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Supply- vs. Demand-Side Rationing in Developing Country Health Insurance: Evidence from Colombia's '*Régimen Subsidiado*'

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In developing countries, medical costs associated with unexpected illness are an important source of economic risk confronting households. Health insurance expansions are therefore a public policy priority, but they also produce socially undesirable consumer incentives for wasteful medical care use. This paper studies the first major developing country effort (Colombia's *Régimen Subsidiado*) to promote efficient consumption under health insurance without sacrificing risk-protection. Using several regression discontinuity approaches, we find that by improving supply-side incentives through high-powered health insurance contracting, Colombia has provided risk protection with minimal wasteful consumption – and it has also increased the use of services with positive externalities.

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1. Introduction

In developing countries, the inability to smooth consumption directly reduces welfare and leads to informal risk management strategies that stifle productive activity (Paxson 1993, Townsend 1994, Morduch 1995). A leading source of economic risk that poor households face is unexpected illness (Gertler and Gruber 2002, Mohanan 2008).[1] The expansion of health insurance is therefore a public policy priority in many parts of the developing world (GTZ, WHO and ILO 2005). Because the value of health insurance is proportionate to medical care costs, this emphasis is particularly strong in middle income countries where expensive medical technologies are epidemiologically appropriate but living standards remain low.

Health insurance expansions also produce socially undesirable consumer incentives for wasteful medical care use (*ex post* moral hazard) (Arrow 1963, Pauly 1968).[2] The balance between risk-protection and efficient consumption has traditionally been struck through demand-side cost sharing (Newhouse et. al. 1993). This approach is nearly universal in developing countries today – even out-of-pocket payments made by the 'uninsured' typically cover only a fraction of total medical care costs (with tax revenue financing the difference). The alternative approach – one increasingly emphasized in wealthy countries – is health insurance contracting that better aligns the incentives of medical care providers with efficient service use (Glied 2000). Reliance on supply-side incentives circumvents the otherwise unavoidable trade-off between risk

[1] For example, one recent study finds that 5% of Latin American households spend 40% or more of non-subsistence income on medical care each year (Xu et. al. 2003). As Gertler and Gruber (2002) note, there are two major costs of illness: medical care costs and reduced labor income. Health insurance addresses the former, while disability insurance addresses the latter.

[2] This assumes that health care prices facing consumers reflect true resource costs in the absence of health insurance. Health care prices in developing countries are generally set administratively, so this is unlikely to be true, but the direction of the error is uncertain. For a thorough treatment of administrative pricing in medical care, see Newhouse (2002). Health insurance also creates inefficient incentives for under-investment in private preventive health activities (*ex ante* moral hazard), a phenomenon that we investigate in this paper as well.

protection and efficient consumer incentives (Zeckhauser 1970) and shifts decision-making authority to clinicians with superior information about treatment efficacy.[3]

This paper studies the first developing country effort (to the best of our knowledge) to improve efficiency under health insurance without forgoing risk-protection.[4] In 1993, the Colombian government introduced the *Régimen Subsidiado* (or "Subsidized Regime," henceforth "SR"), a variant of the classical 'managed competition' model of insurance (Enthoven 1978a and 1978b). Colombians passing a means test are eligible for fully-subsidized health insurance from one of multiple competing health insurers. Insurers, in turn, have new authority to form restrictive medical care networks, deny coverage for services deemed wasteful, and pay health care providers in ways that encourage higher quality and lower cost medical care. We emphasize more efficient supply-side incentives and the outright denial of inefficient services as the key innovations over reliance on demand-side cost sharing alone.[5] We also stress that the comparison between "uninsurance" and SR enrollment is actually a comparison of types of insurance and rationing methods: less generous insurance with exclusive reliance on demand-side cost sharing vs. more generous insurance with more efficient supply-side incentives.

To compare insurance regimes and rationing methods (i.e., those with and without the SR), we employ an empirical strategy that utilizes discrete breaks in eligibility along Colombia's continuous poverty-targeting index (called SISBEN, or *Sistema de Identificación de*

[3] Consumers value aspects of medical care distinct from health improvement, however, and supply-side instruments place the onerous burden of knowing patient preferences on health care providers (Hayek 1945).

[4] Importantly, promoting efficiency implies not only curtailing wasteful use, but also increasing the use of traditionally under-utilized preventive and primary care services with positive externalities. For other studies of health insurance in developing countries, see Abel-Smith (1992); Dow, Gertler, Schoeni, Strauss, and Thomas (1997); WHO (2000); WHO Commission on Macroeconomics and Health (2001); Gertler and Solon (2002); Dow, Gonzalez, Rosero-Bixby (2003); Dow and Schmeer (2003); Duflo, Banerjee, and Deaton (2004); Gakidou et. al. (2006); Pauly, Zweifel, Scheffler, Preker, and Bassett (2006); Hughes and Leethongdee (2007); Wagstaff (2007); Wagstaff, Adam and Yu, Shengchao (2007); Odonnell (2008); and Pauly, Blavin, and Meghan (2008).

[5] Only a handful of large Colombian cities actually had more than one insurer during the years we study, and heavily regulated premiums and benefit packages (a departure from textbook managed competition) leave few margins along which plans can compete.

Beneficiarios). We address concerns about widespread manipulation of eligibility (BDO and CCRP 2000, DNP 2001, 2003a, and 2003b, Fresneda 2003, Camacho and Conover 2007) by instrumenting for SR enrollment with simulated eligibility (Hahn, Todd, and Van der Klaauw 2001). To construct this instrument, we calculate SISBEN scores in household surveys not used for actual eligibility determinations. We also estimate and utilize county-specific thresholds used in practice by each of Colombia's local governments (following Chay, McEwan, and Urquiola 2005). A variety of evidence bolsters the validity of our approach.[6]

In general, we find evidence that the SR has succeeded in protecting poor Colombians from financial risk associated with the medical costs of unexpected illness. In particular, SR enrollment appears to have successfully reigned-in large outliers in the right-skewed distribution of medical spending. In doing so, it has provided substantial consumption smoothing benefits as well. Consistent with the ability of high-powered supply-side incentives to provide risk protection without inducing wasteful service use, we also find little evidence of growth in medical care use despite less demand-side cost sharing under the SR.

An important exception is a large increase in the use of preventive health services associated with SR enrollment. Because preventive services are generally free regardless of insurance status, we attribute this increase to high-powered supply-side incentives under the SR. There are important positive externalities associated with preventive care use (both infectious disease externalities and pecuniary externalities for risk pool members), so this increase in preventive care is presumably efficient as well. We also find evidence of some small degree of health improvement and little evidence of other behavioral distortions (either *ex ante* moral hazard or other distortions related to obtaining coverage). We conclude by noting that the full

[6] We have also used another intuitively appealing two-stage least-squares strategy that we discovered ultimately to lack a sufficiently strong first stage. This approach utilizes a geographic discontinuity in SR eligibility occurring along sharply-defined administrative boundaries (*cabecera* boundaries) within each Colombian county.

potential of high-powered supply-side incentives in health insurance contracting has not been realized in Colombia and that they offer additional promise for welfare improvement.

2. Colombia's Subsidized Health Insurance Regime for the Poor

2.1 Overview

Under Law 100 in 1993, Colombia introduced the *Régimen Subsidiado* (or SR), a novel form of publicly-financed health insurance for the poor (Gwatkin et al. 2005, Escobar 2005). Primarily through SR expansion, formal health insurance coverage in Colombia grew from 20% of the population in 1993 to 80% in 2007 (CENDEX 2008). The SR is essentially organized as a system of 'managed competition' (Enthoven 1978a and 1978b). Beneficiaries receive full public subsidies to purchase health insurance from competing public and private health insurance plans. These subsidies are financed by a combination of public resources including payroll taxes and national and local general revenue. These resources are transferred to county governments, which in turn are responsible for eligibility determination, enrollment, and contracting with health plans.

Health plans charge government-regulated premiums and offer a standardized package of benefits (see Appendix 1 for the details of these benefits).[7] Participating health plans also act as group purchasers of health services for their enrollees by contracting with a network of health facilities and clinicians (Section 2.4 describes incentives embedded in these contracts). Because premiums and benefit packages are standardized by law (unlike the classical 'managed competition' model), health plans compete for enrollees on the margins of provider networks and

[7] The benefits package of the SR (*Plan Obligatorio de Salud Subsidiado*) emphasizes coverage for preventive and basic outpatient services, drugs, and some catastrophic care. There is very limited coverage for specialist services, and there are substantial gaps in coverage for hospital care.

service quality. In practice, very few cities had more than one insurer during the years that we study.

2.2 Eligibility for the SR

Eligibility for the SR is determined using a poverty-targeting index called SISBEN (or *Sistema de Identificación de Beneficiarios*). The original SISBEN index consisted of fourteen components measuring different aspects of household well-being (such as housing material, access to public utilities, ownership of durable assets, demographic composition, educational attainment, and labor force participation – for a complete description, see Appendix 2). On each dimension, households are classified according to mutually exclusive, collectively exhaustive categories with varying weights assigned to each category; these weights vary between urban and rural areas. A household's SISBEN score is then calculated by summing points across components. Possible scores range from 0 to 100 (with 0 being the most impoverished) and are divided into six strata. Households scoring in SISBEN strata 1 and 2 (the lowest strata) are eligible for the SR (below 48 in urban areas, below 31 in rural areas).[8]

2.3 Eligibility and Enrollment in Practice

Although eligibility for the SR increases the likelihood of enrollment, neither one necessarily implies the other for at least three reasons: misclassification or manipulation of

[8] SISBEN eligibility shifts abruptly at each county's *cabecera* boundary, an administrative demarcation formally distinguishing urban and rural parts of each county and loosely corresponding to the fringe of public utility infrastructure. Distinct urban and rural SISBEN scales are applied to households on corresponding sides of the boundary, differing both in component parts and in the weighting of response categories for each component. We implemented a research design exploiting these urban/rural index differences, but inconsistent application of the rural index and data limitations prevent us from drawing meaningful conclusions from it. In this paper we therefore focus on urban eligibility.

SISBEN scores, shortfalls in local government revenue, and enrollment that preceded SISBEN enumeration.[9]

First, both local governments and households have incentives to manipulate SISBEN scores. Local governments receive fixed transfers from the national government for each resident they enroll, creating incentives to maximize enrollment. The selective enrollment of key constituents can also provide political benefits (Camacho and Conover 2007). Households prefer enrollment over "uninsurance" as well because co-insurance rates are lower for SR beneficiaries than for those lacking formal insurance. Consistent with both types of incentives, there is evidence of considerable SISBEN score manipulation between 1997 and 2003 (Camacho and Conover 2007).[10]

Second, most local governments lack sufficient revenue to finance the enrollment of all eligible residents. According to law, those with lower SISBEN scores and those belonging to certain targeted groups (such as children under five and pregnant women) are therefore prioritized for enrollment.[11] This means that many counties use *de facto* eligibility thresholds that fall below the uniform national threshold.

Third, some counties began enrolling residents in the SR before all of their residents had been classified using SISBEN. These counties instead used other means-test criteria such as residents' *estrato*, an alternative poverty measure used to establish electricity prices paid by local households.

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[9] Administrative mistakes in the enrollment process are also important.

[10] Using results from the 2005 population census, the Colombian newspaper *El Tiempo* reports that there are more SR enrollees than residents in some counties (*El Tiempo*, October 26, 2006). Camacho and Conover (2007) show that the distribution of official SISBEN scores exhibits both large leftward shifts in density over time and the formation of a mass point just to the left of the national eligibility threshold in urban areas. Neither are present in Colombian household surveys. The former suggests misrepresentation by households, while the latter suggests misrepresentation by enumerators or officials.

[11] The laws formalizing this prioritization are *Acuerdos 244 y 253 del Consejo Nacional de Seguridad Social en Salud*. This prioritization also means that although SISBEN scores are calculated at the level of family "nucleus," individuals within families can vary in enrolment status; we observe this in our household survey data.

In general, these practical considerations have two broad implications for our empirical analyses. One is the necessity of an empirical strategy that addresses manipulation of official SR eligibility and enrollment. Section 3.2 describes our instrumental variables approach of simulating eligibility with household data not used for official eligibility decisions and then instrumenting for enrollment using simulated eligibility. The other is that our first stage regressions (of enrollment on predicted eligibility, as explained in Section 3.2) will be weaker than if eligibility mapped directly onto enrollment (which we address by estimating and utilizing county-specific eligibility thresholds and by controlling for other criteria like *estrato* used for SR enrollment).

2.4 Supply-Side Incentives and Contracting for More Efficient Medical Care Use

Given that not all local markets are served by more than one insurer (and that regulation prevents competition on the basis of premiums or benefits), we emphasize that the SR's key innovations are contracting for more efficient use of medical care via high-powered supply-side incentives and authority to deny coverage for services considered inefficient.[12] More efficient incentives are transmitted through two types of contractual relationships: those between insurers and medical organizations (hospitals and medical groups) and those between organizations and individual clinicians.

There are two basic types of contracts between insurers and organizations under the SR: capitated primary care contracts and fee-for-service specialty care contracts. For primary care, insurers pay organizations (generally public hospitals) fixed amounts per month for all services used by enrollees. These contracts create strong incentives for organizations to constrain total

[12] The ability to deny coverage for inefficient services (termed "utilization review") can reduce wasteful services but does nothing to improve efficiency by promoting under-utilized health services.

spending on primary care. Constraining spending can be accomplished either by promoting preventive service use (reducing the need for other services) or by limiting the use of all services (or both). The former is likely to improve efficiency given preventive care's large positive externalities (both pecuniary and infectious disease-related).[13] The welfare implications of the latter are ambiguous because the use of both efficient and inefficient services may be reduced.

For specialty care, insurers pay organizations (a mixture of hospitals and medical groups in this case) a pre-determined fee for each service provided. These contracts promote the use of all reimbursed services (both efficient and inefficient). However, SR insurers also have the authority to deny coverage for inefficient specialty care on a case-by-case basis, possibly resulting in greater efficiency.

Health care organizations, in turn, must transmit their incentives to individual clinicians. Primary care physicians… <ADD DETAILS OF PRIMARY CARE PHYSICIAN CONTRACTING AND ASSOCIATED INCENTIVES>. Specialist physicians essentially receive fee-for-service payments, but their incentives to over-provide medical care are counterbalanced by insurer denial of coverage for inefficient services.

3. Data and Empirical Strategy

3.1 Data

Our empirical approach requires household survey data containing three types of information: (1) enrollment in the SR, (2) components of the SISBEN index (enabling us to simulate SR eligibility), and (3) potential behavioral responses and outcomes of interest (both welfare-improving and distortionary). There are two candidate Colombian household surveys

[13] Even in this case, however, organizational incentives are not perfectly aligned with efficiency in medical care: some efficient care is not promoted because it is not cost-saving.

that meet these criteria: the *Encuestas de Calidad de Vida* (ECV) and the Demographic and Health Surveys (DHS).[14] The ECVs are nationally-representative household surveys designed to measure socio-economic well-being and "quality of life," broadly defined. The DHS data reports detailed fertility, health, and socio-economic information for nationally-representative samples of fertile age women (defined as ages 15-49) and their households. Because the *de facto* implementation of the SR occurred in 1996/1997, we use the 2003 ECV and the 2005 DHS for our analyses.[15] Table 1 shows descriptive statistics by type of behavior/outcome for the full samples as well as those with and without SR coverage.

As our empirical strategy requires, we calculate household-level SISBEN scores to simulate SR eligibility because simulated eligibility should not reflect misrepresentation of household characteristics as official SISBEN scores do (Camacho and Conover 2007). However, not all household surveys contain all necessary components of the SISBEN index. Appendix 2 provides a complete description of the SISBEN components present in each survey as well as our ordered-probit procedures for imputing values for a small number of missing components.[16]

3.2 Empirical Strategy

Instrumenting for Enrollment with Simulated Eligibility

In principle, the SISBEN index's SR eligibility threshold (at score 48 in urban areas) can be used to study behavioral responses associated with SR enrollment. This discontinuity induces

[14] Official SISBEN classification data (used for eligibility determination) do not contain outcomes of interest and are unattractive for our purposes given manipulation evidence of manipulation (Camacho and Conover 2007).
[15] There was also a Colombian DHS survey conducted in 2000. Our results when pooling the 2000 and 2005 DHS are generally comparable (available upon request), but because the 2000 wave contains many fewer outcomes of interest than the 2005 wave, so we choose not to emphasize results from the pooled sample. Similar considerations apply to the 1997 wave of the ECV.
[16] In theory, SISBEN scores should be calculated at the family (or "nucleus") level. However, we treat entire households as families given reports that SISBEN enumerators adopted this definition in practice due to difficulties in conforming to the technical definition.

an abrupt shift in eligibility (and enrollment) along otherwise smooth distributions of household characteristics; coincident shifts in behaviors and outcomes can reasonably be linked to the program. However, selection into eligibility (and enrollment) according to unobserved household characteristics as discussed in Section 2.3 is likely to bias the estimates of interest (McCrary 2008).

To circumvent this difficulty, we employ an instrumental variables strategy closely resembling one proposed by Hahn, Todd, and Van der Klaauw (2001). Conceptually, we seek to reconstruct 'true' SISBEN scores when both official SISBEN scores and observed SR enrollment reflect manipulation. To do so, we calculate SISBEN scores for each household in the ECV and DHS data and then use calculated scores to instrument for SR enrollment (for prominent examples of simulated instruments, see Currie and Gruber (1996), and Cutler and Gruber (1996), and Hoxby (2001)).[17] A virtue of this approach is that neither ECV nor DHS data is used for eligibility determinations.

Using urban households with simulated SISBEN scores near the urban eligibility threshold,[18] we could in principle begin by estimating the following first-stage equation for individuals *i*:

$$(1) \qquad enroll_i = \alpha + \gamma below_i + \beta SISBEN_i + \Sigma_k \delta_k estrato_{ik} + \varepsilon_i,$$

where *enroll* is an indicator for whether or not household *i* is enrolled in the SR, *below* is an indicator for simulated SISBEN score lying below the eligibility threshold, *SISBEN* is simulated SISBEN score, and *estrato* is a dummy variable for an *estrato* category. Using Two-Stage Least Squares (2SLS), we could then estimate the following second-stage equation:

[17] We emphasize "old" SISBEN scores – those calculated using the official scale in effect between the beginning of the SR and 2003. Enrollees eligible only under the old scale were not disenrolled with the introduction of the "new scale," and the old (but not the new) eligibility discontinuity is evident in the 2005 DHS.

[18] We do not use rural households to examine the rural threshold between SISBEN strata 2 and 3 because of inconsistent application of the rural scale.

(2) $outcome_i = \varphi + \lambda enroll_i + \theta SISBEN_i + \Sigma_k \pi_k estrato_{ik} + \xi_i$,

instrumeting for *enroll* with *below* using equation (1). The relationship between behavioral outcomes of interest (*outcome*) and SR enrollment would then be captured by estimates of the parameter λ.

Estimating County-Specific Eligibility Thresholds

As described in Section 2.3, financial shortfalls led many Colombian counties to use SR eligibility thresholds at SISBEN scores below the official national threshold.[19] The implication of this for estimating equations (1) and (2) using the official threshold is that our first stage relationship will be weaker than necessary, compounding limitations to first stage strength posed by the other issues raised in Section 2.3. We therefore use county-specific eligibility thresholds. In addition to improving the strength of our first stage, this approach offers another key benefit: because some local governments use the official national threshold for other public benefits (such as public utility subsidies), changes in outcomes observed at county thresholds will not reflect behavioral responses to other public programs.

Exact county-specific eligibility thresholds are unknown, so we estimate them following Chay, McEwan, and Urquiola (2005). Specifically, using our full samples, we establish county-specific breaks in SR eligibility at the SISBEN score that maximize the goodness-of-fit of a model of SR enrollment as a function of a dichotomous indicator for whether or not a household's score falls below the threshold.[20] This approach establishes thresholds that maximize the percentage of individuals correctly classified as eligible in each county.

[19] Bogotá adopted a threshold above the uniform national one, first using SISBEN score 50 and later SISBEN score 52.

[20] We also constrain estimated thresholds to fall below the uniform national threshold.

We then use county-specific thresholds to re-code the variable *below* for each individual *i* in each Colombian county *c* and estimate the following equation:

(3) $enroll_{ic} = \alpha + \gamma below_{ic} + \beta SISBEN_i + \varphi SISBEN\_diff_{ic} + \Sigma_k \delta_k estrato_{ik} + \mu_c + \varepsilon_{ic}$,

where *below* is now an indicator for whether or not individual *i*'s simulated SISBEN score falls below the eligibility threshold in the individual's county *c*, *SISBEN_diff* is the difference between an individual's simulated SISBEN score and the estimated eligibility threshold in the individual's county, μ_c represents county fixed effects (allowing us to focus on within-county variation in simulated eligibility), and all other variables are defined as in equation (1). To adhere transparently to the identifying assumption that individuals with simulated SISBEN scores very near the threshold are comparable with the exception of their eligibility, we conservatively focus on individuals whose calculated scores lie within two index points of the county-specific cutoff (our main estimates persist across various bandwidths, as discussed in Section 4.6).

Figure 1 uses ECV and DHS data to show SR enrollment and "uninsurance" by simulated SISBEN score relative to county-specific eligibility thresholds. Each county's threshold is normalized to zero, and the figure then shows means and 95% confidence intervals for each SISBEN index integer relative to the threshold as well as non-parametric kernel density plots on either side. The figure illustrates large discrete increases in the probability of enrollment and concomitant decreases in the probability of uninsurance at the threshold ranging between 25 to 30 percentage points.

Using our re-coded variable *below* to instrument for *enroll*, we then estimate the following equation by 2SLS:

(4) $outcome_{ic} = \varphi + \lambda enroll_{ic} + \theta SISBEN_i + \psi SISBEN\_diff_{ic} + \Sigma_k \pi_k estrato_{ik} + \mu_c + \xi_{ic}$,

where the estimate of interest is the estimate of λ. Section 4.6 shows that our results are not sensitive to alternative ways of conditioning on *SISBEN* and *SISBEN_diff* (with slopes that differ on opposite sides of the threshold, higher-order SISBEN score polynomials, etc.).[21]

4. Results

In this section we present results by type of behavioral response to the SR. We begin by investigating the effectiveness of health insurance in accomplishing its primary objectives: protecting households against financial risk and helping them to smooth their consumption. Next, we examine changes in medical care use (including changes by service type) under the SR. We then consider how changes in service use may have influenced health outcomes, providing some insight into whether or not consumption changes are efficient. To investigate other possible behavioral distortions, we also examine changes in private health investments associated with SR enrollment (*ex ante* moral hazard) as well as distortions related to obtaining coverage. Finally we present evidence on the validity of our empirical strategy.

4.1 Consumption Smoothing, Protection against the Medical Costs of Unexpected Illness, and Portfolio Choice

A primary appeal of the SR is its potential to improve efficiency through supply-side incentives without sacrificing risk-protection. We therefore first examine the relationship between SR enrollment and variability both in medical care spending and in household consumption (accounting for mean differences associated with enrollment status). To construct variability measures, we begin by calculating mean household spending (and consumption

[21] We calculate our standard errors by relaxing the assumption that disturbance terms are independent and identically-distributed within households, the level at which the treatment of interest (eligibility based on the SISBEN index) is assigned.

expenditures, etc.) among households on either side of the eligibility threshold. For each individual/household in our sample, we then measure the difference between individual/household spending and the corresponding mean among all individuals/households on the same side of the threshold. Our variability measures are the absolute values of these differences.

Panel A of Table 2 presents econometric results obtained by estimating equations (3) and (4) for these variability measures. The first row presents IV estimates for SR enrollment, and the second row reports intent-to-treat estimates (ITT) for simulated SR eligibility. <NEED TO ADD ASTERISKS TO ITT ESTIMATES> In general, we find that the variability of nearly all measures of health care spending and household consumption is significantly lower for SR enrollees (including total medical spending and spending on outpatient and inpatient care as well as expenditures on education, food, and overall consumption). Consistent with insurance through the SR reigning-in large outliers in the right-skewed distribution of medical spending (those requiring cancer treatment, for example – a benefit of the SR), medical spending variability generally fell by more than the mean of the variability measure (variability in total, inpatient, and outpatient spending fell by 261%, 377%, and 214% of the respective means).[22] Appendix 3 Figure 1 graphically shows medical spending and consumption expenditure variability across county-specific eligibility thresholds (essentially, graphical versions of our intent-to-treat analyses).

We then examine shifts in the distribution of medical spending associated both with simulated eligibility and SR enrollment in greater detail. Panel A of Figure 2 first shows the distribution of medical spending separately for those falling above and those falling below

[22] Among members of our sample enrolled in the SR, mean variability values (in Colombian pesos) are 5,739, 1,597, and 4,408. Dividing the corresponding point estimates shown in Table 2 Panel A by these values: -14,969/5,739= -261%; -6,022/1,597=-377%; and -9,448/4,408=-214%.

county-specific thresholds (using our sample of those within two index points of the cutoff). Both distributions are sharply right-skewed, but there is more mass in the left tail (and less mass at greater values of spending) among those below the threshold.[23] Panel B shows the difference between the two distributions (density among those below the threshold minus density among those above the threshold at every level of spending). This difference is positive in the left tail of the distribution and then negative at larger spending levels. Both panels suggest that simulated SR eligibility is associated with less dispersion in medical spending.

<NEXT, GRAPHS OF SPENDING BY PREDICTED QUARTILE OF SR ENROLLMENT – AND THEN QUANTILE REGRESSION RESULTS>

Overall, our findings thus far suggest that SR enrollment provides substantial risk protection and consumption smoothing benefits. By reducing household exposure to unpredictable medical costs associated with illness, SR enrollment could also produce meaningful changes in the composition of household asset portfolios. Specifically, it may increase investments not previously undertaken because of costly informal risk-management activities (such as precautionary saving). Panel B of Table 2 presents estimates for durable goods and other assets. In general, it shows that SR enrollment is associated with living in a house having more rooms and being more likely to have durable goods (including refrigerators, air conditioners, and televisions), suggesting that greater risk protection through the SR has increased spending on these items.

4.2 Medical Care Use

[23] For the sake of scale, we do not display spending greater than 100,000 Colombian pesos. The distributions of the two groups are similar at high levels of spending and contain very little mass.

If the SR has effectively provided risk-protection, the next question is whether or not it has been able to do so without inducing wasteful consumption of medical services.[24] To investigate how service use has changed with SR enrollment, Table 3 reports estimates for different types of medical care use obtained from equations (3) and (4) (and Appendix 3 Figure 2 shows graphical versions of the intent-to-treat analyses). In general, it suggests a substantial increase in the use of preventive health care services. SR enrollment is associated with a 29 percentage point increase in the probability of a preventive doctor visit in the past year (a 50% increase). Additionally, children enrolled in the SR had 1.24 more growth-monitoring and well-care visits in the past year than their "uninsured" peers (nearly doubling the number of visits). Alternatively, we find no evidence of increases in the use of costly curative services (in-patient care, specialty care for chronic diseases, or many other curative services, for example). The single exception is that we estimate a 14 percentage point increase in the probability of having visited a physician in the past 30 days because of a health problem.[25]

There are two general points about these medical care use estimates that are worth highlighting. One is that because most preventive medical care is free for Colombians regardless of insurance status (well child care and growth development monitoring, for example), these increases must necessarily reflect high-powered supply-side incentives under the SR (because of capitated primary care payments, for example) rather than lower demand-side cost sharing.

The other is that the increase in medical care consumption under the SR is likely to improve welfare. Preventive health care has important positive externalities – not only because it reduces rates of infectious disease transmission, but also because it can reduce costly curative

[24] Although the welfare implications of increased health service use under insurance are theoretically ambiguous, policymakers often view health insurance expansions as a desirable means of increasing the use of medical care.
[25] The dependent variable is defined to be 0 for those not having a health problem; conditioning on illness is undesirable because the SR can influence health (we present some evidence of this in Section 4.3).

care costs borne by others through risk pools. Preventive services are therefore generally under-used, so we interpret this increase as efficient. Although we generally find no increase in costly curative services, the exception we find for physician visits has ambiguous welfare consequences. An increase in curative medical care can be decomposed into income and substitution effects; only the latter reflects *ex post* moral hazard and is therefore inefficient (Cutler 2002). Although we are unable to separate these effects, we suspect the income effect to be large in developing countries,[26] and primary care services are likely to be under-used for reasons similar to those discussed for preventive care.

4.3 Health Outcomes

As with medical care use, the net welfare implications of health improvement under insurance are also theoretically ambiguous (although health improvement assumes a central role in policy discussions about health insurance) (Levy and Meltzer 2004). Table 4 shows estimates of λ for a range of health outcomes obtained from equations (3) and (4). For infants and young children there is no evidence of improvement across a variety of anthropometric measures (birth weight; child weight; child height; child BMI). However, SR enrollment is associated with reductions in the number of days absent from usual activities due to illness in the past month for both children and adults (1.3 days and 0.42 days, respectively) as well as a 35 percentage point reduction in the self-reported incidence of cough, fever, or diarrhea among children in the preceding two weeks.[27] Appendix 3 Figure 3 shows graphical versions of the intent-to-treat analyses for health outcomes.

[26] See also Besley (1988), Ma and Riordan (2002), and Vera-Hernandez (2003) on the importance of income effects in determining the optimal level of health care use.

[27] Table 5 also shows a reduction in self-reported health qualifying as "excellent" (but no change in other subjective self-assessed categories), presumably reflecting greater contact with clinicians.

Overall, Table 4 provides some tentative evidence of health improvement associated with SR enrollment (although the importance of this improvement uncertain). However, given the socially desirable increases in preventive care and the general absence of wasteful growth in the use of other services, the health improvement that we estimate is likely to be efficient.

4.4 *Ex Ante* Moral Hazard and Eligibility-Related Behavioral Distortions

Protection from financial risk associated with unexpected illness weakens private incentives for costly health protection (*ex ante* moral hazard) (Pauly 1968). Because we find evidence of greater risk protection, we investigate how protective private health behaviors not directly linked to medical care change with SR enrollment.[28] As Table 5 and Figure 4 of Appendix 3 show, however, we find no change in handwashing, breastfeeding, or maternal investments in fetal health (alcohol, drug, or tobacco use during pregnancy; or prenatal dietary supplementation with iron, calcium, or folic acid), suggesting little *ex ante* moral hazard associated with SR enrollment.

Manipulation of official SISBEN scores suggests that Colombians perceive benefits of SR enrollment, so we also investigate the possibility of behavioral distortions to increase the likelihood of SR eligibility or enrollment. Potential distortions include avoidance of formal sector employment (which requires enrollment in Colombia's employment-based *Regimen Contributivo* instead and precludes SR participation) and distortions related to prioritization for

[28] More generally, private health behaviors and public health services could theoretically be either complements or substitutes for publicly provided health services. While reductions in the price of medical care may raise the return to private health investments given competing risks, cheaper health services could also instead 'crowd-out' costly private health behaviors (Dow, Holmes, Philipson, and Sala-i-Martin 1999, Murphy and Topel 2003).

SR enrollment conditional on being classified as eligible (principally having infants or young children or being a single mother).[29]

To investigate the possibility of these distortions, Table 5 presents intent-to-treat (ITT) estimates obtained by estimating equation (3) with dichotomous indicators for *Regimen Contributivo* enrollment, other forms of health insurance (those for the military, police officers, and certain industrial groups like oil industry workers, for example), and "uninsurance" as dependent variables. The estimates for *Regimen Contributivo* and other insurance are not statistically meaningful, suggesting that the SR does not "crowd-out" other forms of insurance (and that our comparisons throughout the paper are between SR enrollees and the "uninsured"). We also re-estimate equations (3) and (4) for pregnancy, contraceptive use, and marital status but find no meaningful relationship between them and SR enrollment. Taken together, there is no clear evidence of eligibility-related behavioral distortions linked to the SR. An important implication of this finding is that manipulation of SR eligibility is likely to be due exclusively to misreporting rather than to actual behavior change.

4.6 Balance across Discontinuities and Robustness

The results presented in Sections 4.1 through 4.5 require that absent the SR, eligible and ineligible (according to our SISBEN score calculations) in the vicinity of each county's threshold are comparable. To probe this assumption further, Table 6 first presents results obtained by estimating equations (3) and (4) for individual characteristics that could not plausibly change in response to SR enrollment (such as age or educational attainment for adults). Consistent with

[29] Formal sector employees are mandated to enroll in an employment-based health insurance system called *Regimen Contributivo*. This mandate holds even for individuals with SISBEN scores falling below the SISBEN eligibility threshold for the SR.

our assumption, we find no statistically meaningful estimates (Appendix 3 Figure 5 shows this graphically as well).

Next, we explore whether or not out SR enrollment results might instead be attributable to other public programs (including housing and job training programs) that also use the SISBEN index for eligibility. In principle, because we estimate and use *de facto* county-specific thresholds that fall below the uniform national threshold, this concern is not applicable (because other public programs use the national threshold). To verify this, we re-estimate equations (3) and (4) using a dichotomous indicator for participation in other programs as the dependent in equation (4). Table 6 and Appendix 3 Figure 5 present these results, suggesting that participation in other programs is balanced across county-specific SR eligibility thresholds.

We then use household survey data from before the 1997 implementation of the SR (the 1995 Colombian DHS) to conduct falsification exercises. Specifically, we use both the uniform national eligibility threshold our county-specific thresholds to code eligibility and conduct intent-to-treat analyses for a wide range of relevant outcomes. Appendix 4 presents these results; we find no evidence of meaningful relationships between falsified SR eligibility and these outcomes.
<ADD APPENDIX 4 TABLES>

Finally, to investigate the robustness of our results, we estimate a variety of alternative forms of our main estimating equations. Specifically, we re-estimate equations (3) and (4) using SISBEN score bandwidths ranging between three and six; we estimate these equations controlling for higher order polynomials of SISBEN score (including squared, cubic, and fourth power terms); we estimate equations interacting SISBEN score with eligibility (allowing for different SISBEN score gradients on either side of the eligibility threshold); and we estimate equations (3) and (4) without county fixed effects. As the tables in Appendix 5 show, our results

are generally robust across these alternative bandwidths and specifications. <ADD ADDITIONAL ALTERNATIVE BANDWIDTH ESTIMATES>

5. Conclusion

This paper presents new evidence that the SR has succeeded in protecting the poor from financial risk due to unanticipated medical care spending – and in doing so, it has provided commensurate consumption smoothing benefits as well. Importantly, the introduction of high-powered supply-side incentives embedded in new forms of health insurance contracting appears to have circumvented the otherwise inevitable trade-off between risk protection and efficient consumer incentives – a tension inherent in exclusive reliance on demand-side cost sharing (Zeckhauser 1970). Specifically, we find little evidence that the SR induces wasteful medical care use despite less demand-side cost sharing than required for "uninsured." We also show that the SR is associated with large increases in preventive health service use. Given the positive externalities generated by the use of preventive care, this increase in preventive services can reasonably be interpreted as efficient.

We conclude by observing that Colombia has yet to realize the full welfare-improving potential of higher-powered supply-side incentives in health insurance contracting. A variety of political concessions followed the creation of the SR – including exemptions from the end of government subsidies as well as requirements that insurers contract with public facilities for a minimum share of the services that they finance. These concessions may have limited the ability of health plans to pay medical care providers in ways that encourage better quality and lower cost services.

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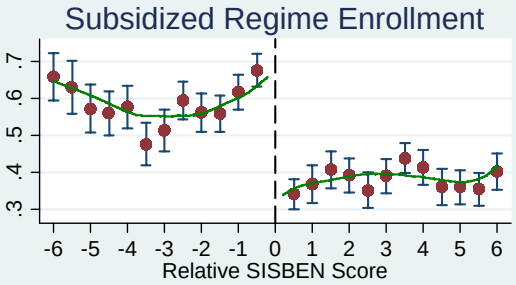
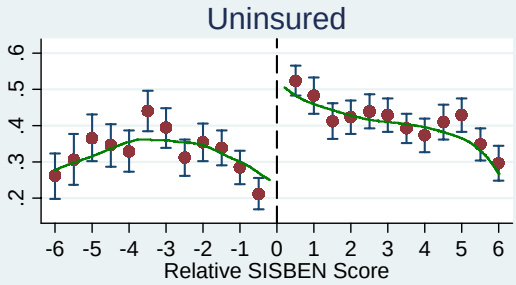
Figure 1: Subsidized Regime Enrollment and 'Uninsurance' across SISBEN Eligibility Thresholds



Data: DHS WOMEN 2005



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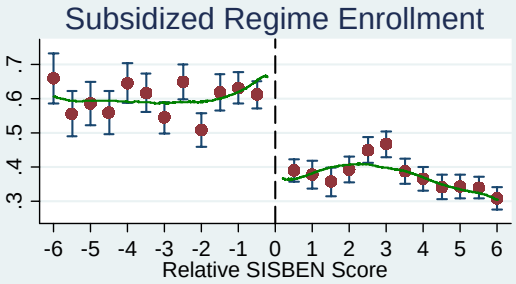

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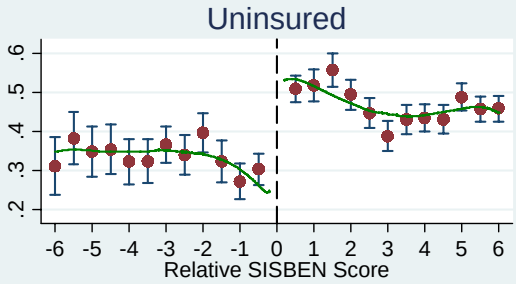


Data: ECV 2003

Figure 2

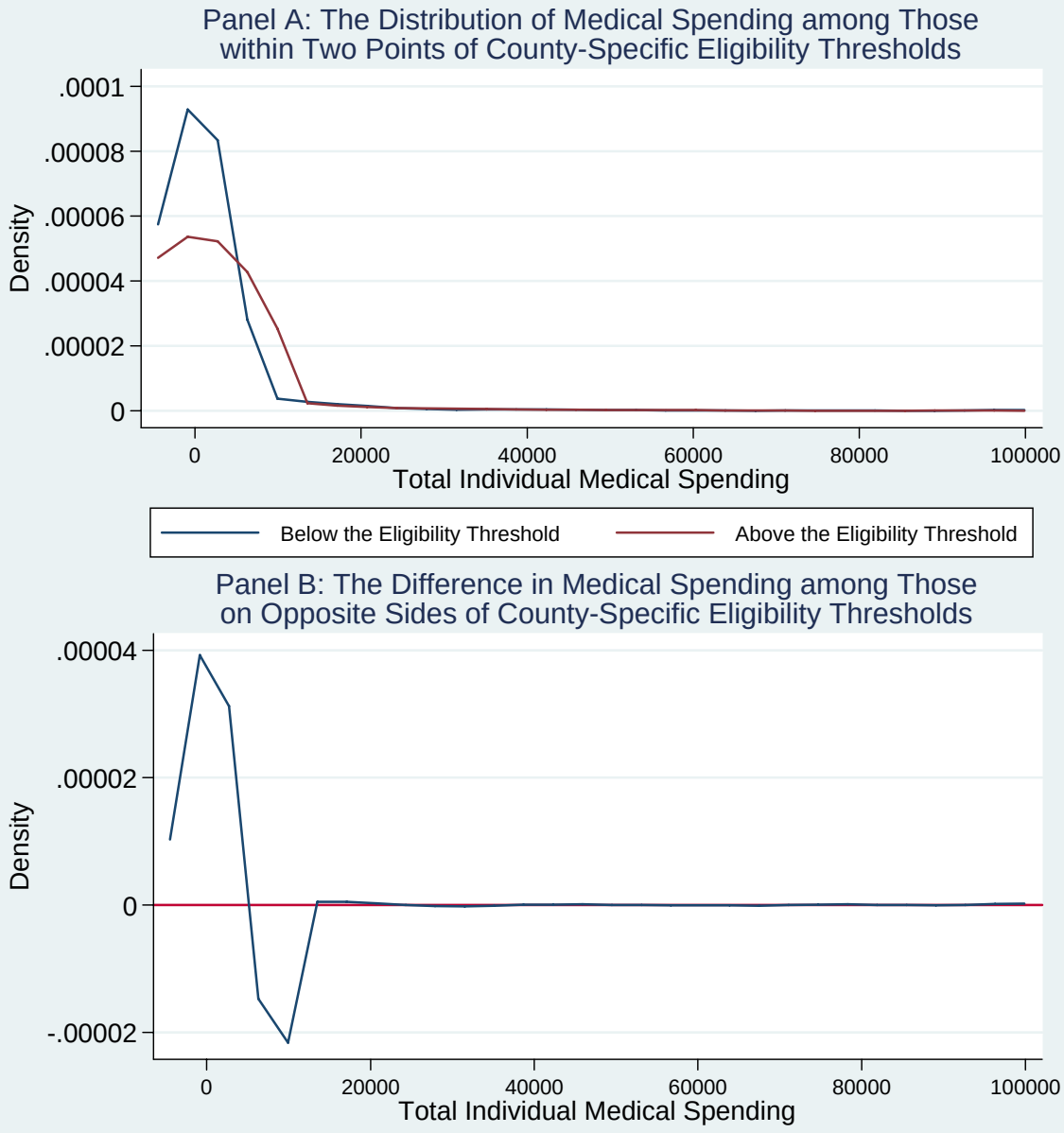

Panel A: The Distribution of Medical Spending among Those within Two Points of County-Specific Eligibility Thresholds
Density
.0001
.00008
.00006
.00004
.00002
0
0
20000
40000
60000
80000
100000
Total Individual Medical Spending
Below the Eligibility Threshold
Above the Eligibility Threshold
Panel B: The Difference in Medical Spending among Those on Opposite Sides of County-Specific Eligibility Thresholds
Density
.00004
.00002
0
-.00002
0
20000
40000
60000
80000
100000
Total Individual Medical Spending

TABLE 1:
DESCRIPTIVE STATISTICS

	Total			Not Enrolled in the Subsidized Regime			Enrolled in the Subsidized Regime			
Variable:	Mean	SD	N	Mean	SD	N	Mean	SD	N	Data Source
Risk Protection, Consumption Smoothing, and Portfolio Choice										
Total Individual Medical Spending	5,525	227,104	77,291	6,276	253,676	61,789	2,533	25,401	15,502	ECV
Individual Inpatient Medical Spending	1,163	25,036	77,349	1,289	27,633	61,836	659	9,017	15,513	ECV
Individual Outpatient Medical Spending	4,369	225,321	77,417	4,996	251,739	61,886	1,871	23,320	15,531	ECV
Out-of-Pocket Spending for Chronic Disease Medication	10,937	48,091	77,470	12,433	51,392	61,928	4,976	30,982	15,542	ECV
Individual Education Spending	17,048	76,882	63,872	19,731	85,586	50,725	6,696	17,891	13,147	ECV
Household Education Spending	65,238	175,466	76,984	74,291	193,883	61,503	29,273	46,317	15,481	ECV
Total Spending on Food	367,649	325,465	74,378	389,377	347,222	59,172	283,096	199,981	15,206	ECV
Total Monthly Expenditure	1,290,827	1,273,455	23,888	1,364,127	1,322,066	21,218	708,323	486,980	2,670	ECV
Number of Rooms	2.39	1.08	38,015	2.49	1.09	25,510	2.18	1.03	12,505	DHS
Wood Floors	0.06	0.24	38,015	0.05	0.22	25,510	0.09	0.28	12,505	DHS
Cement Floors	0.47	0.50	38,015	0.41	0.49	25,510	0.58	0.49	12,505	DHS
Tile/Brick/Carpet Floors	0.40	0.49	38,015	0.49	0.50	25,510	0.21	0.41	12,505	DHS
Has Washing Machine	0.24	0.43	38,015	0.31	0.46	25,510	0.10	0.30	12,505	DHS
Has Refigerator	0.70	0.46	38,015	0.77	0.42	25,510	0.56	0.50	12,505	DHS
Has Air Conditioner or Fan	0.47	0.50	38,015	0.50	0.50	25,510	0.40	0.49	12,505	DHS
Has TV	0.86	0.34	38,015	0.90	0.31	25,510	0.80	0.40	12,505	DHS
Total Number of Appliances	2.76	1.20	38,015	2.95	1.12	25,510	2.37	1.28	12,505	DHS
Has Car	0.09	0.28	38,015	0.11	0.32	25,510	0.03	0.17	12,505	DHS
Has Radio	0.68	0.47	38,015	0.70	0.46	25,510	0.64	0.48	12,505	DHS
Medical Care Use										
Preventive Physician Visit	0.56	0.50	77,475	0.57	0.49	61,933	0.53	0.50	15,542	ECV
Preventive Dentist Visit	0.42	0.49	77,475	0.44	0.50	61,933	0.32	0.47	15,542	ECV
Any Physician Visit	0.07	0.26	77,475	0.07	0.25	61,933	0.08	0.27	15,542	ECV
Any Physician or Nurse Visit	0.07	0.26	77,475	0.07	0.26	61,933	0.08	0.28	15,542	ECV
Waiting Time for Physician Visit (Days)	14.34	29.19	5,530	15.79	30.80	4,252	9.53	22.39	1,278	ECV
Hospitalization	0.07	0.25	77,475	0.07	0.25	61,933	0.07	0.26	15,542	ECV
Medical Visit for Chronic Disease	0.60	0.49	10,923	0.61	0.49	8,518	0.58	0.49	2,405	ECV
Medical Check-up Following Birth	0.54	0.50	10,784	0.56	0.50	6,745	0.49	0.50	4,039	DHS
Tetanus Vaccination at Birth	0.90	0.30	9,824	0.90	0.30	6,853	0.91	0.28	2,971	DHS
Medical Care for Child Diarrhea	0.33	0.47	1,994	0.30	0.46	1,330	0.37	0.48	664	DHS
CurativeCare Use Conditional on Illness	0.46	0.50	7,818	0.45	0.50	5,306	0.48	0.50	2,512	DHS
Curative Care Use Not Conditional on Health Status	0.29	0.45	12,639	0.28	0.45	8,615	0.30	0.46	4,024	DHS
Growth and Development Program Registration	0.47	0.50	12,707	0.43	0.49	8,661	0.55	0.50	4,046	DHS
Has Growth and Development Card	0.42	0.49	12,707	0.38	0.49	8,661	0.51	0.50	4,046	DHS
Number of Growth Development Checks Last Year	1.14	1.86	12,691	1.06	1.87	8,650	1.31	1.84	4,041	DHS
Health										
Women's BMI	24.41	4.80	35,321	24.39	4.75	23,581	24.45	4.89	11,740	DHS
Child BMI	16.24	1.72	11,503	16.25	1.77	7,826	16.22	1.62	3,677	DHS
Birthweight (KG)	11.93	3.73	11,545	11.73	3.86	7,855	12.37	3.41	3,690	DHS
Child Days Lost to Illness	0.64	5.01	77,475	0.61	4.91	61,933	0.75	5.39	15,542	ECV
Adult Activity Days Lost	0.60	1.95	12,639	0.60	1.97	8,615	0.60	1.90	4,024	DHS
Chronic Disease	0.14	0.35	77,475	0.14	0.34	61,933	0.15	0.36	15,542	ECV
Child Diarrhea Last Two Weeks	0.16	0.36	12,689	0.15	0.36	8,648	0.16	0.37	4,041	DHS
Child Fever Last Two Weeks	0.26	0.44	12,687	0.26	0.44	8,649	0.27	0.44	4,038	DHS
Child Cough Last Two Weeks	0.41	0.49	12,690	0.40	0.49	8,649	0.41	0.49	4,041	DHS
Cough, Fever Diarrhea	0.53	0.50	12,684	0.53	0.50	8,646	0.54	0.50	4,038	
Any Health Problem	0.62	0.49	12,639	0.62	0.49	8,615	0.62	0.48	4,024	DHS
Excellent Self-Reported Health	0.11	0.31	77,475	0.12	0.32	61,933	0.05	0.22	15,542	ECV
Good Self-Reported Health	0.74	0.44	77,475	0.77	0.42	61,933	0.64	0.48	15,542	ECV
Fair Self-Reported Health	0.97	0.17	77,475	0.98	0.15	61,933	0.95	0.21	15,542	ECV
Behavioral Distortions										
Drank Alcohol during Pregnancy	0.10	0.30	10,784	0.10	0.31	6,745	0.10	0.30	4,039	DHS
Number of Drinks per Week during Pregnancy	1.92	7.89	1,110	1.76	7.84	703	2.20	7.99	407	DHS
Months Child Breastfed	12.05	9.70	10,355	11.18	9.38	7,224	14.04	10.12	3,131	DHS
Folic Acid During Pregnancy	0.54	0.50	10,665	0.56	0.50	6,673	0.50	0.50	3,992	DHS
Number Months Folic Acid during Pregnancy	4.19	2.46	5,527	4.35	2.47	3,596	3.91	2.44	1,931	DHS
Handwashing	0.59	0.49	7,076	0.57	0.50	5,043	0.66	0.48	2,033	DHS
Ever Married	0.63	0.48	38,015	0.63	0.48	25,510	0.64	0.48	12,505	DHS
Current Contraceptive Use	0.51	0.50	38,015	0.51	0.50	25,510	0.51	0.50	12,505	DHS
Currently Pregnant	0.04	0.20	38,015	0.04	0.20	25,510	0.04	0.21	12,505	DHS
Children Ever Born	1.72	1.90	38,015	1.58	1.75	25,510	2.02	2.13	12,505	DHS
Household Head Employed	0.36	0.48	38,015	0.40	0.49	25,510	0.29	0.46	12,505	DHS
Contributory Regime Enrollment	0.33	0.47	38,015	0.49	0.50	25,510	0.00	0.00	12,505	DHS
Other Health Insurance	0.03	0.17	38,015	0.05	0.21	25,510	0.00	0.00	12,505	DHS
Uninsured	0.31	0.46	38,015	0.46	0.50	25,510	0.00	0.00	12,505	DHS
Contributory Regime Enrollment	0.44	0.50	77,475	0.55	0.50	61,933	0.00	0.00	15,542	ECV
Other Health Insurance	0.04	0.19	77,475	0.04	0.21	61,933	0.00	0.00	15,542	ECV
Uninsured	0.32	0.47	77,475	0.40	0.49	61,933	0.00	0.00	15,542	ECV
Balance										
Household Head Age	45.04	13.61	38,006	44.99	13.61	25,501	45.16	13.60	12,505	DHS
Completed Elementary School	0.14	0.35	37,976	0.11	0.32	25,478	0.19	0.39	12,498	DHS
Completed Secondary School	0.22	0.41	37,976	0.24	0.43	25,478	0.17	0.38	12,498	DHS
Household Head Completed Elementary School	0.20	0.40	37,230	0.19	0.39	24,981	0.23	0.42	12,249	DHS
Household Head Completed Secondary School	0.16	0.37	37,230	0.19	0.39	24,981	0.10	0.30	12,249	DHS
Services from Bienstar Familiar	0.12	0.33	77,475	0.11	0.31	61,933	0.19	0.40	15,542	ECV
Benefits to Buy House	0.01	0.07	77,475	0.00	0.07	61,933	0.01	0.09	15,542	ECV
Attended Training	0.12	0.32	59,613	0.13	0.34	48,281	0.05	0.21	11,332	ECV

TABLE 2:
RISK PROTECTION, CONSUMPTION SMOOTHING, AND PORTFOLIO CHOICE

Panel A: Risk Protection and Consumption Smoothing

Outcome:	Variability of Total Individual Medical Spending	Variability of Individual Inpatient Medical Spending	Variability of Individual Outpatient Medical Spending	Variability of Out-of-Pocket Spending for Chronic Disease Medication	Variability of Individual Education Spending	Variability of Household Education Spending	Variability of Total Spending on Food	Variability of Total Monthly Expenditure
IV Estimate, Subsidized Regime Enrollment	-14,969***	-6,022**	-9,448**	-4,141	-27,213***	-39,011**	-134,571*	-1,564,000***
	(5,257)	(2,364)	(4,194)	(8,725)	(6,224)	(18,477)	(69,342)	(552,670)
Intent to Treat Estimate, Subsidized Regime Enrollment	-3,769	-1,511	-2,379	-1,039	-6,485	-9,793	-34,334	-472,845
	(-1,145)	(-540)	(-961)	(-2,180)	(-904)	(-4,561)	(-16,738)	(-81,935)
Below Eligibility Threshold, First Stage Estimate (OLS)	0.26***	0.26***	0.26***	0.26***	0.25***	0.26***	0.27***	0.41***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.11)
First Stage F-Statistic (OLS)	33.72	33.52	33.74	33.54	29.15	33.54	34.15	10.24
Observations	6,238	6,242	6,253	6,257	5,249	6,257	6,075	1,395
Average Value Outcome for People with Subsidiado	5,739	1,597	4,408	12,190	13,752	40,407	164,499	522,827
Data Source	ECV	ECV	ECV	ECV	ECV	ECV	ECV	ECV

Panel B: Portfolio Choice

Outcome:	Number of Rooms	Wood Floors	Cement Floors	Tile/Brick/Carpet Floors	Has Washing Machine	Has Refigerator	Has Air Conditioner or Fan	Has TV	Total Number of Appliances	Has Car	Has Radio
IV Estimate, Subsidized Regime Enrollment	0.67***	-0.0001	-0.09	0.07	0.10	0.20*	0.14*	0.14*	0.50**	0.07	0.14
	(0.25)	(0.05)	(0.10)	(0.08)	(0.08)	(0.11)	(0.07)	(0.08)	(0.24)	(0.04)	(0.11)
Intent to Treat Estimate, Subsidized Regime Enrollment	0.27***	0.00	-0.04	0.03	0.04	0.08*	0.06**	0.06*	0.20**	0.03*	0.05
	(0.10)	(-0.02)	(-0.04)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.09)	(0.02)	(0.04)
Below Eligibility Threshold, First Stage Estimate (OLS)	0.40***	0.40***	0.40***	0.40***	0.40***	0.40***	0.40***	0.40***	0.40***	0.40***	0.40***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
First Stage F-Statistic (OLS)	110	110	110	110	110	110	110	110	110	110	110
Observations	3,276	3,276	3,276	3,276	3,276	3,276	3,276	3,276	3,276	3,276	3,276
Average Value Outcome for People with Subsidiado	2.17	0.07	0.70	0.19	0.10	0.62	0.46	0.84	2.56	0.02	0.61
Data Source	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS

Standard errors clustered at the household level shown in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Intention to treat is computed using Dprobit for discrete outcomes

TABLE 3:
MEDICAL CARE USE

Outcome:	Preventive Physician Visit	Preventive Dentist Visit	Number of Growth Dev. Checks Last Year	Growth and Dev. Program Registration	Has Growth and Dev. Card	Waiting Time for Physician Visit (Days)	Hospital Stay	Medical Visit for Chronic Disease	Medical Check-up Following Birth	Medical Care for Child Diarrhea	Curative Care Use Conditional on Illness	Curative Use not Conditional on Health Status	Any Physician Visit	Any Physician or Nurse Visit
IV Estimate, Subsidized Regime Enrollment	0.29*	0.03	1.24*	0.21	0.20	-13.44	-0.04	0.51	0.01	-1.62	0.11	-0.05	0.14**	0.13**
	(0.17)	(0.16)	(0.74)	(0.18)	(0.18)	(21.38)	(0.06)	(0.34)	(0.17)	(2.35)	(0.30)	(0.19)	(0.06)	(0.06)
Intent to Treat Estimate, Subsidized Regime Enrollment	0.08	0.01	0.39*	0.07	0.06	-4.33	-0.01	0.20	0.005	-0.25	0.03	-0.02	0.04	0.04
	(0.05)	(0.04)	(0.23)	(0.06)	(0.06)	(-6.64)	(0.02)	(0.10)	(0.06)	(-0.15)	(0.08)	(-0.06)	(0.02)	(0.02)
Below Eligibility Threshold, First Stage Estimate (OLS)	0.26***	0.26***	0.31***	0.32***	0.32***	0.32**	0.26***	0.26***	0.35***	0.16	0.28***	0.31***	0.26***	0.26***
	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)	(0.15)	(0.05)	(0.05)	(0.06)	(0.18)	(0.08)	(0.06)	(0.05)	(0.05)
First Stage F-Statistic (OLS)	25.45	25.45	25.19	25.53	25.53	4.81	25.45	11.58	31.29	0.73	11.42	25.11	25.45	25.45
Observations	4,222	4,222	1,186	1,188	1,188	264	4,222	564	1,013	222	757	1,184	4,222	4,222
Average Value Outcome for People with Subsidiado	0.57	0.34	1.45	0.58	0.54	7.10	0.08	0.64	0.51	0.39	0.53	0.34	0.07	0.07
Data Source	ECV	ECV	DHS	DHS	DHS	ECV	ECV	ECV	DHS	DHS	DHS	DHS	ECV	ECV

Standard errors clustered at the household level shown in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Intention to treat is computed using Dprobit for discrete outcomes

TABLE 4:
HEALTH OUTCOMES

Outcome:	Women's BMI	Child BMI	Birthweight (KG)	Child Days Lost to Illness	Adult Activity Days Lost	Chronic Disease	Child Diarrhea Last Two Weeks	Child Fever Last Two Weeks	Child Cough Last Two Weeks	Cough, Fever, Diarrhea	Any Health Problem	Excellent Self-Reported Health	Good Self-Reported Health	Fair Self-Reported Health
IV Estimate, Subsidized Regime Enrollment	-0.42	-0.36	-0.38	-1.30*	-0.42**	0.06	-0.14	-0.11	-0.25	-0.35*	-0.26	-0.12*	-0.07	-0.07
	(0.83)	(0.71)	(0.33)	(0.71)	(0.18)	(0.10)	(0.16)	(0.17)	(0.22)	(0.21)	(0.19)	(0.07)	(0.14)	(0.06)
Intent to Treat Estimate, Subsidized Regime Enrollment	-0.17	-0.12	-0.10	-0.41**	-0.13	0.02	-0.04	-0.03	-0.08	-0.11*	-0.08	-0.03	-0.02	-0.02
	(-0.34)	(-0.23)	(-0.08)	(-0.21)	(-0.05)	(0.03)	(-0.05)	(-0.05)	(-0.07)	(-0.06)	(-0.06)	(0.02)	(0.04)	(0.02)
Below Eligibility Threshold, First Stage Estimate (OLS)	0.41***	0.33***	0.28***	0.31***	0.26***	0.26***	0.32***	0.32***	0.32***	0.32***	0.32***	0.26***	0.26***	0.26***
	(0.04)	(0.07)	(0.07)	(0.06)	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)
First Stage F-Statistic (OLS)	109.60	24.83	14.36	25.11	25.11	25.45	25.53	25.53	25.53	25.53	25.11	25.45	25.45	25.45
Observations	3,107	1,082	901	1,184	1,184	4,222	1,188	1,188	1,188	1,188	1,184	4,222	4,222	4,222
Average Value Outcome for People with Subsidiado	24.37	16.20	3.28	0.49	0.15	0.15	0.19	0.28	0.44	0.57	0.65	0.04	0.64	0.95
Data Source	DHS	DHS	DHS	DHS	ECV	ECV	DHS	DHS	DHS	DHS	DHS	ECV	ECV	ECV

Standard errors clustered at the household level shown in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Intention to treat is computed using Dprobit for discrete outcomes

TABLE 5:
BEHAVIORAL DISORTIONS - *EX ANTE* MORAL HAZARD, ELIGIBILITY-RELATED BEHAVIOR, AND INSURANCE CROWD-OUT

	***Ex-Ante* Moral Hazard**						**Eligibility-Related Behavior**					**Insurance Crowd-Out**					
Outcome:	Drank Alcohol during Pregnancy	Number of Drinks per Week during Pregnancy	Months Breastfed as Child	Folic Acid During Pregnancy	Number Months Folic Acid during Pregnancy	Hand washing	Ever Married	Current Birth Control Use	Currently Pregnant	Children Ever Born	Household Head Employed	Contributory Regime Enrollment	Uninsured	Other Health Insurance	Contributory Regime Enrollment	Uninsured	Other Health Insurance
IV Estimate, Subsidized Regime Enrollment	-0.05 (0.12)	-21.59 (136)	-0.82 (5.27)	0.15 (0.17)	0.52 (1.46)	-0.24 (0.37)	-0.07 (0.07)	-0.01 (0.08)	-0.04 (0.04)	-0.19 (0.25)	0.02 (0.08)						
Intent to Treat Estimate, Subsidized Regime Enrollment	-0.02 (-0.04)	-1.89 (-10.56)	-0.22 (-1.41)	0.06 (0.06)	0.17 (0.47)	-0.05 (-0.08)	-0.03 (-0.03)	0.00 (-0.03)	-0.02 (-0.01)	-0.07 (-0.10)	0.01 (0.03)	-0.025 (0.03)	-0.23*** (0.05)	-0.002 (0.003)	-0.043* (0.02)	-0.36*** (0.04)	-0.001 (0.008)
Below Eligibility Threshold, First Stage Estimate (OLS)	0.35*** (0.06)	0.09 (0.32)	0.27*** (0.06)	0.36*** (0.06)	0.33*** (0.09)	0.36*** (0.06)	0.40*** (0.04)	0.40*** (0.04)	0.40*** (0.04)	0.40*** (0.04)	0.40*** (0.04)						
First Stage F-Statistic (OLS)	31.29	0.07	17.56	32.49	11.91	8.44	110	110	110	110	110						
Observations	1,013	109	962	1,003	528	652	3,276	3,276	3,276	3,276	3,276	4,222	4,222	4,222	3,276	3,276	3,276
Average Value Outcome for People with Subsidiado	0.10	3.47	14.32	0.55	3.97	0.72	0.61	0.48	0.05	1.85	0.31						
Data Source	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS	ECV	ECV	ECV	DHS	DHS	DHS

Standard errors clustered at the household level shown in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Intention to treat is computed using Dprobit for discrete outcomes

TABLE 6:
BALANCE ACROSS ELIGIBILITY THRESHOLDS

Outcome:	Household Head Age	Completed Elementary School	Completed Secondary School	Household Head Completed Elementary School	Household Head Completed Secondary School	Services from Bienstar Familiar	Benefits to Buy House	Attended Training
IV Estimate, Subsidized Regime Enrollment	1.29	-0.09	0.09	-0.16	0.0006	-0.04	0.02	0.01
	(3.15)	(0.06)	(0.07)	(0.11)	(0.03)	(0.20)	(0.04)	(0.05)
Intent to Treat Estimate, Subsidized Regime Enrollment	0.52	-0.04	0.04	-0.06	0.00	-0.01	0.01	0.002
	(1.26)	(-0.03)	(0.03)	(-0.04)	(0.01)	(0.06)	(0.02)	(0.02)
Below Eligibility Threshold, First Stage Estimate (OLS)	0.40***	0.40***	0.40***	0.40***	0.40***	0.26***	0.26***	0.27***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)
First Stage F-Statistic (OLS)	110	111	111	110	110	25.45	25.45	28.79
Observations	3,276	3,275	3,275	3,276	3,276	4,222	4,222	3,010
Average Value Outcome for People with Subsidiado	46.31	0.20	0.18	0.31	0.03	0.20	0.01	0.04
Data Source	DHS	DHS	DHS	DHS	DHS	ECV	ECV	ECV

Standard errors clustered at the household level shown in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Intention to treat is computed using Dprobit for discrete outcomes

Appendix 1: Subsidized Regime Benefits

<table>
<tr><th rowspan="2">AGE / POPULATION GROUP</th><th colspan="8">TYPE OF BENEFIT</th></tr>
<tr><th>Preventive care</th><th>Primary care (basic medical consultations, procedures and diagnostic tests)</th><th>Secondary care (specialist care, hospitalizations)</th><th>Tertiary care</th><th>Catastrophic care</th><th>Medications</th><th>Transportation</th><th>Excluded interventions</th></tr>
<tr><td>< 1 YEAR</td><td>Neonatal care and screening (Vit K, anemia, TSH), immunizations, well child care</td><td rowspan="6">All</td><td>All</td><td>All</td><td rowspan="6">Treatment with radiotherapy and chemotherapy for cancer, dialysis and organ transplant for renal failure, Surgical treatment of heart, cerebrovascular, neurological and congenital conditions, treatment of major trauma, intensive care unit, hip and knee replacement, major burns, treatment for AIDS</td><td rowspan="6">All medications in national formulary</td><td rowspan="6">For referrals, catastrophic care cases</td><td rowspan="6">Aesthetic surgery
Infertility treatment
Treatment for sleep disorders
Organ transplants (except renal, heart, chornea and bone marrow)
Psychotherapy and psychoanalysis
Treatments for end stage disease</td></tr>
<tr><td>1-4 years</td><td>Well child care, immunizations, anemia screening</td><td rowspan="3">Cataract and strabismus surgery, herniorraphy, appendectomy, cholecystectomy, orthopedics, rehabilitation services and procedures</td><td rowspan="3">Not covered</td></tr>
<tr><td>5-19 years</td><td>Well child care, immunizations, anemia screening</td></tr>
<tr><td>20-60 years</td><td>Cardiovascular and renal disease risk screening, cervical and breast cancer screening</td></tr>
<tr><td>>60 years</td><td>Cardiovascular and renal disease risk screening, cervical and breast cancer screening</td></tr>
<tr><td>PREGNANT WOMEN</td><td>High risk screening, STD, prenatal care</td><td>Same as above plus obstetric care</td><td>Obstetric care</td></tr>
</table>

Appendix 2: Components of the SISBEN Index and SISBEN Score Calculations

This appendix describes the components of SISBEN index, details the index information available in each household survey, and explains how we calculate SISBEN scores in each data source.

1. Components of the SISBEN Index

As explained in the text of the paper, our study focuses on the original urban SISBEN index There are four general types of information used in calculating the SISBEN index: (A) human capital, employer characteristics, and benefits; (B) demographics, income, and labor force participation; (C) housing characteristics; and (D) access to public utilities. The index is composed of 14 components across these categories. For each component, respondents are categorized according to mutually exclusive, collectively exhaustive polychotomous response categories. Each response category for each component corresponds to a weight or "points," and index scores are calculated by summing across points. Scores range between 0 and 100; higher scores denote higher socio-economic status.

The specific components of the index are:

(A) Human Capital; Employer Characteristics and Benefits

- (1) Educational attainment of the household head
- (2) Mean Schooling for household members twelve years old and older
- (3) Firm size and provision of Social Security benefits for the household head

(B) Demographics, Income, and Labor Force Participation

- (4) Proportion of children six years old and under (as share of children under age eighteen)
- (5) Proportion of household members employed (as a share of those older than twelve)
- (6) Per capita income indexed to the minimum wage (all types of income are counted)

(C) Housing Characteristics

- (7) Number of rooms per person
- (8) Primary wall material
- (9) Primary roof material
- (10) Primary floor material
- (11) Number of appliances (among those on a pre-determined list)

(D) Access to Public Utilities

- (12) Water source
- (13) Sewage disposal
- (14) Garbage disposal

2. SISBEN Components Available in Each Household Survey

For reasons explained in the text, our analyses focus on the 2003 ECV and the 2005 DHS. However, we also use the 1995 DHS to probe our identifying assumptions. The table below shows which SISBEN components are available in each survey.

Variable	DHS 2005	DHS 1995	ECV 2003
Educational Attainment	Available	Available	Available
Employment Status	Available	Available	Available
Social Security Benefits			
Health Insurance	Available	Available	Available
Pension	Not Available	Not Available	Available
Firm Size (Number of Employees)	Not Available	Not Available	Available
Age	Available	Available	Available
Income	Not available	Not available	Available
Number of Rooms	Available	Available	Available
Primary Wall Material	Available	Not available	Available
Primary Roof Material	Not available	Not available	Not available
Primary Floor Material	Available	Available	Available
Number of Appliances			
TV	Available	Available	Available
Refrigerator	Available	Available	Available
Air Conditioner	Available	Not available	Available
Blender	Available	Available	Available
Washing Machine	Available	Not available	Available
Water Source	Available	Available	Available
Sewage Disposal	Available	Available	Available
Garbage Disposal	Available	Not available	Available

Most SISBEN components are available in the household surveys we use in our primary analyses (nearly all in the 2003 ECV and the great majority in the 2005 DHS). For missing components, we use an ordered probit procedure to predict the most likely response category for each missing component using a large number of observable household characteristics. The section below describes how we performed our SISBEN score calculations.

3. SISBEN Score Calculations

In this section we report SISBEN index weights for each response category for each component and describe how we impute scores for components not represented in our household surveys. SISBEN index scores are then calculated by summing weights or points across all components.

A. Human Capital; Employer Characteristics and Benefits

1. Educational attainment of the household head

1	No education	0
2	Some elementary	1.6239
3	Complete elementary	3.4435
4	Some secondary	5.0039
5	Complete secondary	7.3434
6	Some of higher education	9.7833
7	Complete higher education	11.546
8	Graduate studies	12.4806

To compute educational attainment, we use information of level of schooling completed and number of years of schooling. Levels of schooling correspond to the following number of years of education:

- Complete elementary school: 5 years
- Complete secondary education: 11 years
- Complete higher education: 16 years
- Graduate studies: 16 or more years

Sufficient information on level and years of schooling is available to compute this variable in all household surveys.

2. Mean Schooling for household members twelve years old and older

1	0 years	0
2	Between 0 and 4 years	1.657
3	Between 4 and 5 years	2.9947
4	Between 5 and 10 years	4.969
5	Between 10 and 11 years	7.6387
6	Between 11 and 15 years	9.4425
7	Between 15 and 16 years	10.69
8	16 years or more	11.1396

Using the coding scheme described for calculating educational attainment for the household head, we calculate mean years of schooling for all household members 12 and older. Sufficient information is available to compute this variable in all household surveys.

3. Firm size and provision of Social Security benefits for the household head

1	Without benefits and either works alone or does not work	0
2	Without benefits and works in firm with 2 to 9 employees	1.166
3	Without benefits and works in firm with 10 or more employees	2.6545
4	With benefits and either works alone or does not work	3.9539
5	Without benefits and works in firm with 2 to 9 employees	5.8427
6	Without benefits and works in firm with 10 or more employees	6.9718

Assigning response categories for this index component requires information about employment status, social security benefits (health insurance and pension benefits), and firm size:

- *Employment status* is available in all household surveys.
- *Firm size* is not available in the 1995 and 2005 DHS. We therefore use ordered probit models to predict the probability of falling into each of the three firm size categories (1 employee, 2-9 employees, 10 or more employees). We then select the category with the highest predicted probability. To obtain parametric estimates of the relationship between a variety of observable household characteristics (demographic characteristics, education,

and regional controls among urban residents) and firm size, we estimate these ordered probit models using the Encuesta de Calidad de Vida conducted closest in time to each DHS wave (the 1997 ECV for the 1995 DHS and the 2003 ECV for the 2005 DHS).

- *Social Security benefits* consist of two components: health insurance benefits and pension benefits:
  - *Health Insurance Benefits.* Health insurance status is judged in each household survey in the following way:

    ECV 2003: Has health insurance if affiliated with "ISS," "Caja de Prevision," "army/police" insurance scheme, "Ecopetrol" scheme, the "educational system" scheme, or an "EPS – different to ISS or Caja de Prevision." Those with insurance through an "ARS" or "Empresa solidaria" are excluded.

    DHS 1995: Has health insurance if affiliated with "ISS," "Caja de Previsión," "Public EPS," "Private EPS," or "Caja Compensacion. "Prepaid medicine" and "Other" are excluded.

    DHS 2005: Has health insurance if affiliated with "ISS," "EPS," "Public Agency," "army/police" insurance scheme, "Ecopetrol" scheme, the "educational system"scheme, or "Foncolpuertos." Those with insurance through an "ARS" are excluded.
  - *Pension Benefits.* Pension benefits are judged according to affiliation with the public or private pension system. This information is available in the ECVs but not in the 1995 or 2005 DHS.

In the 2003 ECV, Social Security benefits are judged according to having health insurance and/or pension benefits. In the 1995 and 2005 DHS, Social Security benefits are judged according to health insurance benefits.

(B) Demographics, Income, and Labor Force Participation

(4) Proportion of children six years old and under (as share of children under age eighteen)

1	Greater than 0.65	0
2	From 0 to 0.65	0.2237
3	Zero	1.4761

Sufficient information is available to compute this variable in all household surveys.

(5) Proportion of household members employed (as a share of those older than twelve)

1	Less than 0.30	0
2	From 0.30 to 0.60	0.6717
3	From 0.60 to 0.90	1.739
4	Greater than 0.90	4.0149

For constructing this proportion, employment is defined as having worked in the preceding week, not having worked but having regular job, or receiving payment for working more than one hour. Sufficient information is available to compute this variable in all household surveys.

(6) Per capita income indexed to the minimum wage (all types of income are counted)

1	Up to 0.15	0
2	Above 0.15 up to 0.25	0.8476
3	Above 0.25 up to 0.35	2.1828
4	Above 0.35 up to 0.50	3.5362
5	Above 0.50 up to 0.75	5.3636
6	Above 0.75 up to 1.00	7.0827
7	Above 1.00 up to 1.25	8.2489
8	Above 1.25 up to 1.50	9.4853
9	Above 1.50 up to 2.00	10.2098
10	Above 2.00 up to 3.00	11.3999
11	Above 3.00 up to 4.00	13.0872
12	Above 4.00	13.7378

To calculate per capita income for a family, we define income to include labor income from primary and secondary jobs (both for the employed and self-employed) and pension benefits for retirees. In-kind subsides are excluded. We obtained nominal minimum wage information (summarized below) from The Colombian Central Bank's *Monetary and Financial Statistics*:

Year	**Minimum wage (in Colombian pesos)**
1990	41,025.1
1993	81.510.0
1995	118,933.5
1997	172,005.0
2000	260,100.0
2003	332,000.0
2005	381,500.0

Income variables are available only in the 2003 ECV. For the 1995 and 2005 DHS, we use ordered probit models to predict the probability of falling into each of 12 discrete categories; we then select the category with the highest predicted probability. To obtain parametric estimates of the relationship between a variety of observable household characteristics (demographic characteristics, education, and regional controls among urban residents) and firm size, we estimate these ordered probit models using the Encuesta de Calidad de Vida conducted closest in time to each DHS wave (the 1997 ECV for the 1995 DHS and the 2003 ECV for the 2005 DHS).

(C) Housing Characteristics

(7) Number of rooms per person

1	Less than 0.20	0
2	0.20 to 0.30	0.5584
3	0.30 to 0.40	1.6535
4	0.40 to 0.70	2.5727
5	0.70 to 1.00	4.3886
6	1.00 to 4.00	6.0042

7	Greater than 4.00	8.3828

To assign response categories for this index component, rooms are defined as rooms exclusively used by household members (including living rooms but excluding kitchens, bathrooms, garages, and rooms used for business). This information is available in the 2003 ECV. For the 1995 and 2005 DHS, we use number of rooms used by household members for sleeping.

(8) Primary wall material

1	Without walls or with bamboo or other organic materials	0
2	Zinc, cloth, cardboard, cans	0.2473
3	Raw wood	2.0207
4	Mud and cane wall	4.8586
5	Adobe, wide mud wall	6.2845
6	Block, bricks, stone, prefabricated material, polished wood	7.7321

Information on wall material is available in the 2003 ECV and the 2005 DHS but not the 1995 DHS. For the 1995 DHS, we therefore use an ordered probit model to predict the probability of falling into categories 3-6 shown above (we do not predict probabilities for categories 1 and 2 because we have fewer than 60 observations with these wall materials in our other datasets; we therefore assign zero probability for these categories). We then select the category with the highest predicted probability. To obtain parametric estimates of the relationship between a variety of observable household characteristics (floor materials, number of rooms, and regional dummies among urban housheolds) and wall material, we estimate this ordered probit model using the 1997 ECV (the household survey with information on wall material conducted closest in time to the 1995 DHS).

(9) Primary roof material

1	Straw or palm leaves	0
2	Recycled household materials (cardboard, cans, burlap sacks, etc)	2.1043
3	Zinc, asbestos, cement, without ceiling	3.7779
4	Clay tile, zinc, asbestos, cement, with ceiling	5.0973

Information on primary roof material is available only in the 1997 ECV. We therefore use parametric estimates of the relationship between observable characteristics (number of rooms, floor material and regional dummies among urban households) and roof material obtained from an ordered probit model fit with the 1997 ECV to predict the probability of falling into each roof material category shown above. We assign the category with the highest predicted probability.

(10) Primary floor material

1	Dirt	0
2	Raw wood, boards	2.9037
3	Cement	3.6967
4	Floor tile (clay, vinyl), brick or paving tile	5.8712
5	Wall to wall carpet, marble, polished wood	6.8915

Sufficient information is available to compute this variable in all household surveys. In the 1995 DHS, a few assumptions are also required to square the categories above with information provided. Specifically, the 1995 DHS provides the following floor material categories: earth/sand, wood planks, bricks, tiles, cement, carpet, polished wood and other; we assign the response "other" to category 4 because it includes vinyl.

(11) Number of appliances (among those on a pre-determined list)

1	No appliances	0
2	1-3 basic appliances basics	2.1435
3	4 basic appliances without laundry machine	3.0763
4	3 or more basic appliances with laundry machine	4.7194

For this SISBEN index component, four appliances are considered "basic" (TVs, refrigerators, blenders, and air conditioners) and a washing/laundry machine is treated separately as shown in the table above. All necessary information about appliances is present in the 2003 ECV and the 2005 DHS; the 1995 DHS is missing information about air conditioners and laundry machines. For the 1995 DHS, we therefore use an ordered probit model with coefficient estimates obtained using the 1997 ECV to predict the probability of each discrete response category. The observable characteristics we use for these predictions are ownership of a car, radio, presence of a gas connection, and region of residence.

(D) Access to Public Utilities

(12) Water source

1	River or spring	0
2	Public fountain or other source	1.1606
3	Well without water pump, container or rain water	2.6497
4	Well with water pump	4.6037
5	Container truck	6.1693
6	Aqueduct	7.2554

All necessary information for assigning response categories is available in the 2003 ECV. In the 1995 DHS, we classify "well" as "well with water pump" and "other piped sources" as "aqueduct." In the 2005 DHS, we classify "bottled water" as "aqueduct."

(13) Sewage disposal

1	No sewage	0
2	Latrine	2.4519
3	Toilet without connection to sewer or septic tank	3.3323
4	Toilet with connection to septic tank	3.9615
5	Toilet with connection to sewer	6.8306

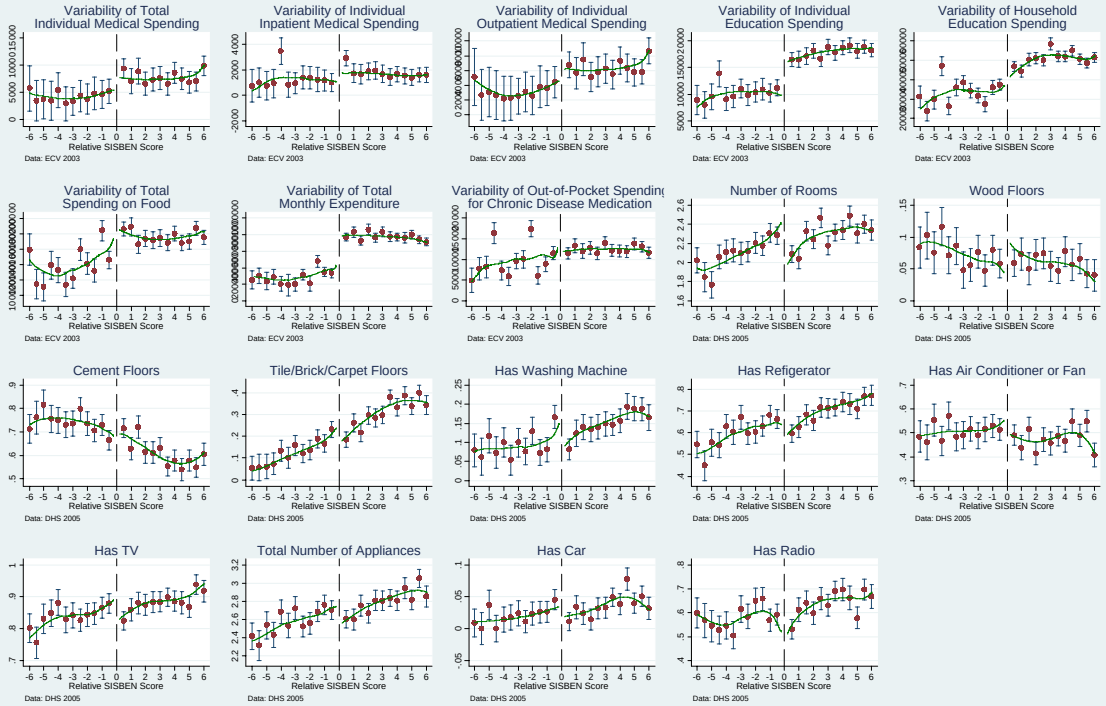
Information on sewage disposal is available in all household surveys, but in the 1995 and 2005 DHS, some minor coding assumptions were necessary. In the 1995 DHS, we code "toilet to other" as "toilet without connection to sewer or septic tank." In the 2005 DHS, we code both "traditional pit toilet" and "traditional toilet to sea/river" as "latrine."

(14) Garbage disposal

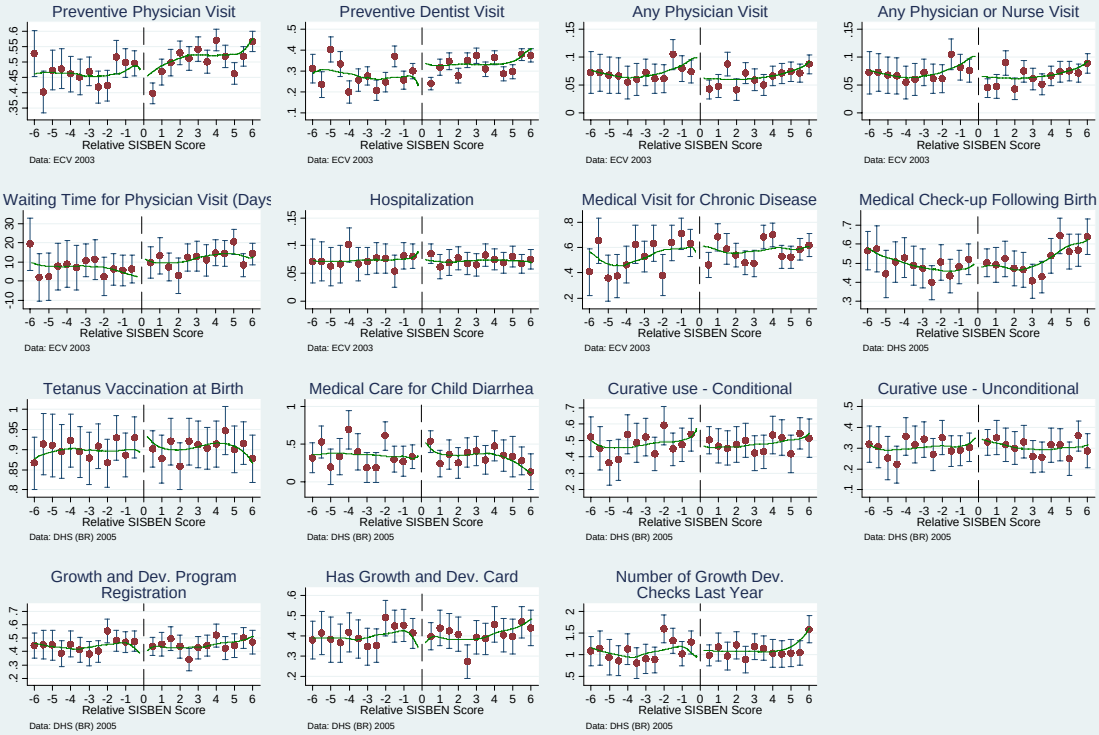
1	Yard, lot, river, etc.	0
2	Local container or public trashcan	2.1291
3	Picked up by public services	3.2701

Information on garbage disposal is available in the 2005 DHS and the 2003 ECV but is not available in the 1995 DHS. For the 1995 DHS, we therefore use an ordered probit model with coefficient estimates obtained using the 1997 ECV to predict the probability of each discrete response category. The observable characteristics we use for these predictions are type of sewage disposal, floor material, time required to obtain water, and region of residence.

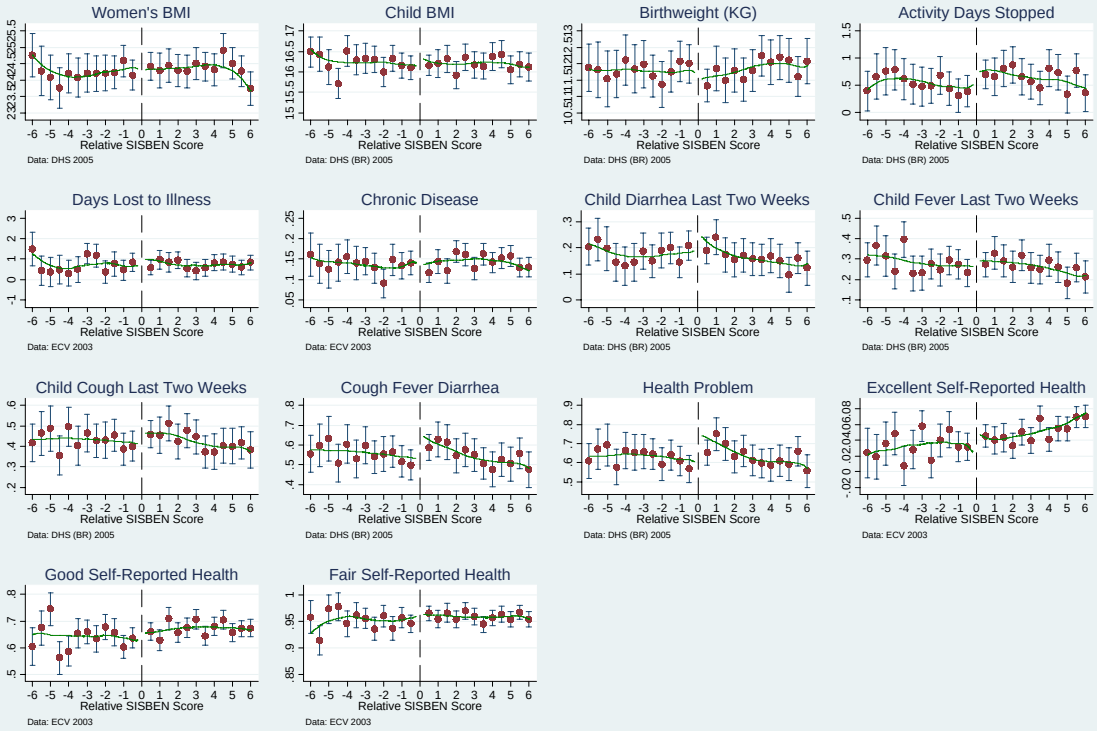
Appendix 3, Figure 1: Risk Protection, Consumption Smoothing, and Portfolio Choice



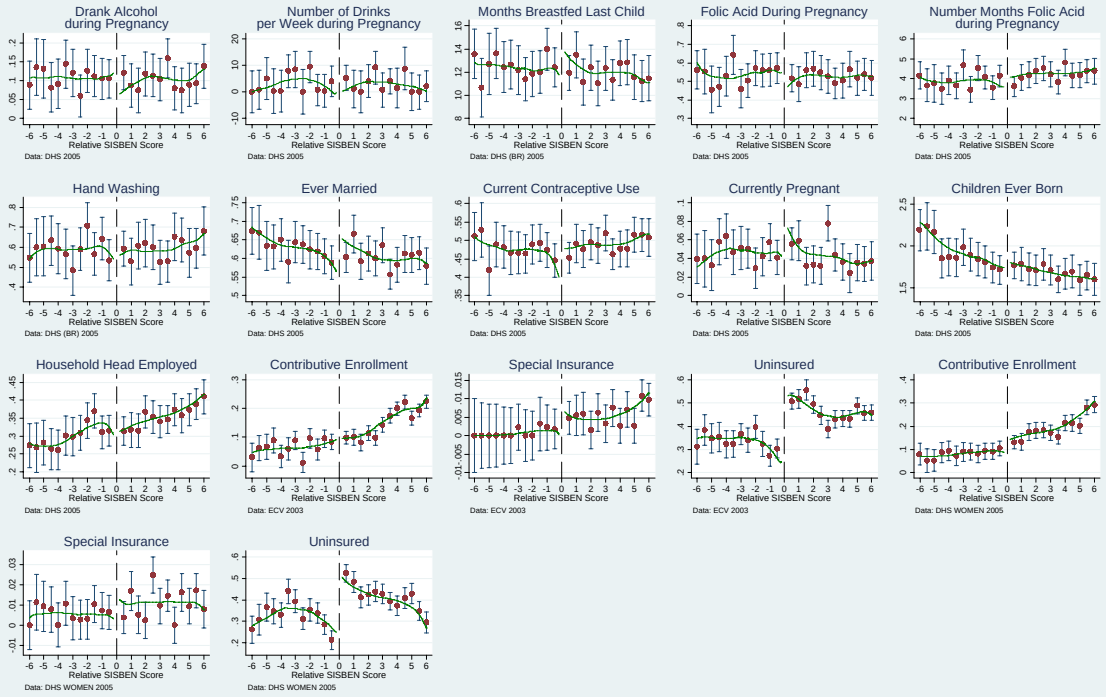
Appendix 3, Figure 2: Medical Care Use



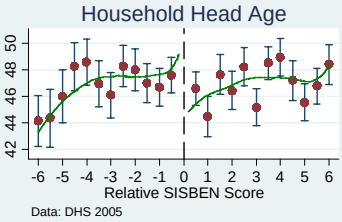
Appendix 3, Figure 3: Health Outcomes

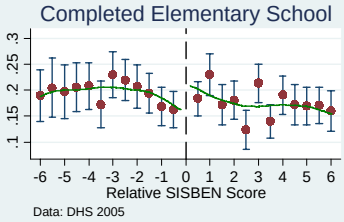


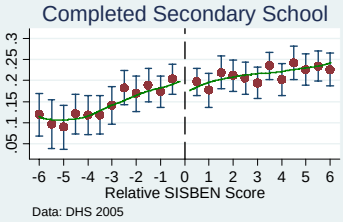
Appendix 3, Figure 4: Ex Ante Moral Hazard and Eligibility-Related Behavioral Distortions

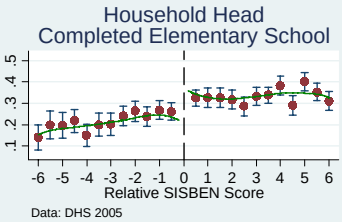


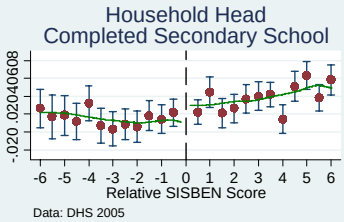
Appendix 3, Figure 5: Balance across SISBEN Eligibility Thresholds

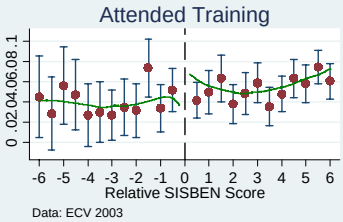


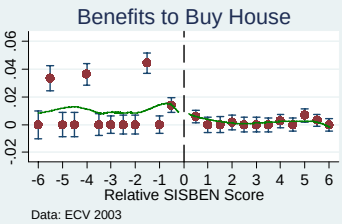


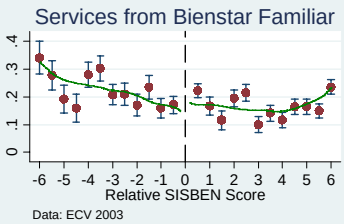












APPENDIX 5, TABLE 1: RISK PROTECTION, CONSUMPTION SMOOTHING, AND PORTFOLIO CHOICE <ADD OTHER BANDWIDTHS>

Panel A: Risk Protection and Consumption Smoothing

Model:	Variability of Total Individual Medical Spending	Variability of Individual Inpatient Medical Spending	Variability of Individual Outpatient Medical Spending	Variability of Out-of-Pocket Spending for Chronic Disease Medication	Variability of Individual Education Spending	Variability of Household Education Spending	Variability of Total Spending on Food	Variability of Total Monthly Expenditure
Subsidiado Bandwidth 2	-12,656***	-7,149**	-6,065*	-8,625	-27,408***	-35,674*	-130,161	-1,316,100***
	(4,624)	(2,890)	(3,228)	(11,428)	(6,926)	(19,520)	(83,344)	(430,288)
Subsidiado Higher Order Polynomial	-19,161*	-15,585**	-4,797	-3,750	-45,413**	-49,041	-186,362	-1.524,300**
	(10,676)	(7,798)	(6,631)	(20,821)	(21,182)	(38,452)	(155,395)	(622,313)
Subsidiado bt*score Interaction	-11,195**	-6,610**	-5,166	-10,639	-27,226***	-34,403	-117,071	-1,364,200***
	(4,492)	(2,570)	(3,390)	(14,204)	(7,112)	(21,244)	(82,999)	(476,211)
Subsidiado without Municipio Fixed E	-18,668**	-7,380**	-11,699	-1,642	-26,546***	-36,289*	-130,380	-1,577,500***
	(8,883)	(3,560)	(7,374)	(9,276)	(6,874)	(19,146)	(100,635)	(598,952)
Data Source	ECV	ECV	ECV	ECV	ECV	ECV	ECV	ECV

Panel B: Portfolio Choice

Outcome:	Number of Rooms	Wood Floors	Cement Floors	Tile/Brick/Carpet Floors	Has Washing Machine	Has Refigerator	Has Air Conditioner or Fan	Has TV	Total Number of Appliances	Has Car	Has Radio
Subsidiado Bandwidth 2	0.67***	0.00	-0.09	0.07	0.10	0.20*	0.14*	0.14*	0.50**	0.07	0.14
	(0.25)	(0.05)	(0.10)	(0.08)	(0.08)	(0.11)	(0.07)	(0.08)	(0.24)	(0.04)	(0.11)
Subsidiado Higher Order Polynomial	0.58**	0.01	-0.07	0.06	0.19**	0.12	0.16*	0.13	0.31	0.09*	0.19
	(0.27)	(0.06)	(0.11)	(0.10)	(0.10)	(0.12)	(0.08)	(0.09)	(0.27)	(0.05)	(0.13)
Subsidiado bt*score Interaction	0.64**	0.00	-0.10	0.08	0.10	0.19*	0.14*	0.14*	0.49**	0.07	0.11
	(0.25)	(0.05)	(0.10)	(0.08)	(0.08)	(0.10)	(0.07)	(0.08)	(0.24)	(0.04)	(0.11)
Subsidiado without Municipio Fixed E	0.74**	0.04	-0.15	0.10	0.18*	0.23*	0.11	0.16	0.41	0.06	0.13
	(0.31)	(0.06)	(0.13)	(0.11)	(0.10)	(0.13)	(0.14)	(0.10)	(0.31)	(0.05)	(0.14)
Data Source	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS

APPENDIX 5, TABLE 2: MEDICAL CARE USE <ADD OTHER BANDWIDTHS>

Model:	Preventive Physician Visit	Preventive Dentist Visit	Any Physician Visit	Any Physician or Nurse Visit	Waiting Time for Physician Visit (Days)	Hospital Stay	Medical Visit for Chronic Disease	Medical Check-up Following Birth	Tetanus Vaccination at Birth	Medical Care for Child Diarrhea	Curative Care Use Conditional on Illness	Curative Use not Conditional on Health Status	Growth and Dev. Program Registration	Has Growth and Dev. Card	Number of Growth Dev. Checks Last Year
Subsidiado Bandwidth 2	0.29*	0.03	0.14**	0.13**	-13.44	-0.04	0.51	0.01	0.001	-1.62	0.11	-0.05	0.21	0.20	1.24*
	(0.17)	(0.16)	(0.06)	(0.06)	(21.38)	(0.06)	(0.34)	(0.17)	(0.13)	(2.35)	(0.30)	(0.19)	(0.18)	(0.18)	(0.74)
Subsidiado Higher Order Polynomial	0.40	0.31	0.23*	0.23*	12.89	-0.08	1.79	0.26	0.08	-0.53	0.07	-0.05	0.38	0.20	1.63**
	(0.31)	(0.30)	(0.14)	(0.14)	(30.29)	(0.13)	(2.13)	(0.21)	(0.14)	(0.66)	(0.26)	(0.19)	(0.20)	(0.19)	(0.80)
Subsidiado bt*score Interaction	0.27	0.03	0.12**	0.12**	-11.08	-0.03	0.56*	0.02	0.02	-1.54	0.09	-0.05	0.19	0.19	1.16
	(0.17)	(0.16)	(0.06)	(0.06)	(19.86)	(0.06)	(0.34)	(0.17)	(0.13)	(2.23)	(0.30)	(0.18)	(0.18)	(0.18)	(0.73)
Subsidiado without Municipio Fixed Effects	0.46***	0.09	0.13**	0.14**	-12.03	0.00	0.41	-0.05	0.04	-0.79	-0.01	-0.18	0.08	0.08	0.86
	(0.18)	(0.15)	(0.06)	(0.06)	(14.44)	(0.06)	(0.27)	(0.20)	(0.13)	(0.67)	(0.28)	(0.21)	(0.22)	(0.21)	(0.73)
Data Source	ECV	ECV	ECV	ECV	ECV	ECV	ECV	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS

APPENDIX 5, TABLE 3: HEALTH OUTCOMES <ADD OTHER BANDWIDTHS>

Outcome:	Women's BMI	Child BMI	Birthweight (KG)	Child Days Lost to Illness	Adult Activity Days Lost	Chronic Disease	Child Diarrhea Last Two Weeks	Child Fever Last Two Weeks	Child Cough Last Two Weeks	Cough, Fever, Diarrhea	Any Health Problem	Excellent Self-Reported Health	Good Self-Reported Health	Fair Self-Reported Health
Subsidiado Bandwidth 2	-0.42	-0.36	-0.38	-1.30*	0.80	0.06	-0.14	-0.11	-0.25	-0.35*	-0.26	-0.12*	-0.07	-0.07
	(0.83)	(0.71)	(0.33)	(0.71)	(1.64)	(0.10)	(0.16)	(0.17)	(0.22)	(0.21)	(0.19)	(0.07)	(0.14)	(0.06)
Subsidiado Higher Order Polynomial	-0.68	0.05	-0.44	-1.05*	2.38	-0.07	-0.03	-0.13	-0.25	-0.31	-0.21	-0.27*	-0.13	-0.15
	(0.96)	(0.78)	(0.34)	(0.61)	(3.16)	(0.18)	(0.16)	(0.19)	(0.23)	(0.21)	(0.20)	(0.16)	(0.28)	(0.13)
Subsidiado bt*score Interaction	-0.35	-0.33	-0.37	-1.30*	0.83	0.07	-0.12	-0.11	-0.24	-0.34*	-0.26	-0.12*	-0.10	-0.07
	(0.83)	(0.70)	(0.32)	(0.70)	(1.56)	(0.09)	(0.16)	(0.17)	(0.21)	(0.20)	(0.19)	(0.07)	(0.14)	(0.06)
Subsidiado without Municipio Fixed Effects	-0.24	-0.40	-0.51	-1.24*	0.50	0.12	-0.11	-0.19	-0.28	-0.42*	-0.37*	-0.09	-0.10	-0.06
	(0.99)	(0.74)	(0.44)	(0.72)	(1.31)	(0.09)	(0.16)	(0.19)	(0.23)	(0.23)	(0.22)	(0.07)	(0.14)	(0.05)
Data Source	DHS	DHS	DHS	DHS	ECV	ECV	DHS	DHS	DHS	DHS	DHS	ECV	ECV	ECV

APPENDIX 5, TABLE 4: BEHAVIORAL DISORTIONS - *EX ANTE* MORAL HAZARD, ELIGIBILITY-RELATED BEHAVIOR, AND INSURANCE CROWD-OUT <ADD OTHER BANDWIDT

	***Ex-Ante* Moral Hazard**						**Eligibility-Related Behavior**				
Outcome:	Drank Alcohol during Pregnancy	Number of Drinks per Week during Pregnancy	Months Breastfed as Child	Folic Acid During Pregnancy	Number Months Folic Acid during Pregnancy	Hand washing	Ever Married	Current Birth Control Use	Currently Pregnant	Children Ever Born	Household Head Employed
Subsidiado Bandwidth 2	-0.05	-21.59	-0.82	0.15	0.52	-0.05	-0.07	-0.01	-0.04	-0.19	0.02
	(0.12)	(136.39)	(5.27)	(0.17)	(1.46)	(0.09)	(0.07)	(0.08)	(0.04)	(0.25)	(0.08)
Subsidiado Higher Order Polynomial	-0.09	39.35	-0.79	0.04	2.82	-0.07	-0.04	0.00	-0.04	-0.14	-0.07
	(0.14)	(428.76)	(5.64)	(0.20)	(2.20)	(0.11)	(0.08)	(0.09)	(0.04)	(0.27)	(0.08)
Subsidiado bt*score Interaction	-0.05	-11.75	-0.54	0.14	0.34	-0.06	-0.07	-0.01	-0.04	-0.17	0.01
	(0.11)	(123.55)	(5.20)	(0.17)	(1.45)	(0.09)	(0.07)	(0.08)	(0.03)	(0.25)	(0.07)
Subsidiado without Municipio Fixed Effects	-0.06	-19.65	4.79	0.18	1.46	0.00	-0.10	-0.05	-0.05	-0.33	-0.01
	(0.12)	(56.39)	(5.24)	(0.19)	(1.47)	(0.10)	(0.09)	(0.09)	(0.04)	(0.29)	(0.09)
Data Source	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS	DHS