The Effects of Extending Social Security Health Insurance Eligibility to Public Safety Net Insurance Beneficiaries: Lessons from a Pro-Choice Reform in Uruguay

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Abstract

With the implementation of the National Integrated Health System in 2007, the Uruguayan government extended social health insurance to groups of individuals who were previously covered by the public safety net or that paid for private insurance out of pocket. The policy allowed new beneficiaries to choose care from a set of private providers that offered a more generous coverage than the public alternative. In this paper, we focus on the extension of social health insurance to adolescent mothers previously covered by the public safety net. Exploiting the gradual incorporation of children of formal workers, and the geographic variation in the intensity of the reform, we find that the increase in choice associated to the expansion of social security health insurance had a negligible effect on perinatal health care and on health outcomes. We hypothesize that health care rationing by private providers due to rising wages and a smaller primary care infrastructure of private providers in low income neighborhood may have accounted for the result.

Key words: social security insurance, impact evaluation, provider choice, birthweight, prenatal care

JEL: D12, H51, I11, I12, I13, I14, I18, J13.

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1. Introduction

In the past decades, Latin America experienced a widespread process of health care reforms aimed at expanding access to health care and strengthening health systems. These reforms included the reorganization of health systems to address structural fragmentation, a decentralization of decision-making, improvements of regulatory functions, and a separation of financing and provider functions (Atun et al., 2015). In terms of health insurance structure, some countries, such as Costa Rica and Brazil, shifted from highly fragmented health insurance systems to integrated single-payer systems.[1] Others maintained semi-integrated systems but expanded coverage and/or guaranteed the provision of basic benefits to the poorest population. Such was the process followed by Chile, Colombia and Uruguay, and more shyly by Peru, Argentina, Dominican Republic, and Mexico. For the countries that implemented single-payer systems, there is some evidence that the reforms decreased infant and maternal mortality and rationalized the use of resources (Dow and Schmeer, 2003; Soares et al., 2017). There is little rigorous evidence, however, on the impacts of the reforms that expanded social security insurance. Unlike single-payer systems, social security health systems in Latin America rely on private provision and on provider competition. It is quite important to understand how these institutional arrangements affect the allocation of health care services and health outcomes.

In this paper, we assess the effects of one aspect of the health care reform launched in Uruguay in 2007: the expansion of social security health insurance (SSHI) eligibility to groups of the population previously covered by the public safety net insurance (PSNI). The

[1] Cuba also implemented a single-payer system earlier in the past century.

reform expanded the ability to choose a health provider to 808,000 new beneficiaries between 2007 and 2010 (a quarter of the Uruguayan population). Out of these, 256,000 were already purchasing services from private providers out of pocket. Thus, the reform expanded choice to 552,000 new beneficiaries in the period (formerly covered by the PSNI), an increase that was mainly due to the incorporation of children under the age of 18 of formal workers to their parents' SSHI. While the PSNI provided services only through public hospitals and clinics, SSHI allowed beneficiaries to choose from a network of private and public providers that operated in a fixed-price competitive setting.

Our identification strategy exploits the phased-in implementation of the reform to different groups of the population as well as the reform's differential intensity across geographic regions. Using a saturated sample of national births collected from the Live Birth Certificates for Uruguay for the period 2002-2010, we find that the increase in SSHI eligibility increased the choice of private providers, but had negligible effects on newborns' health and on access to and use of perinatal health care.

Our findings contribute to several strands of the literature. First, our paper is among a few to provide evidence of a recent market oriented health reform in Latin America aimed at making health care access universal and equitable. The reform increased health expenditure by 1 point of GDP within a few years from implementation. Understanding its value for money is by itself an important issue to focus on.

Second, our paper contributes to the recent literature on the effects of expanded choice and competition on quality of care and health outcomes. As argued by Hart et al., (1997) and Goddard (2015), in settings with asymmetric information and incomplete contracts, competition may not be good or bad per se, but may depend on the institutional framework. This includes the type of providers competing (insurers, hospitals, primary care providers),

the nature of the agent ultimately making the choice (informed or uninformed patients, physicians), market regulations including price controls, the vertical integration between hospitals and primary care practices, or the type of procedure being chosen, among other features. Several recent papers provide evidence that the 2000's reforms that fostered hospital competition in the UK enhanced patient welfare, reduced patient mortality (mostly from heart attacks), improved health, and increased hospital management quality, without raising costs (Cooper et al., 2011; Gaynor and Town, 2012; Gaynor et al., 2013; Bloom et al., 2015; Gutacker et al., 2016; Gaynor et al., 2016). Kessler and McClellan (2000) also found that hospital competition improved welfare and reduced costs for Medicare patient in the US. On the other hand, authors exploring the association between competition and quality in knee and hip replacement, arguably conditions with a higher demand elasticity than heart attacks, do not find evidence of positive associations between competition and quality (Colla et al., (2016), Moscelli et al. (2016) and Skellern (2017)). In some cases, they even find that higher competition leads to worse health outcomes. There is also mixed evidence on the effects of competition in markets where prices are flexible (Gaynor and Town, 2012). For example, Propper et al. (2004) show that the payer driven UK reform in the 1990s that promoted hospital competition led to higher mortality rates. Finally, the literature also provides suggestive evidence that competition and choice may not be welfare enhancing in poorly regulated health care markets. Private provision in unregulated markets can be more inequitable and rely less on evidence-based care than public provision (Schleifer, 1998; Hart, 2003). There is some evidence that in poorly regulated settings, or in settings where patients have poor information about quality, competition among private providers may lead to cream-skimming of patients, unnecessary testing and treatment, and even violation of medical standards (Basu et al., 2012).

While the pro-choice health care reform in Uruguay was set up in a highly regulated market, with fixed risk adjusted capitated payments to providers and a mandate to accept any applicant, we argue there were two institutional features that may have refrained it from having welfare enhancing effects. First, the higher demand for private providers together with a fixed short run supply of physicians led to wage increases in the private sector, which, in a context of regulated capitated payments to providers, might have resulted in a rationing of services (lower length of visits, longer waiting lists) and a decrease in quality. Second, because the private sector had a lower number of primary health care clinics in poor neighborhoods, a shift to the private sector may have negatively affected primary care for vulnerable women, at least during the first years of the reform. Thus, even in a heavily regulated context, an expansion in choice may not lead to positive outcomes.

2. The Health System in Uruguay

Prior to the reform in 2007, there were three sources of health insurance in Uruguay: PSNI, SSHI, and private insurance. The first, catered primarily to the low-income population, was financed with general taxes and offered health coverage only through public clinics and hospitals. All formal workers in the private sector and most public-sector workers were entitled to SSHI. SSHI was partially financed through employer and employee contributions, and allowed beneficiaries to choose among a set of private not-for-profit health care organizations called Collective Medical Care Institutions (IAMC, for its Spanish acronym). The IAMCs are closed organizations with full time salaried staff and geographically concentrated clinics that integrate all levels of care. They are owned by physicians' cooperatives, by physician unions, or by patients' cooperatives. The government collected employee contributions and paid each IAMC a risk adjusted regulated premium per beneficiary. Those with no formal employment but economic means, as well as family members of well-off formal workers, bought private insurance out of pocket.

In 2007, the Uruguayan government launched a reform with the aim of achieving universal access to health care services, equity in spending and funding, improvements in the quality of care, and better primary care (MSP, 2010a, 2010b). The main feature of the new scheme was the gradual expansion, between 2008 and 2016, of SSHI to disabled dependents and children under the age of 18 of formal workers, spouses, partners, independent professionals, and retirees. SSHI, now organized around a national health solidarity fund called FONASA and administered by a new authority (JUNASA), entitled beneficiaries to choose comprehensive health care either from the network of IAMC or from public providers (administered by the State Health Care Administrator or ASSE, for its Spanish acronym).[2] By law, SSHI providers could not reject any beneficiary requesting coverage.

The first important expansion spanned the period 2008-2010, and included children of formal workers under the age of 18. By the end of 2010, 808,000 new beneficiaries (mostly children) had joined the SSHI (Arbulo et al., 2010). Out of these, 32% were beneficiaries that used to buy private insurance out of pocket, while the other 68% were individuals that were previously entitled to coverage in the PSNI. By 2015, the reform had extended coverage to 1,640,000 new beneficiaries (around half of the Uruguayan population). Most new SSHI beneficiaries chose to get care from private providers. Prior to the reform, in 2007, per capita health expenditure in the PSNI was about half the expenditure in the SSHI sector and the quality of the public health care services was perceived to be lower. Table 1 provides a rough idea of these initial differences in quality by comparing perinatal services and outcomes for women delivering in public vs. private hospitals during the pre-reform years (2002-2007), after adjusting for mother's age, education, marital status, occupation, fertility history, region, and year fixed effects, and after trimming the sample to enforce a common support of covariates for the two groups. Table 1 shows that, conditional on other covariates, mothers

[2] If the beneficiary chooses a public clinic, she will use the same network from the PSNI.

delivering in private hospitals had children with higher birthweight, and were less likely to have low birth weight and premature births. Mothers delivering in the private sector were also more likely to have initiated care in the first trimester, and to have had more prenatal control visits.

[INSERT TABLE 1 HERE]

By the end of 2010, both systems were spending similar amounts per capita, but 90% of SSHI beneficiaries were choosing to get care from a private provider. Although the choice of the public provider increased in more recent years, private coverage continued to prevail, with a share of 82% among SSHI beneficiaries in 2015 (JUNASA, 2014).

From a financial point of view, providers working for the new SSHI are paid an age-and-gender risk-adjusted capitated fee plus a pay-for-performance component for each beneficiary.[3]The new SSHI implied increasing workers' contributions from 3% of wages to between 4.5% and 8.0% depending on the number of dependents. In addition, the government has been complementing the funding of the system with general revenues. In parallel, the budget assigned by the government to the public provider (ASSE) increased by 46% in real terms between 2007 and 2010, and by 89% in real terms between 2007 and 2015, despite a decline in the share of the population covered by the PSNI. The purpose of this budgetary effort was to raise the per capita expenditure in the public insurance to that of SSHI (MSP/PAHO, 2010).

The expansion of SSHI caused a reduction in out of pocket health expenditure for families who previously paid individual premiums for private health insurance and were now entitled to SSHI (crowding out effect) and an increase in social security contributions. The

[3] By the end of 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.

overall income effect depended on the family's income and size. Llambi et al (2010) show that the reform favored relatively lower income families who had to pay smaller SSHI contributions and families with more children.

Finally, from a market perspective, it is important to note that there are 19 regions or departments in Uruguay with different private health care markets. Those in the metropolitan area of Montevideo (the capital) are more competitive, with concentration Herfindhal-Hirschman Indices (HHI) around 800. Other regions have more concentrated markets, with HHIs above 3000. In all regions, the reform enabled beneficiaries to shift from public to private providers. But only in some regions did the reform increase the market competitiveness. In Montevideo, the capital, the Herfindhal index after the reform decreased from 879 in 2007 to 708 in 2010.

3. Research Question, Identification and Methodology

In this paper, we explore whether the expansion in SSHI eligibility to populations previously covered by the PSNI increased prenatal and perinatal health care access and outcomes. Our treatment of interest is the option to choose care from a set of public and private providers (SSHI) relative to a system that provided care only through public providers (PSNI). The reform may have affected quality in at least three ways. First, even in the absence of choice and competition among SSHI providers, the health insurance coverage offered during the first years of the reform by the SSHI was more generous than that of the PSNI, at least until 2010 in terms of expenditure per capita. The expansion of the SSHI could have improved average quality if higher expenditure materialized in higher quality.

Second, if beneficiaries can assess quality ex-ante, the average quality of care accessed and the average health outcomes for these beneficiaries should improve through sorting after

expanding choice. As mentioned before, the quality of private providers was perceived to be higher than that of the public provider prior to the reform.

Third, the transition of patients from a monopoly setting (the PSNI) to a competitive one (the IAMCs) resulted in an increase in the intensity of competition in some areas of the country, and in particular in the capital, Montevideo. In a setting of complete information about quality and fixed prices, economic theory predicts that expanded competition will lead providers to restructure their services in order to attract patients. We would therefore expect private providers to react by offering services of higher quality and better catered to the population needs.

If quality is non-observable, however, competition may not lead to higher quality, in particular in a setting of fixed capitated payments and short-term rigidity of human resources. The increased demand for private health care services that followed the reform expanded the demand for medical inputs. Given a fixed supply of physicians, this resulted in higher wages and in an augmented ratio of wages to costs.[4] The not-for-profit nature of private providers may have also fed this process, as groups of physicians are the residual claimants. Figure 1 shows that wages in the health care sector increased by 17% in real terms between July 2007 and December 2010, while capitated payments to providers, fixed by the regulator, decreased 3% in real terms. The ratio of wages to total costs for private providers changed from 56% in January 2008 to 63% in January 2011. Informal qualitative evidence suggests that private providers responded to these higher costs by rationing services (increasing waiting lists and decreasing length of consultations).

In addition, in the period right after the implementation of the reform, private providers had a smaller primary care network in disadvantaged neighborhoods than public

[4] Wages in the Uruguayan private health care sector are set according to negotiations between the medical unions and the providers. Since 2008 the medical unions also negotiate public sector wages with the government, but public wages are still substantially lower than those in the private sector.

providers. Cultural or geographic barriers may have made it more difficult for vulnerable women to navigate the private system. For example, families that used to drop by at PSNI clinics in their neighborhoods may have found it harder to understand how to schedule appointments or how to choose physicians in facilities located further away from their homes. Distance and transportation costs may have also influenced their decisions to seek care.

The above arguments suggest that the sign of the effect of expanded insurance generosity and choice on quality remains an empirical issue. We first approach our research question by exploiting the fact that children of formal workers below the age of 18 were the first large group of beneficiaries favored by the expansion of SSHI between 2008 and 2010. We thus compare the differences in use of prenatal care and perinatal outcomes between mothers aged 17, and mothers aged 19, before and after January 2008, when this stage of the reform took place. We truncate the analysis in 2010 because, after this year, new women of other age groups began to benefit from the SSHI expansion, confounding the identification strategy. The underlying assumption is that the trends observed in the outcomes of mothers aged 19 are a good counterfactual for those of mothers aged 17.[5] Our choice of these age-groups follows developmental reasons; both are below the ideal reproductive age, which goes from 20 to 34 years old. The first equation of interest is:

$$Y_{igt} = \lambda_t + \mu_g + \sum_{\substack{t=2002,\\ t\neq 2007}}^{t=2010} \delta_{0t} D_{igt} + X'_{igt}\rho + \varepsilon_{igt} \qquad (1)$$

where Y_{igt} is a perinatal health care measure or health outcome for child i born to mother of age g (17 vs. 19) in year t. The first outcome we consider is whether the birth occurred in a private hospital. Other outcomes include birthweight, low birthweight, premature birth, and four

[5] Our data does not provide information on the mother's date of birth, only on mother's age at the time of delivery. Because we do not know whether a mother aged 18 at the time of delivery was eligible for SSHI insurance throughout the full pregnancy or not, we prefer to exclude mothers aged 18 from the analysis.

indicators of health care use, onset of prenatal care in the first trimester of pregnancy, if the mother had at least three, or at least six prenatal visits during her pregnancy, and delivery by Cesarean section. λ_t is a vector of year fixed effects that captures annual differences (common to both age-groups) in the dependent variable relative to the year 2007 and μ_g are age-group specific dummies capturing time invariant differences between adolescent mothers aged 17 and adolescent mothers aged 19. D_{igt} are dummy variables defined for each year 2002-2006 and 2008-2010, that take the value of 1 if the mother gave birth at year t and was aged 17 at the time of birth, and 0 otherwise. X_{igt} is a set of variables that capture mother characteristics such as education (incomplete primary school, incomplete secondary school, complete secondary school), marital status (married or cohabiting) trimester of gestation, and department (geographic region) fixed effects. We also include time-varying regional (department-level) characteristics such as unemployment, fraction of population that completed middle school, fraction of population that completed high school, and fraction of household owners. For observations with missing information, we impute the value of that variable with the average value in the sample and include a binary indicator that takes the value of 1 if the record is missing and 0 otherwise. ε_{igt} stands for a pregnancy-specific error term. δ_t are the year-specific difference in difference (DD) parameters of interest. We verify the parallel trends assumption by testing whether these parameters equal zero for the years prior to the reform (years 2002-2006), where 2007 is the omitted category. Equation (1) is estimated by ordinary least squares (OLS) with Huber White robust standard errors.

The introduction of additional policies in the period may limit somehow the validity of the difference in difference analysis. First, between 2005 and 2010 the Uruguayan government implemented a comprehensive tobacco control campaign that decreased disproportionately tobacco use among younger cohorts (Triunfo et al., 2016), decreased smoking among pregnant women and increased birthweight (Harris et al., 2015). Second, by

the end of 2008 pregnant women under the age of 18 were entitled to receive family allowances regardless of their formal participation in the labor market. There is suggestive evidence that family allowances in Uruguay increased birthweight, a result consistent with improved maternal nutrition during pregnancy (Amarante et al. 2016). Both of these policies may bias our estimates upwards.

To overcome this problem, we exploit the geographic dimension of the reform. There are 19 geographic units (departments) in Uruguay, which showed different levels of public health care coverage for adolescent mothers in the years before the reform (2002-2007). Our hypothesis is that those departments with a low fraction of private coverage among adolescents (greater public coverage) in these years had more to gain from the expansion of SSHI, and were more likely to increase the volume of beneficiaries choosing a private provider. Thus, we expect the expansion of SSHI to have had stronger effects in terms of health outcomes and health care utilization in these regions. Defining the variable *Public coverage* in department *r* (C_r) as the fraction of mothers under the age of 18 with public coverage in the period 2002-2007, we estimate a triple difference model that provides full nonparametric control for age-group specific time effects that are common across departments, time-varying department effects and age-specific department effects. The equation of interest is:

$$Y_{igrt} = \mu_{gt} + \lambda_{rt} + \eta_{rg} + \sum_{\substack{t=2002 \\ t\neq 2007}}^{2010} \delta_{1t} D_{igt} * C_r + X'_{igrt}\zeta + v_{igrt} \quad (2)$$

where Y_{igrt} is an outcome variable for child i born to mother in age group g (17 vs. 19) in region r and year t. The parameters μ_{gt}, λ_{rt}, and η_{rg} represent fixed effects for mother's age group (17 vs. 19), year dummies, region fixed effects, interactions of age group and year dummies, interactions of year dummies and the variable *Public coverage before the reform* (C_r), and an interaction between age group and C_r. The variables we are interested in are the interactions between age group, C_r, and the nine year dummies. δ_t is a vector of parameters depicting the

triple difference effects of interest. The coefficients of δ_t for the years prior to the reform allow us to assess the parallel trends assumption between groups of mothers more likely to have benefitted from the reform (adolescents in regions with lower private provision) and those less likely to have benefitted from it. X_{igrt} includes the same set of control variables defined for equation (1). v_{igrt} stands for a pregnancy-specific error term.

All models in the triple difference analysis are estimated by OLS with standard errors clustered at the region and age-group level (38 clusters). This level of clustering allows for the estimation of arbitrary correlation of errors across years within age group and regions.

In addition to the mother-specific outcomes reported above, we analyze an outcome at the population level, fertility. We define fertility as the ratio of births in a particular age-group and region to the total number of women in that age-group and region.

We believe the triple difference approach addresses the problem of the tobacco control policy and the family allowances, both of which were implemented at a national level and were not differentiated by department according to prior SSHI penetration. To simplify the exposition, assume that departments are divided into binary treatment groups (C_L=low prior PSNI exposure, C_H=high prior PSNI exposure). Then the DDD estimator (DD(C_H) minus DD(C_L)) captures the difference between the differential trend in C_H departments, which will reflect both increased SSHI coverage and extension of family allowances or the introduction of the tobacco control policy, and the differential trend in C_L departments, which reflect mainly the extension of family allowances/tobacco policy.[6]

[6] We thank an anonymous referee for this point.

4. 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.

As of 2008, the registration of birth certificates changed from paper to electronic format. While this change had no impact on the registration of birth outcomes, it significantly affected the coding of maternal characteristics, such as education or marital status. These variables increased their missingness after 2008 and were harder to interpret due to noisy responses. For this reason, whenever we were able to match the ID of the mother, we imputed education and marital status information from the Perinatal Information System, a nationwide electronic registry operating in many prenatal care clinics in Uruguay since 1990.

We study the period 2002 to 2010 in order to cover pre- and post-reform years. Although we have post-2010 data, we truncate the data in 2010 to avoid distorting the identification strategy, as an increasing proportion of women above the age of 18 became entitled to the NHI after 2010. In a robustness check we rerun the analysis including three years after 2010.

From an initial population of 436,455 births in the period spanning 2002-2010 for the full country, we excluded 48,061 corresponding to multiple births, births with birthweight below 500 grams or below 25 weeks of gestation, births with no information on the mother's age, and births with missing values for the dependent or explanatory variables of interest. Of the remaining 388,394 observations, 32,653 were births to mothers aged 17 or 19. We excluded births to mothers aged 18 because we did not have information on mother's date of birth and were unable to assess the extent to which these women were exposed to the choice of a private provider throughout some or none of the pregnancy.

Table 2 shows descriptive statistics for the variables considered in the analysis. We define two types of outcomes: perinatal health outcomes and use of prenatal health services. Health outcomes include birthweight (measured in grams), low birthweight or LBW (defined as birthweight below 2500 grams) and prematurity (less than 37 weeks of gestation). Health services include whether the woman had at least three and 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 large effects of these variables on birth outcomes in Uruguay. We also consider whether the mother had a delivery by cesarean section.

[TABLE 2 ABOUT HERE]

Table 2 shows that prior to the reform, mothers aged 17 had a slightly smaller rate of deliveries in private hospitals than mothers aged 19 (22% vs. 26%). The reform increased private sector deliveries at a higher rate for under-aged mothers. By 2010 36% of mothers aged 17 were delivering in a private hospital relative to 33% for mothers aged 19.

The children of mothers aged 17 have a lower average birthweight, and a higher likelihood of low birthweight and prematurity than those of older mothers. Younger mothers are also less likely to initiate care in the first trimester and to have a C-section. When comparing the pre- and post-reform periods, we see improvements in the indicators of prenatal care and perinatal outcomes for mothers of all age groups. As expected, mothers aged 19 are more likely to have finished high school, although more than 90% of mothers have not completed high school by the time they give birth. A few mothers are married at delivery, but between 40% and 60% cohabit with the child's father.

5 Results

5.1 Core Findings

Results for the difference in differences analysis are displayed in Table 3. Column (1) provides evidence that the health reform was associated with a large increase in the use of private providers by adolescents relative to other mothers between 2008 and 2010. The gap for giving birth at a private hospital between a mother aged 17 and one aged 19 increased by 7.2 percentage points in 2008 (relative to 2007), by 10.3 percentage points in 2009, and by 10.9 percentage points in 2010. While prior to the reform older mothers were more likely to give birth in a private hospital, the reform reverted the sign of the difference (see Figure 2 and the coefficients on the age-year interactions in Table 3 for the pre-reform period). Results show that the pre-reform trends were not exactly parallel between our treatment and control groups; however, the widening of the gap prior to the reform, if anything, would be playing against our estimates. On the other hand, the lack of statistical significance in most of the pre-reform interactions in columns (2)-(9) suggests that 19-year old mothers are a good counterfactual of younger women in terms of the health outcomes and health care measures analyzed.

[INSERT TABLE 3 HERE]

[INSERT FIGURE 2 HERE]

In spite of the observed increase in the use of private health care by younger mothers, we find no evidence of changes in health outcomes or perinatal health care access following the reform. Most coefficients are statistically insignificant and small. The exceptions are the coefficients on the likelihood of having had at least three prenatal care visits ($p<0.05$) at least six prenatal care visits ($p<0.1$) for 2010, which exhibit negative signs. When assessing the post-reform aggregate effect for the years 2008-2010 (see last row in Table 3), we cannot reject the hypothesis that the reform had no effect on perinatal health outcomes or on prenatal health services utilization.

As mentioned, the double difference analysis may result in biased estimates due to the introduction of other policies in the period. Table 4 presents the results of estimating the triple difference equation (2), which exploits bo age-region-and time differences in private coverage Figure 3, panels a) to i), provides a graphical analysis of the outcomes in Table 4.

[INSERT TABLE 4 HERE]

[INSERT FIGURE 3 HERE]

Panel a) in Figure 3 shows that adolescent mothers in regions with a pre-reform rate of public coverage 10 percentage points above average, increased their likelihood of delivering in a private hospital by between 5 and 6 percentage points in 2009 and 2010. The figure also indicates that, in years prior to the SSHI expansion, the trend in use of private maternities between young adolescent mothers in regions with a high fraction of public coverage and older adolescent mothers in other areas was not exactly parallel. While we acknowledge this identification problem, the trend differential was negative prior to the reform and the sign changed after the expansion of SSHI. If anything, this identification problem would be underestimating the effect of the reform on the uptake of private providers.

In terms of health care outcomes, the triple difference analysis shows no statistically significant evidence of reform effects on birthweight or low birthweight, although we find some evidence of increases in prematurity in the first year after the reform. Adolescent mothers delivering in areas with a pre-reform public coverage 10% higher than average increased the likelihood of a premature delivery by 1.8 percentage points in 2008 relative to older mothers in other areas. Results also show a negative and marginally significant ($p<0.1$) coefficient on having had at least three prenatal care visits in 2010, but no other statistically significant effects on health care use after the reform. When analyzing aggregate effects for

the period 2008-2010, we find that both the effects on private delivery and prematurity remain statistically significant, but the effect on having at least three prenatal visits loses significance.

5.2 Robustness and Sensitivity

We conducted several sensitivity checks for the triple difference analysis. First, we re-estimated the model without adjusting for pregnancy-level characteristics (mother's education, marital status, gestation quarter, newborn's gender) and department time-varying characteristics. Results are very close to those in Table 4 (see Appendix Table 1), suggesting that our results are unlikely to be driven by unobserved changes in the composition of pregnant mothers.

Second, we expanded the set of treatment and control mothers. In a first approach, we defined treated mothers as those aged 16 to 17 at the time of delivery and control mothers as those aged 19 to 20 at delivery. We still observe a positive and statistically significant effect of the reform on the likelihood of prematurity in 2008 (though slightly smaller in size) and a negative effect on the likelihood of having at least three prenatal control visits, both in 2008 and 2010 (see Appendix Table 2). We also re-estimated the triple difference regression using the full sample of women between 14 and 45 years old at birth, with the exception of those aged 18 (results are displayed in Appendix Table 3). We observe a positive and marginally significant effect of the reform on prematurity ($p<0.1$) for 2009 and a negative and marginally significant effect on the likelihood of having at least 3 prenatal control visits in 2010. On the other hand, we now observe a positive effect on birthweight and a negative effect on the likelihood of low birthweight in 2008.

Third, we expanded the period of analysis to allow for some additional years post-reform (2002 and 2013). Note that between 2011 and 2013 the SSHI system extended benefits to couples of formal workers with children. The incorporation was gradual: the benefits were

extended in 2011 to couples of formal workers with at least three children, in 2012 to couples with at least two children, and in 2013 to couples with at least one children. Because the likelihood that a 19 year old has three children is relatively small, we can still be quite confident about the 2011 results. The identification strategy becomes more blurry as additional years are added. We present results in Appendix Table 4.[7] We continue to observe the positive effects on prematurity in 2008 and 2009. However, these effects are reverted in 2011. The coefficient on the 2011 triple interaction when analyzing prematurity is now negative and statistically significant. We also observe in 2011 an increase in birthweight of 30 grams for a 10% increase in the intensity of private coverage prior to the reform, and a corresponding decrease in low birthweight.

6. Discussion

We conducted double and triple differences analyses to assess the impact of the SSHI expansion in Uruguay between 2008 and 2010. We gave reasons for and against a positive association between the SSHI expansion and health care quality. Our DD estimation shows that the reform increased the use of private providers but had hardly any effects on health outcomes, and decreased the use of prenatal care services in 2010. If these estimates were biased by other co-occurring policies, such as the increase in family allowances or the deepening of the tobacco control policies, the effect of the SSHI expansion on health outcomes and health care would be even more negative.

We conducted a DDD analysis to overcome the potential biases caused by these other policies. Our findings confirmed that the SSHI expansion resulted in an increase in the use of private providers by adolescents after 2008 in departments with high pre-reform public

[7] The specification controls for pregnancy- and mother-characteristics, but not for time varying regional controls. We showed before that the exclusion of time varying regional controls had no effect on the results.

coverage. However, as in the DD results, we do not find support for the hypothesis that the pro-choice reform led to improved perinatal health outcomes or to better use of perinatal health care. On the contrary, we find some evidence that during the first years, the shifts to private providers resulted in increases in prematurity and decreases in the probability of having at least three prenatal care visits. These findings suggest that the expansion of provider choice, at least during the first years of the reform, may have negatively affected the most vulnerable women, which are most likely to have inadequately controlled pregnancies.

When interpreting the results it is important to consider that the gap in insurance generosity (measured by per capita expenditure) between SSHI and PSNI decreased gradually during the first years of the reform, closing eventually by 2010.[8] This budget increase may have improved the quality of services in the PSNI during the process. In a way, our estimates reflect the impact of SSHI relative to the best available alternative, in a context of changes also in the PSNI. Our estimates of the impact of the reform, thus, tend to capture both the effects of higher insurance generosity in the SSHI relative to the PSNI in 2008 and 2009 (under the assumption that higher expenditure proxies better quality of care) and the effect of expanded choice and private provision. Since the gap in expenditure closed by 2010, and under the arguable assumption that quality in the public sector accompanied the increase in expenditures, results for 2010 would only capture the the effect of expanded choice and private provision on perinatal outcomes. Together, the analysis by year shows suggestive evidence that neither the larger generosity, nor the expanded choice had beneficial effects on prenatal and infant outcomes during the first post-reform years.

Our results differ from those supporting a positive association between pro-choice reforms and quality of health care provision (Gaynor and Town, 2012; Gaynor et al., 2013;

[8] The amount spent by the government on PSNI insurance increased between 2007 and 2010 by 54% in real terms. Because the number of beneficiaries covered by the PSNI decreased, per capita expenditure on the PSNI almost doubled in the period, approximately reaching the levels of SSHI insurance in 2010.

Bloom et al., 2015; Gutacker et al., 2016; Gaynor et al., 2016). Our evidence is more in line with Colla et al. (2016), Moscelli et al. (2016) and Skellern (2017), who find that higher competition does not necessarily lead to better health outcomes in services with larger demand elasticity.

As argued before, the quality of private services may have decreased due to the higher demand for physician services that followed the SSHI expansion and the short term rigidity in human resources. Because providers are not-for-profit in Uruguay, the residual claimants are either unions of physicians or physician owners of the institutions. As mentioned, the risk-adjusted capitated payment per enrollee paid to IAMCs practically remained constant in real terms between 2008 and 2010. Wages, on the other hand increased by 17% in real terms. Fleitas (2017) explores the effects of removing lock-in restrictions on beneficiary mobility across providers during the first years of the Uruguayan reform on physician's wages and provider quality. Quality is measured by the hours worked by high skilled relative to low skilled physicians. He finds that the reform resulted in increased returns to skills for physicans, but not in increases in average quality (average skills), an effect he attributes to a very inelastic supply of high quality physicians in the short run.

In addition, cultural and geographic barriers due to an initially smaller network of private providers in vulnerable neighborhoods may have decreased access to prenatal services for new beneficiaries of SSHI. This hypothesis is in line with the findings in Bhalotra et al. (2017), who showed that the expansion in primary care facilities associated with the Family Health Program in Brazil during the 90's contributed significantly to improve birth-related outcomes.

Our core analysis studies only the first three years of the reform. Because of the magnitude of the changes involved, the adjustments required from providers and beneficiaries

may have delayed potential benefits from the new system during these years. Our (less rigorous) assessment for the following years shows some evidence of improvements in health outcomes in 2011 (higher birthweight and lower rates of prematurity), but not robust across the next years.

SSHI expenditure increased by 131% in real terms between 2007 and 2010 to accommodate the 808,000 new beneficiaries that adopted the new scheme. A quick back of the envelope computation[9] suggests that the expansion of SSHI between 2007 and 2010 increased SSHI expenditure by 500 million dollars, about 1% of GDP. Considering that 32% of beneficiaries were already paying for private insurance out of pocket, and that the government was paying prior to the reform for the coverage of those in the PSNI, the incremental costs of the reform exceeded the 300 million US dollars. If prenatal services are indicative of other health care services, our results suggest that the reform was cost-ineffective, at least during the first years. Unfortunately, we are unable to analyze other services. We cannot dismiss improvements in other health care areas and leave the task of studying health care services that go beyond the first level of care for a future research agenda. We still believe that the quality of prenatal care and perinatal outcomes are a good representation of the quality of primary care in a country.

There are some potential limitations to our analysis. First, private providers in Uruguay can set discretionary copayments, subject to a regulated cap. Copayments do not directly affect access to prenatal care, as most prenatal care services are free from out of pocket charges.[10] However, because beneficiaries must select an integrated provider for a

[9] Our computation assumes that the expansion of SSHI between 2008 and 2010 reached 256,000 beneficiaries that substituted SSHI for private insurance, 209,000 that were listed as users of the PSNI in 2007, around 306,000 that were not listed as public or private users, and 38,000 corresponding to population increase. We estimate that SSHI expenditure per capita was around 688 US dollars between 2008 and 2010 and PSNI expenditure was around 340 US dollars in 2007.

[10] Prenatal care was exempted from copayments in January 2006.

lock-in period,[11] copayments for other services may introduce some price competition into the system. We still do not believe this to be a critical problem , as the services most likely to be used by the women studied in this paper are exempt from copayments (copayments charges are set mostly in specialty care and diagnostic tests).

Second, our analysis does not deal with changes in welfare purely due to financial changes resulting from the reform. High-income families who used to pay for private health insurance out-of-pocket were probably financially worse off due to the tax increase, but for middle-income families, the extent to which taxes exceeded previous out-of-pocket premiums depends on whether they purchased private insurance, on their level of income and the number of children. The financial status of very low-income families who were previously uninsured or covered by the PSNI and were now eligible for SSHI insurance was relatively unchanged in terms of taxes (a lower bound of the income distribution was exempted from the tax increases). However, new beneficiaries of the SSHI previously in the PSNI may have increased somehow their out-of-pocket costs after 2007 due to copayment charges in services other than prenatal care.

7. Conclusions

During the past decades, Latin America has witnessed significant reform processes in the health care sector . with the aims of 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).

[11] The lock in period was initially set at three years, although it has been extended indefinitely since February 2018. The lock-in requirement can be exempted for economic reasons, change of address, or dissatisfaction with the service.

The Uruguayan health care reform launched in 2007 pointed in this direction, expanding SSHI and entitling new beneficiaries to choose services from a set of private and public providers. 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 this paper, we seek to answer whether the SSHI expansion, reflected in increased insurance generosity and more choice of health care providers, improved the quality of perinatal care and health outcomes. We exploit the phased-in design of the SSHI expansion, and, specifically, the fact that during the first three years, only children of formal workers under the age of 18 or disabled children were entitled to the insurance. The incorporation of other groups of women of childbearing age did not occur until 2011. The design allows us to use a methodology of double and triple differences, taking advantage also of the differential access to private coverage of younger adolescent mothers by region in the pre-reform years.

Unlike other investigations exploring the effects of choice on health care, our results show that higher expenditure and more choice did not lead to improved health care quality or to better perinatal health outcomes. We find some evidence, although not sufficiently robust, that the reform increased prematurity in the first year post-reform and decreased the likelihood of having at least three prenatal care controls. We attribute these results to the smaller network of primary care clinics in disadvantaged neighborhoods for private providers, and to the relative increase in physician wages, which may have led to a rationing of services by private providers. We hypothesize that the not-for-profit status of private providers, in addition to a shortage of skilled physicians (Fleitas, 2018), may explain the observed wage increases and the estimated effects in quality. Future research should further explore these hypotheses, as well as the impact of the reform on health care services beyond the first level of care.

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Table 1: Comparison of private vs. public perinatal outcomes before 2008 (regressions adjust for demographics and parity)

	Birthweight	LBW	Premature	Onset of PC in 1st trim	At least 3 PC	At least 6 PC	At least 9 PC	C-section
Delivery in a private hospital	62.989*** (2.736)	-0.018*** (0.001)	-0.011*** (0.001)	0.073*** (0.003)	0.052*** (0.001)	0.101*** (0.002)	0.103*** (0.003)	0.108*** (0.002)
Other controls	yes	yes	yes	yes	yes	yes	yes	yes
Mean outcome for births in public hospitals	3193	0.084	0.088	0.367	0.912	0.732	0.430	0.220

Notes: Each column depicts a different regression of the outcome (top row) on an indicator of having delivered in a private hospital after adjusting for the following covariates: mother's age, education, occupation, marital status, fertility history, region, and year of delivery). The sample is trimmed in the extremes to consider only ranges of covariates that are common to mothers delivering in private and public hospitals. The first row below the title shows the coefficient on the indicator of a private delivery and standard errors in parentheses. The last row shows the mean value of each outcome variable for births in public hospitals prior to 2008.

Table 2. Summary Statistics

	Age 17 Pre-reform 2002-2007	Age 17 Post-reform 2008-2010	Age 19 Pre-reform 2002-2007	Age 19 Post-reform 2008-2010
Birth and health care outcomes				
Delivered in private hospital	0.221	0.364	0.262	0.330
Birthweight in grams (mean and std.dev)	3117	3151	3157	3195
	(538)	(553)	(538)	(533)
Low Birthweight (< 2500 grams)	0.098	0.094	0.088	0.081
Prematurity (<37 weeks)	0.106	0.104	0.092	0.087
Onset of prenatal care at 1st trimester	0.317	0.407	0.341	0.441
At least 3 prenatal care visits	0.922	0.926	0.915	0.929
At least 6 prenatal care visits	0.730	0.757	0.733	0.773
At least 9 prenatal care visits	0.415	0.457	0.429	0.478
C-section	0.204	0.242	0.219	0.258
Maternal characteristics				
Education< Elementary school	0.106	0.079	0.094	0.080
Elementary≤ Education <High school	0.853	0.887	0.819	0.840
Education >= High school	0.042	0.034	0.087	0.080
Education missing	0.038	0.041	0.036	0.056
Married	0.102	0.058	0.140	0.076
Marital status missing	0.003	0.140	0.003	0.133
Cohabitation	0.399	0.481	0.451	0.560
No information on living arrangements	0.002	0.031	0.002	0.026
Other pregnancy information				
Newborn´s sex	0.518	0.518	0.511	0.499
Gestation in 1st trimester	0.236	0.238	0.237	0.228
Gestation in 2nd trimester	0.247	0.248	0.261	0.265
Gestation in 3rd trimester	0.252	0.257	0.252	0.245
Gestation in 4th trimester	0.265	0.257	0.249	0.262
Department-level demographics				
% unemployed (mean)	0.060	0.038	0.061	0.038
% graduating from middle school (mean)	0.694	0.698	0.694	0.701
% graduating from high school (mean)	0.344	0.353	0.345	0.359
% household owner (mean)	0.677	0.627	0.674	0.626
N	8,771	4,581	12,767	6,534

Table 3. Difference in differences: mothers aged 17 vs mothers aged 19, by year (N=32653)

	Coverage	Health Outcomes			Health Care Use				Fertility
	Delivery in a private hospital	BW	LBW	Prematurity	Onset of prenatal care 1st trimester	At least 3 prenatal care visits	At least 6 prenatal care visits	Cesarean section	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Pre-reform									
Age =17*2002	0.044**	41.971	-0.009	-0.024*	0.043*	0.008	0.025	0.002	-0.013***
	(0.018)	(25.527)	(0.014)	(0.014)	(0.022)	(0.013)	(0.021)	(0.019)	(0.005)
Age =17*2003	0.029	31.738	-0.006	-0.006	0.004	-0.004	-0.025	0.013	-0.005
	(0.019)	(25.704)	(0.014)	(0.015)	(0.022)	(0.013)	(0.021)	(0.020)	(0.005)
Age =17*2004	0.045**	40.044	-0.021	-0.029*	0.004	-0.010	-0.038*	0.014	0.002
	(0.019)	(26.133)	(0.014)	(0.015)	(0.023)	(0.013)	(0.021)	(0.020)	(0.005)
Age =17*2005	0.035*	55.770**	-0.013	-0.016	0.016	0.016	-0.006	-0.008	-0.003
	(0.020)	(26.360)	(0.014)	(0.015)	(0.023)	(0.013)	(0.021)	(0.021)	(0.005)
Age =17*2006	0.007	5.737	-0.007	-0.010	0.007	-0.010	-0.013	-0.015	0.001
	(0.019)	(25.910)	(0.014)	(0.015)	(0.023)	(0.013)	(0.021)	(0.020)	(0.006)
Post-reform									
Age =17*2008	0.072***	17.025	-0.003	-0.006	0.022	0.001	-0.012	-0.022	0.004
	(0.020)	(25.705)	(0.014)	(0.015)	(0.023)	(0.013)	(0.020)	(0.020)	(0.005)
Age =17*2009	0.103***	7.981	0.003	-0.006	0.000	-0.008	-0.022	0.007	-0.001
	(0.020)	(26.262)	(0.014)	(0.014)	(0.023)	(0.013)	(0.021)	(0.021)	(0.005)
Age =17*2010	0.109***	35.856	-0.013	-0.020	-0.018	-0.026**	-0.038*	0.016	0.007
	(0.020)	(25.891)	(0.013)	(0.014)	(0.023)	(0.012)	(0.020)	(0.021)	(0.004)
Avg effect post reform									
Age=17*I(Year>2008)	0.094***	20.350	-0.004	-0.011	0.001	-0.011	-0.024	0.000	0.003
	(0.016)	(21.348)	(0.011)	(0.012)	(0.019)	(0.010)	(0.017)	(0.017)	(0.004)

* p<.1, ** p<.05, ***p<.01. Robust standard errors in parentheses. Regression includes a full non-parametric specification of age and year effects, geographic area (department) fixed effects, and controls for mother's education, marital status, newborn's gender, gestation quarter, and geographic time-varying characteristics (unemployment, education, house ownership). Omitted year: 2007.

Table 4. Triple differences: mothers aged 17 vs mothers aged 19 in regions with different intensity of public coverage, by year (N=32653)

	Coverage	Health Outcomes			Health Care Use				Fertility
	Delivery in a private hospital	BW	LBW	Prematurity	Onset of prenatal care 1st trimester	At least 3 prenatal care visits	At least 6 prenatal care visits	Cesarean section	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Pre-reform									
Age =17*2002*intensity	0.201	9.553	-0.025	-0.004	0.198	0.041	0.237*	-0.100	-0.011
	(0.156)	(96.542)	(0.055)	(0.067)	(0.163)	(0.059)	(0.130)	(0.095)	(0.030)
Age =17*2003*intensity	0.274**	-177.558	0.093	0.125*	0.130	-0.020	0.009	0.083	-0.008
	(0.128)	(147.586)	(0.086)	(0.067)	(0.108)	(0.056)	(0.138)	(0.143)	(0.030)
Age =17*2004*intensity	0.222*	160.919	-0.014	-0.015	-0.017	0.074	0.107	-0.108	-0.012
	(0.131)	(113.100)	(0.071)	(0.071)	(0.104)	(0.070)	(0.125)	(0.133)	(0.027)
Age =17*2005*intensity	0.121	-49.760	-0.052	0.037	0.082	-0.021	0.153	-0.133	-0.017
	(0.105)	(104.285)	(0.057)	(0.063)	(0.090)	(0.053)	(0.111)	(0.141)	(0.017)
Age =17*2006*intensity	0.142	0.644	-0.019	0.026	-0.111	0.086**	0.039	-0.070	-0.002
	(0.121)	(122.595)	(0.060)	(0.065)	(0.121)	(0.040)	(0.081)	(0.116)	(0.027)
Post-reform									
Age =17*2008*intensity	0.122	-46.100	0.019	0.181**	0.014	-0.069	-0.020	-0.090	-0.012
	(0.151)	(96.278)	(0.083)	(0.072)	(0.118)	(0.065)	(0.106)	(0.106)	(0.018)
Age =17*2009*intensity	0.514***	-121.178	0.032	0.110	0.023	0.010	0.142	0.030	-0.002
	(0.125)	(145.533)	(0.060)	(0.073)	(0.144)	(0.048)	(0.123)	(0.110)	(0.026)
Age =17*2010*intensity	0.587***	-145.816	0.044	0.064	-0.003	-0.103*	0.140	-0.075	-0.029
	(0.138)	(125.908)	(0.045)	(0.063)	(0.175)	(0.060)	(0.143)	(0.142)	(0.021)
Avg effect post reform									
Age=17*I(Year>2008) *intensity	0.403***	-103.501	0.031	0.119**	0.011	-0.055	0.085	-0.047	-0.015
	(0.109)	(83.738)	(0.051)	(0.050)	(0.118)	(0.045)	(0.107)	(0.101)	(0.017)

* p<.1, ** p<.05, ***p<.01. Clustered standard errors (at the department and age level) in parentheses. Regression includes a full non-parametric specification of age, year and geographic area (department) effects, plus controls for mother's education, marital status, newborn's gender, gestation quarter, and geographic time-varying characteristics (unemployment, education, house ownership). Omitted year: 2007.

Figure 1: Trends in physician wages and capitated payments to providers

Figure 2. Deliveries in private hospitals (%)

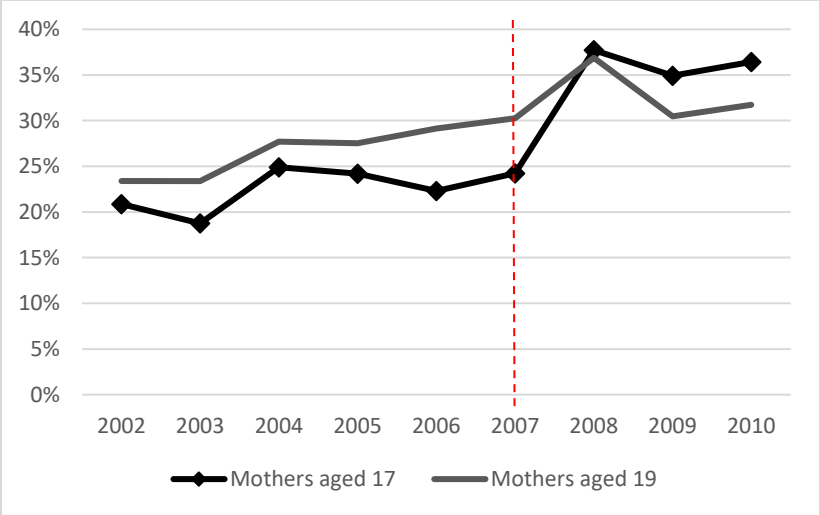
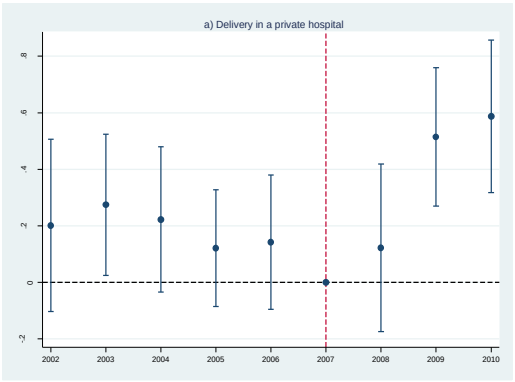
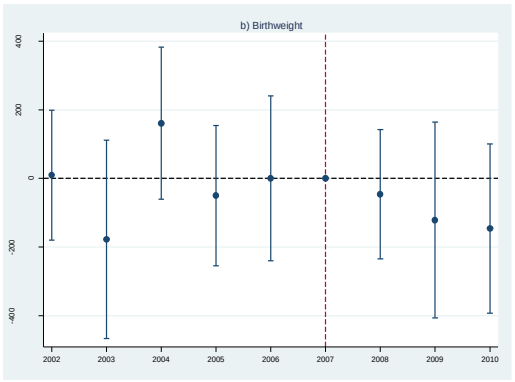
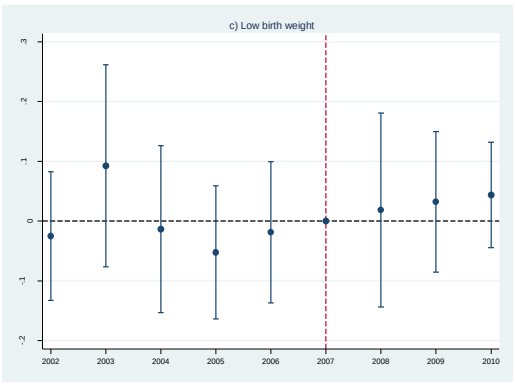
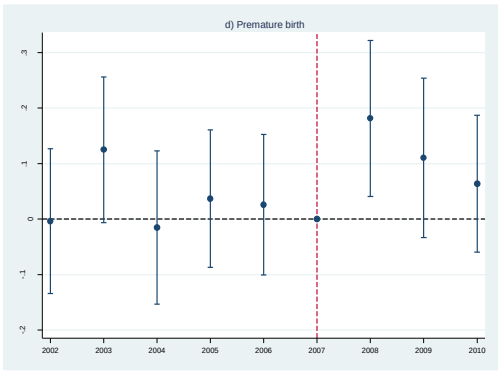


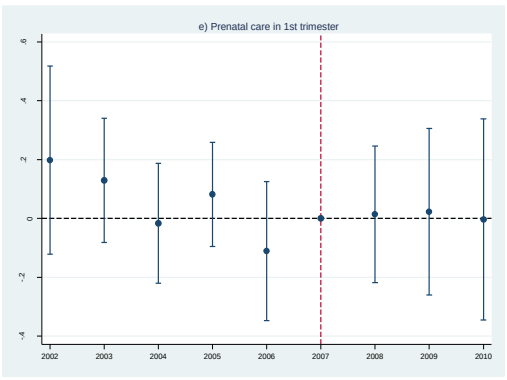
Figure 3: Triple Difference Effects

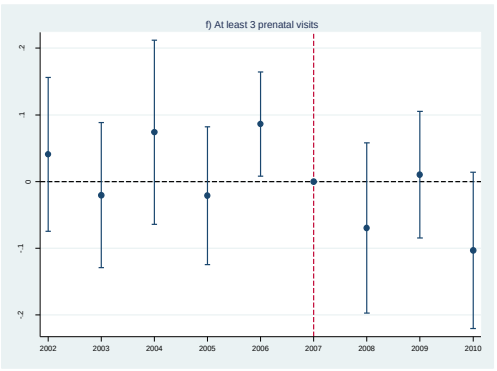


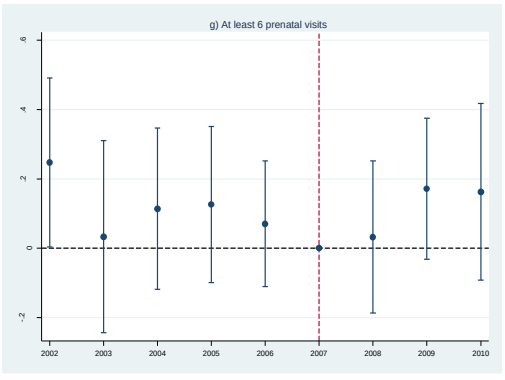


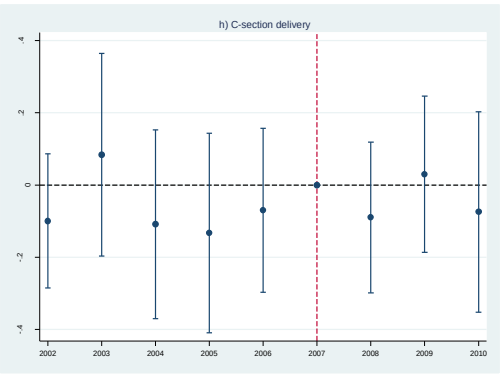


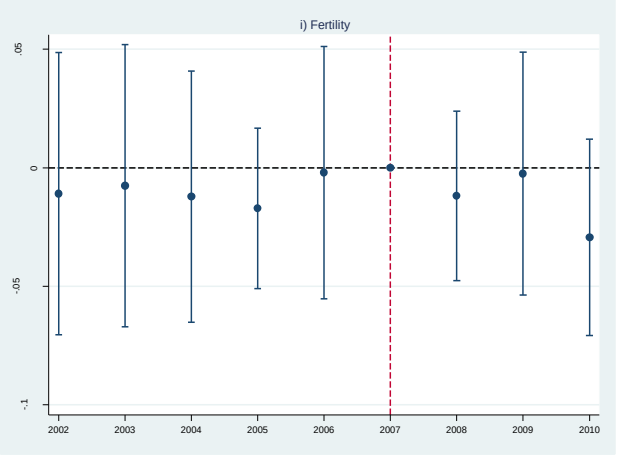








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