had favored, from their earliest inception, the higher income population. Gideon (1993) shows that, at the start of the nineties, nearly 45% of the urban population lacked medical insurance. Likewise, a large share of hospital

discharges and surgical procedures performed by the public system benefitted persons belonging to the top-income quintile. According to the World Bank (2003), such historical evidence suggests that, prior to the reform the most affluent persons were using public sector providers, not for primary care or consultations, like preventive medical visits, but for costly and high-complexity medical procedures.

In 1993, Colombia put into practice one of the most ambitious social reforms ever undertaken in Latin America. Thus has been acknowledged by, among others, several multilateral organizations, which contributed not only huge amounts of resources but also technical orientation throughout the design and execution of the reform. The key principles of the reform included among others: (i) equity in access to health services, (ii) mandatory health insurance to everyone, (iii) comprehensive coverage, which includes the design of a benefit package that would be covered by the Mandatory Health Plan, POS, as well as a subsidized basket, POSS, which initially covered 50% of the POS, and (iv) free choice of insurer and health provider.

First of all, the reform sought to solve the problems mentioned above by proposing: (i) to increase insurance coverage to 36 million people by 2000 (24 million targeted to the poorest), by increasing resources through National and regional contributions, as well as through national transfers, (ii) to increase solidarity by establishing cross subsidies among people able to contribute, and between these and those unable, and (iii) to increase efficiency through a radical change in the

way of participation by the State, which would shift from supply-side subsidies to demand-side subsidies of health services, and by increasing public hospitals efficiency through re-structuring programs.

Given the existing problems, the reform intended that all individuals, regardless of their origin or economic means, would have access to a pre-established package of basic health services. The new healthcare system divided the operation into two different levels: the *Contributive Regime* (CR), which guaranteed the POS to its enrolees, was targeted at the population of means, and the *Subsidized Regime* (SR), which guaranteed the POSS to its enrolees, was designed for the poorest population.[2] During the transition period, before universal coverage was achieved, there would be also the uninsured population, accounted for mainly by the poor not covered by the SR.

Population covered by the Contributive Regime

Persons affiliated to the CR contribute with 12% of their earned income. The employer pays for two thirds of the contribution and the employee pays for the rest. The contribution is collected by the insurance carrier (EPS) that the contributor freely chooses. The EPS discounts from each contributor's contribution the value of the premium stipulated by the regulation (UPC) for the worker and his/her dependants, and transfers the difference to an equalization fund known as the *Fosyga* in the Colombian legislation. When the said difference is negative, the

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[2] The resources required to cover the health services included in the POSS are mainly oriented to fund the less complex health services included in the POS, Currently, the POSS cover 56% of the costs of the POS.

Fosyga compensates the EPS with the corresponding value. One point of the contribution (i.e., the "solidarity point" in the Colombian legal jargon) is transferred to regional entities with the purpose of paying for the financing of SR's beneficiaries (see Figure 1).

Population covered by the Subsidized Regime

Persons enrolled in the SR are selected through a test of their economic means (proxy-means test) known as the Sisben (System of Beneficiaries Selection). The score in the Sisben is used in determining six groups of social-economic levels, with level 1 grouping the poorest population. By legal stipulation, only those households belonging to levels 1 and 2 of the Sisben are eligible to receive the SR. In the SR there are insurance carriers (ARS), equivalent to the EPS of the CR. Enrolled members can freely select their insurance carrier, which receives a premium per each enrolled member (Subsidized UPC), corresponding to the estimated value of services in the package stipulated for the SR (see Figure 1). Each individual ARS establishes agreements with a limited number of public or private hospitals and health professionals, which provide health services to enrolees within the benefit package (the POSS) covered by the SR. If the health service demanded is not covered by the POSS, then the services are provided by public health care providers and the beneficiary would have to pay 5% of its cost if he or she was classified as Sisben 1, and 10% if classified as Sisben 2

Resources of the SR come from different sources. The first of them, which was already mentioned, groups the shared payments put in by contributors to the CR

(i.e., solidarity contributions). The second source consists of resources corresponding to the transfers that the central government makes to regional entities. The third is made up of resources owned by each regional entity. According to Bitrán, Gideon and Muñoz (2004), in the year 2004, 64% of the cost of subsidized services was financed through transfers from the Nation; 24%, through shared contributions by persons enrolled in the contributive regime; and, the remaining 10% was financed through regional sources for health care and out-of-pocket payments made by enrolees.

Uninsured population

A noteworthy fact is that the eligible but not covered population has a right to services provided by public hospitals (or private ones, by means of contracts with regional entities). These services are covered with the so-called supply-side subsidies. In summary, the Colombian health system is not only characterized by the existence of two different insurance systems according to enrolees' ability to pay, but also by two schemes of confronted subsidies: demand-side subsidies for enrolees in the SR and supply-side subsidies for poor citizens not enrolled.

In practice, the system's administrators (municipalities in this case) seem to have considerable flexibility at the time of choosing who the beneficiaries of the SR will be. Given that municipalities are autonomous in the management of the targeting instrument (Sisben) and since the eligible population largely surpasses the number of beneficiaries, there is a wide margin for arbitrariness and political patronage. Concerning this, Ruiz et al (1999) point out that, for example, the enrollment in the

SR in a municipality on the Colombian Pacific Coast was done simply "by pointing at certain individuals on a whim. A lot of people enrolled were workers of the municipality, of the hospital, or of the insurer company itself". Seemingly, this case repeats itself time and again all across the country. If belonging to a political patronage network or counting on political connections has a bearing on the probability of enrollment, having deep-rooted attachments to a municipality (understood, for instance, as the number of years of residence there) would be related with the said probability. This assumption plays a key role in the empirical strategy used for identifying the impact of the SR.

2. Assumptions of the reform

The health reform was approved based on a basic objective: the proposed changes would make it possible to achieve universal insurance coverage within a 10-year term. This objective dominated the legislative discussion and ended up silencing any attempt to voice opposition or express skepticism. The achievement of that objective was based primarily on the projections for extending the coverage of the Contributive Regime, CR. According to initial calculations, the CR would guarantee healthcare coverage for 70% of the better-off tier of the population. Within that percentage, or target population of the CR, the percentage of enrolled members would increase from 40% to 90% of wage earners between the years 1994 and 2000 , and would leap from 9% to 85% for independent workers. As is shown later on, these projections, based on too optimistic assumptions about economic performance and job generation, were not met.

However, the reformist calculations were not only optimistic about macroeconomic and labor market assumptions (and, therefore, in relation to growth in the number of individuals enrolled in the CR); they were also overly confident regarding the possibility of transforming supply-side subsidies into demand-side subsidies. According to the provisions established by lawmakers, after a period of transition, the SR would cover the totality of the eligible population (Sisben 1 and 2); public hospitals would be financed through sales revenues; and supply-side subisdies would be ostensibly reduced. Thus, public expenditure on health care would be primarily oriented to subsidizing demand by the poorest citizens and public hospitals would be transformed into efficient institutions thanks to competition. Entities not achieving competitiveness would simply disappear. In brief, it was assumed that public supply was elastic from a long-term viewpoint.

Multilateral credit institutions backed the aforementioned assumptions. According to the World Bank (2004), for example, "in as much as the number of members enrolled in the EPS and ARS organizations continued to grow, the need for supply-side subsidies would decline, given that public hospitals would be expected to finance half of their annual budget by selling their services to the members enrolled in the Contributive and Subsidized regimes".

Even if this reasoning is valid in theory, what happened in practice was an increase in the coverage of healthcare insurance, accompanied by a growth (not a reduction) in the number of public providers. In short, two assumptions presented

by the government and accepted by the political actors made it possible to pass the law: (i) feasibility of reaching universal coverage in health insurance, and (ii) feasibility of transforming health subsidies from the supply side to the demand side. As we will see, both of these proved to be fallacious.

3. Results of the reform

Let us first analyze the results of the first assumption of the reform, that of universal coverage of health insurance. Both coverage of the Contributive and the Subsidized regimes had a weaker-than-expected performance, as Figure 2 shows. Regarding the CR, the number of individuals actually covered was only 54% of that expected. Not only did growth rates projections turn out to be lower than the forecast, but something similar happened to the growth in formal employment. Thus, resources from the shared-contribution system were lower than expected, which negatively affected the financing of the subsidized regime and the expansion of coverage among the poorest population. Other sources had actually the largest gaps, namely those from the regions, which were expected to fund 30% of the SR, actually collected 90% less resources than expected; while national transfers, that were expected to fund 40% of the SR, collected 50% less resources than expected. The number of individuals actually covered by the SR was only 40% that expected in equivalent terms. On the whole, health insurance coverage increased from 28% in 1992 to 42% (instead of 100%) in 2000.

Despite such observed gap, some actors had anticipated that the goal to achieve universal coverage might have been too optimistic. What was less anticipated by them (or what was ignored by both political and academic actors), and constituted the greatest difference between the theory of the reform and its reality, had to do with the transformation of subsidies to supply into subsidies to demand. In the first place, the transformation of resources of supply into resources of demand was negatively affected by a predictable vicious circle: initially, supply resources had to be maintained in order to assist the poor, uninsured population; which, in turn, diminishes available resources for subsidies to demand, which hinders the enrollment of new members, and which prevents the reduction in resources of supply, thereby deducting more resources from demand, and so on. In other words, the increase in demand for healthcare resources occasioned by the greater insurance coverage is not immediate, which aggravates the transition and may lead to financially unsustainable situations for many public hospitals, thus leading them to exert political pressure for more direct transfers.

But the problem of resource transformation goes beyond the transition. The political pressure exerted by inefficient public hospitals which were not able to attract resources through the sale of services, and therefore display a structural shortfall in their budgets, constituted the major bottleneck in accelerating the transition of subsidies to demand. Gaviria (2004) argues that public supply has proved to be fundamentally inelastic. It might have actually shown some elasticity, but not to market forces, as conceptually assumed by reformers, but to political ones: public hospitals have registered budget increases on the whole, while just a

few of the most inefficient have been shut down. According to available evidence, more than 10 years after the reform, there has been little advance towards rationalizing public supply and making it more efficient.

The introduction of the SR has been accompanied by both growth in the number of public hospitals and lower levels of occupation—a predictable result in the face of soft-budget constraints. Currently, resources are used not only in maintaining underused public hospitals, but also into subsidizing demand by the poorest citizens, who prefer to use private hospitals. In other words, the cost of subsidies to demand has been absorbed, but subsidies to supply have never been dismantled, which has implied a doubling the cost (see Jack, 2000). To sum up, the lack of elasticity to market forces of public supply conspired against the most optimistic projections of reform. Once again, political pressures by public hospitals overpowered the intentions –evident in the rhetoric, diffuse in practice– that successive governments had of consolidating a new scheme of subsidies to demand.

Figure 3 shows the budgetary consequences of the mentioned problem. Growth in the total budget of the healthcare sector increased substantially: the budget of public hospitals (initially meant -by reformists- to fund the SR) inflated instead of declining and a new expenditure item appeared: that of the SR, a good part of which comes from central budget and does not return by the sale of services supplied by public hospitals. The expenditure increase in public hospitals has not taken place as a result of either the opening of new hospitals in underserved areas

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or a budget redistribution favoring efficient hospitals; rather, it occurred because of expenditure boom in formerly established public hospital, thanks in part to the larger resources received from the central government, and to a huge increases in payroll and wages that took place by between 1995 and 1998 (World Bank, 2003).

4. Some lessons from Colombia's health reform

The reform produced three results that had not been anticipated by those who pushed it through: (i) the duplicity in expenditure; (ii) the perpetuation of inefficiencies in public supply; and, (iii) the horizontal inequities generated by the lack of universal coverage of the SR. This situation constitutes a warning for those who continue to defend the movement towards schemes of demand subsidies with theoretical arguments that do not take political restrictions into consideration. If public supply is inelastic to market forces, the alternative is to reform political institutions that impede the working of market forces; or else, the alternative could be learning to live with the public supply. That does not necessarily mean stoically accepting the inefficiency of public providers; instead, it underscores the need of *direct* policies aimed at increasing the efficiency of existing suppliers, and exposes the naivety of believing that *competition* will take care of the problem. This fact is particularly true in a sector such as that of health care, in which, owing to political reasons public institutions operate with soft-budget constraints.

On the other hand, lack of accurate information could partially explain this and other cases of myopic policy design. Governments promoting ambitious (somewhat

experimental) reforms in popular issues are usually well regarded by the electorate, regardless of the feasibility of the reform: good intentions are not always dwarfed by poor results. Thus, bold reformers have the incentives to push through risky agendas, mostly when they can always find a multilateral institution to echo them conceptually and financially.

III. Evaluation of a key component of the reform: the Subsidized Regime

Given the complex structure of the Colombian health system shown in figure 1, a thorough evaluation would be beyond the scope of this paper. In this section, we focus on the impact evaluation of the Subsidized Regime, SR. In spite of the aforementioned problems, the SR remains one of the most important health interventions in Latin America. Not only because of its cost (close to $1 billion dollars -1% of GDP- per year, or a quarter of all public resources invested in the health sector), but also because of its coverage (of over thirteen million people by 2004).

Since public hospitals' budget has continued to grow after the reform, it is crucial to know whether insured individuals are better off than uninsured ones. In this section, we first overview previous work that evaluates the SR, then explain our model specification and empirical strategy, and finally present the results.

1. Bibliography overview and conceptual framework

When the reform was approved, the need to get accurate impact evaluations was never considered. To that extent, most available work on the impact of the SR is based on strong (and doubtful) assumptions. Thus, the available evidence could hardly be used to forge a difficult consensus on the advantages and disadvantages of the reform. This article aims to overcome this problem.[3]

The vast majority of research conducted on the SR is descriptive in nature and has concentrated (i) in characterizing the formal institutional aspects, (ii) in measuring the incidence and targeting, and (iii) in evaluating the differences between the private and public ARS (O'Meara et al. 2003, Vélez and Foster 2000, Londoño et al. 2001, among others). Ayala and Henao (2001) argue that, in spite of the advances in insurance coverage, the system displays problems of resource allocation and efficiency: it does not reach the poorest individuals and a large group of independent workers (who are not poor enough to be eligible for the SR but who earn less than enough to contribute to the CR) is not covered either.

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[3] There exists an extensive international literature on the impact of health insurance. Levy and Meltzer (2001) divide this literature into three categories: (i) observational studies, (ii) quasi-experimental studies, and (iii) randomized experiments (or social experiments). This article belongs to the second category. On this respect, it is worthwhile to cite the works of Currie and Gruber (1996 and 1997) and Card and Shore-Sheppard (2004); both pairs of authors analyze the impact of Medicaid between 1979 and 1992. The first authors find that increases in health insurance coverage improve health indicators for children (rate of mortality at birth, rate of infant mortality, child's weight at birth, preventive medical visits during the last month of pregnancy, and hospitalization during the past year, among others). The second pair of authors is less optimistic; they point out that Medicaid expansions had a more modest impact. In general, the impact of health insurance on health outcomes remains an open question in the literature.

Along the same lines, Bitrán et al. (2004), Escobar and Panopoulou (2003), BDO y CCRP (2000), DNP (2000, 2001, 2003, 2003a), and others, find that there still exists a large part of the poorest population without formal insurance. These studies reiterate that the system has somewhat large errors of both inclusion (non-poor households receiving subsidy) and exclusion (poor households not receiving subsidy).

Bitrán et al. (2004) also show that households enrolled in the SR spend more in health care (as a proportion of total household spending) than those enrolled in the CR and that, for obvious reasons, they are more vulnerable to falling below poverty line as a result of and adverse health-related shock. In a first attempt to evaluate the impact of the SR, Panopoulus and Vélez (2001) identify, initially, the factors that determine enrollment and, later, study the effect of enrollment on both the use of medical services and the spending in health services. In relation to the first outcome, they conclude that enrollment depends both on factors related with demand (individual) and those related with supply (municipality)[4], although they vary in importance depending on whether the individual resides in a rural or urban zone. In relation to the second issue, they find that beneficiaries of the SR are more likely to visit a doctor and less likely to be admitted to a hospital. Nevertheless, they spend less in medical services than those not enrolled. Contrary to what Panopoulus and Vélez found, Trujillo et al. (2004) show that an enrollment to the SR does increase the use of medical services (preventive care, ambulatory visits, and inpatient care).

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[4] The medical expenditures considered were hospitalization, medical visits and medications.

Both articles use the Colombian 1997 LSMS survey and both propose similar strategies to account for the endogeneity of enrollment: using spatial variation in key characteristics and arguing that they are independent of the health variables analyzed. Panopoulus and Vélez (2001) use as instruments the popularity of the mayor of the municipality of residence and the hospitalization rate of the state. On the other hand, Trujillo et al. (2004) use as instruments a set of dummy variables indicating whether the municipality has a health center, whether it is covered by a major national assistance agency (*Red de Solidaridad Social*), as well as an index of living standard conditions of the municipality and voter turn out in 1994 municipal elections.[5]

As will be shown later, spatial variables are likely to be related to health outcomes: not controlling for municipality fixed effects could severely bias impact estimates of the SR. Furthermore, the Propensity Score Matching (PPS) estimates used by both papers are troublesome. For example Trujillo et al. (2004)' estimates have some obvious problems: (i) the propensity scores do include variables that can be classified as outputs (health status, head's employment status and health expenditures) and (ii) it's not clear whether matched individual are drawn from the comparison group with or without replacement.

Figure 4 summarizes the major lines of analysis of this article. In first place, it studies the effect of the SR on the use of medical services. Hypothetically, the

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[5] There are 34 states and 1100 municipalities in Colombia.

lower cost faced by enrolled individuals increases service use; especially for the poorest--income is usually the first factor determining demand for medical services (see Andersen, 1995). In second place, the SR should positively affect consumption, not only because it significantly reduces the price of a relevant package of medical services, but also because it lessens the financial impact that may emerge in case of a medical event of significance.

For effects of this study, the impact of the SR is analyzed on the basis of the four variables underlined in Table 4. In general, the hypotheses analyzed are the following. The SR has a positive effect on health status, both if measured in a subjective manner (self-report) and if measured in an objective manner (days that the individual ceased performing regular activities because of illness).[6] The SR has a positive effect on the use of preventive visits and illness-related visits. The effect on the demand for inpatient care is ambiguous. On the one hand, the use of preventive and ambulatory services averts the later use of curative services (Tono, 2000); on the other hand, the lower cost of inpatient care might increase its use. The SR has a positive effect on the consumption of goods different from health services, as it frees disposable income via price, thereby increasing consumption possibilities.[7] Finally, the SR could have a negative impact on labor market participation.

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[6] Although the ideal objective measure of the state of health of any person is a medical report, this information is not available in the data base used.
[7] We include in consumption all expenditures made by the household, except durable goods, health and education.

2. Empirical strategy and data base

The evaluation of the impact of the SR has to start by solving the problem of the endogenous nature of enrollment. Since the selection of beneficiaries is not randomized, the problem of selection in the non-observables is the first obstacle that must be confronted. We now proceed to illustrate how individuals are selected into the SR, and then present the empirical strategy used to get the impact estimates.

Procedure to enroll individuals into the Subsidized Regime

According to the Colombian health regulations, municipal authorities are responsible of enrolling individuals into the SR but have no discretion to do so, only a set of procedures to follow.[8] Figure 5 presents the steps municipal authorities must follow to enroll individuals into the SR. First, individuals are classified as either "especial" or not. If an individual is classified as "especial", he (and his family group) is automatically included in a list of potential beneficiaries; otherwise, the proxy means test (Sisben) is applied to his family group: each member is classified according to their Sisben score in one out of six levels. Among the subset of people in Sisben levels 1 or 2, other groups of "especial" individuals must also be included automatically into the list of potential beneficiaries: first pregnant women, then children under five, and so on. Once all special groups have been included, and if available resources permit to enroll additional people, the list of potential beneficiaries must be complemented with those belonging to Sisben levels 1 or 2.

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[8] See Accords 77 of November/1997, and 244 of January/2003.

Municipalities are responsible of publicly displaying the complete list of potential beneficiaries and of asking them to freely select their preferred insurance carrier, ARS. Individuals not selecting an ARS on time are dropped from the list and replaced by other individuals not initially included and belonging to Sisben levels 1 or 2. Once individuals selected their preferred ARS, they become officially enrolled in the SR.

Figure 5 uses bold-face to designate local institutions in charge of key steps in the selection process.[9] If there were any sort of corruption (or unduly favoritism) in any of these institutions, ineligible individuals might have the possibility to be included in the list of potential beneficiaries, thus getting access to the SR.

Empirical Methodology

Several types of biases can arise if we do not consider the endogeneity of enrollment to the SR. For instance, if enrollment depends on the extent of social connections, then individuals belonging to the medium stratum who are in good health would have a high probability of becoming beneficiaries, and that, in turn, could bias the estimation of the impact of the SR. With the aim of solving this problem, this article uses a instrumental variable (IV) estimation strategy.[10]

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[9] ICBF: Colombian Institute of Family Welfare, in charge of policy for children (National entity with local branches); RSS: Social Solidarity Network, in charge of policy for population displaced by violence (National entity with local branches).

[10] An IV strategy is surely the most adequate for the problem at hand. The traditional non-parametric methods (Propensity Score Matching) do not correct the problem of selection in the non-observable. Other methods (differences in differences) cannot be applied given that no base line is available.

As usual, the idea is to find a variable that directly affects enrollment, but that does not directly affect the outcome under analysis. In notational terms, let Z_{it} be the instrumental variable affecting participation (D_{it}), but that does not affect the outcome (Y_{it}).[11] Under the assumption that all individuals exhibit homogeneous responses to the SR, a two-stage estimation procedure is followed. In the first stage, Z_{it} and X_{it} are used in predicting D_{it}:

$$D_{it} = f\left(X_{it}, Z_{it}\right) + V_{it},$$ (1)

where $D_{it}=1$ if individual i is enrolled in the SR at time t and $D_{it}=0$ otherwise. In the second stage, the predicted value $\hat{D}_{it}$ of D_{it} is plugged into the impact equation:

$$Y_{it} = f_t\left(X_i\right) + \alpha_t \hat{D}_{it} + \varepsilon_{it}.$$ (2)

The parameter α can be interpreted, under certain assumptions, as the mean impact of the SR. [12]

We propose, as instrument for enrollment in the SR, the fraction of life that the head of household reports having resided in the municipality where he/she resided at the moment when the survey was conducted. In other words, we assumed that, conditional to certain observable characteristics, this variable has an incidence on the person's enrollment in the SR, but has no direct incidence on the outcome

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[11] Beyond standard assumptions, IV only requires that conditional in X, the decision to participate is a non-trivial function (non constant) of Z, and the existence of g(Z) such that: E(g(Z$_{it}$) ε$_{it}$)=0, and g(Z) not collinear with f(X) (see Heckman and Robb (1985), and Heckman, LaLonde and Smith (1999)). The annex presents a listing of all variables (X, Y, Z) with the corresponding statistic descriptions.
[12] This follows if either we assume that treatment is homogeneous for all the population, or that it is heterogeneous, but simultaneously it holds that E(U1-U0|X;D=1)=0, in which cases the average treatment effect, ATE, equals the average treatment on the treated, ATT (see, for example, Heckman and Robb (1985), and Heckman, LaLonde and Smith (1999)).

variables studied: health status, use of medical services, household consumption and labor force participation.

In justifying this decision, it is pertinent to make two precisions. First, the SR is managed directly by the Colombian municipalities, which are in charge of selecting the beneficiaries and paying the premiums to the intermediary companies (ARS). Second, given the existing horizontal inequities, of close to 50%, municipalities have ample autonomy to decide who gets the subsidy and who doesn't, even if they do choose to allocate all available resources to the eligible population (Sisben 1 and 2). This is more so when enrollment information is not usually updated and overseeing is intermittent at best.[13]

Anecdotic and empirical evidence suggests that enrollment to the SR seems to be related with political connections and to the density of social networks, just like happens with the individual's (or its family's) capacity to wangle. This problem becomes evident once we note that by 2000, seven years after the reform had been approved, 54% of the beneficiaries claimed that they did not know their

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[13] According to BDO and CCRP (2000), only 62% of the information available in the databases of a sample of 93 municipalities was supported by the corresponding filled out forms, the rest had been destroyed, were unreadable, lost, etc. When a follow up survey was applied to families that had a Sisben form available, 48% of them had information consistent with the follow up survey, only 8% required to be classified in a lower level, and 44% in a higher level, showing a clear bias toward benefiting the ineligible. Finally, when individuals were asked for the reasons why they were not beneficiaries of the SR, 25% said that they did not know how to apply, 9% that there were too many official procedures, 40% said they already had their Sisben score but the municipality had not proceed to enroll them, and 10% that they lack economic resources. On the other hand, the same source reports that, in 2000, only 61% of individuals reported by ARS as their beneficiaries were in Sisben levels 1 or 2, 9% were in Sisben 3 and 30% did not have any Sisben score since they were not subject to the proxy means test.

rights.[14] Actually, 9% of beneficiaries of the SR selected their ARS following the recommendations of a friend, relative, politician or local leader, while 36% said that their ARS was assigned by their municipality.[15] Thus, local authorities appear to have enough leeway to point at specific insurers at the moment to enroll beneficiaries, from which they might illicitly benefit: especially when less than 7% of beneficiaries actually participated in the election of local committees of citizenship participation and vigilance.[16] On the other hand, in large municipalities and in cities where connections are less important, the formalities required to obtain enrollment demand prudential time. Furthermore, several government documents that have carefully examined the selection process into the SR have mentioned the existence of political biases.[17] Of course, political patronage can not be considered as the only way to get access to the SR, but it is definitely an important one.

In sum, the crucial assumption is that the extent of social and political connections is related with the fraction of life that the head of household has been living in the municipality of residence. In other words, residence can measured how deep-

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[14] See BDO and CCRP (2000).

[15] See BDO and CCRP (2000).

[16] See BDO and CCRP (2000). In addition, National Department of Planning, DNP (2003) reports that individuals do not participate in the committees because (i) they are afraid to confront the ineligible beneficiaries, (ii) they do not have time, or (iii) they think that the committees serve no purpose whatsoever. On the other hand, people distrust the committees: they report that some members use them either for political purposes or for personal gain.

[17] See, for example, DNP (2003), page 125. Also DNP (2001), page 44. The latter document, for example, reiterate the limits of community participation due to local political misconduct. Finally, DNP (2000) presents the statements of State governors, mayors, and local attorneys, all of whom denounce the lack of local control and political misconduct of the system administrators and Sisben surveyors.

rooted is the individual's attachment, and attachment is related with his/her social capital.[18]

Data used

Data used come from the Colombian 2003 LSMS survey, which contains information on 22,949 households and 85,150 individuals and is representative of the country as a whole. This survey contains a detailed module on health, which has information at the individual level concerning. (i) insurance status, (ii) health status and (iii) use of medical services (preventive visits, illnes-related ambulatory visits, use of inpatient care, and out-of-pocket payments for services). Also reported is individual information on education, labor market conditions, as well as information at the household level on consumption, income and dwelling characteristics.

In the evaluation's jargon, the individual who reported being enrolled in the SR is considered treated, and the individual who reported otherwise, non-treated. All individuals belonging to either the CR or to special health regimes were dropped from the sample. This selection is made with the purpose of avoiding negatively biasing the impact estimates. In addition, four categories of outcome variables (Y_{it} variable en Eq. 2, see Table 1) were considered: health status, use of medical services, consumption and labor market participation.

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[18] Some specifications (not shown) use the number of years spent in the municipality of current residence instead of the fraction of life. In this case, results were similar to those shown in the following section.

The first category includes a subjective measurement: a binary variable that takes on the value of 1 if the person considers his/her state of health as very good or good, and the value of 0, otherwise; and an objective measurement: the number of days that the individual stopped performing regular activities because of the latest health problem experienced (an illness not requiring hospital admission). In the category of use of medical services, three variables are considered: use of preventive visits and use of illness-related visits during the 30 days prior to the survey, and admission to hospital during the last twelve months–these three binary variables take on the value of 1 if the event occurs, and of 0 otherwise. In the third category of outcome variables, the per capita consumption in 2003 pesos is analyzed (without including healthcare spending). Finally, in the fourth category, labor market participation is analyzed by means of a variable that takes the value of 1 if the person is employed or unemployed, and of 0 if inactive.[19]

Table 1 also shows the exogenous variables (the X_{it} vector of Eq. 1 and 2) used in the evaluation.[20] These variables are classified in three types: individual, household and census track variables. Additionally, some specifications include municipalities fixed effects. Finally, the instrumental variable, Z_{it} in Eq. 2, corresponds to the fraction of life that the head of household reports having lived in the municipality where he/she resided at the time of the survey.

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[19] Only for people 12 or older.
[20] The use of medical services is commonly considered to be a function of the person's state of health. This model, however, takes the state of health as an endogenous variable, and it does not study the relationship between that variable and the use of medical services.

As mentioned earlier, some authors, Bitrán et al. (2004), Panopoulus and Vélez (2001) and Trujillo et al. (2004), have indicated that targeting problems are widespread in the SR: there are non-poor persons who receive the subsidy while there are poor persons who do not get it. Map 1 illustrates the spatial distribution of households living in Bogotá (Colombia's capital city) and interviewed as part of the 2003 LSMS survey. Each dot represents a block where at least one household was interviewed. There are seven tones in the map, each representing a socioeconomic strata. The zoomed area shows a sector of the city inhabited by lower and lower-middle class households (strata 2 an 3). Empty squares denote blocks where no SR beneficiaries were found. Crisscrossed squares denotes blocks where there is at least an insured household and uninsured one. As shown, there are many blocks where such a situation is found. Given the high levels of spatial segregation in Colombian cities in general and in Bogotá in particular, it should be clear from the map that horizontal inequalities are rather common among neighbors, implying that ample scope for discretion in the spatial dimension is present.[21]

In an attempt to ratify the conclusions of the mentioned authors, the SISBEN score was constructed (with data from the 2003 LSMS survey) for each one of the households, following the questions and original weightings of the survey. Table 2 shows the distribution of beneficiaries according to SISBEN level. The results

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[21] Socioeconomic strata are a spatial targeting mechanism used in Colombia to assign public services subsidies. There are six socioeconomic strata, one being the poorest. The Sisben survey is applied always to all people living in strata one and two, and in some municipalities, to people in strata 3 and over.

suggest the existence of problems of exclusion (poor households not receiving subsidy) and of inclusion (non-poor households receiving subsidy): in levels 1 and 2 of the SISBEN, more than half the population is not enrolled in the SR, whereas in levels 3 and 4, a percentage higher than 20% reports being enrolled. Table 3 repeats the same exercise for income quintiles. Results are the same as in the former case. Taken together, the results suggest that targeting is far from perfect.[22]

The previous results bring to the fore one of the main problems of the reform. The movement from a scheme of subsidies to supply towards a scheme of subsidies to demand was, to a large extent, based on the need of improving targeting. But the results have been discouraging, casting serious doubts on the premise to the effect that "whatever goes to demand is better targeted". In all probability, political patronage and outright favoritism have thwarted the initial intentions of the reformers.

Before moving on to the evaluation, it may be pertinent to study the mean differences among enrolled and non-enrolled individuals for each of the outcome variables. This exercise is performed not only for the whole sample (Table 4) but also for the sub-sample of individuals classified in the 1 and 2 SISBEN levels (Table 5). In the first exercise, the non-enrolled individuals report a better health status, fewer days of illness-related inactivity, better household conditions, and a higher labor market participation. Separately, enrolled individuals report greater

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[22] The results may exaggerate the importance of targeting manipulation since we observe the SISBEN levels at the moment of the survey rather than at the time of affiliation.

use of medical services (preventive consultation, consultation on illness, and hospitalization) and greater per capita consumption. When circumscribing the analysis for individuals in the 1 and 2 SISBEN levels, almost all results hold up.

3. Results of the evaluation

This section presents the results of the evaluation. The analysis is first performed for the total sample and later for the sub-sample of individuals belonging to SISBEN levels 1 and 2.

For each variable, four estimations are presented: Ordinary Least Squares (OLS) with and without municipality fixed effects, and Instrumental variables (IV) with and without municipality fixed effects.[23] All specifications correct for the possible heteroscedasticity in errors. Besides, all estimations were repeated with a larger group of control variables that includes census tract characteristics. Because the evaluation results are quite sensitive to instrument choice, two robustness exercises were carried out. The first exercise used a slightly different instrument: instead of the fraction of life that the head of household has resided in the municipality where he/she currently lives, the number of years that the head of household has lived in the same municipality was used. Results do not change. The second exercise used a sample restriction: the whole exercise was repeated for the city of Bogotá, the main city of the country, where health care availability is

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[23] In IV specifications the R-square is not reported. Reported instead are the coefficient and the significance of the instrumental variable in the first stage of the estimation.

greater than in other regions. Once again, the main results do not change substantially.

Table 6 shows the estimated impact of the SR upon state of health: reported health status (subjective measurement) and number of days that the individual stopped performing regular activities (objective measurement). For the first variable, the impact of the SR goes from being negative in the OLS estimation to being positive in the IV estimation. The estimated coefficient is 15 percentage points if municipalities fixed effects are included, and to 23 points if they are not. In the case of the number of days that the individual stopped performing regular activities, the SR does not seem to have any effect. The same result is obtained for both the OLS estimations and the IV estimations.

Regarding the effect of the SR on the use of medical services, Table 7 shows evidence in favor of a positive and substantial impact on both the attendance to preventive medical consultations and the attendance to medical consultations on illness. In the case of preventive consultations, the estimated effect becomes lower when municipalities fixed effects are included (39 vs. 25 percentage points), whereas in the case of consultations on illness, the contrary occurs (62 vs. 66 percentage points). Both results suggest that the SR facilitates access to medical care, either because of lower cost or because of greater availability of services. For hospitalization, the effect is the opposite: enrollment in the SR decreases the probability of having been hospitalized by approximately 11 percentage points in the IV estimation.

As speculation, it could be argued that by encouraging attendance to preventive medical consultations, the SR diminishes the need of hospitalizations. But perhaps the explanation is more straightforward and the results will simply show that non-covered persons, because of the absence of insurance itself, tend to request medical services via emergency rooms, which implies, in many cases, a preventive hospitalization. In summary, even if the SR does not avoid hospitalizations through the better health of enrollees, does in fact seem to avoid them by means of a more efficient use of medical resources.

The latter result was not foreseen by reformers, who forecasted an increase in the demand for hospitalization services as a consequence of the extension of the insurance to the poorest population. The evidence suggests that the SR rationalized demand for hospital services, although it raised the number of consultations, which is consistent with the increase in transfers to public hospitals that occurred after the reform. As was stated earlier, these transfers did not go into financing an improved functioning but to compensate for the deficit generated by surplus capacity.

Table 8 shows the effect of the SR on consumption. Although OLS estimates indicate a negative effect of the SR on consumption, IV estimates show no effect. This result suggests that savings on medical services prompted by enrollment in the SR is not substantial and does not seem to be reflected in greater consumption. Or alternatively, that the effect of the SR may be offset by behavioral

responses: diminished labor force participation, for example. All in all, the subjective well-being indicators show that in the better case, the SR has a nil effect.

The effect of the SR on consumption may suggest an adverse effect on labor participation, as it is actually shown in Table 9. Even though the OLS estimates (for males and females combined, only for males and only for females) are not significant, the IV estimates suggest that the SR reduces participation by as much as 24 percentage points. The effects differ substantially according to gender. Whereas female participation is reduced by as much as 34 points, male participation remains unchanged. All in all, the SR might indeed relax the need of looking for a job in order to afford getting health insurance or demanding health services as uninsured individuals.

 It is worth to point out that if a household member gets a formal job and is consequently enrolled in the CR, then all family members will also be enrolled. Thus, if, say, a woman head of household gets access to a job in the formal sector, all household members will be excluded from the SR, and would have apply again had the woman in question lost her job. Thus, access to the SR could discourage individuals from taking risky (in terms of long run stability) experiences in the formal sector. To that extent, the SR ends up working as an additional labor market rigidity for the movement of individuals from the informal to the formal sector.

We re-run all the models restricting the sample to the SISBEN 1 and 2 population, theoretically the target population of the program. For the self-reported health status, the effect is negative and small in the OLS estimation, and positive and close to 40 percentage points in the IV estimation, much larger than for the whole sample (Table 8). As it happened in the earlier case, there does not seem to be a discernible effect upon the number of days that the person ceased performing regular activities because of illness. For this estimation, the sample is quite small, 1,700 observations, which may explain the difficulty in finding significant effects.

As for the impact of the SR on the use of preventive consultations (consultations on illness), an important difference appears from the earlier exercise, which analyzes the total sample. Table 10 shows that the effect is larger in this case, especially when municipality fixed effects are included. There may be two explanations for the larger effect of the SR on the poorest population (SISBEN 1 and 2). On the one hand, access to SR would relax their budget and liquidity constraints, which are likely to be much more severe for this group than for the whole sample. On the other hand, there might be some sort of larger adverse selection in this group.

The effect of SR on consultations on illness are in this case nil, thus suggesting that for this group barriers to access are not important enough to prevent them from consulting a doctor when an illness comes up. Finally, results do not change when studying the effect of the SR on hospitalization: the effect continues to be negative and close to 10 percentage points, and the explanation remains the

same: greater prevention and higher efficiency in the use of services prevents ending up in hospitalization.

Table 12 shows the estimation of the impact of the SR on the per capita consumption in the restricted sample. Results are now negative for both OLS and IV estimates, with and without controlling for municipalities: monthly consumption is approximately COP$75,000 (US$ 30) lower. Finally, Table 13 presents the effects upon labor market participation. Results are similar to those found for the whole sample, nonetheless, they are larger in magnitude for females, which in this case would be 41 points less likely to participate in the labor market when enrolled. Again, results on consumption and labor market participation are consistent and stronger than for the whole sample. Needless to say, reformers did not contemplate this type of effect either.

In summary, the SR seems to have a positive impact on perceived health status, but not so on the number of days of temporary disability. At the same time, evidence is consistent with a rationalization in the use of medical services: more consultations and fewer hospitalizations. Finally, SR has a negative impact on consumption and labor market participation.

It is important to note that an exhaustive evaluation of the SR would have to consider the existence of general equilibrium effects. Given that the subsidized regime oriented poor individuals' demand towards private hospitals (i.e. the ARS contracts an important share of services with hospitals of a private nature), public

hospitals have greater capacity to service the non-insured, which could improve the quantity and quality of the service. This type of effects is not considered in the previous analysis.

IV. Conclusions

This article presents an evaluation of an ambitious health reform implemented in Colombia during the first half of the nineties. Among other things, the reform attempted to change the form of public intervention in health, through the transformation of subsidies to supply (direct transfers to hospitals) to a new scheme of subsidies to demand (transfers targeted to the poorest population). Likewise, the reform put into practice a complex system of financing based, in part, on shared contributions by formal workers.

At first glance, the results of the reform have been positive. The percentage of the population with a medical insurance, even though well below what the reform predicted, has grown notably, especially among the poorest. But problems persist. It has not been possible to complete the transformation of subsidies to supply from those to demand. In practice, both schemes subsist and there has been a duplication of expenditure: demand started being subsidized, but subsidizing supply has been continued. At the same time, competition has not raised the efficiency of many public hospitals, which continue to operate with very low occupancy rates, but receiving hefty transfers.

To sum up, the adoption of subsidies to demand has not achieved transforming the historic inefficiencies of a sector that has demonstrated great inertia of costs and an almost absolute inelasticity of supply.

From another angle, the analysis suggests that the targeting of subsidies to demand has not been positive either, and that municipalities seem to be incurring in practices of political patronage (or favoritisms of other types) at the time of assigning subsidies. Ultimately, the Colombian experience calls attention to the fact that granting subsidies to demand, especially when horizontal inequities exist, may result in political opportunism. If the old subsidies to supply created, in several Latin American countries, labor union strongholds dedicated to capture rents, subsidies to demand have generated networks of political patronage dedicated to select the beneficiaries with a political interest.

As a final point, subsidies to health care have a negative effect on households' consumption and on female's labor force participation. These results are mutually consistent, casting serious doubts upon the effect of the subsidized regime on overall wellbeing. All in all, the results imply that the program could have created an involuntary hurdle for individuals seeking to pass from informal to formal employment. As a whole, evidence suggests that the SR has been effective in rationalizing households' demand for health care, but not in rationalizing public supply or increasing the efficiency of service providers.

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FIGURES, MAPS AND TABLES

Figure 1. General System of Health Social Security, SGSSS

(1)

Ministry of Social Protection, MPS

National Council of Health Social Security, CNSSS

Health Superintendence

Mandatory Transit Accidents Insurance, SOAT

(2) Compensation

Weapons taxes

Social VAT

10.5% FC

EPS

8%

(4)

4% Employers

Oil Wells *Cusiana and Cupiagua*

1.0% FS

ARS

4%

GNB

FECAT

0.25%

0.2%
0.4%

CCF

CCF/ARS

0.5% FP&P

SGP

Demand

Public Health

Supply

FTS - SR

FTS – Public Health

FTS - IPS

Private IPS

Public IPS

(3)

Co-payment

Insured in RC:
Employee, pensioner, retired, independent worker with ability to pay. (and their family members)

Insured in SR:
Vulnerable poor, not able to pay for coverage. (and their family members)

Not Insured

Sisben

Local Authorities (*Entidades Territoriales*) Own Resources, Beverages, Lotteries

- - - → Private Funding

——→ Public Funding

——→ Funding by EPS, ARS

Source: Adapted from MHCP y DNP (2003), and Escobar and Panapoulou (2003)

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Figure 2. Projected versus Actual Number of Individuals Enrolled
(i) Contributive Regime

Projected ☐ Observed ☐
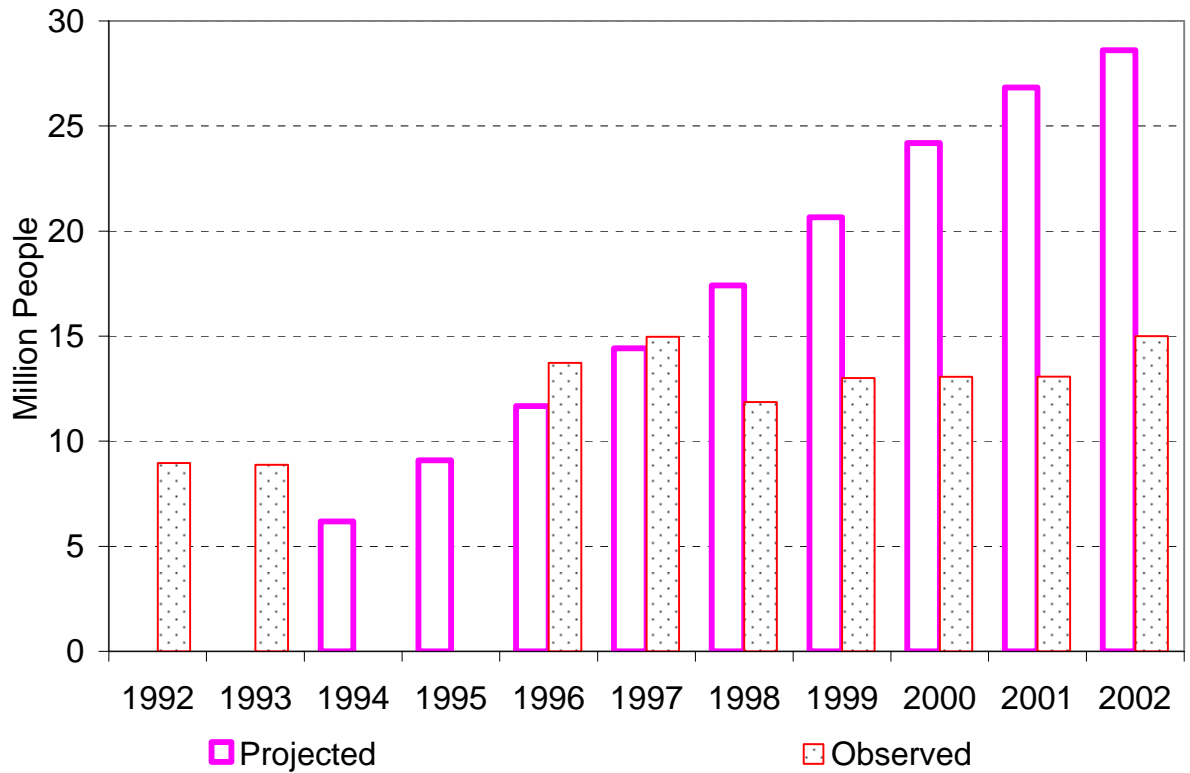
(ii) Subsidized Regime, According to Assumptions about Content of POSS

Projected with POSS Projected ☐   Projected with 50% of POS ☐
Observed with 50% of POS ☐   POSS Projected ◆
POSS of 1994 ✳

45
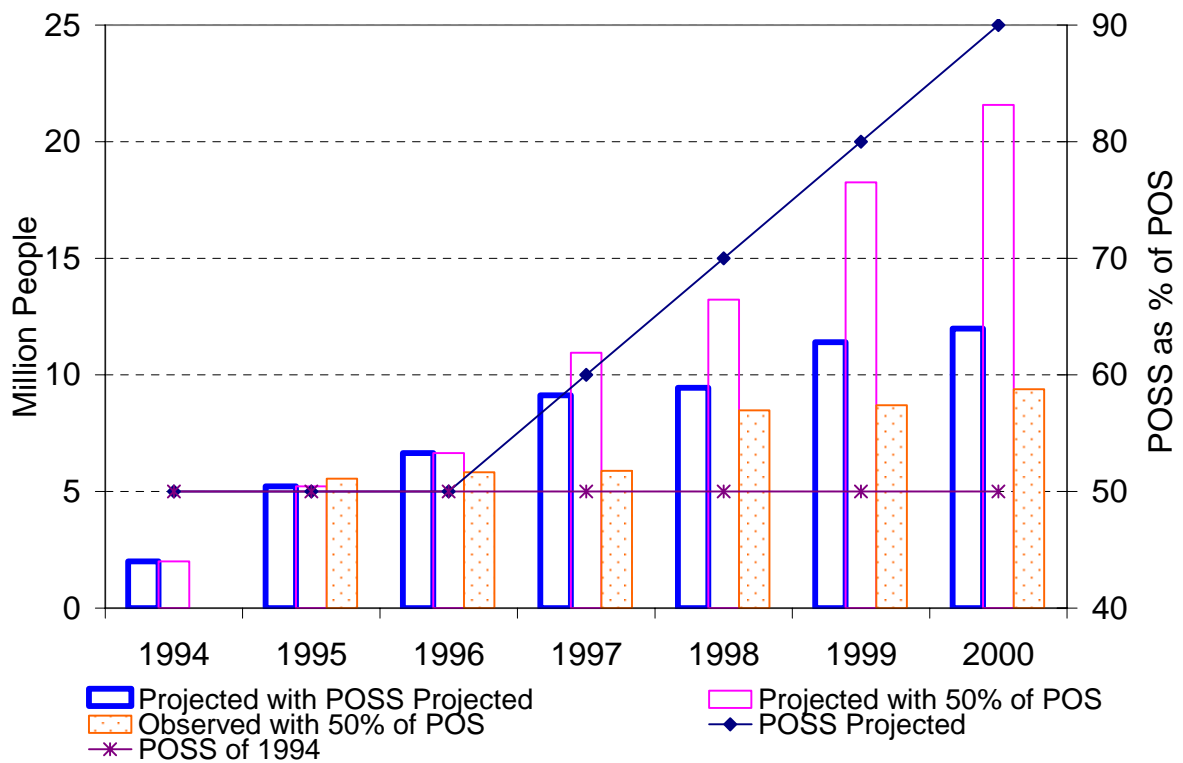
Figure 3. Composition of Public Expenditure in Health in Colombia

☐ Subsidized Regime   ■ Hospitals   ☐ Others
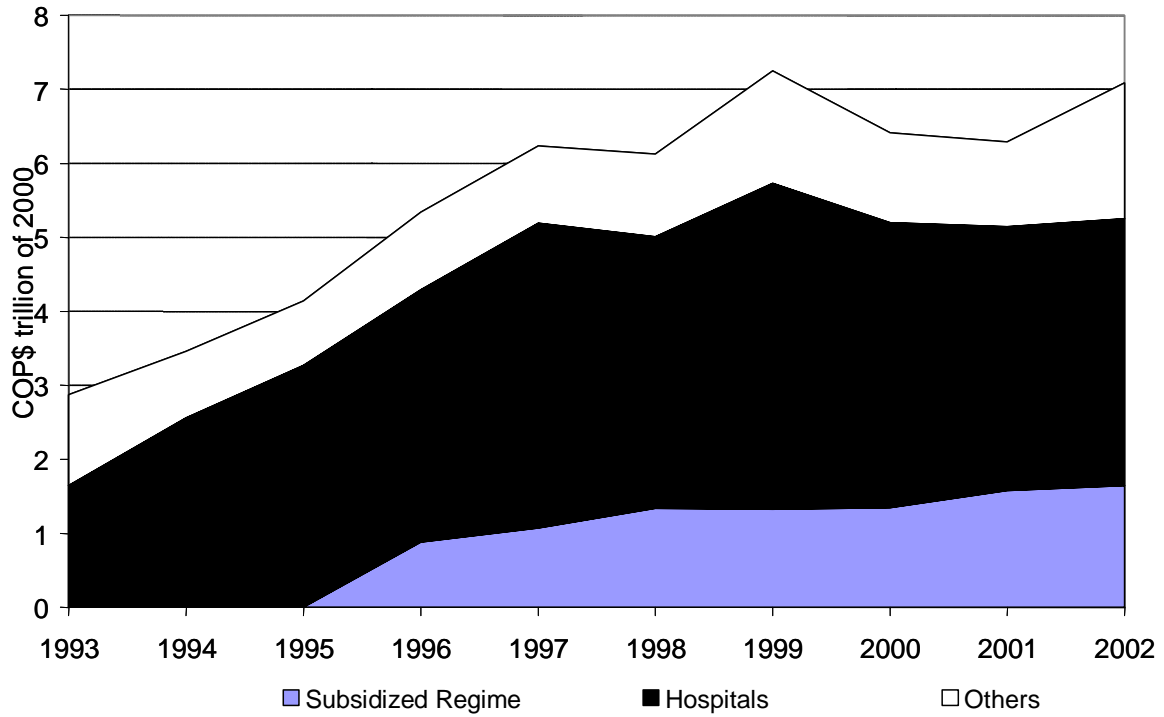
Figure 4. Impact of the Subsidized Regime: Result Variables
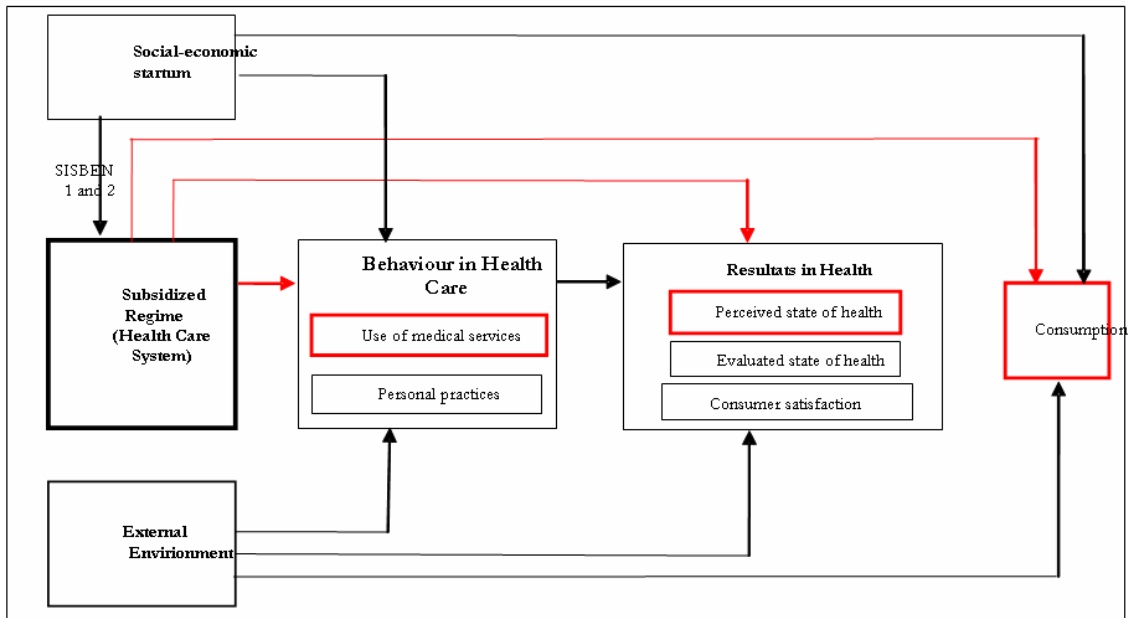
Source: Adaptation from Andersen (1995).

Figure 5. Process of beneficiaries selection into the SR

Abandoned children → **ICBF**
Indigent population → **Municipality**
Displaced population → **RSS**
Indigenous population → Law 691/2001
Ex member of armed group → Ministry of Justice
Head women working for HCB/ICBF → **ICBF**
Abandonded old population → **Municipality**
Rural migrating population → **Agricultural institutions**
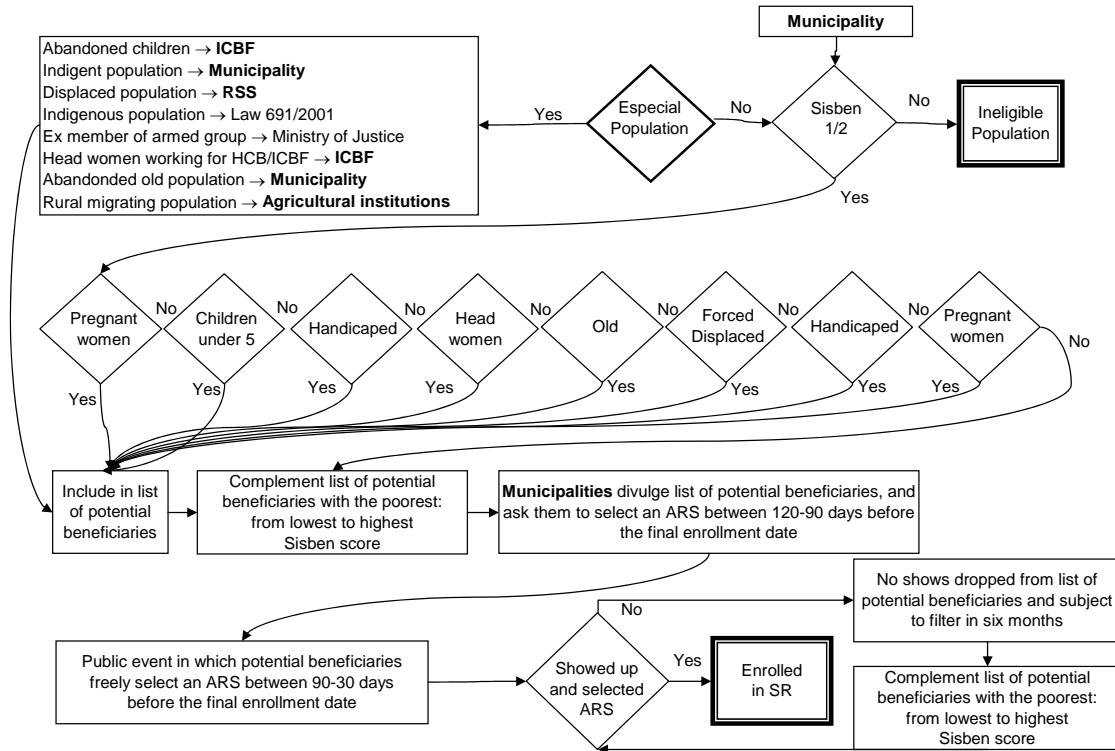
Source: Accords 77 of November/1997, and 244 of January/2003.

Map 1. Targeting of beneficiary households in Bogotá, 2003 LSMS survey
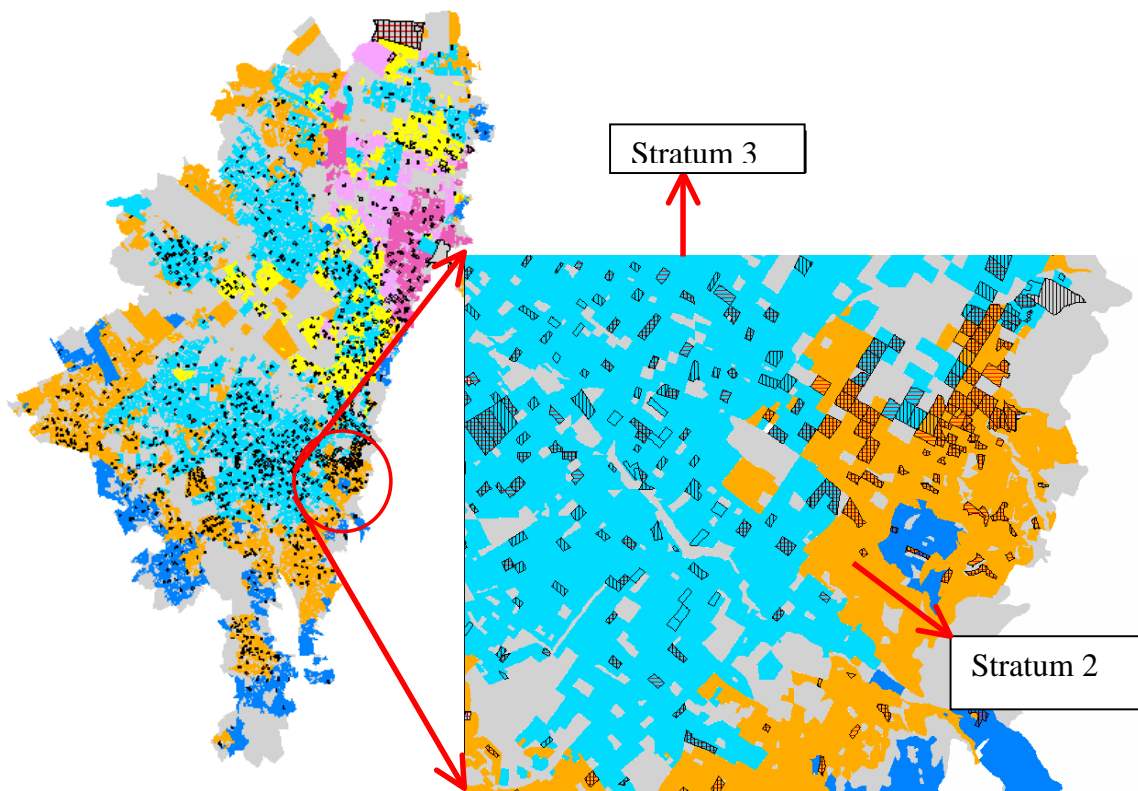
Table 1. Variables used in the analysis

Result variables (Y)	Exogenous variables (X)
State of Health	**Individuals**
Good health and days note able to perform normal activities.	Age, gender, marital status, ethnic minority and years of formal education.
Use of medical services	**Home**
Preventive consultation, consultation on illness and hospitalization during the past year.	Ascending indices for the type of housing, materials that walls are made of, floors, and quality of waste disposal system and water source. Dichotomizing variable for the aqueduct service, sewage system and garbage collection system.
Well-being	**Household**
Per capita consumption, good economic conditions in the household and whether their living standards have improved.	Age of household head, woman head of household, years of education of household head, head unemployed, proportion of children under 7 years of age, per capita income, dichotomizing variable by displacement, rural residence and region.
Labor market participation	
Person is employed or seeking for a job (active)	

Table 2. Targeting of the SR according to the SISBEN level

SISBEN level	Enrolled in the SR		Total
	No	Yes	
1	55.6%	44.4%	100%
2	53.3%	46.7%	100%
3	61.4%	38.6%	100%
4	74.2%	25.8%	100%
5	87.7%	12.3%	100%
6	96.1%	3.9%	100%

Table 3. Targeting of the SR according to income quintiles

Income Quintile	Enrolled in the SR		Total
	No	Yes	
1	56.8%	43.2%	100%
2	58.4%	41.6%	100%
3	67.5%	32.5%	100%
4	75.6%	24.4%	100%
5	85.2%	14.8%	100%

Table 4. Mean differences in result variables: enrolled and not enrolled in the SR (whole sample)

Variable	Enrolled in SR		Significant difference*	Number of Observations
	No	Yes		
Health				
Good health	70.8%	62.5%	Yes	45836
Days not able to perform regular activities	5.84	6.00	No	4661
Use of medical services				
Preventive consultation	35.9%	52.0%	Yes	45836
Consultation on illness	59.1%	77.9%	Yes	4661
Hospitalization	5.3%	6.8%	Yes	45836
Well-being				
Per capita consumption ($)	114,965	82,653	Yes	45836
Conditions in the home are good	37.5%	33.4%	Yes	45836
Living standards have improved lately	31.9%	30.7%	Yes	45836
Labor Participation	74.9%	70.2%	Yes	45836

*Significant at 99%.

Table 5. Mean differences in result variables between the enrolled and the not enrolled (SISBEN 1 and 2)

Variable	Enrolled in SR		Significant difference*	Number of Observations
	No	Yes		
Health				
Good health	65.0%	59.4%	Yes	18393
Days not able to perform regular activities	6.84	6.28	No	1799
Use of medical services				
Preventive consultation	24.5%	46.0%	Yes	18393
Consultation on illness	59.9%	76.5%	Yes	1799
Hospitalization	5.3%	6.6%	Yes	18393
Well-being				
Per capita consumption ($)	69,311	61,357	Yes	18393
Conditions in the home are good	27.4%	28.2%	Yes	18393
Living standards have improved lately	29.8%	28.0%	Yes	18393
Labor Participation	76.4%	68.6%	Yes	18393

*Significant at 99%.

Table 6. Effect of the SR on health status (whole sample)
Dependent variables: good health and number of days that the individual stopped performing regular activities

	National sample				National sample with additional controls			
	OLS		IV		OLS		IV	
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Good Health								
Beneficiary of SR	-0.0300	-0.0314	0.2491	0.1472	-0.0219	-0.0237	0.2257	0.1537
Standard error	0.0062	0.0063	0.0652	0.0694	0.0063	0.0064	0.0676	0.0689
Instrument (1 stage)			0.1276	0.1209			0.1218	0.1198
Standard error			0.0090	0.0088			0.0086	0.0085
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	45031	45031	45031	45031	44280	44280	44280	44280
R-squared	0.1760	0.2016	0.1756	0.2008	0.1975	0.2189	0.1974	0.2186
Days not able to perform regular activities								
Beneficiary of SR	-0.1399	-0.4002	0.0792	0.6482	-0.6122	-0.8345	4.6608	3.6610
Standard error	0.5146	0.5152	6.8167	6.9464	0.5271	0.5324	6.9029	6.9444
Instrument (1 stage)			0.0933	0.0971			0.0928	0.0991
Standard error			0.0266	0.0267			0.0258	0.0251
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	4602	4602	4602	4602	4543	4543	4543	4543
R-squared	0.0363	0.0745	0.0363	0.0743	0.0714	0.1018	0.0711	0.1012

Additional controls include census tracts characteristics.

Table 7. Effect of SR on the use of medical services (whole sample)
Dependent variables: Preventive consultation, consultations on illness and hospitalization.

	National sample				National sample with additional controls			
	OLS		IV		OLS		IV	
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Preventive consultation								
Beneficiary of SR	0.1918	0.1749	0.4759	0.3389	0.1732	0.1691	0.3935	0.2507
Standard error	0.0069	0.0069	0.0753	0.0786	0.0071	0.0071	0.0782	0.0781
Instrument (1 stage)			0.1276	0.1209			0.1218	0.1198
Standard error			0.0090	0.0088			0.0086	0.0085
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	45031	45031	45031	45031	44280	4428	44280	44280
R-squared	0.0770	0.1197	0.0452	0.0951	0.1153	0.1519	0.0916	0.1303
Consultations on illness								
Beneficiary of SR	0.1893	0.1762	0.5477	0.6609	0.1838	0.1739	0.6243	0.6551
Standard error	0.0194	0.0188	0.2857	0.2658	0.0196	0.0196	0.2760	0.2566
Instrument (1 stage)			0.0933	0.0971			0.0928	0.0991
Standard error			0.0266	0.0267			0.0258	0.0251
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	4602	4602	4602	4602	4543	4543	4543	4543
R-squared	0.0580	0.1373	0.0241	0.1123	0.1178	0.1808	0.0901	0.1590
Hospitalization								
Beneficiary of SR	0.0144	0.0173	-0.1137	-0.1004	0.0120	0.0157	-0.1090	-0.1068
Standard error	0.0032	0.0034	0.0360	0.0392	0.0034	0.0035	0.0388	0.0407
Instrument (1 stage)			0.1276	0.1209			0.1218	0.1198
Standard error			0.0090	0.0088			0.0086	0.0085
Control by regions	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	45031	45031	45031	45031	44280	44280	44280	44280
R-squared	0.0167	0.0258	0.0163	0.0250	0.0272	0.0351	0.0270	0.0345

Additional controls include census tracts characteristics.

Table 8. Effect of SR on well-being indicators (whole sample)

Dependent variables: consumption per capita, conditions in the home are good and living standards improved lately

	National sample				National sample with additional controls			
	OLS		IV		OLS		IV	
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Consumption per capita								
Beneficiary of SR	-8732	-9631	-40272	-43506	-6097	-6525	-12028	-16545
Standard error	1252	1360	27817	26519	2443	2628	27820	23401
Instrument (1 stage)			0.1276	0.1209			0.1218	0.1198
Standard error			0.0090	0.0088			0.0086	0.0085
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	45031	45031	45031	45031	44280	44280	44280	44280
R-squared	0.3843	0.3965	0.3835	0.3956	0.4219	0.4340	0.4215	0.4336
Conditions in the home are good								
Beneficiary of SR	-0.0089	-0.0167	-0.0090	0.0959	-0.0127	-0.0164	-0.0121	-0.0181
Standard error	0.0068	0.0068	0.0732	0.0769	0.0067	0.0067	0.0740	0.0749
Instrument (1 stage)			0.1276	0.1209			0.1218	0.1198
Standard error			0.0090	0.0088			0.0086	0.0085
Control by regions	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	45031	45031	45031	45031	44280	44280	44280	44280
R-squared	0.0532	0.0932	0.0531	0.0930	0.1077	0.1381	0.1076	0.1378
Living standards improved lately								
Beneficiary of SR	0.0043	0.0112	-0.3595	-0.3309	-0.0012	0.0060	-0.3534	-0.3573
Standard error	0.0065	0.0064	0.0719	0.0758	0.0067	0.0066	0.0762	0.0763
Instrument (1 stage)			0.1276	0.1209			0.1218	0.1198
Standard error			0.0090	0.0088			0.0086	0.0085
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	45031	45031	45031	45031	44280	44280	44280	44280
R-squared	0.0241	0.0593	0.0252	0.0600	0.0495	0.0845	0.0504	0.0854

Additional controls include census tracts characteristics.

Table 9. Effect of SR on employment indicators (whole sample)
Dependent variables: labor force participation

	National sample				National sample with additional controls			
	OLS		IV		OLS		IV	
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Labor Participation								
Beneficiary of SR	-0.0262	-0.0292	-0.2780	-0.2342	-0.0384	-0.0394	-0.2510	-0.2419
Standard error	0.0071	0.0071	0.0752	0.0789	0.0071	0.0072	0.0752	0.0771
Instrument (1 stage)			0.1271	0.1205			0.1251	0.1214
Standard error			0.0106	0.0105			0.0101	0.0100
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	32866	32866	32866	32866	32318	32318	32318	32318
R-squared	0.2557	0.2683	0.2557	0.2680	0.2984	0.3074	0.2976	0.3065
Male labor participation								
Beneficiary of SR	-0.0406	-0.0417	-0.1088	-0.0313	-0.0457	-0.0473	-0.1374	-0.0992
Standard error	0.0082	0.0082	0.0851	0.0851	0.0083	0.0082	0.0844	0.0818
Instrument (1 stage)			0.1225	0.1226			0.1190	0.1225
Standard error			0.0152	0.0154			0.0147	0.0147
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	15738	15738	15738	15738	15456	15456	15456	15456
R-squared	0.3096	0.3264	0.3076	0.3243	0.3738	0.3854	0.3715	0.3830
Female labor participation								
Beneficiary of SR	-0.0079	-0.0109	-0.4036	-0.3861	-0.0254	-0.0261	-0.3338	-0.3393
Standard error	0.0108	0.0109	0.1138	0.1226	0.0107	0.0108	0.1111	0.1167
Instrument (1 stage)			0.1326	0.1219			0.1317	0.1244
Standard error			0.0148	0.0144			0.0140	0.0137
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	17128	17128	17128	17128	16862	16862	16862	16862
R-squared	0.1647	0.1893	0.1660	0.1902	0.2143	0.2330	0.2147	0.2332

Additional controls include census tracts characteristics.

Table 10. Effect of SR on the health state (SISBEN 1 and 2)
Dependent variables: good health and days that individual was not able to perform regular activities.

	National sample				National sample with additional controls			
	OLS		IV		OLS		IV	
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Good Health								
Beneficiary of SR	-0.0209	-0.0321	0.2860	0.2724	-0.0129	-0.0243	0.4041	0.4027
Standard error	0.0092	0.0092	0.0732	0.0788	0.0099	0.0099	0.1031	0.0953
Instrument (1 stage)			0.1808	0.1672			0.1278	0.1388
Standard error			0.0141	0.0139			0.0128	0.0128
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	17610	17610	17610	17610	17381	17381	17381	17381
R-squared	0.1564	0.1907	0.1573	0.1907	0.1870	0.2147	0.1880	0.2155
Days that individual was not able to perform regular activities								
Beneficiary of SR	-0.3176	-0.8219	-2.9164	-1.6822	-0.8851	-1.2957	-9.5929	-8.8110
Standard error	0.6874	0.6905	5.9652	7.0520	0.6884	0.6934	8.5763	9.9700
Instrument (1 stage)			0.1515	0.1360			0.1149	0.1124
Standard error			0.0410	0.0405			0.0379	0.0380
Control by regions	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	1713	1713	1713	1713	1700	1700	1700	1700
R-squared	0.0395	0.0912	0.0395	0.0903	0.1030	0.1391	0.1030	0.1380

Additional controls include census tracts characteristics.

Table 11. Effect on SR on the use of medical services (SISBEN 1 and 2)
Dependent variables: Preventive consultation, consultations on illness and hospitalization.

	National sample				National sample with additional controls			
	OLS		IV		OLS		IV	
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Preventive consultation								
Beneficiary of SR	0.2259	0.2101	0.4114	0.4093	0.1935	0.1876	0.3865	0.3870
Standard error	0.0095	0.0095	0.0755	0.0814	0.0103	0.0101	0.1067	0.0980
Instrument (1 stage)			0.1808	0.1672			0.1278	0.1388
Standard error			0.0141	0.0139			0.0128	0.0128
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	17610	17610	17610	17610	17381	17381	17381	17381
R-squared	0.0857	0.1424	0.0351	0.1028	0.1418	0.1888	0.1121	0.1627
Consultations on illness								
Beneficiary of SR	0.1671	0.1717	0.2734	0.4328	0.1576	0.1390	0.2794	0.3675
Standard error	0.0291	0.0280	0.2625	0.2996	0.0305	0.0298	0.3381	0.3582
Instrument (1 stage)			0.1515	0.1360			0.1149	0.1124
Standard error			0.0410	0.0405			0.0379	0.0380
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	1713	1713	1713	1713	1700	1700	1700	1700
R-squared	0.0633	0.1738	0.0368	0.1504	0.1593	0.2614	0.1412	0.2489
Hospitalization								
Beneficiary of SR	0.0134	0.0164	-0.1017	-0.0793	0.0092	0.0122	-0.1050	-0.0995
Standard error	0.0047	0.0049	0.0391	0.0436	0.0050	0.0051	0.0561	0.0529
Instrument (1 stage)			0.1808	0.1672			0.1278	0.1388
Standard error			0.0141	0.0139			0.0128	0.0128
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	17610	17610	17610	17610	17381	17381	17381	17381
R-squared	0.0251	0.0393	0.0251	0.0386	0.0438	0.0571	0.0439	0.0570

Additional controls include census tracts characteristics.

Table 12. Effect of SR on well-being indicators (SISBEN 1 and 2)
Dependent variables: consumption per capita, conditions in the home are good and living standards improved lately

	National sample				National sample with additional controls			
	OLS		IV		OLS		IV	
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Consumption per capita								
Beneficiary of SR	-6435	-4768	73876	-65328	-6493	-5642	-74326	-74522
Standard error	1243	1158	11222	12134	1334	1275	15184	14281
Instrument (1 stage)			0.1808	0.1672			0.1278	0.1388
Standard error			0.0141	0.0139			0.0128	0.0128
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	17610	17610	17610	17610	17381	17381	17381	17381
R-squared	0.1783	0.2750	0.1809	0.2768	0.2385	0.3172	0.2389	0.3183
Conditions in the home are good								
Beneficiary of SR	0.0159	0.0286	0.2138	0.3988	0.0196	0.0231	0.3556	0.3743
Standard error	0.0091	0.0091	0.0710	0.0770	0.0098	0.0096	0.1017	0.0938
Instrument (1 stage)			0.1808	0.1672			0.1278	0.1388
Standard error			0.0141	0.0139			0.0128	0.0128
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	17610	17610	17610	17610	17381	17381	17381	17381
R-squared	0.0245	0.0947	0.0250	0.0961	0.0711	0.1408	0.0718	0.1417
Living standards improved lately								
Beneficiary of SR	-0.0046	0.0231	-0.3800	-0.3652	0.0109	0.0198	-0.5023	-0.4693
Standard error	0.0093	0.0088	0.0762	0.0815	0.0098	0.0093	0.1072	0.0964
Instrument (1 stage)			0.1808	0.1672			0.1278	0.1388
Standard error			0.0141	0.0139			0.0128	0.0128
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	17610	17610	17610	17610	17381	17381	17381	17381
R-squared	0.0205	0.1002	0.0230	0.1015	0.0713	0.1419	0.0733	0.1435

Additional controls include census tracts characteristics.

Table 13. Effect of SR on employment indicators (SISBEN 1 y 2)
Dependent variables: labor participation

	National sample				National sample with additional controls			
	OLS		IV		OLS		IV	
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Labor Participation								
Beneficiary of SR	-0.0382	-0.0357	-0.1661	-0.0774	-0.0685	-0.0679	-0.3033	-0.2572
Standard error	0.0105	0.0104	0.0904	0.0952	0.0114	0.0113	0.1185	0.1093
Instrument (1 stage)			0.1694	0.1619			0.1279	0.1389
Standard error			0.0175	0.0174			0.0157	0.0158
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	11607	11607	11607	11607	11468	11468	11468	11468
R-squared	0.2984	0.3181	0.2973	0.3170	0.3400	0.3534	0.3371	0.3506
Male labor participation								
Beneficiary of SR	-0.0406	-0.0417	-0.1088	-0.0313	-0.0567	-0.0516	-0.0796	-0.0155
Standard error	0.0082	0.0082	0.0851	0.0851	0.0140	0.0137	0.1434	0.1272
Instrument (1 stage)			0.1225	0.1226			0.1167	0.1288
Standard error			0.0152	0.0154			0.0225	0.0224
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	15738	15738	15738	15738	5521	5521	5521	5521
R-squared	0.3096	0.3264	0.3076	0.3243	0.3937	0.4139	0.3904	0.4113
Female labor participation								
Beneficiary of SR	-0.0079	-0.0109	-0.4036	-0.3861	-0.0675	-0.0731	-0.4382	-0.4146
Standard error	0.0108	0.0109	0.1138	0.1226	0.0164	0.0165	0.1584	0.1527
Instrument (1 stage)			0.1326	0.1219			0.1434	0.1518
Standard error			0.0148	0.0144			0.0219	0.0222
Municipalities fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	17128	17128	17128	17128	5947	5947	5947	5947
R-squared	0.1647	0.1893	0.1660	0.1902	0.2325	0.2603	0.2307	0.2580

Additional controls include census tracts characteristics.