



Documentos de Trabajo

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**ENROLLING THE SELF-EMPLOYED IN MANDATORY
HEALTH INSURANCE IN COLOMBIA: ARE WE MISSING
OTHER FACTORS?**

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Enrolling the Self-Employed in Mandatory Health Insurance in Colombia: are we missing other factors?

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Abstract

We assess the impact that Colombia's 1993 health sector reform had on the enrollment of self-employed workers in mandatory social health insurance scheme, with a especial focus on the independent contractors. This group grew dramatically in the form of workers cooperatives between 1993 and 2003, becoming a source of self-employed evasion and a way to disguised employment. We use two national-level Living Standards Measurement Surveys conducted in Colombia in 1997 and 2003, and follow a methodology that corrects for sample selection, decomposing health insurance coverage variation into changes attributed to the reform and to the characteristics of independent contractors. We find that: (i) Between 1997 and 2003, enrollment increased in 28 percentage points reaching an insurance rate of 62%, still below the reform goal of 80%, (ii) enrollment of independent contractors in 1997 was only 35% (compared to 50%) after adjusting by the selection bias due to disguised employment, (ii) the new legislation and stringent monitoring implemented in 2003 to cope with evasion seem to be effective since the sample selection due to disguised employment was not statistically significant in 2003. Addressing the interaction of the labor market with the health reform, as well as, accounting for the heterogeneity within the self-employed group are the main contributions of this paper to the literature on health insurance reforms in developing countries.

JEL Classification: D24, I12, I18

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1. Introduction

Self-employed¹ workers constitute a large and increasing part of the labor force in most developing countries (ILO, 2005a). In Latin America, they accounted for between 25% and 46.6% of the worker population in 2000 while, in Colombia, they made up approximately 38.5% of the labor force that year (Maloney and Nuñez, 2003; Tannuri-Pianto et al., 2004; Gindling and Terrell, 2004). However, health insurance among the self-employed is low, which is a matter of concern for governments because it leads to worse health outcomes (Levy, 2002; Institute of Medicine, 2002), and, threatens the financial sustainability of the healthcare system as well as the adequate functioning of its solidarity mechanisms (Gottret and Schieber, 2006). Securing the contribution of the self-employed is especially critical in contexts where fiscal evasion is common and the informal sector is large.

Healthcare coverage of the self-employed is challenging because legal coverage is voluntary in many countries and because self-employed workers comprise a highly heterogeneous group. Some self-employed are not able to afford insurance premiums, while others are not willing to contribute a significant percentage of their incomes to finance social health insurance schemes that do not meet their priority needs. Other self-employed workers enroll in private health insurance schemes instead of public schemes—although this phenomenon is observed mainly among high-income individuals in the formal sector.

In Latin America, self-employed have full mandatory coverage only in Colombia and Costa Rica (Mesa-Lago, 2007), while many other countries (México, Chile, Argentina among others are following that path). However, even when self-employed enrolment is compulsory, enforcement is still a challenge. Colombia was a pioneer in the introduction of mandatory social health insurance with its 1993 health reform law and since then, this reform has been seen as a paradigm in Latin America and many articles have focused on the analysis of its different aspects and implications (see for instance Jaramillo, 2002; Trujillo, 2003; Rodríguez-Monguío and Infante Campos, 2004, Castano and Zambrano, 2006, Ruiz et.al, 2007). However, the literature on Colombia's health reform has barely focused on the self-employed, despite that self-employment represent a large proportion of the working population and their contribution is a key step in guaranteeing the financial viability of the system. The two only papers that, to our

¹ A self-employed person is a day or unskilled laborer, an independent professional and independent worker of any other type, and employer, or an independent farmer.

knowledge, explore the impact of the Colombian health reform on self-employed enrolment show an important reduction in financial barriers and higher insurance coverage for the self-employed (Giedion and Villar-Urbe, 2009; Giota and Garcia-Prado, 2011), still well below the established reform goal of achieving 80% coverage among the self-employed. Since these studies do not focus on the different categories that compound the self-employed group, we believe that some important facts are missing, which in turn, leads us to question previous results regarding the effective increase in the self-employed enrolment.

In this study we focus on the analysis of independent contractors², a type of self-employment status that has been widely used by employers to add flexibility to the labor market and reduce labor costs (ILO, 2011). This group experienced an exponential growth after the 1993 health reform law, in the form of worker cooperatives (*Cooperativas de Trabajo Asociado*), growing by more than thirty times between 1993 and 2003 (Confecoop, 2009). Worker cooperatives are non-profit ventures formed by a group of individuals who provide labor services to companies. As independent contractors, they are not employees from a legal standpoint, and consequently they are excluded from the application of labor laws. Although they were created as a mechanism to add flexibility in the labor market through outsourcing and sub-contracting (Farne, 2008), worker cooperatives have been pointed as an important source of contribution evasion through disguised employment relationships. Many companies pushed their workers off the books, implying a reclassification from private or public employment to self-employment (Salazar et al., 2001).

We believe that the boom in independent contracting might mask the real effect of the 1993 healthcare reform on self-employed insurance coverage found in previous studies. For instance, if companies pushed their more expensive workers off the books, the insurance coverage rate of independent contractors would be larger because reclassified workers are more likely to keep their mandatory insurance. In that case, insurance coverage would be upward biased due to a sample selection effect rather than the healthcare reform effect. Moreover, the increased health insurance coverage of independent contractors could be the result of a change in the composition of the group rather than a change in their willingness to opt for coverage. A change in the composition or characteristics of independent contractors could be linked to the

² An independent contractor is a natural person, business, or corporation that provides goods or services to another entity under terms specified in a contract.

reclassification of workers from private or public employees to independent contracting. Only a change in their willingness to opt for insurance coverage could be associated to effects of the healthcare reform. To our knowledge this is the first study that recognizes and corrects for potential biases produced by the dramatic growth of worker cooperatives.

We use household data from 1997 and 2003. Although the healthcare reform law was enacted in 1993, different regulations affecting the self-employed passed within the period of study. The reform goal was to affiliate 80% of self-employed by 2000, but the target was not reached despite the legal mandatory coverage and the subsidies for poor and low-income self-employed. Evasion in the contributory regime was identified as one of the main challenges of the reform. Of the total evasion estimated in 2000, 43.3% resulted from enrollee evasion in the contributory scheme (Salazar et al., 2001; Rodríguez-Monguío and Infante Campos, 2004). Consequently, between 2000 and 2003 the Colombian government launched a set of measures and regulations targeted to reduce evasion from the self-employed. We quantify the effect of those measures on health insurance coverage of independent contractors. Our methodology corrects for sample selection, and decomposes the change in health insurance coverage into changes attributed to the reform and to the characteristics of independent contractors.

This article contributes to an extensive debate in the literature on how to expand social security coverage, and in particular, on how to incorporate the self-employed (Mesa-Lago 2008). Social health insurance schemes have been criticized for the difficulty in attracting the self-employed while, at the same time, have been implemented with the main purpose of reducing informality and the uninsured population.

Our results are not only relevant for Colombia. Many other countries in Latin America are facing reforms to introduce mandatory health coverage, and all share the difficulties to increase self-employed affiliation. On the other hand, the growth of worker cooperatives is common to other Latin American countries such as Argentina, Peru, Chile and Brasil (ILO, 2005b), and should be considered when analyzing the real impact of reforms on self-employed health coverage. Addressing the interaction of the labor market with the health reform, as well as, accounting for the heterogeneity within the self-employed group are the main contributions of this paper to the literature on health insurance reforms in developing countries.

2. The Colombian Health Sector Reform

Prior to the 1993 health sector reform, Colombia had a healthcare system divided into three different sub-systems: the Ministry of Health, the social security institute, and the private sector (Londoño and Frenk, 1997). Individuals covered by a healthcare plan were either those employees whose companies/public institutions paid part of their contribution (social security) or individuals who paid for private insurance. About 15% of the population was covered by social security, and 15% had private insurance (Zukin, 1985). The rest of the population resorted to the services of the public health system, which provided free or low-cost care in institutions financed by the government.

In December 1993, Colombia passed Law 100 that established universal health insurance coverage. In the new system, all Colombians are entitled to choose a health insurer, and they have the right to access a standard package of healthcare services. In order to achieve universal coverage, the mandatory contributory scheme is combined with a subsidized plan. Coverage under the subsidized plan is more limited than it is under the contributory scheme. The subsidized plan covers those unable to contribute, who are selected based on a proxy-means test. Participation in the contributory scheme is mandatory for all workers. This includes public and private sector employees, as well as self-employed individuals who earn more than two times the minimum monthly wage. Workers become members of the contributory scheme by enrolling in one of the Health Promotion Entities (HPEs). HPE affiliation is contingent upon the payment of a monthly contribution equal to 12.5% of wage income, shared between employer (8.5%) and employee (4%). One percent of this contribution is directed to the financing of the subsidized plan.

Coverage increased dramatically during the early years of the reform process, growing from 15.7% of the population in 1990 to 57% in 1997 (Ruiz et al., 2007). This expansion was mainly due to the enrollment of new family members in the contributory scheme and the coverage of the poor in the subsidized plan. By the year 2000, roughly half of the population was covered, either by the contributory scheme or the subsidized plan (Castano and Zambrano, 2006).

However, one of the main challenges of the reform was the coverage of self-employed workers characterized by low participation and contribution evasion. Although health insurance participation was mandatory in Colombia, enforcement capacity was very limited and incentives

for evasion were large. Compared to salaried workers who share their wage contribution to HPE with employees, self-employed individuals are required to pay the entire contribution. This created incentives to either evade the contributory regime or under report wages to fraudulently enroll in the subsidized regime. A major source of contribution evasion was the shift from private and public employment to independent contracting (Salazar et al., 2001). Although accurate statistics are not available, a survey from 2007 found that nearly 20% of self-employed worked as independent contractors, while the remaining 80% worked as own-account workers³ (ref: boletin 11). Independent contracting grew rapidly in Colombia after its 1993 health reform law, through the creation of worker cooperatives (CTA, *Cooperativas de Trabajo Asociado*). The raise on the pension and health contributions contemplated by the 1993 health reform produced a boom in the number of CTAs. Between 1993 and 2003 the number of CTAs created each year grew by more than thirty times (Confecoop, 2009). In particular, from 2000 and 2003 CTAs increased dramatically after law 617 of 2000, which openly promoted the creation of CTAs by the government, municipalities and public companies, in order to rationalize public spending (Farné, 2008).

In response to these problems, between 2000 and 2003 the Colombian government launched a set of measures to control disguised employment through worker cooperatives as well as other opportunistic responses to the 1993 health reform law. Thus, in 2002 and 2003, Decree 1703 and Law 797 were approved, respectively. In Colombia, public and private employers were required to demand proof of enrollment in social health insurance for any self-employed worker they may hire before the signing of a contractual agreement. Decree 1703 formed the basis of a system of sanctions for employers who hire uninsured independent contractors. At the same time, Decree 1703 promoted group enrollment for self-employed individuals who are members of authorized worker cooperatives. Finally, Law 797 of 2003 (and its Decree 510 of the same year) stipulated that the pension system and the contributory scheme had to share a common income base. These regulations were coupled with the strengthening of supervision and monitoring mechanisms to detect fraudulent membership in the subsidized plan.

³ Own-account workers are those workers who, working on their own account or with one or more partners, hold the type of jobs defined as a self-employment jobs. They include diverse groups from carpenters, plumbers, electricians, artisans, farmers; to consultants, lawyers, engineers, architects, accountants, pharmacists.

3. Empirical Specification

Demand for health insurance can be modeled as the discrete choice between enrolling in the social health insurance scheme or not enrolling (Cameron et al., 1988), because despite the mandatory character of the insurance, there are still many people who do not comply with the law, and the government lacks the necessary mechanisms to enforce universal coverage.

Like Bertranou (1998) and Trujillo (2003), we assume that the integration over individual health status can be written linearly, so that the function for the enrollment (ENR) of independent contractors in the health insurance scheme can be represented by the following equation:

$$\text{ENR} = 1 \text{ if } \text{ENR}^* > 0 \text{ and } 0 \text{ otherwise}$$

where

$$\text{ENR}^* = \beta_1 H + \beta_2 X + \varepsilon$$

We adopt a latent dependent variable approach in the modeling of the enrollment decision where ENR^* is positive only if the independent contractor is enrolled in the social health insurance scheme. The enrollment equation is a function of self-reported health status (H), and individual characteristics (X), which include health status, socio-economic and demographic characteristics, household characteristics, and community factors; and an error term (ε). This model permits us to evaluate selection by health status by examining the sign of the coefficient β_1 .

As we explained before, during the health reform, many private and public organizations pushed their workers off the books to independent contracting in order to avoid the higher employer payments to health and pensions contemplated in the 1993 law. Reclassification from private or public employment to independent contracting may create a sample selection problem that must be taken into account in order to correct for potential biases when the impact of the health reform is evaluated. We model selection into independent contracting as follows:

$$\text{INDP} = 1 \text{ if } \text{INDP}^* > 0 \text{ and } 0 \text{ otherwise}$$

Where

$$\text{INDP}^* = \gamma X_1 + \mu$$

The selection equation is a function of self-reported health status and individual characteristics (X_1) that include an exclusion restriction for identification. Because the selection

variable (INDP) and the response variable (ENR) are binaries, we correct by sample selection using the approach of Van de Ven and Van Pragg (1981), which assume that error terms ε and μ follow a bivariate probit distribution with correlation ρ . The model is estimated by MLE and the estimate of ρ is used to test for sample selection.

We evaluate the change of independent contractor insurance enrollment between 1997 and 2003. As explained before, the characteristics of independent contractors could have changed within that period because of the change in working status from employment in private and public companies to self-employment in worker cooperatives; and also because Colombia implemented social protection programs that may have improved education, health status and income. Improvements in socioeconomic characteristics are associated with higher insurance coverage, and consequently changes in insurance enrollment could be driven by the health reform and by changes in individual characteristics. We use the Blinder-Oaxaca decomposition applied to probit estimations (Yun, 2003), to quantify how much of the change in insurance enrollment was associated to changes in individual characteristics (endowment effect), and to changes in the effect of individual characteristics on insurance enrollment (coefficient effect). Because we correct by sample selection, the coefficient effect will be associated to the effect of the health reform.

4. Data and Variables

We employ two National Surveys of Quality of Life (NSQL) carried out in Colombia in 1997 and 2003. These surveys follow the Living Standards Measurement Survey (LSMS) methodology implemented by the World Bank. They include a set of questions on the presence of chronic conditions, self-reported health status, and the socio-demographic characteristics of respondents. The unit of analysis is the individual.

Because of large heterogeneity of self-employed workers, we limit our analysis to those individuals who 1) defined themselves as independent workers, farmers, independent professionals and employers; and 2) who work for a company with 2 or more employees. That way, we eliminate most of own-account workers (carpenters, plumbers, artisans, consultants, lawyers, architects, accountants, etc.), and focus on independent contractors who were the most dynamic group in the period of study as a result of the boom of worker cooperatives. This sample includes 2,853 independent contractors in 1997 and 5,531 in 2003. We also exclude individuals

18 years old or older (3.4% of the sample in 1997 and 1.9% in 2003), and without complete observations (2.4% in 1997 and 1.9% in 2003). Our final sample of independent contractors consists of 2,661 observations in 1997 and 5,296 observations in 2003.

Our hypothesis on sample selection is based on the fact that many workers in private and public organizations were pushed off the books to independent contracting. To test and correct for sample selection we estimate the choice between independent contracting and public and private employment. For the sample selection estimation we add a sample consisting of 5,017 private and public workers in 1997 and 15,814 in 2003. We also exclude individuals 18 years old or older (3.1% of the sample in 1997 and 2.3% in 2003), and without complete observations (0.02% in 1997 and 0.3% in 2003). Our final sample of private and private workers consists of 4,859 observations in 1997 and 15,352 in 2003. Table 1 reports weighted averages of the main characteristics of independent contractors and private and public workers in the 1997 and 2003 samples.

Table 1. Characteristics of Individuals by Type of Employment, 1997 and 2003

Variables	Independent Contractors			Employed in private sector		
	1997	2003	Diff	1997	2003	Diff
Insured	49.89	61.97	12.08***	81.63	79.11	-2.52***
Individual chronic condition	12.50	16.59	4.09***	10.34	11.49	1.15*
Family chronic condition	37.60	40.41	2.81*	35.56	37.75	2.19**
Self-reported health status						
Very good	12.06	10.15	-1.91*	18.58	14.19	-4.39***
Good	53.79	54.95	1.16	62.91	67.85	4.94***
Average/poor ^f	34.15	34.91	0.76	18.51	17.96	-0.55
Age (years)	41.45	42.27	0.83*	34.09	34.94	0.85***
Gender (female)	25.50	32.73	7.23***	43.43	42.40	-1.03
Marital status						
Married ^f	42.81	40.39	-2.43	33.73	30.66	-3.07***
Living together	28.97	30.61	1.63	23.02	25.51	2.49***
Widow(er)/divorced	11.06	12.42	1.36	10.41	12.15	1.74**
Single	17.15	16.59	-0.56	32.84	31.68	-1.16
Education						
No education/primary ^f	51.28	45.65	-5.63***	21.96	21.12	-0.84
Secondary/technical	39.53	38.39	-1.14	59.98	54.36	-5.62***
Higher	9.06	15.96	6.9***	18.00	24.51	6.52***
Income (thousand†)	361.86	667.09	305.23***	559.12	674.58	115.46***
Income above limit	24.75	23.21	-1.54	45.91	29.86	-16.06***
Unearned income (thousand†)	16.17	18.41	2.24	17.97	11.22	-6.75***
SISBEN level	3.26	3.43	0.17***	4.05	4.00	-0.05
SISBEN above limit	70.78	75.39	4.61***	93.33	0.92	-92.41
Company size						

2-5 employees	77.65	79.10	1.45	21.18	26.34	5.16***
6-49 employees	16.45	12.81	-3.64***	28.19	28.47	0.28
50 or more employees ^f	5.91	8.09	2.19***	50.63	45.18	-5.44***
Urban	68.99	68.32	-0.67	91.09	89.55	-1.54***
Family size (number)	4.73	4.57	-0.16**	4.51	4.23	-0.28***
Region						
Atlantica	20.04	20.56	0.52	17.12	15.28	-1.84**
Oriental	20.18	19.06	-1.13	14.75	18.88	4.12***
Central	10.52	13.47	2.96***	10.03	9.42	-0.61
Pacifica	19.00	21.00	2	15.80	17.11	1.31*
Bogota	16.08	15.74	-0.34	25.91	24.44	-1.47
Antioquia	12.74	8.56	-4.19***	14.78	13.37	-1.41*
San Andres	0.22	0.24	0.02	0.38	0.23	-0.15***
Orinoquia	1.23	1.38	0.15	1.24	1.27	0.03

Source: National Surveys of Quality of Life, 1997 and 2003.

Weighted averages. Values represent percentages unless otherwise specified. Diff column reports differences and test of differences in fractions, or means when it corresponds.

*** significant at 1%; ** significant at 5%; * significant at 10%

^f reference category, not included in the regression analysis.

† In thousands of 2008 Colombian pesos.

Table 1 shows the proportion of insured workers in 1997 and 2003. Between those years, the insurance rate of independent contractors jumped from nearly 50% to 62%, while the rate of private and public workers fell from 82% to 79%. Both changes are statistically significant and motivate our central hypothesis that some private and public organizations pushed off some workers (probably the most expensive ones) to independent contracting.

We also examine adverse selection in health insurance enrollment. We expect that independent contractors with chronic conditions or bad health are more likely than healthy workers to participate in the national health insurance scheme. We use two types of health binary variables in our models: the presence of chronic conditions for the independent contractor and all members in the family, and self-reported health status for the independent contractor. Given that the Colombian public health insurance system offers family coverage, we expect that the probability of enrollment might be affected by the health status of all family members. However, for employment selection, we expect that the choice of independent contracting is based on individual health status only.

Other variables used to model the insurance enrollment decision of independent contractors include individual demographic characteristics (age, gender, education, and marital status), individual enabling factors (monthly income and wealth), household characteristics (family size), and community-level factors (urban/rural residence, region of residence). With respect to marital status, the desire to purchase health insurance to meet family member needs

implies that married individuals will be more likely to participate in the health insurance scheme. This is especially true since the contributory plan covers spouses. The same applies to the children of the enrollee. A positive relationship between family size and enrollment is, therefore, expected. Urban area residents may also be more likely to enroll than rural residents since insurers are more developed and easily accessible in urban areas and the government is more able to enforce legislation in larger cities.

We also include categorical variables for company size. In Colombia, companies with more than ten employees are considered part of the formal sector. Although we focus on independent contractors by restricting our sample to individuals working in companies with more than one employee, we hypothesize that self-employed workers in the formal sector would be more likely to obtain insurance.

With respect to individual enabling factors, we include worker's monthly income and the SISBEN level. SISBEN (Selection System of Beneficiaries for Social Programs), is the proxy-means test designed to provide local governments with a technical tool that could be used for targeting social subsidies, including health subsidies, to the most vulnerable members of the population. A SISBEN index is calculated using Principal Components Analysis over a set of household assets, which provides a prediction of household welfare and poverty level. The index was calculated using the 1997 and 2003 survey data (for more details see Velez et al., 1998). Based on the score of the index, the household is classified into one of six groups, with SISBEN Level 1 being the poorest. According to the Law, individuals who are grouped into SISBEN Levels 1 and 2 are eligible to the subsidized plan. On the other hand, self-employed workers who earn less than two times the legal minimum monthly wage are also eligible to the subsidized plan. We include dummy variables to indicate eligibility based on income and SISBEN.

An additional variable included only in the selection equation is unearned income. It includes remittances, rental income, interest income, and alimony rents. Unearned income and chronic conditions are used as exclusion restrictions in sample selection model estimation. As explained before, family chronic conditions are used in the enrollment choice and individual chronic conditions in the independent contracting selection.

5. Results

Estimation results of the selection equation are presented in Table 2, and results of the enrollment equation in Table 3. Sample selection, measured by ρ (the correlation between error terms in the selection and enrollment equation), is large, positive and statistically significant only in 1997. This indicates that unobserved factors that increase the probability of being independent contractor also increase the probability of having health insurance. However, in 2003 sample selection becomes not statistically significant, with ρ closer to zero.

The selection equation in table 2 models the choice of independent contracting in companies with two or more employees compared to employment in the private or public sector. The drivers of selection of independent contracting are highly consistent in 1997 and 2003. The main drivers are age, gender, marital status, education, income, wealth, company size and rurality. It is important to highlight the opposite effects of income and wealth. Non-poor individuals (SISBEN level 3 or higher) are more likely to be in the private/public formal sector, while individuals with wages above the minimum to qualify for the subsidize plan are more likely to be independent contractors.

Table 2. Selection Equation: Regression for Independent Contracting Choice, 1997 and 2003

Variables	Coefficients	
	1997	2003
Individual chronic condition	-0.13	0.08
Self-reported health status		
Very good	0.00	0.01
Good	0.01	-0.13***
Age (years)	0.03***	0.02***
Gender (female)	-0.4***	-0.1**
Marital status		
Living together	-0.19***	-0.09**
Widow(er)/divorced	-0.14	-0.22***
Single	-0.33***	-0.28***
Education		
Secondary/technical	0.06	-0.01
Higher	0.37***	0.14*
Income (thousand†)	-0.36***	-0.17***
Income above limit	0.36***	0.48***
Unearned income (thousand†)	0.02*	0.02***
SISBEN level	0.00	0.05*
SISBEN above limit	-0.3***	-0.3***

Company size		
2-5 employees	1.82***	1.58***
6-49 employees	0.88***	0.53***
Urban	-0.36***	-0.5***
Family size (number)	0.01	0.03***
ρ	0.68*	-0.04
Number of (uncensored) observations	7,520	20,648

Source: National Surveys of Quality of Life, 1997 and 2003.

Sample selection estimation using bivariate probit. MLE estimation using sample weights and robust standard errors.

*** significant at 1%; ** significant at 5%; * significant at 10%

† In thousands of 2008 Colombian pesos.

The enrollment equation estimation reported in Table 3 models the probability of health insurance enrollment adjusted by sample selection. Results are consistent between 1997 and 2003, but fewer variables are statistically significant in 2003. Family and individual health conditions are positive but not statistically significant in either year, which contrasts with other studies that found evidence of adverse selection (Panopoulou, 2002). Marital status, education and wealth are statistically significant in both years. Higher wealth (SISBEN) is associated to higher insurance enrollment, but those with SISBEN level 3 or higher (those who do not qualify for the subsidize plan) are less likely to have health insurance.

Table 3. Enrollment Equation: Regression for Health Insurance Choice of Independent Contractors, 1997 and 2003

Variables	Coefficients	
	1997	2003
Family chronic condition	0.06	0.06
Self-reported health status		
Very good	0.03	0.17
Good	0.06	-0.08
Age (years)	0.01***	0.01
Gender (female)	0.11	0.24***
Marital status		
Living together	-0.3***	-0.08
Widow(er)/divorced	-0.4***	-0.37***
Single	-0.61***	-0.3**
Education		
Secondary/technical	-0.25***	-0.2**
Higher	0.16	-0.23*
Income (thousand†)	-0.16***	-0.05
Income above limit	0.18*	-0.02
SISBEN level	0.5***	0.58***
SISBEN above limit	-0.51***	-0.25*

Company size		
2-5 employees	0.69*	-0.22
6-49 employees	0.23	-0.06
Urban	-0.24***	-0.06
Family size (number)	0.06***	0.03
Number of (uncensored) observations	2,661	5,296

Source: National Surveys of Quality of Life, 1997 and 2003.

Sample selection estimation using bivariate probit. MLE estimation using sample weights and robust standard errors.

*** significant at 1%; ** significant at 5%; *** significant at 10%

† In thousands of 2008 Colombian pesos. † In thousands of 2008 Colombian pesos.

Table 4 reports the Blinder-Oaxaca decomposition. The columns present the decomposition with and without adjustment by sample selection. Since sample selection was only significant in 1997 (see table 2 and related discussion above), the differences between unadjusted and adjusted decomposition is mostly explained by the enrollment rate of 1997. For that year, the rate is nearly 50% based on unadjusted numbers, but around 35% when adjusted by sample selection. Sample selection upward biased the insurance rate among independent workers in 1997 because for many the factors explaining their enrolment to health insurance also explained their employment condition. This was not the case in 2003, when sample selection was not statistically significant.

Table 4: Blinder-Oaxaca Decomposition

	Sample selection adjustment	
	Unadjusted	Adjusted
1997 Enrollment	0.50***	0.35***
2003 Enrollment	0.62***	0.63***
Difference	0.12***	0.28*
Endowments	0.03***	0.02**
Coefficients	0.09***	0.25*
Interaction	0.00	0.01

Source: National Surveys of Quality of Life, 1997 and 2003.

Blinder-Oaxaca decomposition applied to probit estimations. Sample selection estimation using bivariate probit. Estimations using sample weights and robust standard errors.

*** significant at 1%; ** significant at 5%; *** significant at 10%

† In thousands of 2008 Colombian pesos.

When corrected by sample section, the insurance rate among independent contractors increased 28 percentage points. Of this, 25 percentage points (nearly 90%) was explained by the

health reform, interpreted by coefficient changes in the Blinder-Oaxaca decomposition. Only 2 percentage points were attributed to change in the characteristics of independent contractors (endowments). Without risk adjustment, the relevance of the reform in the decomposition of enrollment change remains.

6. Discussion and Policy Implications

The few papers that have paid attention to the effect of mandatory health insurance reform in Colombia on self-employed enrollment, find that the 1993 health reform was a success in terms of increasing their affiliation (Giedion, 2009, Panopoulou and García Prado, 2008). In this paper, we show that, when selection bias is having into account and the self-employed category is disaggregated, the impact of the mandatory health insurance on self-employed affiliation is lower than in previous studies. Our findings support the hypothesis that in the early years of the Colombian Health care reform, private and public employers used worker cooperatives as a mechanism to push covered employees off the books to independent contracting. As a result, the increase on insured self-employed cannot be attributed only to the 1993 health reform. Former employees, who were reclassified as independent contractors and kept their insurance, account for an important fraction of the increase in coverage. Insurance enrolment was then caused not only by the healthcare reform but also by flaws in the labor regime that incentivized disguised employment. We estimate that enrollment of independent contractors in 1997 was only 35% (compared to 50%) after adjusting by this labor effect.

In response to the opportunistic behaviors that arise as a result of the 1993 reform, the government of Colombia approved and implemented new legislations accompany by stringent monitoring and supervision mechanisms during the period 1997-2003. Such measures seem to have been effective since, in comparison to the results found in 1997, the sample selection due to disguised employment was not statistically significant in 2003, right after these policies were implemented. In particular, decree 1703 put pressure on employers to ensure self-employed worker participation through sanctions, and also encouraged group affiliation of self-employed workers who were members of authorized group cooperatives, thus introducing incentives to increase and control enrollment of self-employed workers.

The Colombian experience provides some important lessons to other countries that are undergoing changes to increase the coverage of self-employed while fighting against informality. First, the establishment of a mandatory health insurance scheme does not automatically lead to enrollment of the total population and much less the self-employed. We find that the healthcare reform had a moderate but still significant impact on enrollment of independent contractors. Between 1997 and 2003, enrollment increased in 28 percentage points reaching an insurance rate of 62%, still below the reform goal of 80%. However, nearly 90% of this increment in enrollment was linked to the healthcare reform. Second, embedded within mandatory health insurance there are perverse incentives affecting firms and individuals that may limit the impact of the reform and needs to be accounted for. While in the Colombian case, one of the opportunistic responses was the transfer of workers to work cooperatives so as to avoid the higher costs linked to enrollment, other types of opportunistic responses have been found in other countries. In the US, it is remarkable the case of Hawaii, where the approval of the Hawaii's Prepaid Health Care Act led to the transfer of many workers from full-time jobs to part-time jobs as a way to avoid mandatory health insurance (Buchmueller et al, 2011), or the case of Massachusetts, where smaller firms had incentives to discontinue health insurance so that their employees can sign up for cheaper state-subsidized care (Gruber, 2008). Third, strategies to increase coverage of the self-employed must consider the high heterogeneity within this group, and consider that the reform may have different impacts and challenges in different categories of self-employment. In this study we focused on worker cooperatives, whose dramatic growth have been observed in other Latin American countries such as Argentina, Peru, Chile and Brasil (ILO, 2005b). Finally, the Colombian experience, and this paper in particular, show that expanding insurance coverage could be unintended affected by other reforms implemented in the country, in particular labor and pension reforms, which should be taken into account when assessing and designing policies related to health insurance coverage. Some recent papers have focused on this interaction during the latest social protection reforms that took place in Colombia in 2007 to find that these reforms created incentives to push workers to informality and self-employment (Camacho et al, 2008). While the first wave of reforms made mandatory health insurance participation untied to pension contributions, in 2007, there was a second wave of regulations that linked health and pension payment system. This policy made impossible to contribute only to one of the systems, which may have forced many independent workers with health coverage to

stop contributing for health insurance to avoid additional contributions for pension benefits (Calderón-Mejía and Marinescu, 2011). Future research should assess the fraction of health insurance coverage attributed to the different measures undertaken by the Colombian government after 2003.

References

- Bertranou, F. 1998. "Health Care Services Utilization and Health Insurance Coverage: Evidence from Argentina." *Revi Anal Econom.* 13: 25-52.
- Buchmueller, T, DiNardo, John and Valletta, R. 2011. The effect of employer health insurance mandate on health insurance coverage and the demand for labor: Evidence from Hawaii. Working Paper Series, Federal Reserve Bank of San Francisco.
- Camacho, A.....
- Cameron, P.K., Trivedi, F., Milne and Piggot, J. 1988. "A Macroeconomic Model of the Demand for Health Care and Health Insurance in Australia." *Review of Economic Studies.* 55: 85-106.
- Castano, R., Arbelaez, J.J., Giedion, U.B. and Morales, L.G. 2002. "Equitable Financing, Out-of-Pocket Payments and the Role of Health Care Reform in Colombia." *Health Policy and Planning.* 17 (1): 5-11.
- Castano, R. and Zambrano, A. 2006. "Biased Selection within the Social Health Insurance Market in Colombia." *Health Policy.* 79: 313-324.
- Clarke, P.M. and Ryan, C. 2006. "Self-Reported Health: Reliability and Consequences for Health Inequality Measurement." *Health Economics.* 15: 645-652.
- Crossley, T.F. and Kennedy, S. 2002. "The Reliability of Self-Assessed Health Status." *Journal of Health Economics.* 21: 643-658.
- Gertler, P. and Gruber, J. 2002. "Insuring Consumption against Illness." *American Economic Review.* 92 (1): 51-76.
- Giedion, U. and Villar Uribe, M. 2009. Colombia's Universal Health Insurance System. *Health Affairs*, 28(3):853-862.
- Gindling, T. and Terrell, K. 2004. "Legal Minimum Wages and the Wages of Formal and Informal Sector Workers in Costa Rica." William Davidson Institute Working Paper Series, 647; IZA Discussion Paper No. 1018.

- Gottret, P. and Schieber, G. 2006. *Health Financing Re-Examined*. The World Bank: Washington, DC.
- Gruber, J. and Poterba, J.M. 1994. "Tax Incentives and the Decision to Purchase Health Insurance: Evidence from the Self-Employed." *Quarterly Journal of Economics*. 104: 701-733.
- Gruber, J. 2008. Covering the uninsured in the United States. *Journal of Economic Literature* 46(3): 571-606.
- Guerrero, R. 2007. *Financing Universal Enrollment to Social Health Insurance: Lessons Learned from Colombia*. Harvard Initiative for Global Health.
- Harvey, P.H. and Monheit, A.C. 1993. "Sources of Health Insurance for the Self-Employed: Does Differential Taxation Make a Difference?" *Inquiry*. 30: 293-305. Fall.
- Idler, E. and Benyamini, Y. 1997. "Self-Related Health and Mortality: A Review of Twenty Seven Community Studies." *Journal of Health and Social Behaviour*. 38: 21-37.
- Institute of Medicine. 2002. *Care Without Coverage: Too Little, Too Late*. National Academy Press: Washington, DC.
- International Labor Office (ILO). 2005a. *World Employment Report 2004-5*. Geneva, Switzerland.
- International Labor Office (ILO). 2005b. *The Employment Relationship*. International Labour Conference, 95th Session, 2006. Geneva, Switzerland.
- International Labor Office (ILO). 2011. *From precarious work to decent work. Policies and regulations to combat precarious employment*. Geneva, Switzerland.
- Jaramillo, I. 2002. "Evaluación de la descentralización de la salud y la reforma de la Seguridad Social en Colombia." *Gaceta Sanitaria*. 16 (1): 48-54.
- Levy, H. 2002. "The Economic Consequences of Being Uninsured. ERIU (Economic Research Initiative on the Uninsured)." Working Paper 12. University of Michigan.
- Londoño, J.L. and Frenk, J. 1997. "Structured Pluralism: Towards an Innovative Model for Health System Reform in Latin America." *Health Policy*. 41: 1-36.
- Mesa-Lago, Carmelo. 2007. *Reassembling Social Security: A survey of pensions and health care reforms in Latin America*. Oxford University Press.
- Maloney, W.F. and Nuñez, J. 2003. "Measuring the Impact of Minimum Wages. Evidence from Latin America." NBER Working Paper, No. W9800.

- Marquis, M.S. and Long, S.H. 1992. "Adverse Selection with a Multiple Choice among Health Insurance Plans: A Simulation Analysis." *Journal of Health Economics*. 11: 129-151.
- Panopoulou, G. 2002. "Health Insurance and the Use of Health Care Services: The Case of Colombia after the Reform of 1993." Unpublished Doctoral Dissertation. University of Sussex: U.K.
- Perry, C.W. and Rosen, H.S. 2001. *The Self-Employed are Less Likely to Have Health Insurance than Wage-Earners. So What?* National Bureau of Economic Research, Cambridge, MA.
- Rodríguez-Monguío, R. and Infante Campos, A. 2004. "Universal Health Care for Colombians 10 Years after Law 100: Challenges and Opportunities." *Health Policy*. 68: 129-142.
- Ruiz, F., Amaya, L. and Venegas, S. 2007. "Progressive Segmented Health Insurance: Colombian Health Reform and Access to Health Services." *Health Economics*. 16: 3-18.
- Salazar, V., Restrepo, J.H., Rincon, G.P. et al. 2001. "Empleo y Seguridad Social en Colombia: la necesidad de replantear una situación que se diluye." Draft Paper. Universidad de Antioquia.
- Selden, T. Forthcoming. "The Impact of Increased Tax Subsidies on the Insurance Coverage of Self-Employed Families: Evidence from 1996-2004 Medical Expenditure Panel Survey." *Journal of Human Resources*.
- Tannuri-Pianto, M., Pianto, D.M. and Arias, O. 2004. "Informal Employment in Bolivia. A Lost Proposition?" Draft Paper. <http://repec.org/esLATM04/up.29987.1081954718.pdf> [December 22, 2008]
- Trujillo, A.J. 2003. "Medical Care Use and Selection in a Social Health Insurance with an Equalization Fund: Evidence from Colombia." *Health Economics*. 12: 231-246.
- Trujillo, A.J., Portillo, J.E. and Vernon, J.A. 2005. "The Impact of Subsidized Health Insurance for the Poor: Evaluating the Colombian Experience Using Propensity Score Matching." *International Journal of Health Care Finance and Economics*. 3: 211-239.
- Van de Ven, W.P.M.M. and Van Pragg, B.M.S. 1981. "The demand for deductibles in private health insurance: A probit model with sample selection." *Journal of Econometrics* 17: 229-252.
- Van Doorslaer, E. and Gerdtham, U.G. 2003. "Does Inequality in Self-Assessed Health Predict Inequality in Survival by Income? Evidence from Swedish Data." *Soc Sci Med*. 57: 1621-1629.

- Velez, C.E., Castaño, E. and Deutch, R. 1998. *An Economic Interpretation of Colombia's SISBEN: A Composite Welfare Index Derived from the Optimal Scaling Algorithm*. Mimeo. Poverty and Inequality Advisory Unit. Inter-American Development Bank: Washington, DC.
- Yun, M. 2003. "Decomposing Differences in the First Moment." *IZA Discussion Paper 877*.
- Zukin, P. 1985. *Managed Prepaid Health Care in Latin America and the Caribbean: A Critical Assessment*. Mimeo. The Group Health Association of America, Inc.: Washington, DC.