Public Insurance, Private Contracting: Effects of the Uruguayan Health Care Reform on Prenatal Care and Birth Outcomes

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Abstract

With the implementation of the National Integrated Health System in 2008, the Uruguayan government extended the social health insurance to groups not previously covered. Unlike public coverage, social security enables the choice of private providers. In this paper, we focus on the extension of coverage to mothers under the age of 18, which constituted the group of women of childbearing age with major changes in underwriting. In particular, between 2007 and 2010, the number of women under the age of 18 receiving care from a private provider increased by approximately 124,000. Our analysis examines differences in prenatal care and birth outcomes between mothers under the age of 18 and older mothers before and after the policy change. Based on national registries of births spanning the period 2002-2010, and using triple differences as a robustness check, we find that the expansion of private provision had a positive effect on the health of the newborn. These improvements, however, cannot be explained by improvements in the onset of prenatal care or the number of prenatal care visits.

Key words: economic evaluation, private provision, birthweight, prenatal care

JEL: H51, I12, I13, I14, I18, J13

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1. Introduction

In 2007 Uruguay initiated a process of health care reform aimed at building a National Integrated Health System. The reform pursued universal access to health care services, equity in spending and funding, improvements in the quality of care, a shift towards primary care, and system sustainability. One of the distinctive elements of the reform was the extension of social insurance to new groups of the population previously not covered. Unlike public insurance, which covers only services provided by public hospitals and clinics, social insurance allows beneficiaries to choose among private and public providers. In particular, as of January 2008, approximately 124,000 women under the age of 18 were entitled as new beneficiaries of the National Health Insurance (NHI), a benefit associated with a cost of USD 20 million between 2008 and 2010. In this paper we study the impact of the expanded access to private health care provision on perinatal health.

Our research contributes to the literature assessing the impact of health care reform from the point of view of access to benefits (Card et al, 2009; Wagstaff et al, 2009, Maxwell et al., 2011), health outcomes (Meckel, 1990; Bixby, 2004; Armstrong et al., 2001; Macinko et al., 2006; Finkelstein and McKnight, 2008; Card et al, 2009; Courtemanche and Zapata, 2014) and the efficiency and equity of private versus public provision (Bennet et al, 1997; Basu et al, 2012).

Regarding the latter, the literature shows that private provision can be more efficient, accountable and sustainable, and lead to more innovation than public provision, but can also be more inequitable and rely less on evidence-based care (Shleifer, 1998; Hart, 2003). Private provision has been associated with cream-skimming of patients (Hart et al, 1997), unnecessary testing and treatment, and violation of medical standards (Basu et al, 2012). Due to information imperfections and incomplete contracts, private provision imposes, in addition, a significant burden to the government in terms of regulation and quality control (Bennet et al, 1997). The relative strengths and weaknesses of these different patterns of ownership end up depending on the local institutional and regulatory setting, and in particular, on the system's ability to account for the quality and costs of services.

For Uruguay there is little empirical evidence assessing the effects of the reform launched in 2007. Zumar (2013) analyzes the budgetary long-term effects of the reform through simulation models. She concludes that the NHI increases the public sector deficit over time in a scenario with an annual GDP growth of around 2%, but is sustainable over

times in more optimistic scenarios that assume a growth rate of 6%, and increases in labor market formality and labor participation. Moreover, the Ministry of Health (MOH, 2010c) describes the process that led to the National Integrated Health System and the new institutional system, and Arbulo et al (2010) analyze the changes in coverage and insurance that emerged from the reform. Finally, Bérgolo and Cruces (2014) analyze the effect of the reform on the informal labor market.

Our work sheds new light on the impact of the reform by focusing on its effects on access to health services and health care outcomes. Furthermore, we try to isolate the expansion of private provision of health care from other changes that occurred as part of the reform process. Using Live Birth Certificates for Uruguay for the period 2002-2010, and based on models of double and triple differences, we find that increased private provision was accompanied by an improvement in newborns' health, as measured by birth weight, low birth weight, and prematurity. We do not find, however, evidence of an improvement in the timing of access to prenatal care nor in the number of prenatal care visits.

2. The Health System in Uruguay

Prior to the reform, there were three sources of health insurance in Uruguay: public insurance, social insurance, and private insurance. The first catered primarily to the low-income population, and offered assistance only through public clinics and hospitals. All formal workers in the private sector and some public sector workers were entitled to social health insurance. Social coverage was financed through employer and employee contributions, and allowed the beneficiary to choose among a set of private health care organizations (Collective Medical Care Institutions). Finally, those with no formal employment but economic means, including family members of formal workers, contracted private insurance paying for it out of pocket (MSP, 2010a, 2010b; Gonzalez et al, 2010).

In 2007 the Uruguayan government started to implement a National Integrated Health System, with the aim of achieving universal coverage through the NHI (MSP, 2010a, 2010b). The NHI is financed by employers' and workers' contributions,[1] and entitles workers, their spouses and dependents (including cohabitants and their children under 18) to receive comprehensive care from a chosen provider within the NHI network. This network includes

[1] These contributions are collected by the Social Security Bank (BPS), overturned to a

the public provider – the State Health Care Administration or ASSE - and private Collective Medical Care Institutions. The NHI contracts with each provider and pays them a risk adjusted[2] capitated fee for each beneficiary, in addition to an overpayment for complying with certain health care goals.

Most NHI beneficiaries have chosen to get care from private providers. Only a year after the implementation of the reform, 91% of beneficiaries were getting care from a private provider, while only 7% were assisted by the public provider. Although the share of the public provider has increased in recent years, private coverage continues to prevail, with a market share of 88% in December 2010 (JUNASA, 2014).

Between 2005 and 2008, the share of the population covered by the public provider (ASSE) declined by approximately 20%. Because the budget assigned to ASSE increased in real terms, spending per enrollee nearly doubled in ASSE (MOH / PAHO, 2010). This increase, coupled with a slight reduction in spending per capita in the private institutions led to an important decrease in the expenditure gap between the public and private providers (MSP / PAHO, 2010).

The reform also included a payment for performance component, aimed at reorienting the health system towards primary care, disease prevention and early diagnosis, particularly in the area of reproductive health. Late in 2008, the Uruguayan government began to compensate health care institutions for adhering to a set of "primary care goals" associated with a series of performance indicators. In the area of maternity care, one of the objectives was to increase the share of pregnancies with an initial visit in the first trimester and at least six prenatal visits before delivery. Another objective included improving the registration of medical records of pregnant patients in the national Perinatal Information System (JUNASA, 2010; González et al 2010.).

The reform has followed a phase-in process, gradually entitling different groups to the National Health Insurance. In January 2008, under-aged children of formal workers and older children with disabilities were incorporated to the system (see Figure 1).

[FIGURE 1 ABOUT HERE.]

[2] Risk adjustors are age and gender.

In this paper, we focus on the incorporation of mothers under the age of 18, which constituted the group of women of childbearing age with the largest change in health coverage during the period. The assistance of children under 18 by private providers increased from 23% in 2007 to 51% in 2010 and 56% in 2011, reaching around 60% in 2013 (INE, 2014). Other women, excluding retirees, did not experience significant changes in provider coverage until 2011. Even after 2011, the changes were of lesser magnitude due to the large private coverage of this population prior to the reform. Private assistance of non-retired women over the age of 18 rose from 50% in 2007 to 52% in 2010, reaching 58% in 2013 (see Figure 2).

[FIGURE 2 ABOUT HERE.]

The introduction of the NHI generated two fundamental changes in access to benefits and in the financing of health spending in the population under 18 years. First, it caused a substantial reduction in out of pocket spending as families who previously paid individual premiums to private providers for their children's insurance were now entitled to free social insurance (crowding out effect). Second, the reform extended private assistance to children who were previously receiving care from the public provider (expansion effect). Between 2007 and 2010, approximately 124,000 females under the age of 18 began using the services of the private sector, which meant an additional expenditure for the government of more than $ 20 million.

The latest figures available from the World Health Organization for 2012 show that Uruguay spends 9% of GDP on health (WHO, 2014). If we focus on the period of analysis in this study, between 2002 and 2010, total health spending in Uruguay increased by 40% and public expenditure by 66% in real terms (WHO, 2014). Years after the implementation of the reform, it is of particular interest to analyze whether this effort has been effective in increasing interventions of proven cost-effectiveness, such as perinatal care, and in improving health.

3. Data

We analyze birth registries from the National Registry of Live Birth Certificates, which have full coverage in Uruguay. The live birth certificate is completed by the treating physician based on the woman's clinical history. The microdata on births and deaths in Uruguay during the period 1996 to 2011 were harmonized and validated as a result of a

collaborative project between the National Institute of Statistics (INE), the Ministry of Public Health and the Population Unit of the University of the Republic.

We study the period 2002 to 2010 in order to cover pre and post reform years. Although we have post-2010 data, we chose to truncate the data in 2010 to avoid distorting the identification strategy that uses women aged 18 and more as the control group. While few women of childbearing age and above the age of 18 joined the new system before 2010, a higher proportion of women this age became entitled to the NHI after 2010.

From an initial population of 435,041 births in the period, we excluded multiple births, births with birth weight below 500 grams or 25 weeks of gestation, births with no information on the newborn's gender or the mother's age, and births with missing values for the dependent variables of interest. Our final sample had about 394,000 births.

Table 1 shows the descriptive statistics for the main variables considered in the analysis. We define two types of outcomes: health outcomes and use of health services. Health outcomes include birth weight (measured in grams), low birth weight or LBW (defined as birth weights below 2500 grams) and prematurity (less than 37 weeks of gestation). Regarding health services, we consider whether the woman had at least six prenatal visits and whether she initiated prenatal care in the first trimester. In addition to being specific goals set by the Ministry of Health, Balsa and Triunfo (2012) show a large effect of these variables on birth outcomes in Uruguay.

[TABLE 1 ABOUT HERE.]

If we compare the pre- and post-reform periods, we see improvements in indicators of prenatal care for mothers under the age of 18 as well as older mothers. The children of adolescent mothers have lower average birth weights and a higher likelihood of low birth weight and prematurity than offspring of other mothers.

4. Methodology

Our analysis uses double and triple differences as identification strategies. First, we exploit the fact that mothers under the age of 18 were the first group to be favored by the reform, and compare the differences in use of health care and perinatal outcomes between these mothers and older women before and after January 2008, when the first stage of the reform was implemented.

The first equation of interest is:

$$Y_{igt} = \alpha D_t + \beta Adol_g + \delta(Adol_g * Reform) + X'_{igt}\rho + \gamma D_r + \theta(Adol_g * t) + \varepsilon_{igt} \quad (1),$$

where Y_{igt} is one of the following outcome variables: if the birth occurred in a private hospital, birth weight, low birth weight, prematurity, at least six prenatal visits by the time of delivery and onset of prenatal care in the first trimester of pregnancy. The variable is defined for mother i in age group g and year of birth t, where g distinguishes mothers under the age of 18 (*Adol*) from other mothers. Reform is a dummy variable that takes the value of 0 for births up to the 31st of December 2007 and the value of 1 from that date onwards; *Adol* is a dummy variable that takes the value 1 if the woman is under the age of 18 when giving birth and 0 otherwise; X_{igt} is a set of dummy variables that capture mother characteristics such as age, highest educational attainment (incomplete primary school, incomplete secondary school, complete secondary school, university degree), marital status (married, single, divorced, widowed) and cohabitation status. Finally, D_t stands for a set of year dummies.

For observations with missing information on a particular variable, we impute the average value of the variable to that observation. We also create a binary variable that takes the value of 1 if the record is missing and 0 otherwise. The set of controls includes each imputed variable and its associated binary indicator of missing status.

The underlying assumption in difference in differences (DD) analysis is that the trends observed in the outcomes of the control group, in our case mothers aged 18 or more, are a good counterfactual for

adolescent mothers' trends. In other words, they approximate well the trends that adolescent mothers would have experienced had the reform not been implemented. To cover the eventuality of different trends over time in either group, we add an adolescent-mother-specific time trend ($Adol_g * t$).

The vector of parameters α captures annual differences in the dependent variable in relation to 2007 and β represents the difference in the outcome variable between mothers under the age of 18 and other mothers by 2008. Finally, our main parameter of interest, δ identifies the change in the difference in the outcome variable between adolescent and other mothers, before and after the reform.

As mentioned already, despite having data on births after the year 2010, we truncate the analysis on this year because new women of other age groups began to join the NHI after 2010, confusing the identification strategy.

All models are estimated by ordinary least squares (OLS) with robust standard errors. Recognizing that standard errors may be biased due to within age-group correlation in the error terms, we conduct later on robustness checks using aggregate regressions.

The privatization of health care provision was not the only change that occurred during the period under review. A relevant question is whether any differential effects observed for mothers under the age of 18 years can effectively be attributed to the change in the ownership status of health providers. To this end, we analyze the geographic variation in adolescent mothers' private health care coverage prior to the Reform. There are 19 departments in Uruguay, which show different levels of private coverage for adolescent mothers in the year before the reform (2007). The hypothesis is that those departments with a low fraction of private coverage (or greater public coverage) before the Reform had more to gain from the Reform, and were more likely to increase the volume of users changing coverage to the private sector. Defining the variable *Public coverage in 2007* in Department *r* (C_r) as the fraction of mothers under the age of 18 with public coverage in 2007, we estimate the following triple differences model (DDD):

$$Y_{igrt} = \mu_{gt} + \lambda_{rt} + \eta_{rg} + \theta D_g * C_r * D_t + X'_{igrt}\zeta + v_{igrt} \quad (2).$$

The outcome variable Y_{igrt} is now defined for mother *i* in group g (under the age of 18 / 18 years old and older) in period *t* and Department *r* (with public coverage in 2007 equal to C_r). This model has a number of non-parametric controls that capture department *r* and group g specific fixed effects (η_{rg}), department specific time effects (before and after the reform), λ_{rt}, and group specific time effects (μ_{gt}). The parameter θ captures the triple difference of interest.

5. Results

Figures 3-7 show the trends in the main outcome variables for adolescent mothers and other mothers. Figure 3 shows a clear discontinuity in the probability of delivering in a private hospital for mothers under the age of 18 in 2008. This break is a necessary condition for our identification strategy to work. In addition, we observe parallel trends in both this variable and other outcome variables across the two groups of mothers prior to the reform (Figures 4-7).

[FIGURE 3 TO 7 ABOUT HERE.]

Table 2 shows the results of the OLS estimation. Column (1) shows that the reform increased adolescent mothers' likelihood of getting private health care by 8.7 percentage points (pp).

[TABLE 2 ABOUT HERE.]

Columns (2), (3) and (4) explore, respectively, birth weight, the likelihood of LBW, and prematurity. The findings do not show evidence of significant effects of the reform in newborns' health or in prenatal care.

Table 3 depicts the results of a regression that opens up the differences between adolescent and non-adolescent mothers by year. The table shows that there are no statistically significant differences in outcome variables prior to 2008, a result that validates the

assumption of parallel trends and that supports our identification strategy. Moreover, we find in 2010 a relative improvement in the birth weight of children of adolescent mothers (35.5 grams), and relative declines in the likelihood of LBW and prematurity of 2 pp and 2.2 pp, respectively. For each of these outcomes, we build a rough Wald estimator of the effect of the treatment on the treated, defined as the ratio of the reduced form coefficient (the post reform difference in health or health care outcomes) and the first stage coefficient (the post reform difference in private coverage). This rough calculation suggests that access to private care would have increased birth weight by 293 grams in 2010 (35.5 / 0.121).

[TABLE 3 ABOUT HERE.]

The standard errors presented in Tables 2 and 3 could be biased due to different intra-group correlations for mothers under and over the age of 18, and because of the existence of serial correlation (Bertrand et al. 2004, Donald and Lang 2007, Hansen 2007, Cameron et al, 2008, Cameron and Miller, 2013). Following Hansen (2007), we specify a model in two stages. The first stage estimates year and group fixed effects, adjusting for mother-specific controls. When the outcome is, for example, birth weight, these year and group fixed effects represent the average annual birth weight of the residual category in the set of adjustors (i.e., if the omitted category is a married women with less than secondary education, these fixed effects represent the average birth weight of married women with less than secondary education in each year). In the second stage, we regress these group and year fixed effects on year dummies, on group dummies, and on the interaction of Adolescents and Reform. We test for serial correlation and find that errors follow a serial correlation process AR (1). Using this error structure, we estimate a feasible generalized least squares model (FGLS). The findings displayed in Appendix Table A2 support the previous results presented in Table 2. For some indicators of perinatal outcomes (weight and low birth weight) this approach even improves significance, a result that may be due to the higher efficiency of FGLS relative to OLS.

The results for the triple difference analysis (Equation (2)) are presented in Table 4. As hypothesized, we find that the reform caused larger increases in private coverage of adolescents in those departments with smaller adolescent private coverage (or higher public coverage) in 2007. Furthermore, the relative birthweight of children of adolescent mothers experienced a larger increase in these departments after the reform: the coefficient on the triple difference indicates that the weight difference between adolescent and non-adolescent mothers would have increased by 79 grams after the Reform if the mother had been in a department with no private coverage in 2007 (relative to being in a department with full private coverage and no room for an effect of the reform in 2007). We also find a positive and statistically significant coefficient on the triple difference when analyzing prematurity (2.3 pp).

[TABLE 4 ABOUT HERE.]

In Table 5 we repeat the above analysis but identifying different triple difference coefficients for each year after the reform. Again, we see an increase in births to mothers below the age of 18 in departments with low initial private coverage. We observe no changes in perinatal outcomes in the first couple of years of the reform. Moreover, private coverage is associated with increases in prematurity in 2008. On the other hand, results for 2010 show an increase in birth weight of 87.7 grams and a decrease of 3.3 pp in the probability of low birth weight in the same year. These results suggest that both beneficiaries and providers experienced a period of adjustment right after the implementation of the reform. Indeed, there is anecdotal evidence about providers having difficulties in encompassing medical services to the larger demand, and women finding it hard to accommodate to the culture of the private system. This hypothesis is somehow supported also by our findings for the health care processes. Our results show that in the first two years after implementation the NHI decreased women's likelihood of initiating prenatal care in the first trimester of pregnancy (by 15

percentage points in 2008 and 9 percentage points in 2009). Only in 2010 did this indicator return to pre reform levels.

[TABLE 5 ABOUT HERE.]

Finally, we perform sensitivity analyzes that check the robustness of our results to other control groups. Concretely, we re-estimate the model using only data for mothers between the age of 19 and 21 as a counterfactual (see Table A3 in Annex). This analysis is broadly consistent with previous results.

6. Discussion and Conclusions

During the past decades, Latin America has witnessed significant reform processes in the health care sector. These reforms include the Plan AUGE in Chile, the Seguro Popular in Mexico, the Act 100 of Colombia, the Integrated Health System in Brazil, the deregulation of Social Workers' Institutions in Argentina, and the Integrated National Health System in Uruguay. Unlike several reform processes in the 80s, which had tended to privatize health insurance, the new plans were aimed at creating and strengthening solidarity pillars, promoting universal provision of a basic package of services, and offering universal access to care through the creation of unique systems (Mesa Lago, 2005; Mendez and Lopez Vanegas, 2010; Filgueira, 2014, Atun et al, 2014).

The Uruguayan health care reform initiated in 2007 pointed in this direction, expanding social health insurance to different groups of the population not previously covered. In the years following 2007 a large number of individuals shifted their source of care from public health clinics and hospitals to private providers. In the case of pregnant women, this extension of rights did not involve additional out-of-pocket expenditures, as prenatal care is exempted from copayments in Uruguay since 2006. In addition to increasing the share of private health services, the reform implemented incentive payments aimed at expanding

primary care and preventative efforts. It also increased expenditure per capita in the public sector and shrunk the health expenditure gap between the public and private sectors.

In this paper we exploit the phase-in design of the Uruguayan National Integrated Health System, and in particular the fact that during the first three years, most of the new entitlements were awarded to dependents of formal workers (children under the age of 18 or disabled children). The incorporation of other groups of women of childbearing age to the National Health Insurance did not occur until 2011. Our analysis examines differences in health indicators and perinatal outcomes between mothers under the age of 18 and older mothers, before and after the reform.

The results show a clear increase in the use of private health care after the reform, even higher in departments with low prior coverage of private health services. The design allows us to use a methodology of double and triple differences, exploiting the differential access of adolescent mothers to the new system in the first years of the reform and the differential intensity of initial private coverage across different regions. We find that the National Health Insurance did not foster significant advancements during the first years of implementation, probably due to an adjustment period for both beneficiaries and providers, but led to increases in birth weight, and to lower birth weight and prematurity, by the third year (2010).

One legitimate question is whether the gains in perinatal health observed by the third year were due to the shift from public to private provision or to a heterogeneous reaction of mothers under the age of 18 to additional stimuli introduced by the Reform. These stimuli included incentive payments for complying with primary care goals, a larger per capita health budget in the public sector, and other policies taking place in the period, such as the extension of family allowances to teenage mothers in 2009, or the strengthening of the anti-tobacco

campaign. We believe our analysis of triple differences provides credible evidence for the first channel, in particular when analyzing birth weight. None of the other mentioned policies, with the exception of the expansion in private provision, operated distinctly by geographic region.

On the other hand, our failure to find evidence of changes in prenatal care raises the question about the mechanisms operating behind the improved health outcomes. One possibility is that, conditional on the onset of initiation of care and on the number of visits, private providers offer better quality of care. Factors such as the doctor's influence on the behavior of women during pregnancy or the detection and treatment of conditions associated with low birth weight and premature birth could differ across public and private institutions.

Beyond quality issues, which we are unable to assess quantitatively with the current data, our data suggest that further improvements could be made in terms of quantity of care and early initiation. The levels of use of prenatal care by mothers under the age of 18 were still quite low in 2010 relative to that of other mothers. Only 48% of adolescent women started prenatal care visits in the first trimester of pregnancy versus 67% in the case of older mothers, and 75% adolescent mothers had at least six prenatal care visits before delivery versus 85% for older mothers. Previous work has shown the positive impact of expanding these services on perinatal outcomes (Balsa and Triunfo, 2012).

The contribution of our analysis to the literature on public versus private provision of health care should be understood in the light of the Uruguayan institutional arrangements. The literature has associated private provision with greater efficiency and capacity for innovation, but also with reductions in unobserved and non-contractible quality, higher levels of over treatment and diagnosis, and positive selection (cream skimming) of patients. Most of the above evidence has taken place in competitive and poorly regulated scenarios. In the case of

Uruguay, the regulatory framework determines that institutions cannot select patients on the basis of prior medical conditions; institutions are forced to accept beneficiaries that select them. Selection is, thus, a smaller concern in the Uruguayan context. Second, one would expect innovation and efficiency to operate more in competitive markets. The degree of competitiveness differs substantially in Montevideo (with a supply of 11 private Institutions of Collective Medical Assistance and 6 private insurance firms) relative to inland departments (with an average of 1.5 providers per department). Our results show that Montevideo was, in fact, one of the departments with larger changes in health outcomes after the reform.

One final note has to do with the external validity of our analysis. Our results cannot be extrapolated to other health services subject to the payment of copayments. In fact, for other services, there is some evidence that copayments operated as a large barrier to access to care for low-income people who switched to the private sector.

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Table 1. Descriptive statistics

	Pre-reform		Post-reform	
	Mothers <18	Mothers ≥ 18	Mothers <18	Mothers ≥ 18
	(1)	(2)	(3)	(4)
Birth outcomes				
Deliveries in private hospitals (%)	0.210	0.472	0.343	0.545
Birth weight (grams)	3090	3243	3139	3272
Low Birth Weight (< 2500 grams)	0.110	0.070	0.099	0.067
Prematurity (<37 weeks)	0.119	0.078	0.117	0.076
Onset of prenatal care at 1st trimester	0.349	0.514	0.443	0.628
At least 6 prenatal care visits	0.712	0.794	0.741	0.835
Newborn sex: male	0.516	0.513	0.514	0.513
Maternal characteristics				
Adolescent (Age <18)	1.000	0.000	1.000	0.000
18≤Age <25	0.000	0.366	0.000	0.363
25≤Age <36	0.000	0.518	0.000	0.516
36≤Age <40	0.000	0.094	0.000	0.100
Age ≥ 40	0.000	0.022	0.000	0.021
Education< Elementary school	0.090	0.054	0.042	0.031
Elementary≤ Education <High school	0.883	0.661	0.798	0.593
High school ≤ Education < College	0.026	0.186	0.024	0.163
Education ≥College	0.001	0.099	0.001	0.119
Education missing	0.052	0.041	0.155	0.115
Married	0.092	0.410	0.064	0.346
Not married	0.907	0.564	0.933	0.628
Divorced/ Widowed	0.001	0.026	0.003	0.026
Marital status missing	0.003	0.003	0.139	0.098
Cohabitation	0.373	0.336	0.547	0.457
No information on living arrangements	0.003	0.003	0.176	0.076
N	19066	245149	10094	119540

Table 2. Difference in differences pre vs post reform, adolescent vs non adolescent mothers

	Delivery in a private hospital	Birthweight	Low Birthweight	Prematurity	Initiated PC 1st trimester	At least 6 PC visits
Adol*Reform	0.087***	12.156	-0.005	-0.001	0.010	-0.003
	(0.009)	(12.482)	(0.007)	(0.007)	(0.011)	(0.010)
Adol	-0.181***	-164.654***	0.039***	0.037***	-0.069***	-0.028**
	(0.009)	(13.194)	(0.007)	(0.008)	(0.012)	(0.011)
2002	-0.051***	-21.290***	-0.000	-0.004*	-0.091***	-0.035***
	(0.003)	(3.991)	(0.002)	(0.002)	(0.004)	(0.003)
2003	-0.048***	-47.750***	0.009***	0.002	-0.086***	-0.040***
	(0.003)	(3.868)	(0.002)	(0.002)	(0.003)	(0.003)
2004	-0.028***	-34.816***	0.006***	-0.001	-0.070***	-0.019***
	(0.003)	(3.782)	(0.002)	(0.002)	(0.003)	(0.003)
2005	-0.025***	-30.662***	0.005***	-0.003	-0.033***	0.002
	(0.003)	(3.782)	(0.002)	(0.002)	(0.003)	(0.003)
2006	-0.014***	-15.271***	0.003*	-0.003*	-0.016***	-0.001
	(0.003)	(3.701)	(0.002)	(0.002)	(0.003)	(0.003)
2008	0.069***	-0.577	-0.001	-0.001	0.027***	0.015***
	(0.003)	(3.757)	(0.002)	(0.002)	(0.003)	(0.003)
2009	0.070***	8.780**	-0.004**	-0.007***	0.084***	0.040***
	(0.003)	(3.827)	(0.002)	(0.002)	(0.003)	(0.003)
2010	0.111***	25.417***	-0.006***	-0.011***	0.127***	0.062***
	(0.003)	(3.932)	(0.002)	(0.002)	(0.003)	(0.003)

* p<.1, ** p<.05, *** p<.01; robust standard errors in parentheses, N=393,759.

Note: Additional controls: mother's education, marital status, newborn's gender, year and geographical area fixed effects.

Table 3: Difference in differences adolescents vs non adolescent mothers per year

	Delivery in a private hospital	Birthweight	Low Birthweight	Prematurity	Initiated PC 1st trimester	At least 6 PC visits
Adol	-0.192***	-156.112***	0.038***	0.047***	-0.108***	-0.034***
	(0.007)	(10.437)	(0.006)	(0.006)	(0.009)	(0.008)
2002	-0.058***	-24.329***	0.000	-0.003*	-0.091***	-0.039***
	(0.003)	(3.679)	(0.002)	(0.002)	(0.003)	(0.003)
2003	-0.054***	-51.071***	0.010***	0.002	-0.085***	-0.042***
	(0.003)	(3.720)	(0.002)	(0.002)	(0.003)	(0.003)
2004	-0.035***	-36.120***	0.006***	0.000	-0.070***	-0.020***
	(0.003)	(3.754)	(0.002)	(0.002)	(0.003)	(0.003)
2005	-0.029***	-32.146***	0.006***	-0.002	-0.032***	0.001
	(0.003)	(3.848)	(0.002)	(0.002)	(0.003)	(0.003)
2006	-0.016***	-15.622***	0.003*	-0.003	-0.015***	-0.001
	(0.003)	(3.823)	(0.002)	(0.002)	(0.003)	(0.003)
2008	0.071***	0.714	-0.001	-0.002	0.028***	0.015***
	(0.003)	(3.804)	(0.002)	(0.002)	(0.003)	(0.003)
2009	0.072***	9.888**	-0.004**	-0.006***	0.084***	0.041***
	(0.003)	(3.858)	(0.002)	(0.002)	(0.003)	(0.003)
2010	0.111***	25.262***	-0.005***	-0.009***	0.127***	0.064***
	(0.003)	(3.914)	(0.002)	(0.002)	(0.003)	(0.003)
Adol*2002	0.017*	-1.541	0.002	-0.008	0.030**	0.011
	(0.010)	(14.150)	(0.008)	(0.008)	(0.012)	(0.011)
Adol*2003	0.008	12.537	-0.010	-0.013	0.018	-0.001
	(0.010)	(14.236)	(0.008)	(0.008)	(0.012)	(0.012)
Adol*2004	0.044***	-7.687	-0.002	-0.014*	0.011	-0.002
	(0.011)	(14.567)	(0.008)	(0.009)	(0.013)	(0.012)
Adol*2005	0.026**	3.491	0.000	-0.005	-0.002	0.008
	(0.010)	(14.686)	(0.008)	(0.009)	(0.013)	(0.011)
Adol*2006	0.001	-3.311	-0.000	-0.006	-0.003	0.003
	(0.010)	(14.342)	(0.008)	(0.008)	(0.013)	(0.011)
Adol*2008	0.078***	3.248	-0.003	0.006	-0.006	-0.001
	(0.011)	(14.282)	(0.008)	(0.009)	(0.013)	(0.011)
Adol*2009	0.097***	12.471	-0.003	-0.008	-0.012	-0.009
	(0.011)	(14.435)	(0.008)	(0.008)	(0.013)	(0.011)
Adol*2010	0.121***	35.449**	-0.020***	-0.022***	0.003	-0.006
	(0.011)	(14.239)	(0.008)	(0.008)	(0.013)	(0.011)

* p<.1, ** p<.05, *** p<.01; robust standard errors in parentheses; N=393,759.

Note: Additional controls: mother's education, marital status, newborn's gender, year and geographical area fixed effects.

Table 4: DDD, by pre and post reform and by prior intensity of private coverage

	Delivery in a private hospital	Birthweight	Low Birthweight	Prematurity	Initiated PC 1st trimester	At least 6 PC visits
Adol*Reform* Public coverage of adol mothers in 2007	0.268***	79.153***	-0.019	0.023*	-0.033	-0.006
	(0.063)	(18.768)	(0.016)	(0.012)	(0.034)	(0.029)

* p<.1, ** p<.05, *** p<.01; robust standard errors in parentheses; N=393,759.

Note: Additional controls: mother's education, marital status, newborn sex, and fixed effects for: geographical area of occurrence of birth (Department) per year, geographical area of occurrence of birth (Department) for Younger and Younger per year.

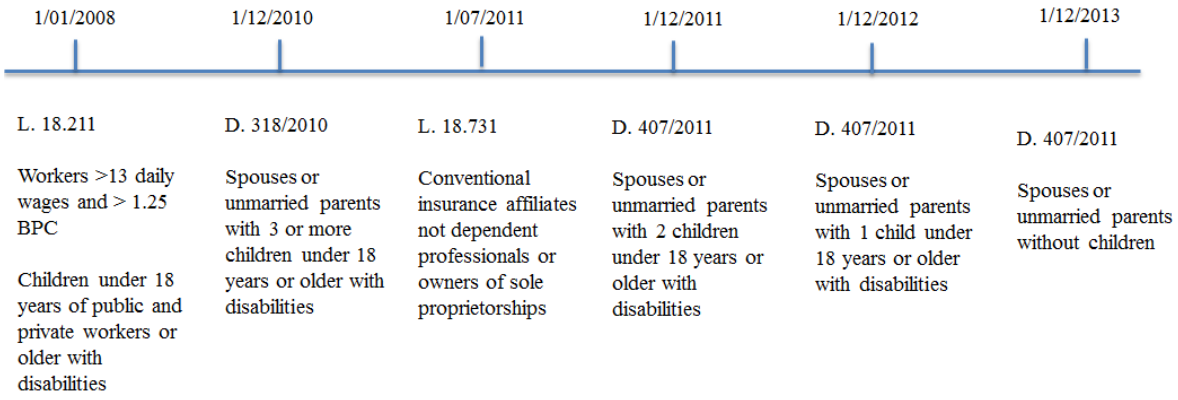
Table 5: DDD, by year and by prior intensity of private coverage

	Delivery in a private hospital	Birthweight	Low Birthweight	Prematurity	Initiated PC 1st trimester	At least 6 PC visits
Adol* Public coverage of adol mothers in 2007* 2008	0.203**	24.009	-0.009	0.036**	-0.145***	-0.049
	(0.077)	(28.222)	(0.020)	(0.014)	(0.035)	(0.032)
Adol* Public coverage of adol mothers in 2007* 2009	0.245***	41.989	-0.010	0.013	-0.090**	-0.025
	(0.077)	(29.708)	(0.017)	(0.011)	(0.035)	(0.032)
Adol* Public coverage of adol mothers in 2007* 2010	0.323***	87.677***	-0.033**	-0.008	-0.027	0.005
	(0.082)	(30.825)	(0.016)	(0.015)	(0.038)	(0.034)

* p<.1, ** p<.05, *** p<.01; robust standard errors in parentheses; N=393,759.

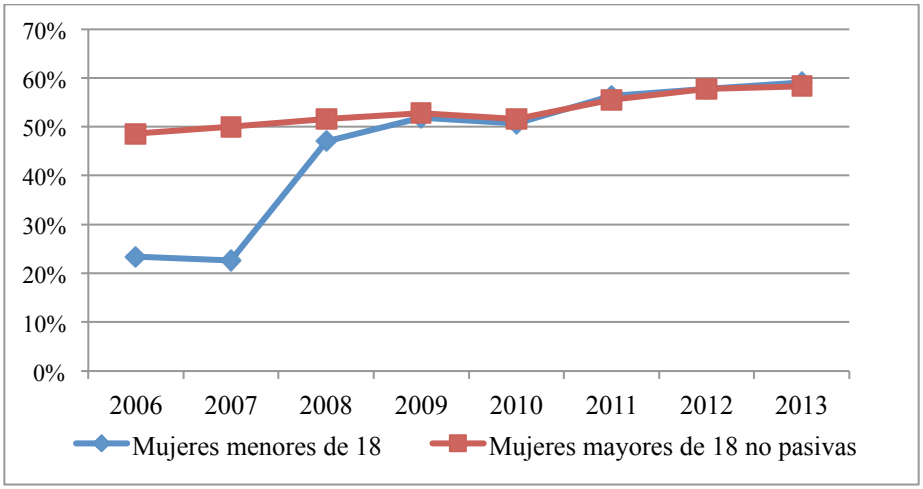
Note: Additional controls: mother's education, marital status, newborn's gender, and fixed effects for: geographic area of delivery (Department) per year, geographic area of delivery (Department) for Adol and Adol * year.

Figure 1: Process of incorporating different groups to National Health Care System



Source: García Martínez (2012); Law 18.211 y Law 18.731 (http://www.parlamento.gub.uy).

Figure 2: Private Coverage (% all women with health rights)



Source: Encuestas Continuas de Hogares, INE.

Figure 3: Deliveries in private maternities

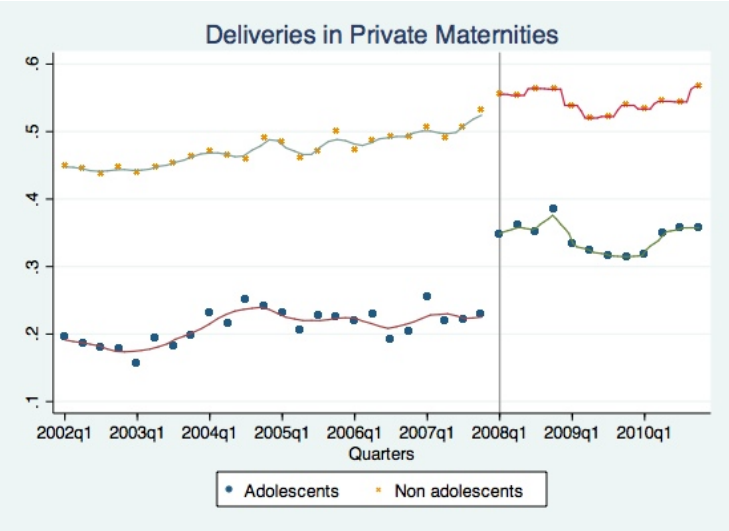


Figure 4: Low Birthweight (<2500 grams)

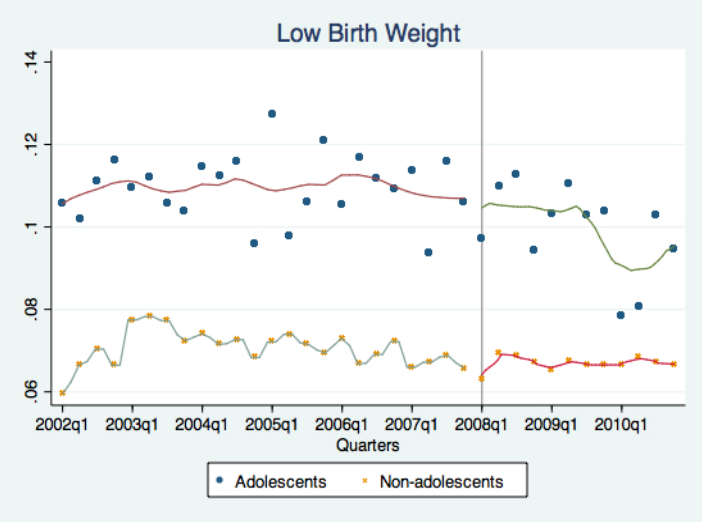


Figure 5: Prematurity (<37 weeks)

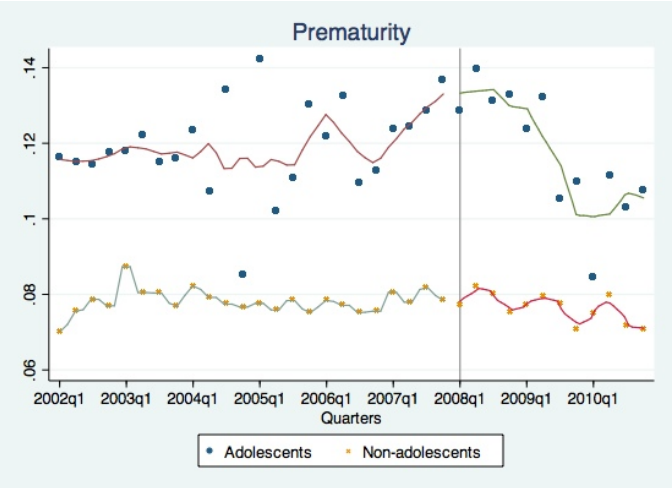


Figure 6: Onset of prenatal care at 1st trimester

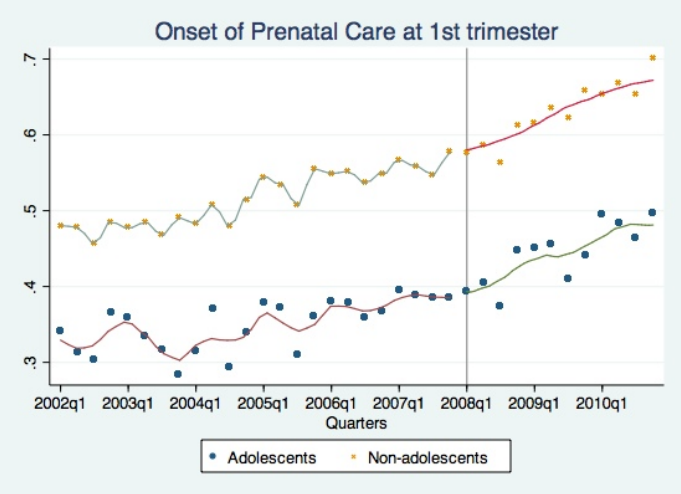


Figure 7: At least 6 PC visits during pregnancy

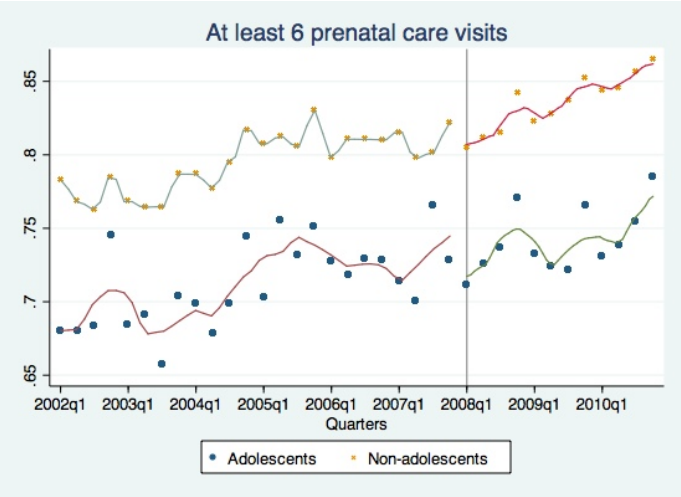


Table A2: Difference in differences, pre vs post reform, adolescent vs other mothers.
Aggregate regressions using Hansen's (2007) two stage method.

	Delivery in a private hospital	Birthweight	Low Birthweight	Prematurity	Initiated PC 1s trimester	At least 6 PC visits
Adol*Reform	0.084***	12.156	-0.005	-0.001	0.010	-0.003
	(0.009)	(12.482)	(0.007)	(0.007)	(0.011)	(0.010)

Table A3: Difference in differences, by year, adolescent vs other mothers.

Aggregate regressions using Hansen's (2007) two stage method.

	Delivery in a private hospital	Birthweight	Low Birthweight	Prematurity	Initiated PC 1st trimester	At least 6 PC visits
Adol	-0.085***	-99.235***	0.031***	0.043***	-0.040***	-0.007
	(0.009)	(11.944)	(0.006)	(0.007)	(0.011)	(0.010)
2002	-0.071***	-38.426***	-0.000	0.004	-0.078***	-0.041***
	(0.007)	(8.853)	(0.004)	(0.005)	(0.008)	(0.007)
Adol*2002	0.028**	13.978	0.002	-0.016*	0.016	0.016
	(0.012)	(16.271)	(0.009)	(0.009)	(0.014)	(0.013)
2003	-0.071***	-67.567***	0.011**	0.005	-0.067***	-0.038***
	(0.007)	(9.001)	(0.005)	(0.005)	(0.009)	(0.008)
Adol*2003	0.025**	29.794*	-0.011	-0.016*	-0.001	-0.004
	(0.012)	(16.416)	(0.009)	(0.010)	(0.015)	(0.014)
2004	-0.043***	-52.386***	0.008*	0.000	-0.057***	-0.004
	(0.008)	(9.130)	(0.005)	(0.005)	(0.009)	(0.008)
Adol*2004	0.047***	9.100	-0.004	-0.014	-0.004	-0.018
	(0.013)	(16.768)	(0.009)	(0.010)	(0.015)	(0.014)
2005	-0.035***	-57.046***	0.013***	0.002	-0.025***	0.009
	(0.008)	(9.421)	(0.005)	(0.005)	(0.009)	(0.008)
Adol*2005	0.030**	28.904*	-0.007	-0.009	-0.011	0.000
	(0.012)	(17.005)	(0.009)	(0.010)	(0.015)	(0.013)
2006	-0.021***	-35.595***	0.008	0.003	-0.006	-0.005
	(0.008)	(9.226)	(0.005)	(0.005)	(0.009)	(0.008)
Adol*2006	0.005	17.263	-0.005	-0.013	-0.012	0.007
	(0.012)	(16.612)	(0.009)	(0.010)	(0.015)	(0.013)

2008	0.086***	-14.642	-0.000	0.002	0.021**	0.014*
	(0.008)	(9.106)	(0.005)	(0.005)	(0.009)	(0.007)
Adol*2008	0.057***	18.321	-0.004	0.002	-0.002	-0.003
	(0.013)	(16.497)	(0.009)	(0.010)	(0.015)	(0.013)
2009	0.075***	0.364	-0.000	-0.004	0.094***	0.052***
	(0.008)	(9.335)	(0.005)	(0.005)	(0.009)	(0.007)
Adol*2009	0.083***	21.356	-0.007	-0.009	-0.029*	-0.023*
	(0.013)	(16.701)	(0.009)	(0.010)	(0.015)	(0.013)
2010	0.101***	17.487*	-0.005	-0.001	0.128***	0.070***
	(0.008)	(9.577)	(0.005)	(0.005)	(0.009)	(0.007)
Adol*2010	0.114***	41.406**	-0.020**	-0.028***	-0.011	-0.020
	(0.013)	(16.578)	(0.009)	(0.009)	(0.015)	(0.013)