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# The private health care sector and the provision of prenatal care services in Latin America

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# **The private health care sector and the provision of prenatal care services in Latin America**

## **Abstract**

Private providers have become an important source of health care in Latin America, yet there is still little documentation on them, especially regarding their role as providers of preventive and public health interventions. This paper uses Demographic and Health Surveys from various Latin American countries to compare the effectiveness of the private and public sectors in providing prenatal care. Although the number of prenatal visits is higher in the private sector, this is not accompanied by better delivery outcomes. We discuss different strategies to improve the role of private providers.

**Keywords:** private health care providers, prenatal care, quality, Latin America

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## 1 Introduction

Private for-profit practitioners form a large part of the health care market in low- and middle-income countries. Their prevalence is growing due to the public sector's limitations in achieving universal access to health care and the low quality of care it provides. Evidence suggests that many patients, poor and wealthy alike, use private health care in these countries, despite the fact that public services are free of charge, as these patients believe that the quality is higher than in the public sector (Das et al., 2008). This perception is usually based on consumer satisfaction with less crowded facilities, shorter waiting times, more time spent with patients, and generally better equipment and medications. While private providers may be more responsive to patient demand, in many settings they are unregulated and the technical quality of their services is questionable.

Many studies have compared the quality of private and public providers in developing countries. Research has demonstrated that some private for-profit health care providers offer low-quality curative services (Barber, 2006; Tuan et al., 2005). In India, Das et al.(2008) found poorer quality in the private sector than in the public one, and in Mexico private practitioners have been found to perform significantly worse than public ones in terms of advice, therapy, and drugs prescribed for both diarrhea and acute respiratory infections (Bojalil et al., 1998). Studies also show evidence of over-medication and over-treatment in the private sector. Waters et al. (2008) used the Living Standard Measurement Surveys of 10 Latin American countries (LACs) and found that children treated by a private provider were more likely to receive more drugs, most commonly unnecessary antibiotics. This treatment was of lower quality and less effective than the care provided by the public sector. Similarly, based on a sample of 24 geographic regions in eight LACs, Villar et al. (2006) found that deliveries of babies in private hospitals were more likely to be by cesarean section. While the regional median c-section rate was 33%, private hospitals had a rate of 51%. They found that c-sections were associated with higher post-partum antibiotic treatment, severe maternal morbidity and mortality, and higher newborn mortality.

These findings challenge the assumption that private providers offer higher quality and greater efficiency than the public sector. Still, policy makers have a strong interest in capturing the potential benefits of the private sector while attempting to counteract its failings. Indeed,



increasing the role of the private sector to meet public policy goals has the potential to mobilize additional health resources, expand access, and promote service responsiveness. Policy makers are currently focused on exploring the potential of private health care providers to offer preventive and public health services such as maternal and child health care and to expand and rationalize their coverage in low- and middle-income countries. However, they are also concerned about the ability of private sector physicians to provide such preventive public care (Brugha and Zwi, 1998; Newell, 2002). It is interesting, therefore, to test private providers' ability to offer quality preventive and public health interventions and identify strategies to improve these services.

This paper compares use of the private and public sectors to provide prenatal care, a basic public health intervention, in several countries of Latin America. To that purpose, we first use a Poisson GLM model to evaluate whether the type of facility ownership (public or private) affects the number of prenatal visits after controlling for obstetric and socioeconomic characteristics. In the second stage, we use risk-adjusted utilization rates to explore the impact of over-provision of private providers on prenatal quality, measured as obstetrical outcomes. Latin America is one of the regions where the private sector has more notably expanded in the several last years. It already accounts for the majority of total health care expenditures, mainly as a result of poor public sector coverage. For instance, private physicians account for 38% of the treatment of children in rural Guatemala (Van der Stuyft et al., 1996; Waters et al., 2008), and throughout LAC most of the private expenditure on health care comes from out-of-pocket payments. Private and non-governmental providers have become an important source of health care, but there is still little documentation on the extent and nature of such providers, especially in relation to their role as providers of preventive and public health interventions.

We focus on six countries: Bolivia, Colombia, the Dominican Republic, Guatemala, Nicaragua, and Peru. All of them are similar in terms of the expansion of the private sector as a provider of health care. But while Bolivia, Guatemala, and Nicaragua have a private sector mostly consisting of solo private practice and non-governmental organization (NGO) participation, the other three countries also have large private insurers and health maintenance organization (HMO)-type financers, as well as private providers that mainly serve the richest members of the population.

The paper is organized as follows: Section 2 reviews the literature on prenatal care and presents the guidelines for adequate prenatal care provision. Section 3 describes the data, methodology, and estimation result. Section 4 discusses the results and the conclusions.

## **2 Prenatal Care**

Since the 1980s, there has been increasing interest on the part of governments and international agencies in improving maternal and child health in poor countries. Despite the progress, currently some 600,000 women around the world die every year as a consequence of factors related to pregnancy and childbirth (WHO, 2003). The problem is especially serious in developing countries, where maternal mortality rates have barely dropped in the last 50 years and some 300 million women suffer diseases as a consequence of pregnancy and childbirth.

The vast majority of infant and maternal deaths and disabilities are preventable through high-quality care, detection and efficient referral for complications, and access to the essential elements of obstetric care when needed (Mahler, 1987). Prenatal care has long been endorsed as a way to identify mothers at risk of delivering a preterm or growth-retarded infant and to provide an array of available medical, nutritional, and educational interventions intended to reduce the risks of low birth weight and other adverse pregnancy conditions and outcomes. Fetal birth weight is one of the most common measures of the effectiveness of prenatal care and is a relevant indicator because of its association with long-term health outcomes in adult life. Other common outcome indicators of prenatal quality include incidence of delivery complications such as preterm delivery, lower post-delivery hospital stays, higher Apgar scores among newborns, higher perinatal mortality, and various other delivery complications (Coimbra et al., 2007; Amini et al., 1996; Boss and Timbrook, 2001).

Unfortunately, in many developing countries prenatal care—as well as many other maternal and child health care interventions—is inadequate, contributing to the large disparities in maternal morbidity and mortality between developing and developed countries. Inadequate prenatal care has been associated with increased risk of low birth weight, premature birth, neonatal mortality, infant mortality, and maternal mortality (Kogan et al., 1994; Herbst et al., 2003). Latin America is no exception, and adequate prenatal care remains a priority, especially in the poorest countries of the region.

In 1994, the World Health Organization (WHO) assembled a working group to prepare prenatal care recommendations for local health centers (WHO, 1996). In addition to identifying risk factors and medical conditions that demand special attention, the working group made recommendations about the timing, content, and suggested number of visits for all women. WHO recommends a minimum of four prenatal visits at specific times during pregnancy. The four visits are suggested to occur at 12 weeks, 26 weeks, 32 weeks, and 36–38 weeks. Elements of the WHO basic prenatal care plan fall into three general categories: screening for socioeconomic factors that would increase the likelihood of pregnancy complications, providing therapies known to be beneficial to birth outcomes, and answering the mother’s questions and educating her on how to deal with emergencies and otherwise plan for a safe birth.

Villar et al. (2001) compared the “basic package” or WHO model with the standard model that ideally suggests 12 visits, half of which are to occur in the last three months of gestation. Using clinical trials in over 20,000 women in Argentina, Cuba, Saudi Arabia, and Thailand, the authors found that the use of a prenatal care model requiring fewer visits resulted in similar or equivalent clinical health outcomes. Their study showed no significant difference in low birth weights, urinary tract infections, pre-eclampsia, or severe postpartum anemia. Although the median number of visits and dispersion (interquartile range, IQR) varied in each country, clinics using the standard model consistently provided more visits. Overall, clinics using the standard model provided a median of eight (IQR five to eleven) visits, while clinics using the new model provided a median of only five (IQR three to six) visits. WHO has recommended the basic package for many years, and it is currently included in the medical guidelines of most public facilities, while private providers usually use the standard model.

In the United States, policies oriented toward improving health outcomes in low-income women pushed Medicaid to expand coverage and delivery services in private facilities. Evaluations of prenatal care programs have shown that insured women going to private facilities had more prenatal care visits than other insured or uninsured women. However, the impact of private settings on quality is not clear. Marquis and Long (2002) found in Florida that the greater use of the private system by those in Medicaid did not appear to translate into improved outcomes relative to the uninsured. On the other hand, Simpson et al. (1997) found in California that private physicians’ offices had the best risk-adjusted birth outcomes.

In developing countries, most studies found weakness in private providers' quality. Such providers often lack the expertise and facilities to deliver high-quality preventive services in developing countries (Mills et al., 2002), while the recent trend in the public sector to adhere to strict medical guidelines makes the public sector better at providing prenatal care. In urban Brazil, for example, Barros et al. (2005) found that although the number of prenatal care visits increased after the universal health system was implemented, the quality of care in terms of content remained inadequate. Outcomes were also worse in the private sector in terms of preterm births and birth weights. The authors found that this result stemmed largely from the overuse of cesarean sections and labor inductions. Other studies find that the content of prenatal care is more comprehensive in the public sector (Kotelchuck et al., 1997) or that public providers devote greater resources to prenatal education than the private sector does (Freda et al., 1993). Barber et al. (2007) and Barber (2006) found that there was less prenatal care content for the rural poor in Mexico in private settings compared with public ones. Contrary to these results, Ciceklioglu et al. (2005) found in Turkey that the continuous use of the private sector was the most important predictor of adequate prenatal care content.

### **3 Data, Methods, and Results**

#### **3.1 Data**

We have used data from the Demographic and Health Survey (DHS) for the six countries considered. The survey includes questionnaires for women in their fertile years (15 to 49 years old) and children under 5 years old. This is a representative sample that allows inference at the national level. The study focuses on institutionalized births within public or private health care facilities. The sample considers only one birth per mother, implying that in multiple gestations, only the oldest baby is considered. For Bolivia, we used the standard DHS 2003 that reported 7,261 births from 1998 to 2003. For Colombia, we used the standard DHS 2005 that registered 11,657 births from 1999 to 2005. For the Dominican Republic, we used the standard DHS 2007, which registered 8,499 births from 2002 to 2007. For Guatemala, we used the continuous DHS 1998–99 that reports 4,545 births from 1994 to 1999. For Nicaragua, we used the standard DHS 2001 that registered 4,848 births from 1996 to 2001. And for Peru, we used the continuous DHS 2004–2008 that reported 10,424 births from 2000 to 2008.

### **3.2 Prenatal service utilization**

Figure 1 shows kernel density estimations for the number of prenatal visits to public and private health care providers in Bolivia, Colombia, the Dominican Republic, Guatemala, Nicaragua, and Peru. Many conclusions can be derived from these estimated distributions. First, the average number of visits to public and private providers largely exceeds the adequate prenatal care utilization of four visits suggested by WHO. At the national level, in Colombia, 8.3% of women who visited a public or private facility for prenatal care had fewer than four visits. The equivalent figures elsewhere were 3% in the Dominican Republic, 6.3% in Peru, 14.5% in Nicaragua, 17.9% in Bolivia, and 20.8% in Guatemala. Second, private companies provided more prenatal services than public providers, especially in Bolivia, the Dominican Republic, Guatemala, Nicaragua, and Peru. Colombia seems to have better control over excessive prenatal visits. The distribution of visits in Colombia, for example, shows prenatal visits stopped after the ninth visit with public providers and after the tenth visit with private providers.

A more detailed description of differences in private and public prenatal care services is provided in Table 1. Although most women received prenatal care in the public sector (which is not surprising, as it is a basic public health service), still a notable percentage used the private sector, especially in Guatemala, where nearly half the women do not have access to prenatal care. The Dominican Republic is easily the country with the highest private sector for prenatal services. There are important socioeconomic differences (rural residence and wealth, measured as a principal component index of household assets) between women who received prenatal care in private facilities and those who went to public providers. These differences underscore the social protection role of public health. Differences in terms of obstetric characteristics (age, multiple births, or history of terminated pregnancies) are not as important as socioeconomic differences.

### **3.3 Differences in number of prenatal visits between public and private providers**

Socioeconomic and demographic factors differ between women who seek prenatal care from the public sector and those who go to private providers, and it has been well established that not only obstetrical but socioeconomic factors affect the utilization of prenatal care (Simkhada et al.,

2000; Coimbra et al., 2007; Barber et al., 2007; Ciceklioglu et al., 2005). It is also known that patients of private versus public providers differ in terms of age, parity, family size, education, occupation, wealth, and other factors. Since these factors also affect prenatal utilization, a crude comparison of prenatal visits between public and private providers would be biased. For example, mothers in the private sector are usually older, and consequently, at higher risk than mothers in the public sector. Since a high-risk patient requires more prenatal visits, it is possible that the large number of observed prenatal visits in the private sector corresponds to an adequate utilization rather than over-provision. To reduce this bias, we estimate, by means of a Poisson GLM model, the impact of provider regime (public or private) and private insurance on the number of prenatal visits after controlling for obstetric and socioeconomic factors. The estimated sigmas are consistent with the Poisson GLM variance assumption (Wooldridge, 2002).

Table 2 shows the impact of private providers on the number of prenatal visits for two groups of countries. The first group (Colombia, the Dominican Republic, and Peru) have similar private payment systems. These countries had reforms that created private HMOs to finance the health care of formal workers. Private providers mainly serve the wealthy population in these countries. The second group (Bolivia, Guatemala, and Nicaragua) has different private schemes. Results are still consistent with Figure 1, where the use of prenatal controls is higher when private providers are used. Columns 1 and 2 report estimates taking into account country fixed effects and time trends, but without controlling by obstetric risk factors and socioeconomic characteristics. Receiving prenatal services in a private facility increases the number of visits by 14% for countries in Group I and 16% for countries in Group II. The results are robust to the inclusion of obstetrical factors (age, multiple gestation, and history of terminated pregnancy) as reported in columns 3 and 4, which suggests that obstetrical differences do not explain the gap in the number of visits to private versus public facilities. However, the results in columns 5 and 6 show that socioeconomic factors (mother's employment and education, marriage, partner's education, wealth, and urban residence) explain much of this gap. Although the number of prenatal visits in the private sector is still higher and statistically significant, controlling for socioeconomic factors reduces the impact of private providers on the number of visits from 13–14% to around 3%.

In the private sector, physicians are usually paid on a fee-for-service basis that creates strong financial incentives to over-treat patients. However, insurance companies may reduce

these incentives through payment mechanisms (capitation, prospective payment, p4p, etc.) and other nonpayment controls (second opinion, penalties, review of network providers, review committees, etc). To analyze the impact of private insurance on prenatal use, column 7 includes the interaction of private insurance and provider. This variable is not statistically significant, suggesting that private insurance does not play a role on the number of prenatal visits.

### **3.4 Effectiveness of excessive prenatal visits**

The higher number of prenatal visits in the private sector, which is clearly above the prescribed number of visits recommended by WHO and above the number provided by public facilities, may not necessarily indicate over-provision. If the excessive number of visits in the private sector is associated with higher quality, then the additional number of visits can be justified and they can even be cost-effective. Measuring quality as greater provision of information as well as drugs and supplements in the prenatal visit has at least two complications. First, it is difficult to obtain accurate information from DHS surveys that have self-assessment answers for a limited number of pre-natal questions. Second, more drugs, supplements, and tests during prenatal visits are also subject to over-provision and therefore do not necessarily capture quality. A better measure is the outcome at delivery associated with better prenatal quality services. If outcomes have not improved with more prenatal visits, then those additional visits are unnecessary and not cost-effective, implying over-provision.

Using randomized and quasi-randomized controlled trials, some studies have found that visits above the WHO model of four prenatal visits do not improve delivery outcomes (Villar et al., 2001). Following the same idea, we may evaluate whether more than four visits provided in private facilities improved delivery outcomes. However, taking the four-visit model of WHO as a benchmark would miss obstetric and socioeconomic differences that affect the number of prenatal visits. Instead, we use the DHS observational data to define our benchmark as the risk-adjusted number of visits. Risk-adjusted utilization rates (Iezzoni, 2003) capture the common practice in the sample, adjusted by patient's obstetric and socioeconomic characteristics. Risk-adjusted visits were estimated using a Poisson GLM model pooling the data from the six countries of analysis. Figure 2 compares kernel densities of the number of observed visits and risk-adjusted visits. It is important to highlight that the number of risk-adjusted visits suggests at

least 4 visits and no more than 12 (75% of cases are below 8 visits). This makes our estimated risk-adjusted visits very consistent with the WHO model.

We measure under- or over-provision of prenatal visits using the ratio of observed number of visits to risk-adjusted number of visits. A provision ratio around 1 indicates appropriate provision of prenatal visits (observed visits are similar to the risk-adjusted number). Consequently, we define the lowest 25 percentile as under-provision, and the highest 75 percentile as over-provision of prenatal visits. Our results were robust to changes in this definition, in particular the 20- and 80- percentile or the 10- and 90- percentile.

To test our hypothesis of over-provision of prenatal services in private facilities, we estimated the following regression using patient-level data for the two groups of countries included in our study. Newborn weight is the delivery outcome, which is reported in kilograms from birth cards primarily and mother's recall secondarily.

$$Weight = \beta_0 + \beta_1 UProv + \beta_2 OProv + \beta_3 UProv \times Private + \beta_4 OProv \times Private + \beta_5 Private + \mu$$

If over-provision in private facilities is not effective in improving weight, the impact of the interaction term between service in a private facility and over-provision (coefficients  $\beta_4$ ) would not be statistically significant, favoring our hypothesis. We control by indicators of quality of prenatal care (provision of tetanus injections and iron supplements), obstetrical risk factors (age, multiple gestation, and history of terminated pregnancy), socioeconomic factors (mother's employment and education, marriage, partner's education, wealth, and urban residence), and country fixed effects and time trend.

Table 3 shows the marginal effects of Probit estimates for the two groups of countries, considering three indicators of delivery outcomes. In columns 1 and 4 we consider normal weight (between 2,500 and 4,500 grams), in columns 2 and 5 we use low weight (below 2,500 grams), and in columns 3 and 6 we consider very low weight (below 1,500 grams).  $\beta_4$  is statistically significant in columns 1 and 2 only, indicating that only in Group I (Colombia, the Dominican Republic, and Peru) did the over-provision of prenatal visits in private facilities reduce the probability of normal newborn weight by 4.7%, while it increased the probability of low newborn weight in 3.8%.



Table 3 confirms that the over-provision by the private sector is not accompanied by better performance, and it reduced quality in countries with HMO-type financiers and private providers that mainly serve the wealthy population (Country Group I). It is worth mentioning that the coefficient for under-provision is statistically significant in any measure of newborn weight in Country Group I. Our results indicate that, independently of the type of facility ownership (public or private), under-provision deteriorates newborn weight. Figure 2 is consistent with this result and suggests that there is room to improve prenatal services by increasing visits to the WHO recommendation levels. This is a topic that is not in the scope of this research.

### **3.5 Accounting for patient's migration between public and private providers**

Although our estimations are controlled by obstetrical risk factors, DHS does not provide a complete set of clinical variables to fully capture risky pregnancies. This opens the possibility of unobserved obstetrical risk factors that would bias our estimates if they were correlated to the type of facility ownership (public or private). This correlation is feasible, given the general opinion that private facilities outperform public facilities in terms of health care quality (Das et al., 2007). Women with unobserved risky pregnancies would choose and cover the cost of prenatal care in private facilities because of the assumed higher quality of service. As a consequence, migration of risky patients from public to private facilities would produce an endogeneity problem that would bias our results, producing a higher number of prenatal visits and lower newborn weights in private hospitals not related to over-provision or lower quality.

We explore the magnitude of the migration problem to have a sense of the size of the omitted variable bias. (If the migration problem exists, using an instrumental variable approach can reduce the bias.) We first compare place of prenatal care with place of delivery. In our sample, less than 2% of women who had prenatal services in a public facility migrated to the private sector for delivery. Because prenatal care and delivery are subject to the same unobserved obstetrical risk factors, we compare place of prenatal care with place for the treatment of children's fever or diarrhea. Both treatments are independent of obstetrical risk but are correlated to the choice of facility for obstetrical services, which make these variables potential candidates for instruments. In our sample, nearly 7% of women whose children

received treatment for fever or diarrhea in a public facility had prenatal services in the private sector, and only 5% had delivery in the private sector.

Our previous numbers suggest that migration from public to private facilities is small and, thus, so is the possible omitted variable bias. Surprisingly, migration from private to public facilities is much bigger. Some 35% of women who had prenatal care in private facilities had their delivery in a public facility. It is important to mention that these high percentages are negatively correlated with wealth, which suggests that it is household budget constraint and not obstetric risk factors that drives migration from private to public facilities. Understanding this migration is out of the scope of this research.

Given that we do not find migration from the public to the private sector based on obstetric risks, our results are reliable. Migration does not upwardly bias our results, and consequently we do not correct by endogeneity using, for example, instrumental variables. Migration from private to public is more a reflection of barriers to access than choice based on health care quality, and therefore it does not create an endogeneity problem. Correcting by migration from private to public will inflate the impact of the private setting on prenatal visits and quality.

#### **4 Discussion and Conclusions**

Many developing countries have a private sector that plays a major role in delivering positive health outcomes. Yet, private sector involvement in the provision of public health is still limited, as is the evidence on its effectiveness.

In this paper, we have used a GLM Poisson model to compare the provision of prenatal care by the private and public sector in six countries in Latin America. We find that the private sector over-provides prenatal care services and that the additional prenatal visits observed in the private sector are unnecessary because they do not improve delivery outcomes, measured by means of birth weight. Our results confirm the disconnection between quantity and quality of prenatal services. In fact, more quantity may coexist with lower quality. According to universal clinical protocols, routine prenatal care includes services that providers do not always offer, even if they are seeing the same patient many times. This finding is consistent with Peabody et al. (1998), who found in a study of Jamaica that prenatal care, provided on the basis on strict

medical guidelines, has a more powerful effect on birth weight than upgraded facilities or equipment (more commonly found in private settings). The higher number of prenatal visits, the better equipment and facilities, and the better access to drugs and tests—all factors observed in the private sector—do not guarantee better quality. Indeed, quality in developing countries relies more on knowledge, capacity, and attitude of doctors than on facility characteristics (Das et al., 2008; Prual et al., 2000).

Why is there over-provision of prenatal services in the private sector? Physicians and patients in this sector are subject to different incentives that make the system subject to overuse. The asymmetry of information in the physician-patient relationship creates incentives to produce unnecessary care in any system that pays doctors per service provided. In some cases, doctors may exert influence over patients and intentionally shift the patient demand curve, thereby increasing health care services that are counter to the patient's best interest (physician-induced demand). The role of incentives is crucial in order to align the goals of private providers (primarily to generate earnings and profits) with a government's goals and patients' expectations. Market strategies may serve to ameliorate these incentives by using payment systems that are not based on production (such as capitation, prospective payment, and payment for quality). Policymakers must consider the different goals if government and the private sector are to work together to extract the most positive aspects of private provision of health care and to achieve a common aim.

This paper also notes that differences in the health system organization and types of private providers should be taken into account when analyzing the effect of over-provision of services. Thus in countries like Colombia, the Dominican Republic, and Peru, where large private insurers are commonly found, the over-provision of prenatal care services is harmful for health outcomes (birth weight), while in countries like Bolivia, Guatemala, or Nicaragua, where the private sector, especially in rural areas, relies more on solo private practices or NGO provision of health care services, over-provision of prenatal care does not have a negative effect on health outcomes. The incentives of large insurers tend toward higher earnings, leading to lower-quality or unnecessary care, as well as to overcharging patients. Further research should explore more deeply the differences between countries with large private insurers and clinics and those countries where solo practices or NGO provision are more prevalent.

Incentives, however, are not the only factor that explains this problem. There is also a notorious lack of regulation and transparency that affects the private health care provision in Latin America overall, as it does in other developing regions. Few countries in the region have institutions with a broad scope of regulation that includes the supervision of health care financiers and providers in both the public and private sector. Colombia is an exception in the sample group of countries. This is the only country with a National Health Superintendence, a supervisory and regulatory agency created in 1989 and reformed in 1994 to oversee both private and public providers. The combination of such supervisory and health care regulation and a system in which private and public providers compete (without access being limited to the wealthy population) reduces health care costs and incentives to over-treat and improves quality (Ruiz, 2007).

Government regulation and supervision may mitigate perverse incentives to over-provide in the private sector, as well as guarantee adherence to medical standards, transparency of health care quality information, and consumer education. Accreditation of private and public facilities can ensure minimum technical quality standards.

Despite problems of quality, private providers perform a very relevant role in improving access to health care services in developing countries. Private provision reduces a government's fiscal burden, and government budgets, while strained worldwide, are especially over-extended in developing countries. Thus governments, donors, and others in the international community need to reconsider the role of the private sector in health, in particular in public and reproductive health, and to engage with the private sector as a necessary part of an overall strategy to improving health care.

Getting the private sector to meet public policy goals requires developing and implementing strategies to guarantee adequate quality of care. Thus governments may invest in increasing overall clinical capacity for basic services and in specific training for human resources about clinical protocols. Franchising networks have been proposed to improve quality in settings where regulations are weak (Prata, 2005). A social franchise involves partnerships between the franchiser and selected providers (franchisees) with the agreement that these providers should integrate a defined package of services and deliver them according to the high standards of the franchiser. In return, the provider (franchisee) receives specialized support and training to provide minimum quality standards. In some African countries and in Pakistan, social

franchising has been used to provide primary health services and reproductive health services, and it appears to have been quite successful (Bishai et al., 2008).

These are only some strategies that may help Latin American countries improve the private provision of public health care interventions.

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**Table 1. Socioeconomic Characteristics by Place of Prenatal Care (weighted values)**

	Bolivia	Colombia	Dominican Republic	Guatemala	Nicaragua	Peru	Total
<b>Prenatal care in private facility</b>							
Percentage of total population	8.51	5.11	27.57	18.69	8.06	6.73	11.40
Fraction living in rural areas	10.50	11.47	22.69	39.60	12.73	6.13	18.75
Fraction in lowest wealth quintile	1.07	5.76	5.01	3.52	1.68	0.41	3.58
Fraction in highest wealth quintile	53.51	28.85	36.16	50.44	60.60	60.13	44.06
Average age in years	27.26	26.46	26.56	26.20	27.24	29.30	27.01
Fraction with multiple births	0.40	0.41	1.07	2.63	0.72	0.32	0.95
Fraction with terminated pregnancies	23.48	23.73	26.93	18.04	14.16	21.84	23.54
<b>Prenatal care in public facility</b>							
Percentage of total population	48.81	82.48	70.07	34.00	68.56	88.15	71.28
Fraction living in rural areas	24.29	24.49	35.11	47.75	46.50	39.05	33.50
Fraction in lowest wealth quintile	9.85	16.89	29.68	16.26	20.71	13.27	17.81
Fraction in highest wealth quintile	18.03	14.98	6.84	20.48	12.11	14.01	13.44
Average age in years	26.76	26.12	24.81	27.50	25.11	27.81	26.36
Fraction with multiple births	0.51	1.00	1.14	0.83	0.94	0.96	0.95
Fraction with terminated pregnancies	20.45	21.89	27.11	15.81	15.42	16.16	20.21

**Table 2. Determinants of the Number of Prenatal Visits**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Group I	Group II	Group I	Group II	Group I	Group II	Group I
Private provider	0.14 (0.007)**	0.16 (0.012)**	0.133 (0.007)**	0.152 (0.012)**	0.031 (0.008)**	0.032 (0.013)*	0.027 (0.008)**
Private insurance & provider							0.025 (0.017)
Mother's age			0.005 (0.000)**	0.005 (0.001)**	0.003 (0.001)**	0.003 (0.001)**	0.003 (0.001)**
Mother aged 35 or more			-0.083 (0.009)**	-0.126 (0.018)**	-0.05 (0.010)**	-0.061 (0.018)**	-0.05 (0.010)**
Multiple gestation			0.049 (0.021)*	0.128 (0.046)**	0.061 (0.022)**	0.127 (0.045)**	0.061 (0.022)**
Had a terminated pregnancy			0.033 (0.005)**	0.031 (0.012)**	0.023 (0.006)**	0.03 (0.011)**	0.023 (0.006)**
Mother prof. employed					0.026 (0.007)**	0.022 (0.013)	0.026 (0.007)**
Mother's educational level					0.049 (0.004)**	0.064 (0.008)**	0.048 (0.004)**
Mother is married					0.027 (0.007)**	0.058 (0.014)**	0.027 (0.007)**
Partner's educational level					0.031 (0.004)**	0.037 (0.007)**	0.03 (0.004)**
Household's wealth index					0.036 (0.003)**	0.051 (0.005)**	0.036 (0.003)**
Household in urban area					-0.007 (0.006)	-0.001 (0.012)	-0.007 (0.006)
Observations	27525	9586	27514	9584	22538	8909	22537
Log likelihood	-66960.6	-22410.3	-66833.3	-22366.8	-53979.3	-20395	-53976.2
Sigma	1.01	1.06	1.01	1.05	0.98	1.01	0.98

Dependent variable is number of visits ranging from 0 to 15 or more. Poisson GLM estimation. Country fixed effects and time trend included.

Group I: Colombia, Peru, and the Dominican Republic. Group II: Bolivia, Guatemala, and Nicaragua.

Standard errors in parentheses, standard errors scaled using square root of Pearson X2-based dispersion

\* significant at 5%; \*\* significant at 1%

**Table 3. Excessive Number of Visits in Private Providers and Newborn Weight**

	(1)	(2)	(3)	(4)	(5)	(6)
	Country Group I			Country Group II		
	Normal weight	Low weight	Very low weight	Normal weight	Low weight	Very low weight
Under-provision	-0.044 (0.006)**	0.045 (0.006)**	0.015 (0.003)**	-0.015 (0.010)	0.023 (0.010)*	0.001 (0.003)
Over-provision	0.015 (0.006)**	-0.019 (0.005)**	0.001 (0.002)	-0.013 (0.010)	-0.002 (0.009)	0.001 (0.003)
Private provider	0.011 (0.009)	-0.007 (0.009)	0.003 (0.004)	0.016 (0.014)	-0.023 (0.013)	-0.001 (0.004)
Under-provision x Private	-0.021 (0.017)	0.033 (0.019)*	0.003 (0.005)	-0.024 (0.029)	0.006 (0.026)	0.005 (0.010)
Over-provision x Private	-0.047 (0.019)**	0.038 (0.020)**	0.003 (0.005)	-0.015 (0.027)	0.047 (0.031)	0.007 (0.011)
Observations	18679	18679	18679	6996	6996	6996
Log likelihood	-5794.18	-5770.08	-1043.77	-2241.86	-2032.08	-339.94

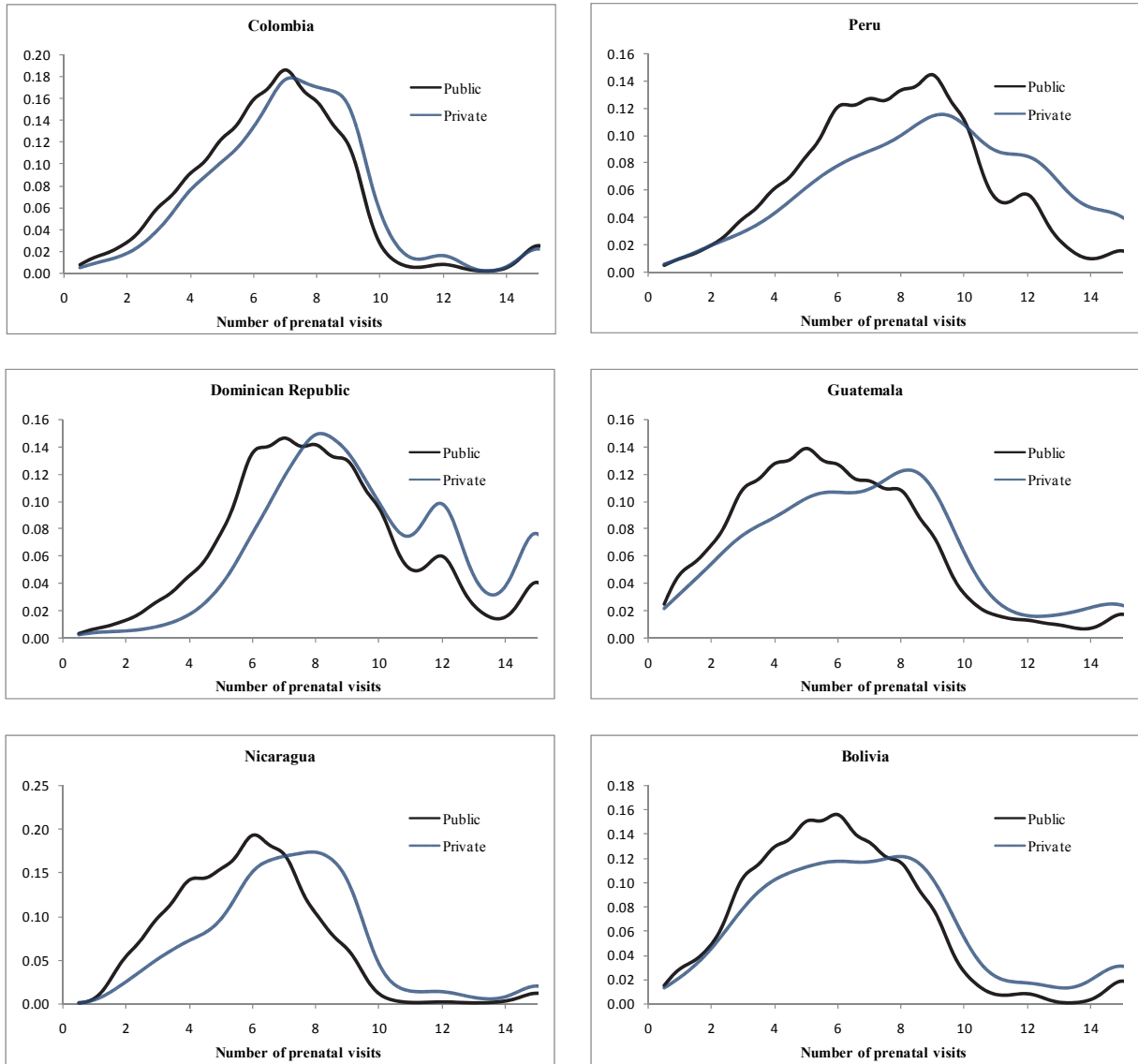
Probit estimation. Over- and under-provision is the 75- and 25- percentile of ratio of observed number of visits to risk-adjusted number of visits. Control variables include prenatal quality services (provision of iron tables and tetanus injection), obstetrical risk factors, socioeconomic factors, country fixed effects, and time trend.

Group I: Colombia, Peru, and the Dominican Republic. Group II: Bolivia, Guatemala, and Nicaragua.

Marginal effects reported. Bootstrapped standard errors in parentheses.

\* significant at 5%; \*\* significant at 1%

**Figure 1. Distribution of Number of Prenatal Visits by Provider**



**Figure 2. Distribution of observed and risk-adjusted number of prenatal visits**

