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Assessing Health Reform in Colombia: From Theory to Practice

Colombia implemented an ambitious health reform in 1993. Its key component was a radical transformation in the financing of health care provision, particularly for lower income individuals. Historically funding had flowed through supply-side subsidies in the form of direct transfers to public hospitals. The reform attempted to redirect resources to demand-side subsidies (that is, transfers targeted to poor citizens) through a system of health care vouchers. The basic assumption of the reform was that after a transition period, public service providers would cover their costs through the sale of services (partially in exchange for these vouchers), and competition would force them to become more efficient.

This paper describes the institutional aspects of the reform and discusses the difficulties that transferring funding from supply- to demand-side channels entailed. While the reform substantially increased health insurance coverage, progress was slower than forecast and entailed a substantial increase in expenditure. A central reason for the latter was that the introduction of voucher financing was not accompanied by an equivalent reduction in supply-side funding; the net result was nearly a doubling of expenditure. Additionally, competition has not resulted in the exit of seemingly inefficient public providers.

The second part of the paper evaluates the impact of the subsidized regime that the reform introduced to benefit the low-income population. We explore

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the subsidized regime's effect on four areas: health outcomes measured through self-reports on health status and on the number of days that individuals were unable to perform regular activities; the use of medical services (specifically, preventive consultations, illness-related consultations, and hospitalizations); household consumption of nonhealth goods; and labor force participation. Assessing these impacts is difficult because of the endogeneity of enrollment in the subsidized regime, an issue we address using an instrumental variables strategy. Enrollment in the subsidized regime is administered by municipalities, and it seems to depend on social and political connections. We therefore use measures of the length of time the household head has resided in his or her current municipality as an instrument for enrollment.

Our results suggest that the subsidized regime has a positive effect on self-reported health and on the use of both preventive and illness-related consultations. Enrollment also seems to lessen the frequency of hospitalizations. Finally, it appears to have an adverse effect on consumption and labor market participation.

The remainder of this paper is organized as follows. The next section describes the reform and analyzes its implementation problems. The paper subsequently presents our evaluation exercise, summarizing relevant literature, outlining our empirical strategy, and presenting results. The final section concludes.

Colombia's Health Reform: Background, Assumptions, and Results

This section presents a description of the main institutional innovations introduced by the reform, the assumptions behind these changes, and their results. The discussion emphasizes the differences between the expected and the actual results of the reform.

Institutional Aspects

Prior to the reform, the Colombian health care system consisted of three independent subsystems: public, private, and social security. The public system served individuals from the low and medium-low economic strata, who were not protected by any kind of medical insurance (about 70 percent of the population in 1985). The private sector catered to the high-income population (about 15 percent of the total) through direct charges or private insurance.

The social security system included two types of institutions with different target populations: the Social Security Institute (*Instituto de Seguridad Social*) covered formal private sector workers and was financed by employer and employee contributions, while the social security funds (*cajas de previsión social*) covered public sector workers and were financed directly by the state.

This system was perceived to have three types of problems: widespread inefficiencies, particularly in the public sector; low levels of coverage; and inequities in the access to services and low levels of cross-subsidization from higher to lower income individuals (termed solidarity). These problems were probably shared by the majority of Latin American health care systems, most of which have historically covered primarily higher income populations. Giedion and others show that nearly 45 percent of Colombia's urban population lacked medical insurance in the early 1990s.[1] Likewise, a large share of hospitalizations and surgeries performed by the public system benefited people in the top income quintile. The World Bank reports that prior to the reform, Colombians with a relatively high income were using public providers for costly and complicated medical procedures (though not for preventive care).[2]

The 1993 reform garnered the support of multilateral organizations, which contributed resources and knowledge toward its design.[3] The key principles of the reform were the following: equity in access to health services; mandatory health insurance; integral protection, which involved the design of a basket of health services that would be covered by the mandatory health plan (called the *plan obligatorio de salud,* or POS) and a subsidized basket (called the *plan obligatorio de salud subsidiado,* or POSS) that initially covered 50 percent of the mandatory plan; and free choice of insurers and health providers. Through these principles, the reform sought to achieve three objectives: increase insurance coverage to 36 million people by 2000 (of which 24 million were to come from the lowest income segments of the population); establish cross-subsidies between wealthy and poor contributors; and improve public hospitals' efficiency by exposing them to competition through voucher-type funding and by directly restructuring public hospitals.[4]

All individuals, regardless of their economic means, were to have access to a preestablished package of basic health services. The new system was

1. Giedion, López, and Marulanda (1993).
2. Escobar and Panopoulou (2003).
3. The Inter-American Development Bank participated in the reform process, as evident from technical documents (available online at www.dnp.gov.co/Archivos/Documentos/Subdireccion_Conpes/Social001.pdf). The World Bank also sponsored the reform.
4. Ministry of Health (1994).

divided into two regimes: the contributive regime, which guaranteed its affiliates the mandatory health plan and was directed toward upper- and middle-class individuals, and the subsidized regime, which guaranteed its affiliates the subsidized health plan and was intended for the poor.[5] In the transition to universal coverage, there would also be an uninsured population not covered by the subsidized regime.

THE CONTRIBUTIVE REGIME. Individuals affiliated with the contributive regime contribute 12 percent of their earned income. The employer is responsible for two-thirds of the contribution, and the employee pays for the rest. The contribution is collected by the insurance company (*entidad promotora de salud,* or EPS), which the contributor freely chooses. The EPS discounts from each contribution the value of the premium stipulated by regulation (termed the *unidad de pago por capitación,* or UPC) and transfers the difference to a public fund known as a solidarity and guarantee fund (*fondo de solidaridad y garantía,* or Fosyga). When this difference is negative, the Fosyga compensates the EPS with the corresponding value. One percentage point of the contribution (called the solidarity point in the Colombian legal jargon) is transferred to regional entities to fund the subsidized regime.

THE SUBSIDIZED REGIME. Enrollment in the subsidized regime is means tested using the SISBEN (beneficiaries selection system) scheme, in which individuals receive one of six SISBEN scores, with one corresponding to the lowest socioeconomic level. Only households belonging to levels one and two are eligible for the subsidized regime. The subsidized regime has insurance carriers (called *administradoras del régimen subsidiado,* or ARS) equivalent to the EPS of the contributive regime. Enrolled members can freely select their insuring company, which receives a premium per enrolled member (the subsidized UPC), corresponding to the estimated value of services in the package stipulated for the subsidized regime. Each individual ARS establishes agreements with public or private hospitals and health professionals, which provide services to beneficiaries up to the basket covered by the subsidized health plan (POSS). If a service is not covered by the POSS, then beneficiaries have to pay 5 percent of its cost if they are classified as SISBEN 1 and 10 percent if classified as SISBEN 2.

Funding for the subsidized regime comes from different sources. The first, as mentioned above, are the solidarity contributions from contributive regime

5. The resources required to cover the health services included in the subsidized plan are mainly oriented toward funding the less complex health services included in the mandatory plan. The subsidized plan covers 56 percent of the costs of the mandatory plan.

members. The second are regional entities (municipalities and provinces), and the third are transfers from the central government to these regional entities. In 2004, 64 percent of the cost of subsidized services was financed by the national government, 24 percent by contributive regime contributions, and the remaining 12 percent by regional sources and payments made by enrolled members.[6]

UNINSURED POPULATION. Under the reform, the eligible but uncovered population is entitled to services provided by public hospitals (or private ones, by means of contracts with regional entities). These services are still funded through supply-side subsidies, which are largely paid by the central government.[7] The new system is thus characterized not only by the existence of two different insurance systems tailored to beneficiaries with different payment capacities, but also by overlapping subsidies channeled through demand (for those enrolled in the subsidized regime) and supply (for low-income citizens without coverage).

Furthermore, the system's administrators (municipalities) seem to have considerable discretion in selecting the beneficiaries of the subsidized regime. Given that they have full autonomy in administrating the targeting instrument (SISBEN) and that the eligible population amply surpasses the number of beneficiaries, there is a wide margin for arbitrary selection and political patronage. For example, a Pacific Coast municipality selected its beneficiaries 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."[8]

If belonging to a political patronage network or having political connections has a bearing on the probability of enrollment, then having deep-rooted attachments to a municipality (understood, for instance, as the number of years of residence there) should increase this probability. Below we use this possibility to formulate an empirical strategy for assessing the impact of the subsidized regime.

Assumptions of the Reform

The reform's stated goal was to achieve universal coverage within ten years. The belief that this was feasible was based on projections regarding growth

6. Bitrán, Giedion, and Muñoz (2004).

7. Public hospitals are legally owned by municipalities and provinces, but the central government contributes resources and has been involved in bailouts.

8. Ruiz and others (1999).

in the coverage of the contributive regime, which was expected to cover 70 percent of the higher income tier of the population. Within this target population, the coverage rate was expected to increase from 40 percent in 1994 to 90 percent in 2000 for wage earners and from 9 to 85 percent for independent workers. These projections, however, were based on incorrect assumptions regarding economic and job growth, and thus they were not met.[9]

The other area in which projections proved overly optimistic was the phasing out of supply-side funding. According to provisions established by law, after a transition period the subsidized regime would cover the totality of the eligible population (SISBEN 1 and 2), public hospitals would be financed through service sales, and supply-side subsidies would therefore be substantially reduced. Competition would also help improve public hospitals' efficiency, and those unable to compete would close. Multilateral institutions shored up these assumptions. According to the World Bank, for example, "in as much as the number of members enrolled in the EPS and ARS organizations continued to grow, the need for subsidies to supply 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."[10]

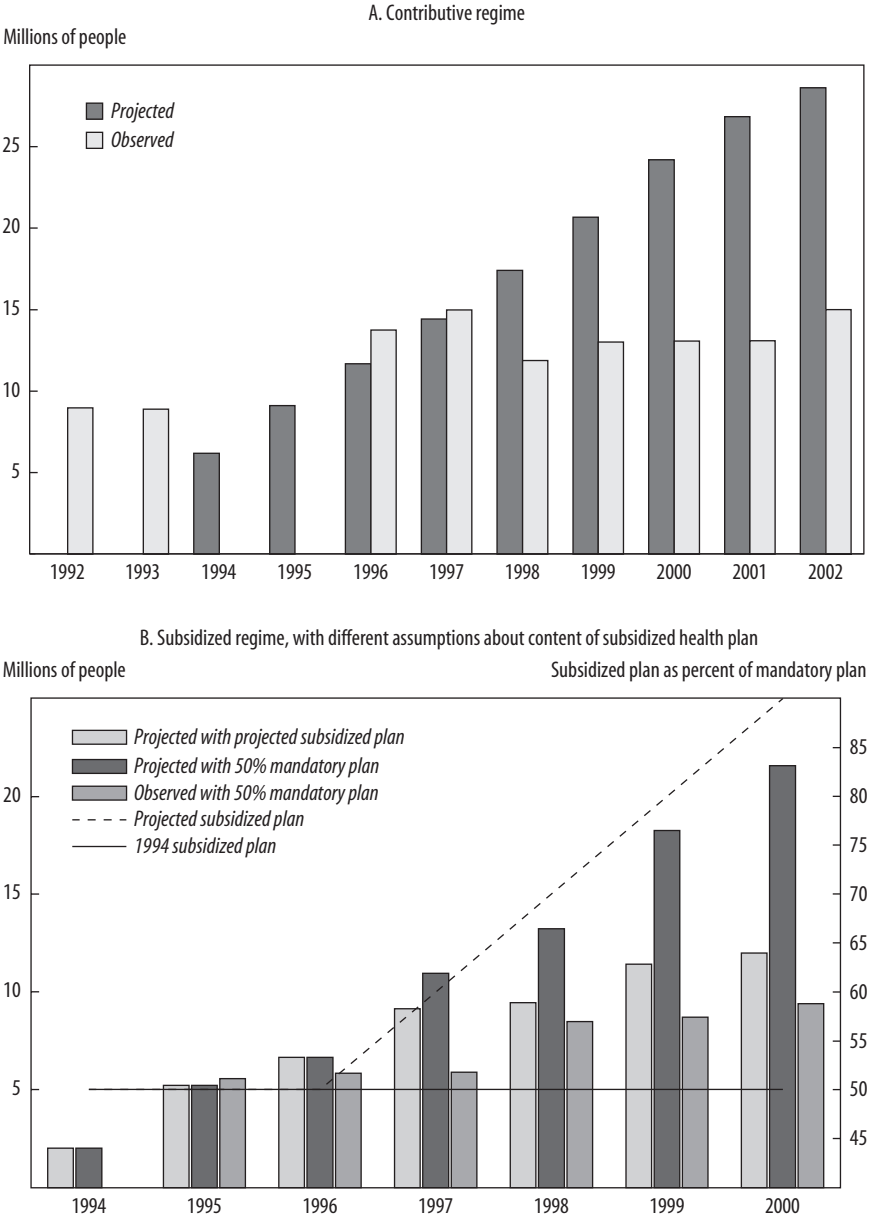
To summarize, the case for financial feasibility rested on two pillars: the possibility of reaching universal coverage rather quickly and the feasibility of rapidly redirecting subsidies from supply to demand. In practice, however, the increase in contributive and subsidized regime coverage was smaller than expected, and it was accompanied by an increase, rather than a reduction, in the number of public providers.

Results of the Reform

Figure 1 shows that both contributive and subsidized regime coverage growth were weaker than expected. On the whole, coverage increased from 28 percent in 1992 to 42 percent (instead of 100 percent) in 2000. For the contributive regime, the number of individuals actually covered was only 54 percent of that expected. The resources from the shared-contribution system were thus lower than forecast, which negatively affected the financing of the subsidized regime and its expansion among the poorest population. Other sources of funding displayed even larger gaps. Regional sources were expected to fund 30 percent of the subsidized regime, but they ultimately reached only

9. Ministry of Health (1994).
10. World Bank (2004).

FIGURE 1. Projected versus Actual Number of Individuals Enrolled



Source: Ministry of Health (1994) and National Planning Department (2003).

10 percent of their expected level (that is, 3 percent); national transfers, in turn, were expected to fund 40 percent, but they only reached 50 percent of their projected level (that is, 20 percent). In part as a result of these shortfalls, the number of individuals actually covered by the subsidized regime was only 40 percent of that expected.

Many observers anticipated that the coverage projections were overly optimistic. The difficulty in redirecting resources from supply- to demand-side subsidies, however, seems to have come as a surprise. The transfer was hindered by a vicious circle of sorts: supply-side subsidies had to be maintained to assist the uninsured population, which diminished the resources available for demand-side subsidies, which in turn hindered the enrollment of new members and slowed any associated reduction in supply-side expenditure.

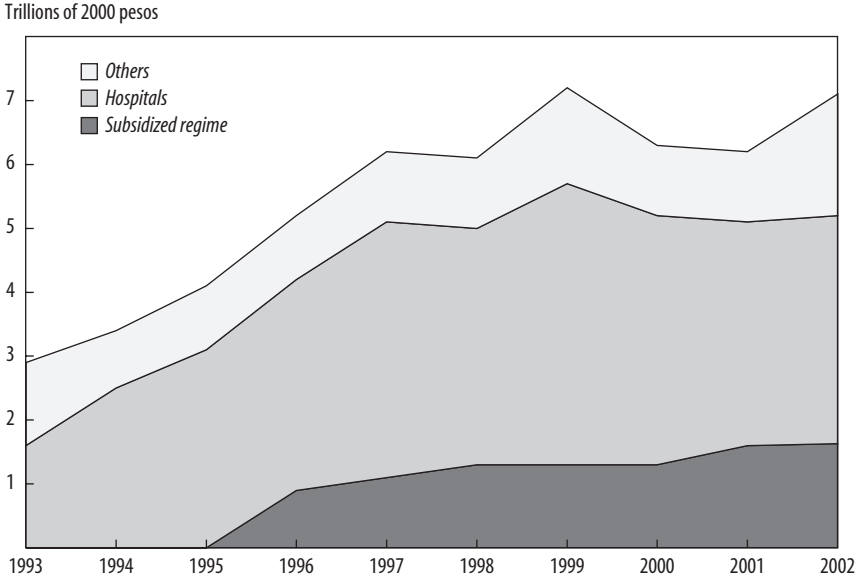
The decline in supply-side financing generated financial problems for many public hospitals, which were unable to attract sufficient resources through the sale of services. The hospitals responded by exerting political pressure for more direct transfers, and this pressure became a major bottleneck in accelerating the transition to demand-side financing. Gaviria argues that public supply was fundamentally inelastic: public hospitals registered budget increases overall, while just a few were shut down.[11] In fact, the introduction of the subsidized regime was accompanied by net growth in the number of public hospitals and lower levels of occupation. The evidence indicates that more than ten years after the reform, little progress has been achieved in rationalizing public supply and making it more efficient.

In short, while the amount of resources devoted to demand-side subsidies increased, supply-side subsidies did not decline proportionately.[12] Figure 2 shows the budgetary consequences. Growth in the health care sector's total budget increased substantially: the budget of public hospitals (initially meant to fund the subsidized regime) rose, and a new expenditure item appeared in the form of the subsidized regime, a good part of which comes from national transfers and does not return to public hospitals through the sale of

11. Gaviria (2004). The Colombian Ministry of Social Protection regularly publishes the balance sheets of a sample of 475 public hospitals, representing 88 percent of the total income of all Colombian public hospitals in 2001. Of these hospitals, 61 percent had an operational deficit in both 1998 and 2001, and 50 percent had a deficit every single year from 1998 to 2001. The aggregated annual deficit of the hospitals included in the sample varied between 16 and 23 percent of total income. None of these hospitals were shut down; several of them were subject to costly bailouts funded by national and local governments. Since the health reform was passed, every hospital that was shut down was later reopened, with only one exception.

12. See Jack (2000).

FIGURE 2. Composition of Public Expenditure in Health in Colombia



services. The larger budget devoted to public hospitals did not reflect either the opening of new hospitals in underserved areas or a redistribution favoring efficient hospitals; on the contrary, established public hospitals registered an expenditure boom, partly as a result of a substantial increase in the wage bill between 1995 and 1998.[13]

Some Lessons from Colombia's Health Care Reform

The reform thus generated, at least partially, three unanticipated outcomes: a net increase in health expenditure; the maintenance of loss-making public hospitals; and the persistence of horizontal inequality inherent in the failure to achieve universal coverage under the subsidized regime. These results serve as a cautionary tale on how political and other restrictions can affect attempts to shift financing toward demand-side subsidies, a situation that has been observed in other settings. For instance, the number of public schools in Chile remained essentially unchanged despite substantial private sector

13. Escobar and Panopoulou (2003).

growth in response to the introduction of school vouchers.[14] If public supply is inelastic, the alternative might be to reform political institutions that impede its streamlining. One might also just learn to live with the public supply, but direct policies must still be designed to increase the efficiency of existing suppliers. Competition alone is unlikely to resolve the problems.

The Impact of the Subsidized Regime

Given the complexity of the Colombian health care reform, a thorough evaluation of its impact is well beyond the scope of this paper. We therefore focus on assessing the impact of the subsidized regime, which, despite the problems mentioned above, remains one of the most important health interventions in Latin America—not only because of its cost (about $1 billion dollars, or 1 percent of GDP, by 2005), but also because of its coverage (over fifteen million people by 2005). In particular, we ask whether individuals insured under the subsidized regime are better off than the uninsured. This section reviews the literature, explains our empirical strategy, and presents the results. The results show that the subsidized regime has a positive effect on both self-reported health and the use of preventive consultations. Enrollment also seems to lessen the frequency of hospitalizations. Finally, it appears to have an adverse effect on labor market participation.

Literature Overview and Conceptual Framework

The reform did not incorporate an explicit evaluation design, so estimates of the subsidized regime's impact typically rely on strong assumptions.[15] The majority of studies on the subsidized regime are descriptive and concentrate on characterizing its institutional aspects, measuring the incidence and

14. Hsieh and Urquiola (2003).

15. The international literature on the impact of health insurance is extensive. Levy and Meltzer (2004) divide this literature into three categories: observational studies, quasi-experimental studies, and randomized (or social) experiments. This paper belongs to the second category, which includes Currie and Gruber (1996, 1997) and Card and Shore-Sheppard (2004). These works analyze the impact of Medicaid between 1979 and 1992. Currie and Gruber find that increases in health insurance improve health indicators for children (such as mortality at birth, infant mortality, birth weight, preventive medical visits during the last month of pregnancy, and hospitalization during the past year). Card and Shore-Sheppard are less optimistic, pointing to a more modest impact of Medicaid expansions. In general, the impact of insurance on health outcomes remains an open question in the literature.

targeting, and evaluating the differences between private and public insurance providers (ARS).[16]

Ayala and Henao argue that despite the advances in coverage, the system displays poor resource allocation and low efficiency: it does not reach the poorest population, as well as a large group of independent workers (who are not poor enough to be eligible for the subsidized regime but do not earn enough to participate in the contributive regime).[17] Several authors similarly report that a large number of low-income individuals continue to live without formal insurance.[18] These studies confirm that the system displays somewhat large inclusion errors—that is, nonpoor households receiving the subsidy. Bitrán, Giedion, and Muñoz also show that households enrolled in the subsidized regime spend more on health care (as a proportion of total household spending) than those enrolled in the contributive regime, and they are more vulnerable to falling into poverty because of adverse health-related shocks.[19]

Panopoulus and Vélez identify the factors that determine enrollment and study enrollment's effect on the use of medical services and health spending.[20] They conclude that enrollment depends both on individual demand and municipal supply factors.[21] These vary in importance depending on whether individuals reside in rural or urban areas. Moreover, beneficiaries of the subsidized regime are more likely to consult a doctor and less likely to be hospitalized than people who are not enrolled, and they have lower medical expenses. Trujillo, Portillo, and Vernon show that enrollment in the subsidized regime increases the use of services (namely, preventive attention, ambulatory consultations, and hospitalizations).[22]

Both Trujillo, Portillo, and Vernon and Panopoulus and Vélez use the World Bank's 1997 Living Standards Measurement Study (LSMS) for Colombia, and they address the endogeneity of enrollment using geographical variation of key characteristics, under the assumption that these are independent of the health outcomes analyzed. Panopoulus and Vélez also use as instruments the

16. For example, O'Meara, Amaya, and Ruiz (2003); Vélez and Foster (2000); Londoño, Jaramillo, and Uribe (2001).

17. Ayala and Henao (2001).

18. Bitrán, Giedion, and Muñoz (2004); Escobar and Panopoulous (2003); BDO International and CCRP (2000); National Planning Department and Ministry of Health (2000, 2001, 2003a, 2003b).

19. Bitrán, Giedion, and Muñoz (2004).

20. Panopoulus and Vélez (2001).

21. The medical expenditures considered were hospitalization, medical visits, and medications.

22. Trujillo, Portillo, and Vernon (2004).

popularity of the mayor of the municipality of residence and the hospitalization rate of the province.[23] Trujillo, Portillo, and Vernon use as instruments a set of dummy variables indicating whether the municipality has a health center and whether it is covered by a major national agency (*Red de Solidaridad Social*), as well as an index of living standards and voter turnout in municipal elections.[24] As we discuss below, however, spatial variables are likely to be related to health outcomes. Furthermore, the propensity score matching (PSM) estimates used by both papers are problematic. In Trujillo, Portillo, and Vernon, for example, the propensity scores include variables that could be outcomes (such as health status and health expenditures).[25]

This paper addresses two main aspects of the reform. First, we consider the subsidized regime's effect on the use of medical services. Hypothetically, the lower cost faced by enrolled individuals should increase the use of services, since income is usually the most important determinant of demand for medical services, especially for the poorest segment of the population.[26] Second, we look at the reform's impact on consumption and labor market participation. The subsidized regime should positively affect consumption, not only because it reduces the price of medical services, but also because it lessens the financial impact of medical events. Indeed, the consumption-smoothing impact of the subsidized regime was considered one of its desirable properties from the start. The subsidized regime might negatively affect labor force participation because it reduces the incentives to get a job (especially in the formal sector).

We explore the following five specific hypotheses. First, the subsidized regime has a positive effect on health status, measured using either self-reported health status or the number of days of regular activity missed as a result of illness.[27] Second, the subsidized regime has a positive effect on the use of both preventive and illness-related consultations. Third, the subsidized regime's effect on hospitalizations is ambiguous: on the one hand, the use of preventive and ambulatory services averts the later use of healing services; on the other, the lower cost of hospitalization might increase its use.[28] Fourth, the subsidized regime has a positive effect on the consumption

23. Panopoulus and Vélez (2001).

24. Trujillo, Portillo, and Vernon (2004). There are thirty-four provinces and 1,100 municipalities in Colombia.

25. Trujillo, Portillo, and Vernon (2004).

26. See Andersen (1995).

27. Although the ideal objective measure of any person's state of health is a medical report, this information is not available in the data set used.

28. See Tono (2000) on the use of preventive and ambulatory services.

of nonhealth goods and services, as it frees disposable income.[29] Finally, the subsidized regime could have a negative impact on labor market participation, because it grants unemployed individuals access to health care, whereas getting a job implies that these individuals are taken out of the subsidized regime without any assurance that they will be reinstated if they become unemployed again.

Empirical Strategy and Data

Any evaluation of the subsidized regime's impact has to address the endogeneity of enrollment. Since the selection of beneficiaries is not random, there is a clear potential for selection based on unobservables. In this section, we discuss how individuals are selected into the subsidized regime and then present the empirical strategy used to estimate its impact

PROCEDURE FOR ENROLLING INDIVIDUALS IN THE SUBSIDIZED REGIME. Under Colombian regulation, municipal authorities are responsible for enrolling individuals in the subsidized regime, but they have no discretion in doing so, only a set of procedures to follow.[30] First, individuals are classified as either "special" or not.[31] All special individuals and their families are automatically included on a list of potential beneficiaries. For all individuals who do not receive a special classification, the proxy means test (SISBEN) is applied to the family group, and each member is classified according to his or her SISBEN score (one through six, with one representing the lowest socioeconomic level). Within the subset of people making up SISBEN levels one and two, additional individuals are identified as "special" and must be automatically added to the list of potential beneficiaries; these include pregnant women, children under five, disabled people, the elderly, and women heads of household. Once all special groups have been included, and if resources are still available, the remainder of the population classified as SISBEN levels one and two must be added to the list of potential beneficiaries. Municipalities must publicly display the list of potential beneficiaries, who must then select their insurance providers (ARS). Individuals who do not select a provider on time are dropped from the list and replaced by others belonging to SISBEN levels 1 or 2. Once individuals select their ARS, they are officially enrolled.

29. Consumption includes all expenditures made by the household except durable goods, health services, and education.

30. See Accord 77 of November 1997 and Accord 244 of January 2003.

31. The special population includes abandoned children and displaced, indigent, and indigenous people.

In addition to the municipality itself, local institutions in charge of key steps in the selection process include the following: Colombian Institute of Family Welfare (ICBF), which coordinates policy on child welfare; the Social Solidarity Network (RSS), which oversees policy on population displaced by violence; the Ministry of Justice; and agricultural institutions. If any of these institutions are corrupt, ineligible individuals might be placed on the list of potential beneficiaries, thus gaining access to the subsidized regime.

As mentioned above, Bitrán, Giedion, and Muñoz, Panopoulus and Vélez, and Trujillo, Portillo, and Vernon indicate that targeting problems are widespread in the subsidized regime.[32] To test this possibility, we first drew up a spatial distribution of a sample of households living in Bogotá that were interviewed as part of the 2003 LSMS survey.[33] We found many neighborhood blocks with at least one insured and one uninsured household. Given the high levels of spatial segregation in Colombian cities, this result represents a clear indication that horizontal inequalities are rather common, implying that municipalities have ample scope for discretion in subsidized regime allocation.[34]

To check this conclusion, we constructed the SISBEN score (using a national representative sample taken from the 2003 Colombian LSMS survey) for each household in the survey. Table 1 shows the distribution of beneficiaries according to SISBEN level. The results reveal problems of exclusion (that is, poor households not receiving subsidy) and of inclusion (nonpoor households receiving subsidy): more than half the population in levels 1 and 2 is not enrolled in the subsidized regime, whereas more than 20 percent of levels 3 and 4 is enrolled. Table 2 repeats the exercise for income quintiles; the results are the same as in the former case.[35]

Taken together, these results highlight one of the main problems of the reform. The shift from supply- to demand-side subsidies was partially motivated by the need to improve targeting. Our results cast doubt, however, on the premise that demand-side subsidies are generally better targeted than

32. Bitrán, Giedion, and Muñoz (2004); Panopoulus and Vélez (2001); Trujillo, Portillo, and Vernon (2004).

33. A graphic of the spatial distribution is available on request.

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

35. 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.

TABLE 1. Targeting of the Subsidized Regime by SISBEN level
Percent

	Enrolled in subsidized regime		
SISBEN level	*No*	*Yes*	*Total*
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

supply-side subsidies. Political patronage and favoritism seem to have at least partially thwarted the reformers' intentions.

EMPIRICAL METHODOLOGY. Several types of biases can arise if one does not consider the endogeneity of subsidized regime enrollment. For instance, if enrollment depends positively on unobserved socioeconomic attributes then healthy middle-class individuals might have a high probability of becoming beneficiaries, which, in turn, might bias the estimation of the impact of the subsidized regime. We use an instrumental variables (IV) strategy to address this problem.

As usual, the idea is to find a variable that affects enrollment but does not influence the outcomes of interest through other pathways. Formally, we specify Z_{it} as the instrumental variable affecting participation (D_{it}) but not the outcome (Y_{it}). In the first stage, we use Z_{it} and $\mathbf{X}_{it}$ to predict D_{it}:

$$D_{it} = f\left(\mathbf{X}_{it}, Z_{it}\right) + V_{it}, \tag{1}$$

TABLE 2. Targeting of the Subsidized Regime by Income Quintiles
Percent

	Enrolled in subsidized regime		
Income quintile	*No*	*Yes*	*Total*
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

where D_{it} is equal to one if individual i is enrolled in the subsidized regime at time t and zero otherwise. In the second stage, the predicted value, $\hat{D}_{it}$, of D_{it} is plugged into the outcome equation:

$$Y_{it} = f_t(\mathrm{X}_i) + \alpha_t \hat{\hat{D}}_{it} + \varepsilon_{it}. \quad (2)$$

The parameter α represents the mean impact of the subsidized regime.[36]

As an IV, we propose the fraction of life that the head of household reports having resided in the municipality where he or she was at the time of the survey. In other words, we assume that conditional on observable characteristics, this variable affects individuals' enrollment in the subsidized regime, but has no direct impact on health status, use of medical services, household consumption, and labor force participation. The IV's validity is supported by two observations. First, the subsidized regime is managed directly by municipalities, which are in charge of picking the beneficiaries and paying premiums to the intermediary companies (ARS). Second, municipalities have ample autonomy to decide who gets the subsidy, even if they allocate all available resources to the eligible population (SISBEN 1 and 2). This autonomy is heightened when enrollment information is not fully updated and oversight is intermittent.[37]

Anecdotal and empirical evidence suggests that enrollment in the subsidized regime is related to political connections and the density of social networks. The scope for political patronage is broad: in 2000—seven years after the inception of the reform—54 percent of beneficiaries claimed they did not know their rights.[38] Additionally, 9 percent of beneficiaries selected

36. This follows if we assume either that treatment is homogeneous for the full population or that it is heterogeneous but that $E(U_1 - U_0 | \mathbf{X}; D = 1) = 0$, in which case the average treatment effect equals the average treatment on the treated (see, for example, Heckman and Robb, 1985; Heckman, LaLonde, and Smith, 1999).

37. According to BDO International and CCRP (2000), only 62 percent of the information available in the databases of a sample of 93 municipalities was supported by the corresponding forms; the rest had been destroyed or was unreadable or lost. A follow-up survey of families that had a SISBEN form on file revealed a clear bias toward benefiting the ineligible: 48 percent of the participants in the new survey reported information consistent with the data on file, 8 percent had to be reclassified at a lower level, and fully 44 percent had to be reclassified at a higher level. Finally, when individuals were asked why they were not beneficiaries of the subsidized regime, 25 percent said that they did not know how to apply, 9 percent that there were too many official procedures, 40 percent that they already had their SISBEN score but the municipality had not enrolled them, and 10 percent that they lacked economic resources. The same source reports that in 2000, only 61 percent of the individuals reported by ARS insurance carriers as beneficiaries were in SISBEN levels 1 or 2, while 9 percent were in SISBEN 3 and 30 percent did not have a SISBEN score since they were not subject to the proxy means test.

38. See BDO International and CCRP (2000).

their ARS based on the recommendation from a friend, relative, politician, or local leader, while 36 percent said that their ARS was assigned by their municipality.[39] Local authorities thus appear to have enough leeway even to choose insurers when they enroll beneficiaries. In large municipalities and cities, where political connections are less important, the formalities required to obtain enrollment are time consuming and cumbersome. Furthermore, several government documents that carefully analyze the beneficiary selection process mention the existence of large political biases.[40] Political patronage is certainly not the only way to get access to the subsidized regime, but it does seem relevant.

In sum, one crucial assumption is that the extent of social and political connections is related to the fraction of life that the head of household has been living in the municipality of residence. In other words, residence can measure how deeply rooted an individual's attachment is, and attachment is related to social capital.[41]

Table 3 shows our results for the first-stage regression, which examines the determinants of the probability of being a beneficiary of the subsidized regime. Even after we control for a battery of individual, household, housing, and census tract variables, as well as for municipality fixed effects, the effect of the chosen instrument (that is, the share of his or her life that the household head reports living in the municipality of current residence) remains positive and statistically significant. Among the individual variables, the probability in question increases for older individuals and for individuals with chronic diseases, while it diminishes for men, singles, and minorities, as well as for individuals with higher levels of schooling.

The probability of being a beneficiary of the subsidized regime increases with the share of people under seven in the household, the number of people

39. See BDO International and CCRP (2000).

40. See, for example, National Planning Department (2003, p. 125); National Planning Department and Ministry of Health (2001, p. 44). The latter document reiterates the limits of community participation as a result of local political misconduct. Finally, National Planning Department and Ministry of Health (2000) cites state governors, mayors, and local attorneys who denounce the lack of local control and the extent of political misconduct by the system administrators and SISBEN surveyors.

41. The first-stage regressions include some variables that are used to select beneficiaries, including whether the individual belongs to a displaced household (because of violence) or to a minority group (such as indigenous or black); whether there are children under five in the household; and the gender and age of the head of household. We also include socioeconomic indicators that increase the likelihood of being selected, such as the SISBEN score, the household's socioeconomic stratum, other household and household member characteristics, and census tract variables. Table 3 presents the results of a first-stage regression.

TABLE 3. First-Stage OLS Estimates of the Probability of Being Enrolled in the Subsidized Regime[a]

Variable	*Coefficient*	*Standard error*
Fraction of his or her life that the household head reports living in the municipality of current residence	0.1189	0.0087
Individual characteristics		
Age	0.0012	0.0003
Gender (dummy)	−0.0317	0.0058
Marital status (dummy: 1 if single, 0 otherwise)	−0.0190	0.0086
Ethnic minority (dummy)	−0.0582	0.0104
Years of formal education	−0.0068	0.0011
Chronic disease (dummy)	0.0865	0.0072
Migrant (dummy: 1 if person migrated to a capital city, 0 otherwise)	−0.0150	0.0111
Household characteristics		
Age of household head	−0.0010	0.0005
Gender of household head (dummy)	0.0019	0.0108
Years of formal education of household head	−0.0003	0.0026
No. people living in the household	−0.0039	0.0122
Share of members under seven years old	0.1768	0.0351
Displaced household (dummy)	−0.0961	0.0168
Per capita Income	0.0000	0.0000
SISBEN level 1 or 2 (1 if SISBEN level was 1 or 2, 0 otherwise)	−0.0406	0.0103
No. members under 60 years old	0.0700	0.0076
Household without one parent (dummy)	−0.0100	0.0115
Household with no children (dummy)	−0.0204	0.0120
Housing characteristics		
House (dummy: 1 if living in a house, 0 if in an apartment)	0.0237	0.0152
Walls made out of nonrustic materials (dummy)	−0.0633	0.0093
Floors made out of nonrustic materials (dummy)	−0.1344	0.0102
Housing with water service (dummy)	0.0744	0.0190
Housing with sewerage (dummy)	−0.0452	0.0377
Garbage collection service (dummy)	−0.0395	0.0134
Water for consumption supplied by aqueduct (dummy)	−0.0335	0.0195
No. rooms	−0.0421	0.0026
Bathroom with shower (dummy)	−0.0142	0.0092
Kitchen (dummy)	0.0267	0.0094
Electricity for cooking (dummy)	0.0181	0.0183
Gas for cooking (dummy)	−0.0178	0.0138
Rural (dummy)	0.0951	0.0206
Stratum 1 (dummy)	0.1621	0.0168
Stratum 2 (dummy)	0.0655	0.0123
Census tract characteristics		
No. kindergartens per census tract	0.0805	0.0194
No. asylums per census tract	−0.0088	0.0122
No. jails per census tract	−0.0021	0.0188
No. convents per census tract	0.0139	0.0072
No. police stations per census tract	0.0224	0.0059
Municipality fixed effects	Yes	
Summary statistic		
No observations	44,280	
R squared	0.2094	

a. Other variables included in the regression were the educational level attained by the individual's parents, the educational level attained by the household head, the SISBEN score, the adverse economic shock indicators, and other characteristics of the census tract, including the share of households with an unsatisfied basic need and the share of households using public utilities.

under sixty, and the number of people under eighteen, as well as when the household head is between twenty-five and fifty-four years of age. These results are consistent with a situation in which those who are most likely to get ill are also most likely to get access, suggesting the existence of adverse selection. In general, individuals with higher socioeconomic status are less likely to get access: the probability of participation is lower for more educated individuals, for smaller households, and so forth. Housing and census tract variables exhibit a similar pattern: households in rural areas or in areas with inadequate infrastructure are more likely to be beneficiaries of the subsidized regime than urban households in areas with modern infrastructure.

While the results in table 3 suggest that the length of the residence in the current municipality does affect the probability of treatment, this variable could also affect health outcomes. On the one hand, long-term residence may be associated with deep and wide networks of social support, which may positively affect welfare. On the other, long-term residents are less likely to be migrants, who may be positively selected in terms of health outcomes. Such channels cast some doubt on the validity of our instrument, but we address this concern by including a large array of control variables in the first stage.

An alternative strategy to uncover the effects of the subsidized regime would be to use a regression discontinuity design (RDD).[42] This strategy orders individuals according to a continuous variable (in our case, the SISBEN score). This assignment variable must have a relevant cutoff point at which individuals on one side of the cutoff are selected into the program (in our case, SISBEN levels 1 and 2) and individuals on the other side are excluded. Under some assumptions, RDD allows the analyst to compare individuals within some arbitrarily narrow band of the cutoff, and since the individuals are observationally identical in the limit, such comparisons may reveal the causal effect of the treatment.

This strategy has at least three problems in this context. First, we do not know the socioeconomic characteristics of the household (which are used to define the SISBEN score) at the moment of enrollment in the subsidized regime, but rather at the moment of the LSMS survey. Second, even when enrollment is contemporaneous with the survey, selection into the subsidized regime is based on the SISBEN survey, which is subject to strategic

42. RDD was originally introduced by Thistlethwaite and Campbell (1960). More recent applications include Hahn, Todd, and van der Klaauw (1999, 2001) and van der Klaauw (2002).

responses on the part of households.[43] Third, and perhaps most important, subsidized regime enrollment is not cleanly related to individuals' SISBEN scores, and the fact that political connections influence enrollment in the subsidized regime may result in nonrandom sorting around the discontinuity. While this is generally a concern with our strategy as well, it may be exacerbated in an RDD setting.

DATA USED. The data are from the 2003 Colombian LSMS survey, which is nationally representative and contains information on 22,949 households and 85,150 individuals. This survey includes a detailed module on health, which collects individual-level information on insurance status, health status, and the use of medical services. It also reports individual-level data on education and labor market participation, as well as household-level data on consumption, income, and dwelling characteristics.

In the evaluation jargon, individuals who reported being enrolled in the subsidized regime are considered treated, and those who report otherwise are classified as nontreated. All individuals belonging to either the contributive regime or to special health regimes were dropped from the sample. As mentioned earlier, we considered four outcome categories: health status, use of medical services, consumption, and labor force participation. The first category includes a dummy that takes on the value of one if the person considers his or her state of health to be very good or good, and zero otherwise; it also takes into account the number of days that the individual ceased to perform regular activities because of an illness not requiring hospitalization. The second category (that is, the use of medical services) considers three variables: preventive consultations, illness-related consultations, and hospitalizations during the last twelve months. Each of these is constructed as a dummy variable that takes on the value of one if the event occurred, and zero otherwise. The third category analyzes 2003 per capita consumption (excluding health care spending). Finally, to capture labor force participation, we use a variable that takes the value of one if the person is employed or unemployed, and zero if the person is inactive.[44]

Table 4 shows the mean values of the outcome variables for both enrolled and unenrolled individuals. Table 5 does the same for a restricted sample of

43. We obtained RDD estimates using a two-stage procedure similar to that used by van der Klaauw (2002). We used several specifications for the first-stage regression, based on SISBEN levels 1 and 2 and polynomials on SISBEN scores. The subsidized regime variable thus estimated showed no relation to any of our health outputs.

44. Only for people over twelve years old.

TABLE 4. Mean Differences in Outcome Variables between Being Enrolled and Unenrolled in the Subsidized Regime: Whole Sample

Variable	Enrolled in subsidized regime		Significant difference[a]	No. observations
	No	Yes		
Health				
Good health (percent)	70.8	62.5	Yes	45,836
Days not able to perform regular activities	5.84	6.00	No	4,661
Use of medical services				
Preventive consultation (percent)	35.9	52.0	Yes	45,836
Consultation on illness (percent)	59.1	77.9	Yes	4,661
Hospitalization (percent)	5.3	6.8	Yes	45,836
Well-being				
Per capita consumption (pesos)	114,965	82,653	Yes	45,836
Conditions in the home are good (percent)	37.5	33.4	Yes	45,836
Living standards have improved lately (percent)	31.9	30.7	Yes	45,836
Labor participation (percent)	74.9	70.2	Yes	45,836

a. Statistically significant at the 1 percent level.

people in SISBEN leveles 1 and 2. Before moving on to the evaluation, we examine the mean differences among enrolled and unenrolled individuals for each of the outcome variables, both for the whole sample (table 4) and for the subsample of individuals classified as SISBEN levels 1 and 2 (table 5). In the first exercise, the unenrolled individuals report a better health status, fewer

TABLE 5. Mean Differences in Outcome Variables between Being Enrolled and Unenrolled in the Subsidized Regime: SISBEN Levels 1 and 2

Variable	Enrolled in subsidized regime		Significant difference[a]	No. observations
	No	Yes		
Health				
Good health (percent)	65.0	59.4	Yes	18,393
Days not able to perform regular activities	6.84	6.28	No	1,799
Use of medical services				
Preventive consultation (percent)	24.5	46.0	Yes	18,393
Consultation on illness (percent)	59.9	76.5	Yes	1,799
Hospitalization (percent)	5.3	6.6	Yes	18,393
Well-being				
Per capita consumption (pesos)	69,311	61,357	Yes	18,393
Conditions in the home are good (percent)	27.4	28.2	Yes	18,393
Living standards have improved lately (percent)	29.8	28.0	Yes	18,393
Labor participation (percent)	76.4	68.6	Yes	18,393

a. Statistically significant at the 1 percent level.

days of illness-related inactivity, better household conditions, and higher labor market participation than enrolled individuals. Separately, enrolled people report greater use of medical services (that is, preventive consultation, consultation on illness, and hospitalization) and higher per capita consumption than unenrolled people. Almost all the results hold up when we circumscribe the analysis for individuals in SISBEN levels 1 and 2.

The appendix lists the control variables used in the analysis (namely, the $\mathbf{X}_{it}$ vector of equations 1 and 2).[45] These are of three types: individual, household, and census tract. Some specifications also include municipality fixed effects. Finally, the instrumental variable, Z_{it}, in equation 2 corresponds to the fraction of life that the head of household reports having lived in the municipality where he or she resided at the time of the survey.

Results

We perform the analysis first for the full sample and then for the subsample of individuals belonging to SISBEN levels 1 and 2. We present four specifications for each variable: ordinary least squares (OLS) with and without municipality fixed effects and instrumental variables (IV) with and without municipality fixed effects.[46] All specifications correct for heteroskedasticity, and standard errors are clustered at the household level. Additionally, we repeat all estimations with a larger group of control variables that includes census tract characteristics. Because the results are sensitive to the choice of IV, we carried out two robustness exercises. The first used a slightly different instrument: instead of the fraction of life that the head of household has resided in the municipality where he or she currently lives, we used the absolute number of years of residence, which returned similar results. The second exercise restricted the sample to individuals living in Bogotá; once again, the main results did not change substantially.

Table 6 shows our estimates of the impact of the subsidized regime on self-reported health status and on the number of days that the individual did not perform regular activities. For the first variable, the impact is negative in the OLS specification and positive in the IV one. The estimated coefficient is 15 percentage points if municipality fixed effects are included and

45. 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 relation between that variable and the use of medical services.

46. We do not report the *R* squared for the IV specifications, but instead provide the coefficient and the significance of the instrumental variable in the first stage of the estimation.

TABLE 6. Effect of the Subsidized Regime on Health Status: Whole Sample[a]

	National sample				*National sample with additional controls*[b]			
	OLS		*IV*		*OLS*		*IV*	
Dependent and explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Good health								
Beneficiary of subsidized regime	–0.0300	–0.0314	0.2491	0.1472	–0.0219	–0.0237	0.2257	0.1537
	(0.0062)	(0.0063)	(0.0652)	(0.0694)	(0.0063)	(0.0064)	(0.0676)	(0.0689)
Instrument (first stage)			0.1276	0.1209			0.1218	0.1198
			(0.0090)	(0.0088)			(0.0086)	(0.0085)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. 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 subsidized regime	–0.1399	–0.4002	0.0792	0.6482	–0.6122	–0.8345	4.6608	3.6610
	(0.5146)	(0.5152)	(6.8167	(6.9464)	(0.5271)	(0.5324)	(6.9029)	(6.9444)
Instrument (first stage)			0.0933	0.0971			0.0928	0.0991
			(0.0266)	(0.0267)			(0.0258)	(0.0251)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. 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

a. The dependent variable in the first panel is whether the individual enjoys good health; in the second panel, it is the number of days that the individual stopped performing regular activities as a result of illness. Standard errors are in parentheses.

b. Additional controls include census tract characteristics.

23 percentage points if they are not. In the case of the number of days that the individual did not perform regular activities, the subsidized regime does not seem to have any effect in either specification.

With regard to the use of medical services, the subsidized regime has a positive and substantial impact on preventive and illness-related medical consultations (see table 7). In the case of preventive consultations, the estimated effect is lower when municipality fixed effects are included (39 versus 25 percentage points), whereas the opposite occurs in the case of illness-related consultations (62 versus 66 percentage points). Both results suggest that the subsidized regime facilitates medical attention, either by lowering the cost or by improving the availability of service. We find the opposite effect for hospitalization: enrollment in the subsidized regime decreases the probability of having been hospitalized by approximately 11 percentage points in the IV estimation. One possible cause for this reduction is that the increased used of preventive medical consultations diminishes the need for hospitalizations. The explanation could be even simpler, however: uncovered individuals tend to request medical services via emergency rooms (since they have no insurance for consultations), which frequently implies a preventive hospitalization. Thus, even if the subsidized regime does not curb hospitalizations through preventive health care, it may have a positive impact by promoting a more efficient use of medical resources.

The latter result was not foreseen by the reformers, who actually forecasted an increase in hospitalizations as a result of extending insurance to the poorest population. Our evidence is consistent with the subsidized regime rationalizing demand for hospital services, although it appears to have raised the number of consultations, which is consistent with the increase in transfers to public hospitals that occurred after the reform. As stated earlier, these transfers may not have gone into improved functioning, but rather compensated for deficits stemming from surplus capacity.

Table 8 shows the effect of the subsidized regime on per capita consumption. Although our OLS estimates indicate a negative effect on consumption, the IV estimates show no effect. This result suggests that savings on medical services through enrollment in the subsidized regime is not substantial and does not allow increased consumption. Alternatively, the subsidized regime's effect may be offset by behavioral responses, such as diminished labor force participation. Table 9 explores this hypothesis. None of the OLS estimates (for males and females combined and separately) are significant, but the IV estimates suggest that the subsidized regime reduces participation by as much as 24 percentage points. The effects differ substantially by gender.

TABLE 7. Effect of the Subsidized Regime on the Use of Medical Services: Whole Sample[a]

	National sample				*National sample with additional controls*[b]			
	OLS		*IV*		*OLS*		*IV*	
Dependent and explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Preventive consultation								
Beneficiary of subsidized regime	0.1918	0.1749	0.4759	0.3389	0.1732	0.1691	0.3935	0.2507
	(0.0069)	(0.0069)	(0.0753)	(0.0786)	(0.0071)	(0.0071)	(0.0782)	(0.0781)
Instrument (first stage)			0.1276	0.1209			0.1218	0.1198
			(0.0090)	(0.0088)			(0.0086	(0.0085)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	45,031	45,031	45,031	45,031	44,280	44,28	44,280	44,280
R squared	0.0770	0.1197	0.0452	0.0951	0.1153	0.1519	0.0916	0.1303
Consultations on illness								
Beneficiary of subsidized regime	0.1893	0.1762	0.5477	0.6609	0.1838	0.1739	0.6243	0.6551
	(0.0194)	(0.0188)	(0.2857)	(0.2658)	(0.0196)	(0.0196)	(0.2760)	(0.2566)
Instrument (first stage)			0.0933	0.0971			0.0928	0.0991
			(0.0266)	(0.0267)			(0.0258)	(0.0251)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	4,602	4,602	4,602	4,602	4,543	4,543	4,543	4,543
R squared	0.0580	0.1373	0.0241	0.1123	0.1178	0.1808	0.0901	0.1590
Hospitalization								
Beneficiary of subsidized regime	0.0144	0.0173	–0.1137	–0.1004	0.0120	0.0157	–0.1090	–0.1068
	(0.0032)	(0.0034)	(0.0360)	(0.0392)	(0.0034)	(0.0035)	(0.0388)	(0.0407)
Instrument (first stage)			0.1276	0.1209			0.1218	0.1198
			(0.0090)	(0.0088)			(0.0086)	(0.0085)
Control by region	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	45,031	45,031	45,031	45,031	44,280	44,280	44,280	44,280
R squared	0.0167	0.0258	0.0163	0.0250	0.0272	0.0351	0.0270	0.0345

a. The dependent variable in the first panel is the use of preventive consultations in the last twelve months; in the second panel, it is the use of illness-related consultations in the last twelve months; in the third panel, it is occurrence of hospitalization in the last twelve months. Standard errors are in parentheses.

b. Additional controls include census tract characteristics.

TABLE 8. Effect of the Subsidized Regime on Well-Being Indicators: Whole Sample[a]

	National sample				*National sample with additional controls*[b]			
	OLS		*IV*		*OLS*		*IV*	
Dependent and explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Consumption per capita								
Beneficiary of subsidized regime	–8,732	–9,631	–40,272	–43,506	–6,097	–6,525	–12,028	–16,545
	(1,252)	(1,360)	(27,817)	(26,519)	(2,443)	(2,628)	(27,820)	(23,401)
Instrument (first stage)			0.1276	0.1209			0.1218	0.1198
			(0.0090)	(0.0088)			(0.0086)	(0.0085)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	45,031	45,031	45,031	45,031	44,280	44,280	44,280	44,280
R squared	0.3843	0.3965	0.3835	0.3956	0.4219	0.4340	0.4215	0.4336
Good conditions in the home								
Beneficiary of subsidized regime	–0.0089	–0.0167	–0.0090	0.0959	–0.0127	–0.0164	–0.0121	–0.0181
	(0.0068)	(0.0068)	(0.0732)	(0.0769)	(0.0067)	(0.0067)	(0.0740)	(0.0749)
Instrument (first stage)			0.1276	0.1209			0.1218	0.1198
			(0.0090)	(0.0088)			(0.0086)	(0.0085)
Control by region	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	45,031	45,031	45,031	45,031	44,280	44,280	44,280	44,280
R squared	0.0532	0.0932	0.0531	0.0930	0.1077	0.1381	0.1076	0.1378
Improved living standards								
Beneficiary of subsidized regime	0.0043	0.0112	–0.3595	–0.3309	–0.0012	0.0060	–0.3534	–0.3573
	(0.0065)	(0.0064)	(0.0719)	(0.0758)	(0.0067)	(0.0066)	(0.0762)	(0.0763)
Instrument (first stage)			0.1276	0.1209			0.1218	0.1198
			(0.0090)	(0.0088)			(0.0086)	(0.0085)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	45,031	45,031	45,031	45,031	44,280	44,280	44,280	44,280
R squared	0.0241	0.0593	0.0252	0.0600	0.0495	0.0845	0.0504	0.0854

a. The dependent variable in the first panel is per capita consumption; in the second panel, it is whether conditions in the home are good; in the third panel, it is whether living standards have improved during the last twelve months.

b. Additional controls include census tract characteristics.

TABLE 9. Effect of the Subsidized Regime on Employment Indicators: Whole Sample[a]

	National sample				*National sample with additional controls*[b]			
	OLS		*IV*		*OLS*		*IV*	
Dependent and explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Total labor participation								
Beneficiary of subsidized regime	–0.0262	–0.0292	–0.2780	–0.2342	–0.0384	–0.0394	–0.2510	–0.2419
	(0.0071)	(0.0071)	(0.0752)	(0.0789)	(0.0071)	(0.0072)	(0.0752)	(0.0771)
Instrument (first stage)			0.1271	0.1205			0.1251	0.1214
			(0.0106)	(0.0105)			(0.0101)	(0.0100)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	32,866	32,866	32,866	32,866	32,318	32,318	32,318	32,318
R squared	0.2557	0.2683	0.2557	0.2680	0.2984	0.3074	0.2976	0.3065
Male labor participation								
Beneficiary of subsidized regime	–0.0406	–0.0417	–0.1088	–0.0313	–0.0457	–0.0473	–0.1374	–0.0992
	(0.0082)	(0.0082)	(0.0851)	(0.0851)	(0.0083)	(0.0082)	(0.0844)	(0.0818)
Instrument (first stage)			0.1225	0.1226			0.1190	0.1225
			(0.0152)	(0.0154)			(0.0147)	(0.0147)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	15,738	15,738	15,738	15,738	15,456	15,456	15,456	15,456
R squared	0.3096	0.3264	0.3076	0.3243	0.3738	0.3854	0.3715	0.3830
Female labor participation								
Beneficiary of subsidized regime	–0.0079	–0.0109	–0.4036	–0.3861	–0.0254	–0.0261	–0.3338	–0.3393
	(0.0108)	(0.0109)	(0.1138)	(0.1226)	(0.0107)	(0.0108)	(0.1111)	(0.1167)
Instrument (first stage)			0.1326	0.1219			0.1317	0.1244
			(0.0148)	(0.0144)			(0.0140)	(0.0137)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	17,128	17,128	17,128	17,128	16,862	16,862	16,862	16,862
R squared	0.1647	0.1893	0.1660	0.1902	0.2143	0.2330	0.2147	0.2332

a. The dependent variable in the first panel is total labor force participation; in the second panel, it is male labor participation; in the third panel, it is female labor participation.
b. Additional controls include census tract characteristics.

While female participation is reduced by 34 points, male participation remains unchanged. Overall, the subsidized regime might indeed relax the need to look for a job in order to get health insurance. Moreover, if a household member gets a formal job and is consequently moved from the subsidized to the contributive regime, all family members will also be moved. For example, if a female head of household receives formal employment, all household members will be removed from the subsidized regime and would have to reapply if the woman in question lost her job. Access to the subsidized regime might thus discourage individuals from accepting "risky" formal jobs. To that extent, the subsidized regime provides an additional disincentive to move into the formal sector.

We also estimated all the models using the restricted sample of the SISBEN 1 and 2 population, which theoretically is the target population of the program. For self-reported health status, the effect is negative and small in the OLS specification, while it is positive and close to 40 percentage points in the IV estimation—much larger than for the whole sample (table 10). As before, the subsidized regime does not seem to have a discernible effect on the number of days lost to illness, although the sample is somewhat small for this estimation (1,700 observations).

An important difference with the first set of results appears when we analyze the impact of the subsidized regime on the use of preventive consultations. Table 11 shows that the effect is larger in this case, especially when municipality fixed effects are included. The larger effect of the subsidized regime on the poorest population (SISBEN 1 and 2) has two possible explanations. On the one hand, access to the subsidized regime may relax households' budget and liquidity constraints, which are likely to be more severe for this group. On the other hand, adverse selection may be large in this group.

The subsidized regime's effect on consultations related to illness are nil in this case, suggesting that barriers to access are not important enough to prevent households in this group from seeing a doctor in case of illness. Finally, results do not change when we consider the subsidized regime's effect on hospitalization: the effect continues to be negative and close to 10 percentage points. The likely explanation remains the same: greater prevention and higher efficiency in the use of services reduces the need for hospitalization.

Table 12 shows our estimation of the subsidized regime's impact on per capita consumption in the restricted sample. Our results are now negative for both the OLS and IV estimates, with and without controlling for municipality fixed effects: monthly consumption is approximately U.S.$30 lower for beneficiaries than for unenrolled households. Finally, Table 13 presents the

TABLE 10. Effect of the Subsidized Regime on Health Status: SISBEN Levels 1 and 2[a]

	National sample				*National sample with additional controls*[b]			
	OLS		*IV*		*OLS*		*IV*	
Dependent and explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Good health								
Beneficiary of subsidized regime	−0.0209	−0.0321	0.2860	0.2724	−0.0129	−0.0243	0.4041	0.4027
	(0.0092	(0.0092)	(0.0732)	(0.0788)	(0.0099)	(0.0099)	(0.1031)	(0.0953)
Instrument (first stage)			0.1808	0.1672			0.1278	0.1388
			(0.0141)	(0.0139)			(0.0128)	(0.0128)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	17,610	17,610	17,610	17,610	17,381	17,381	17,381	17,381
R squared	0.1564	0.1907	0.1573	0.1907	0.1870	0.2147	0.1880	0.2155
Days not able to perform regular activities								
Beneficiary of subsidized regime	−0.3176	−0.8219	−2.9164	−1.6822	−0.8851	−1.2957	−9.5929	−8.8110
	(0.6874)	(0.6905)	(5.9652)	(7.0520)	(0.6884)	(0.6934)	(8.5763)	(9.9700)
Instrument (first stage)			0.1515	0.1360			0.1149	0.1124
			(0.0410)	(0.0405)			(0.0379)	(0.0380)
Control by region	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	1,713	1,713	1,713	1,713	1,700	1,700	1,700	1,700
R squared	0.0395	0.0912	0.0395	0.0903	0.1030	0.1391	0.1030	0.1380

a. The dependent variable in the first panel is whether the individual enjoys good health; in the second panel, it is the number of days that the individual stopped performing regular activities as a result of illness. Standard errors are in parentheses.

b. Additional controls include census tract characteristics.

TABLE 11. Effect on the Subsidized Regime on the Use of Medical Services: SISBEN Levels 1 and 2[a]

	National sample				*National sample with additional controls[b]*			
	OLS		*IV*		*OLS*		*IV*	
Dependent and explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Preventive consultation								
Beneficiary of subsidized regime	0.2259	0.2101	0.4114	0.4093	0.1935	0.1876	0.3865	0.3870
	(0.0095)	(0.0095)	(0.0755)	(0.0814)	(0.0103)	(0.0101)	(0.1067)	(0.0980)
Instrument (first stage)			0.1808	0.1672			0.1278	0.1388
			(0.0141)	(0.0139)			(0.0128)	(0.0128)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	17,610	17,610	17,610	17,610	17,381	17,381	17,381	17,381
R squared	0.0857	0.1424	0.0351	0.1028	0.1418	0.1888	0.1121	0.1627
Consultations on illness								
Beneficiary of subsidized regime	0.1671	0.1717	0.2734	0.4328	0.1576	0.1390	0.2794	0.3675
	(0.0291)	(0.0280)	(0.2625)	(0.2996)	(0.0305)	(0.0298)	(0.3381)	(0.3582)
Instrument (first stage)			0.1515	0.1360			0.1149	0.1124
			(0.0410)	(0.0405)			(0.0379)	(0.0380)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	1,713	1,713	1,713	1,713	1,700	1,700	1,700	1,700
R squared	0.0633	0.1738	0.0368	0.1504	0.1593	0.2614	0.1412	0.2489
Hospitalization								
Beneficiary of subsidized regime	0.0134	0.0164	−0.1017	−0.0793	0.0092	0.0122	−0.1050	−0.0995
	(0.0047)	(0.0049)	(0.0391)	(0.0436)	(0.0050)	(0.0051)	(0.0561)	(0.0529)
Instrument (first stage)			0.1808	0.1672			0.1278	0.1388
			(0.0141)	(0.0139)			(0.0128)	(0.0128)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	17,610	17,610	17,610	17,610	17,381	17,381	17,381	17,381
R squared	0.0251	0.0393	0.0251	0.0386	0.0438	0.0571	0.0439	0.0570

a. The dependent variable in the first panel is the use of preventive consultations in the last twelve months; in the second panel, it is the use of illness-related consultations in the last twelve months; in the third panel, it is occurrence of hospitalization in the last twelve months. Standard errors are in parentheses.

b. Additional controls include census tract characteristics.

TABLE 12. Effect of the Subsidized Regime on Well-Being Indicators: SISBEN Levels 1 and 2[a]

	National sample				*National sample with additional controls*[b]			
	OLS		*IV*		*OLS*		*IV*	
Dependent and explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Consumption per capita								
Beneficiary of subsidized regime	−6,435	−4,768	73,876	−65,328	−6,493	−5,642	−74,326	−74,522
	(1,243)	(1,158)	(11,222)	(12,134)	(1,334)	(1,275)	(15,184)	(14,281)
Instrument (first stage)			0.1808	0.1672			0.1278	0.1388
			(0.0141)	(0.0139)			(0.0128)	(0.0128)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	17,610	17,610	17,610	17,610	17,381	17,381	17,381	17,381
R squared	0.1783	0.2750	0.1809	0.2768	0.2385	0.3172	0.2389	0.3183
Good conditions in the home								
Beneficiary of subsidized regime	0.0159	0.0286	0.2138	0.3988	0.0196	0.0231	0.3556	0.3743
	(0.0091)	(0.0091)	(0.0710)	(0.0770)	(0.0098)	(0.0096)	(0.1017)	(0.0938)
Instrument (first stage)			0.1808	0.1672			0.1278	0.1388
			(0.0141)	(0.0139)			(0.0128)	(0.0128)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	17,610	17,610	17,610	17,610	17,381	17,381	17,381	17,381
R squared	0.0245	0.0947	0.0250	0.0961	0.0711	0.1408	0.0718	0.1417
Improved living standards								
Beneficiary of subsidized regime	−0.0046	0.0231	−0.3800	−0.3652	0.0109	0.0198	−0.5023	−0.4693
	(0.0093)	(0.0088)	(0.0762)	(0.0815)	(0.0098)	(0.0093)	(0.1072)	(0.0964)
Instrument (first stage)			0.1808	0.1672			0.1278	0.1388
			(0.0141)	(0.0139)			(0.0128)	(0.0128)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	17,610	17,610	17,610	17,610	17,381	17,381	17,381	17,381
R squared	0.0205	0.1002	0.0230	0.1015	0.0713	0.1419	0.0733	0.1435

a. The dependent variable in the first panel is per capita consumption; in the second panel, it is whether conditions in the home are good; in the third panel, it is whether living standards have improved during the last twelve months.

b. Additional controls include census tract characteristics.

TABLE 13. Effect of the Subsidized Regime on Employment Indicators: SISBEN Levels 1 and 2[a]

	National sample				*National sample with additional controls*[b]			
	OLS		*IV*		*OLS*		*IV*	
Dependent and explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Total labor participation								
Beneficiary of subsidized regime	–0.0382	–0.0357	–0.1661	–0.0774	–0.0685	–0.0679	–0.3033	–0.2572
	(0.0105)	(0.0104)	(0.0904)	(0.0952)	(0.0114)	(0.0113)	(0.1185)	(0.1093)
Instrument (first stage)			0.1694	0.1619			0.1279	0.1389
			(0.0175)	(0.0174)			(0.0157)	(0.0158)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	11,607	11,607	11,607	11,607	11,468	11,468	11,468	11,468
R squared	0.2984	0.3181	0.2973	0.3170	0.3400	0.3534	0.3371	0.3506
Male labor participation								
Beneficiary of subsidized regime	–0.0406	–0.0417	–0.1088	–0.0313	–0.0567	–0.0516	–0.0796	–0.0155
	(0.0082)	(0.0082)	(0.0851)	(0.0851)	(0.0140)	(0.0137)	(0.1434)	(0.1272)
Instrument (first stage)			0.1225	0.1226			0.1167	0.1288
			(0.0152)	(0.0154)			(0.0225)	(0.0224)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	15,738	15,738	15,738	15,738	5,521	5,521	5,521	5,521
R squared	0.3096	0.3264	0.3076	0.3243	0.3937	0.4139	0.3904	0.4113
Female labor participation								
Beneficiary of subsidized regime	–0.0079	–0.0109	–0.4036	–0.3861	–0.0675	–0.0731	–0.4382	–0.4146
	(0.0108)	(0.0109)	(0.1138)	(0.1226)	(0.0164)	(0.0165)	(0.1584)	(0.1527)
Instrument (first stage)			0.1326	0.1219			0.1434	0.1518
			(0.0148)	(0.0144)			(0.0219)	(0.0222)
Municipality fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	17,128	17,128	17,128	17,128	5,947	5,947	5,947	5,947
R squared	0.1647	0.1893	0.1660	0.1902	0.2325	0.2603	0.2307	0.2580

a. The dependent variable in the first panel is total labor force participation; in the second panel, it is male labor participation; in the third panel, it is female labor participation.
b. Additional controls include census tract characteristics.

effects on labor market participation. The results are similar to those for the whole sample, although they are larger in magnitude for women, who are 41 percentage points less likely to participate in the labor market when enrolled in the subsidized regime than when not enrolled. These results on consumption and labor market participation are thus consistent with and stronger than our results for the whole sample. The reformers, however, did not contemplate this type of effect.

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

An exhaustive evaluation of the subsidized regime would have to consider the existence of general equilibrium effects. Since the subsidized regime directs poor individuals' demand toward private hospitals (in that the ARS insurers contract an important share of services with private hospitals), the reform has increased the capacity of public hospitals to service the uninsured, which could improve the quantity and quality of these services. Our analysis does not incorporate these effects, which must be addressed in future research.

Conclusions

We have presented a partial assessment of the ambitious health reform Colombia undertook in the first half of the 1990s. Among other things, the reform attempted to change the form of public intervention in health by replacing supply-side subsidies with a new scheme of demand-side subsidies (namely, transfers targeted to the poorest population). The reform also put into practice a complex financing system based, in part, on shared contributions by formal workers.

At first glance, the results of the reform appear to have been positive. The percentage of households with medical insurance has grown notably, particularly among the poorest segments of the population, although it never reached the levels that the initial blueprint predicted. Many problems persist, however. It has not been possible to complete the transfer of resources from supply- to demand-side subsidies. In practice, the two schemes subsist side

by side, resulting in a net increase in expenditure. Additionally, competition has not raised the efficiency of many public hospitals, which continue operating with very low occupation rates and receiving hefty transfers. The adoption of demand-side subsidies thus was not sufficient to reverse the historic inefficiencies of a sector characterized by both persistently high costs and inelastic supply.

The demand-side subsidies are also less targeted than was expected. Many municipalities seem to assign them at least partially on the basis of political patronage or other types of favoritism. If the old health care system promoted labor union strongholds dedicated to capturing rents, the new system appears to have generated networks of political patronage dedicated to selecting the beneficiaries based on political interest. This is relevant for similar efforts elsewhere, where political opportunism may similarly be a factor.

Finally, we evaluated the impact of the subsidized regime by addressing the endogeneity of enrollment in the subsidized regime with an instrumental variables strategy. Our analysis suggests that the subsidized regime has a positive effect on self-reported health and on the use of both preventive and illness-related consultations. Enrollment also seems to lessen the frequency of hospitalizations. Finally, it appears to have an adverse effect on consumption and labor market participation.

Appendix

This appendix lists the variables used in the analysis, breaking them down into result variables (Y) and exogenous variables (X). The result variables fall into four categories: health quality (good health and days not able to perform normal activities); use of medical services (preventive consultation, consultation on illness, and hospitalization during the past year); well-being (per capita consumption, good economic conditions in the household, and whether household living standards have improved); and labor market participation (dummy variable for labor market activity versus inactivity, measured as whether a person is employed or looking for a job).

The exogenous variables can also be classified into four categories: individual (age, gender, marital status, ethnic minority, and years of formal education); housing (ascending scores for the type of housing, materials used to build the walls, materials used to build the floors, and the quality of the waste disposal system and water source, together with dichotomous variables for the availability of aqueduct services, a sewage system, and a garbage collection

system); household (the age, gender, and years of education of household head, whether the household head is unemployed, the share of children under seven years of age, per capita income, a dummy for displaced households [due to violence], rural residence, and municipality); and census tract (number of preschools, asylums, prisons, convents, headquarters, households with no aqueduct, households with no sewerage, households per housing, hotels, internees, other institutions, households with basic needs—namely, accumulation, dependence, drop outs, and public utility services—and people per household).