The Impact of Nonlinear Contracts on Medical Decisions*

Cici McNamara
Georgia Institute of Technology

Natalia Serna
Stanford University

September 28, 2025

Abstract

We show that nonlinear pricing terms in vertical contracts significantly affect medical decisions. We compare fee-for-service (FFS) versus bundled payment (BP) contracts between insurers and healthcare practices focusing on medical decisions for childbirth. We find that covering c-sections under FFS increases c-section rates by 20% relative to baseline and the marginal woman undergoing a c-section is healthier. Conversely, covering vaginal deliveries under FFS reduces c-section rates by 35%. Effects are explained mainly by differences between the two contracts in prices for marginal ancillary services. Despite large shifts in procedure choices, maternal and infant outcomes are the same under both contracts.

Keywords: Moral hazard, Cesarean section, Fee-for-service, Bundled payments.

JEL codes: I11, I13, I18.

*McNamara: cmcnamara30@gatech.edu. Serna: nserna@stanford.edu. We are deeply grateful to the Colombian Ministry of Health and Social Protection for providing the data. We thank Liran Einav, Grant Miller, Corina Mommaerts, Ciaran Phibbs, Maya Rossin-Slater, Heather Royer, Dan Sacks, David Silver, Alan Sorensen, and Ashley Swanson for their useful comments. We also thank participants of the 2024 Health Economics and Policy Innovation Collaborative mini-conference and the 2024 ASHEcon conference, and seminar attendees at UCSB. Our findings do not represent the views of any involved institution. All errors are our own.

1 Introduction

Relationships between upstream and downstream firms are often governed by complex contracts specifying nonlinearities in pricing or timing of payments (Lee et al., 2021; Katz, 1989). In the special case where these nonlinear terms are not binding, contracts can be summarized with a linear price.[1] In fact, several papers are able to summarize vertical contracts with linear prices in their setting (e.g., Ho and Lee, 2017; Gowrisankaran et al., 2015; Draganska et al., 2010). However, emerging evidence shows that nonlinear pricing elements can play a significant role in market outcomes, though there is limited evidence in healthcare markets (e.g., Ho and Lee, 2024; Bonnet et al., 2013; Conlon and Mortimer, 2013; Crawford and Yurukoglu, 2012; Rennhoff and Serfes, 2009; Mortimer, 2008).

In this paper, we study the impact of nonlinear contracts between health insurers and healthcare practices on medical treatment decisions. Healthcare practices in our setting include hospitals and clinics. We compare the impact of two contracts, fee-for-service (FFS) and bundled payments (BP), on treatment decisions for women giving birth. This setting is well-suited to our analysis because there are two distinct delivery methods, cesarean section (c-section) and vaginal delivery, allowing us to fully characterize medical practice for childbirth.

The two contract types we analyze are widespread in the context of childbirth. In our empirical setting, the health system of Colombia, around 64% of deliveries are reimbursed under a FFS contract and 33% under BP, with the remaining being reimbursed under alternative contracts such as capitation. These contracts are also common in other countries. For instance, the Netherlands (Scheefhals et al., 2024), China (Meng et al., 2019), Nepal (Ostad-Ahmadi et al., 2025), and the United States (US) (Kozhimannil et al., 2018) have experimented with transitions from FFS to BP for childbirth.

In Colombia's health system, multiple insurers negotiate with multiple practices over contracts for every health service. Insurers and practices may cover c-sections and vaginal deliveries under different contracts, and may even index these contracts to women's characteristics, creating contract variation within insurer, practice, and type of woman.

[1] Linear pricing refers to a constant payment for every service or unit of output.

For example, insurer j and practice h can cover c-sections for women under the age of 27 under BP, but can cover the same procedure for women aged 27 or older under FFS. We denote the combination of insurer, practice, and type of woman as the "contracting unit."

Under these conditions, each contracting unit has four possible contract-type combinations for c-sections and vaginal deliveries: FFS-FFS, FFS-BP, BP-FFS, and BP-BP. Most notably, we observe these contracts in our data, allowing us to exploit the highly granular variation within contracting unit to estimate the causal impact of contracts on c-section rates. This is a significant contribution over existing literature which has mainly documented the association between FFS contracts and healthcare spending (e.g., Baker, 1999, 1997), analyzed system-wide changes in payments such as transitions from FFS to managed care systems (e.g., Kuziemko et al., 2018; Aizer et al., 2007), or leveraged variation in FFS prices or in the degree of capitation separately (e.g., Clemens and Gottlieb, 2014; Ho and Pakes, 2014).

FFS and BP contracts differ mainly on whether prices are nonlinear. Under a FFS contract, the insurer and the practice negotiate a (linear) service price that is paid every time the service is provided. Under BP, they negotiate a (nonlinear) price for an episode of care involving a fixed number of services. If the practice provides more services during the episode of care than what the contract specifies, it does not receive payment for those additional services. For example, a BP contract may cover one c-section, one hospitalization day, and one blood test. If the woman stays two days in the hospital, the second day is not reimbursed by the insurer. Hence, revenues under BP do not vary with the number of services provided. Even for a fixed set of services, negotiated prices for delivery procedures may vary across the contracts.

The potential for variation in contracts as well as prices across procedures increases the scope for financial incentives to determine practices' medical decisions. Under BP, the practice faces the risk of having to provide services it will not be compensated for, which generally incentivizes lower levels of utilization of the procedure covered under BP. For the same reasons, the practice may encourage utilization of the procedure when it is covered under FFS. In our setting, this means that if insurer j and practice h cover both procedures for women aged 27 or older under BP, but switch c-sections to FFS, we would

expect to see increases in the c-section rate among this type of women. Conversely, if they cover both procedures under FFS but switch c-sections toward BP, we would expect to see reductions in the c-section rate.

We develop a stylized theoretical model that delivers these predictions for every contract type combination and test the predictions in the data. In doing so we build on a long line of literature dating back to the 1980s which studies provider moral hazard under different payment schemes (e.g., Acquatella, 2021; Ma and Mak, 2019; Miller and Barbiarz, 2013; Ellis and McGuire, 1996, 1986). Empirical tests of these incentives have been scant, with a few exceptions using experimental variation in India for maternity care providers (Mohanan et al., 2021) or modeling optimal contracts for dialysis medications in the US (Gaynor et al., 2023).

We use individual-level data covering nearly half of all deliveries in Colombia between 2013 and 2019. We aggregate the data to the level of a contracting unit and implement an event study approach, comparing trends in c-section rates between contracting units that change their contracts and those that do not. Identification of the causal effect relies on the assumption that contract switches are unrelated to pre-switch trends in c-section rates and that no other changes occur around the time of the contract switch. We provide several pieces of evidence supporting these assumptions, including tests of whether treatment and control groups exhibit parallel trends prior to the switch. Importantly, the common concern of selection of women or practices into contracts is minimized in our setting since we exploit contract variation within insurer, practice, and type of woman.[2]

The possibility that contracts differ between c-sections and vaginal deliveries within the same contracting unit presents both empirical challenges and opportunities. On the one hand, correctly identifying the treatment effect of a c-section contract switch requires holding the vaginal delivery contract fixed to avoid confounding effects. On the other hand, this variation allows us to estimate treatment effects for c-section and vaginal delivery contracts separately, providing a complete characterization of medical decisions for childbirth.

[2]Other work has studied hospital selection into government contracts in the context of hip and knee replacements (Einav et al., 2022).

Our main findings show that contract type has large effects on delivery procedure choice. FFS contracts significantly increase the c-section rate when applied to c-sections but significantly reduce it when applied to vaginal deliveries, while BP contracts have the opposite effects. Specifically, the c-section rate increases by 20% when c-sections switch from BP to FFS (with vaginal deliveries fixed at BP), and decreases by 35% when vaginal deliveries switch from BP to FSS (with c-sections fixed at BP). Conversely, switching c-section contracts from FFS to BP (holding vaginal deliveries fixed at FFS) reduces the c-section rate by 23%. When vaginal delivery contracts switch from FFS to BP, we find no significant effects.

We then analyze the characteristics of the marginal woman, estimating heterogeneous treatment effects by the prevalence of chronic disease and placenta previa/abruptia—two clinical indicators of c-section suitability (Corredor-Waldron et al., 2024). We find that switching c-sections from BP to FFS (holding vaginal delivery fixed at BP) raises the c-section rate by a greater magnitude among contracting units with below-average rates of chronic disease, suggesting the marginal woman receiving a c-section is relatively healthier. Similarly, changing the vaginal delivery contract from BP to FFS (holding c-sections fixed at BP) reduces the c-section rate by a greater magnitude among units with low chronic disease prevalence, indicating the marginal woman receiving a c-section is in relatively worse health.

Our exercises using the rates of placenta previa/abruptia support the conclusion that, when contracts switch from BP to FFS, the marginal woman receiving a c-section is less clinically suited for the procedure. In contrast, we find that switching from FFS to BP appears to improve alignment between the clinical necessity of a c-section and its actual provision. These results suggest that the impact of financial incentives on procedure choice is not mitigated by practices' diagnostic skill.

To determine the extent to which nonlinearities in prices drive our results, we estimate our event study separately for contracting units with predicted price levels that remain relatively stable after a contract switch, allowing us to isolate the effect of zero prices for marginal services under BP. We find that treatment effects on c-section rates are substantially larger in this group. For example, switching c-sections from BP to FFS (holding

vaginal delivery fixed at BP) yields an effect nearly 1.5 times greater than our main estimate. This suggests substitution away from use of procedures covered under BP is driven mainly by nonlinear pricing terms and to a lower extent on price levels.

Throughout our analysis, we maintain the assumption that healthcare practice and physician incentives are perfectly aligned. Contracts established at the practice level may affect medical decisions made by individual physicians through internal incentives such as salary compensations. In our setting it is often the case that delivering physicians are employed at a single practice and are paid a salary, sometimes with additional compensations for procedures rendered. This allows the practice to more easily influence physician behavior relative to settings where physicians work in multiple practices as in the US. We test this hypothesis by estimating our event study separately for large and small practices, finding that responsiveness to contract types is more pronounced among smaller healthcare practices, where incentives between physicians and managers may be better aligned or where impacts of level changes in insurers' bargaining power may be stronger.

Overall, our results are consistent with moral hazard at the healthcare practice level: contracts with insurers influence medical treatment decisions in ways unobservable at the time of contracting. We also directly analyze whether there is scope for selection into contracts but find no evidence of this. First, results are robust to restricting the sample to women who never switch insurers and who select their delivery provider early in pregnancy, when delivery contracts and provider choice are plausibly unrelated. Second, following Brown et al. (2014), we show that the contract combinations are unrelated to women's enrollment decisions and lagged healthcare spending, reinforcing moral hazard as the primary mechanism behind our effects.

We conclude our analysis by examining whether the contractual incentives that shift treatment choices also affect maternal and infant health. We find no evidence that the use of FFS or BP affects rates of severe maternal morbidity after birth or the average gestational age. Although the rate of low infant 5-minute APGAR scores is higher for contract switches from FFS to BP, in general the results are too noisy to draw significant conclusions.[3]

[3]The APGAR score is a measure of infant health during the birthing process. This score is on a scale

Our findings indicate that nonlinear contracts in healthcare substantially affect medical decisions. Thus, summarizing complex contracts with linear prices may miss relevant incentives created by the structure of payments. Additionally, our application to childbirth identifies these nonlinear contracts as important determinants of c-section rates. With c-sections becoming more prevalent in the last two decades across the globe (Betrán et al., 2016), contributing to rising healthcare costs (Sakala et al., 2013), and being the top reason for hospitalization among women (AHRQ, 2018), understanding how delivery decisions are made has become central to the health policy debate. The literature has examined place effects (e.g., Fischer et al., 2024; Robinson et al., 2024; Card et al., 2023), the impact of health risk and diagnostic expertise (e.g., Corredor-Waldron et al., 2024; Currie and MacLeod, 2017), and the role of physician moral hazard (e.g., Foo et al., 2017; Johnson and Rehavi, 2016; Allin et al., 2015; Godager and Wiesen, 2013) on c-section rates. We show that bundling payments for c-section causally reduces the c-section rate, implying potential cost savings for healthcare systems.

The remainder of this paper is structured as follows: Section 2 describes our institutional setting and presents the theoretical framework, Section 3 describes our data, Section 4 presents our empirical design, Section 5 shows our main results, and Section 6 concludes.

2 Setting and Theoretical Framework

We study the contracts established between insurers and healthcare practices participating in Colombia's contributory healthcare system, which covers the half of the population in the country who pay payroll taxes and their dependents (around 25 million people). In this system, private insurers provide one national health insurance plan to their beneficiaries through a network of preferred providers. Other elements of the insurance plan such as premiums, cost-sharing, and benefits are strictly regulated. Healthcare practices in our setting include hospitals and clinics, but not stand-alone doctors. These practices typically operate in a single market or municipality (similar to a county in the US).

Insurers negotiate with practices over contracts for each health service covered by the

from 1 to 10, with a higher score reflecting better infant health.

national insurance plan. This means that different services such as c-sections and vaginal deliveries may be covered under different contracts even for the same insurer-practice pair. Insurers and healthcare practices can choose from a set of three contract types: FFS, BP, and capitation. If a service is covered under FFS, then the insurer negotiates a price to be paid every time the service is provided to one of its beneficiaries only after it has been provided. Thus, FFS is fully retrospective and the marginal payment for a service is strictly positive.

If a service is covered under capitation, then the insurer negotiates a price per person, a service frequency per person, and a target population, and pays the healthcare practice the product of these three elements before services are provided to their beneficiaries, typically at the beginning of the calendar year. Thus, capitation is fully prospective and the price of a marginal service is zero. Low-complexity services such as primary care consultations and blood tests tend to be capitated.[4]

Under BP, the insurer negotiates a price for a bundle of services used during an episode of care. This price is paid every time an episode of care occurs. Episodes of care typically covered under BP tend to be highly standardized such as hysterectomies, appendectomies, or deliveries. BP is less than fully retrospective because the insurer does not pay for additional services provided during the episode of care that are not included in the bundle. For example, if the BP contract covers one hospitalization day for a c-section but the woman stays two days at the hospital, this additional day is not reimbursed by the insurer. Hence, the price for marginal ancillary services included in the bundle (along with the delivery procedure) is zero.

FFS contracts differ from BP and capitation not only in their price levels but also in whether prices for marginal services are strictly positive or zero. Therefore, for the remainder of this study we will distinguish between FFS and non-FFS, where non-FFS refers to both capitation and bundled payments and will be referred to as simply BP.

Throughout our analysis, we assume physician and practice incentives are aligned because physicians are often employed at a single institution, allowing the practice to

[4]The distinction between FFS and capitation with respect to the complexity of the service implies that delivery procedures are more likely to be covered under FFS and BP than under capitation.

more directly influence their behavior. Hospitalists and OB/Gyns at private healthcare practices or hospitals are typically paid a base salary plus commissions per procedure or are paid directly per procedure. In the case of public hospitals, physicians and OB/Gyns tend to have fixed salaries.

Under this assumption, physicians at healthcare practices that have fully retrospective contracts like FFS have an incentive to provide the delivery procedure with the highest profit margin. More prospective contracts increasingly incentivize physicians to provide the lowest-cost treatment since payments do not vary with the number of services actually rendered. These incentives have been well documented in other settings where contracts vary over time but do not vary across services (e.g., Kuziemko et al., 2018; Adida et al., 2017; Ho and Pakes, 2014). However, in our setting where contracts may differ across services, healthcare practice incentives will depend on the combination of contracts across delivery procedures.

To see these incentives more clearly, we propose a simple model in which the practice chooses a procedure for each woman to maximize profits. This decision is independent across women and we assume all physicians within the practice adopt these procedure choices.[5] Suppose each woman has health status h. Higher values of h denote that the woman is in worse health. For c-section, let the FFS price be p_C, the BP price be b_C, and the marginal cost be $m_C(h)$. The corresponding values for vaginal deliveries are p_V, b_V, and $m_V(h)$. The BP price reimburses the practice not only for the provision of the delivery procedure, but also ancillary services included in the bundle, the marginal cost of which are $m_O(h)$. For simplicity, we assume the BP contract for c-sections and vaginal deliveries includes the same set of ancillary services. In this setting, FFS and BP contracts differ in payment levels (e.g., p_C versus b_C) as well as in marginal payments for ancillary services, which make BP contracts nonlinear. Finally, we assume all marginal cost curves are monotonically increasing in health status.[6]

[5]In this model, we also take insurer-practice contracting decisions as fixed and focus on practices' downstream procedure choices. In the upstream contracting problem, a risk-neutral insurer contracts with a practice whose treatment intensity is unobservable to the insurer, generating a problem of asymmetric information. The treatment intensity determines the probability of c-sections and vaginal deliveries. The insurer offers a contract to the practice, which it can accept or reject. Our analysis centers on determining the practice's optimal choice of treatment intensity, given that they have accepted the contract.

[6]Our specification of the BP contract closely follows Einav et al. (2022).

We assume the marginal cost of a c-section increases less rapidly with the woman's health status, $0 < m'_C(h) < m'_V(h)$, to reflect the fact that c-sections tend to be medically recommended for women with certain chronic health conditions. We also assume practices are risk neutral, although our results would extend to settings with risk aversion if we assume marginal cost curves are strictly convex.

The profit from choosing procedure $s \in \{C, V\}$ conditional on the contracts and the woman is:

$$\Pi_s = E[\pi_s|\mathbf{FFS}, h]D(h)$$

with

$$E[\pi_s|\mathbf{FFS}, h]D(h) = (p_s - m_s(h))\text{FFS}_s + (b_s - (m_s(h) + m_O(h)d_O))(1 - \text{FFS}_s)$$

where FFS_s is an indicator for whether service s is covered under FFS and d_O is the number of ancillary services provided. Here we have assumed practice demand $D(h)$ is independent of the contracts since these are not directly observable to women before choosing where to give birth.[7] The practice's problem is

$$\max_{s \in \{C,V\}} \{E[\pi_C|\mathbf{FFS}, h], E[\pi_V|\mathbf{FFS}, h]\}$$

The trade-off for a practice in choosing a procedure covered under BP is that it may receive a higher payment ($b_s > p_s$) but receives no additional reimbursement for marginal ancillary services supplied as part of the episode of care.

Table 1 summarizes practices' expected profits per woman under the four possible contract type combinations ("contracting scenarios" hereafter). The table highlights that the optimal procedure choice in each contracting scenario will follow a cutoff rule in h. For example, in scenario 2 where both procedures are covered under FFS, the health status h^* at which the practice is indifferent between providing a c-section and a vaginal delivery is implicitly defined by $p_C - m_C(h^*) = p_V - m_V(h^*)$. This equation gives a unique solution

[7] Patients in Colombia do not observe the contracts between insurers and practices, but may select into practices based on health status, which may in turn be correlated with use of FFS. Thus, our assumption is that conditional on h, practice demand does not vary with contract types.

TABLE 1: Contracting Scenarios and Incentives

Scenario (1)	Contract (2)	Service (3)	Expected practice profit (4)
1	BP	C-section	$b_C - (m_C(h) + m_O(h)d_O)$
	BP	Vaginal delivery	$b_V - (m_V(h) + m_O(h)d_O)$
2	FFS	C-section	$p_C - m_C(h)$
	FFS	Vaginal delivery	$p_V - m_V(h)$
3	FFS	C-section	$p_C - m_C(h)$
	BP	Vaginal delivery	$b_V - (m_V(h) + m_O(h)d_O)$
4	BP	C-section	$b_C - (m_C(h) + m_O(h)d_O)$
	FFS	Vaginal delivery	$p_V - m_V(h)$

Note: Table shows the practice's profit under four possible contracting scenarios in which c-sections and vaginal deliveries are either covered under the same contract or under different contracts. The FFS price, bundled payment, and marginal cost of a c-section are p_C, b_C and $m_C(h)$, respectively. The corresponding values for vaginal delivery are p_V, b_V and $m_V(h)$. d_O is the number of ancillary services provided during the delivery. h denotes the woman's health status, with higher values implying worse health.

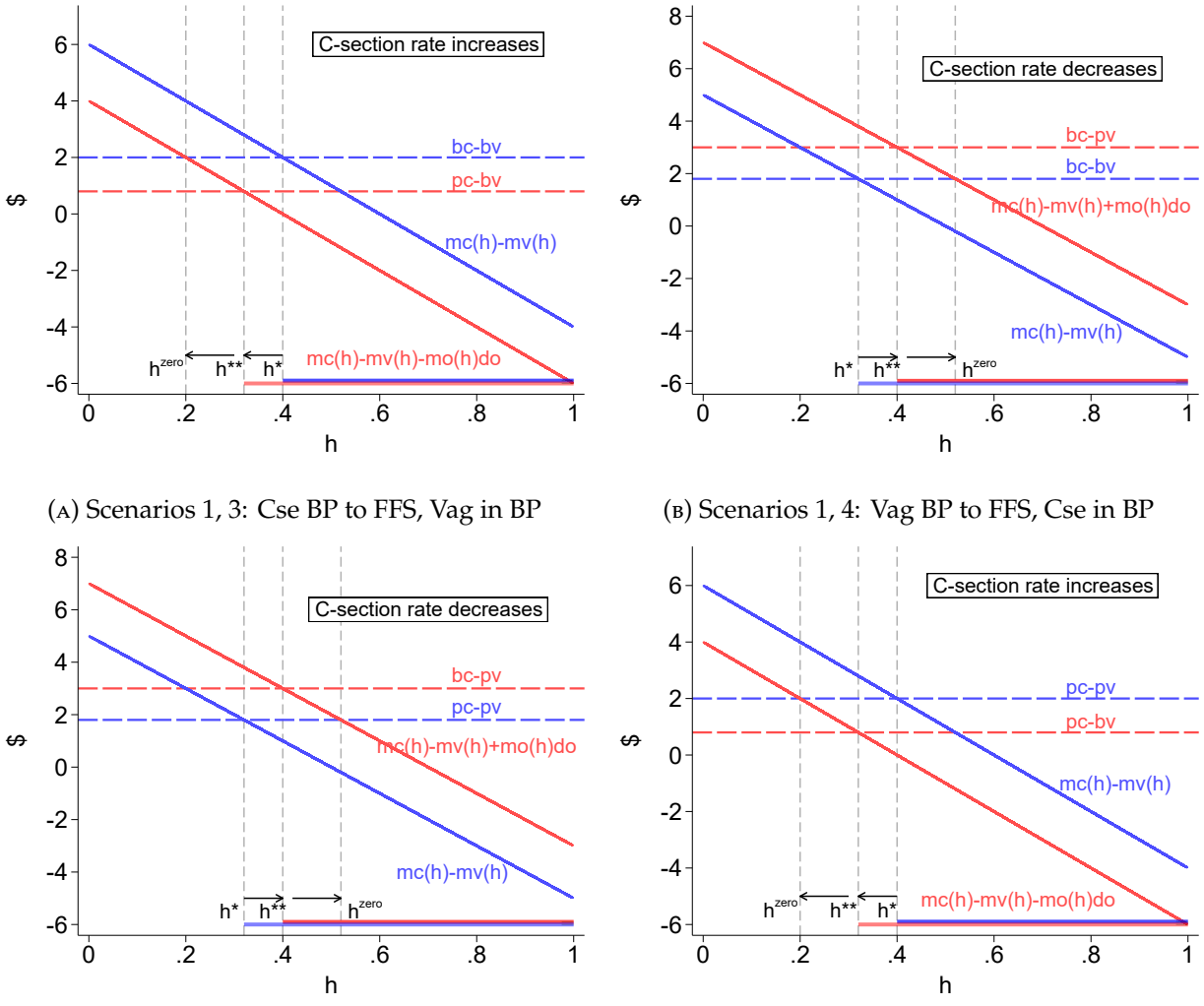
for h^* given our assumption of monotonicity of the marginal cost curves.

The table also provides insight into how to compute the effect of each contract type. For example, to estimate the effect of covering c-section under FFS we can compare scenario 3 to 1, where the contract for vaginal deliveries is fixed to BP. Similarly, we can compare scenario 2 to 4, where the contract for vaginal deliveries is fixed to FFS. To estimate the effect of covering vaginal delivery under FFS we can compare scenario 4 to 1, where the contract for c-sections is fixed to BP or compare scenario 2 to 3, where the contract for c-section is fixed to FFS.

The impact of the different contracting scenarios on c-section rates is generally ambiguous and depends on the relative magnitudes of the difference in prices levels $(b_s - p_s)$ and the cost of ancillary services $(m_O(h)d_O)$. For example, in the case of scenarios 1 and 3, switching c-section from BP to FFS results in a decline in prices of $b_C - p_C$, but also a decline in costs of $m_O(h)d_O$. C-section rates will only rise after switching to FFS if the decline in prices is offset by the decline in the cost of the episode of care, which no longer includes ancillary services.

Figure 1 illustrates the case where the price differences between contracting scenarios are smaller, in absolute value, than the differences in costs. This special case highlights the incentives created by nonlinearities in prices: if BP contracts are unprofitable after

accounting for the higher price, it is precisely because the price for marginal ancillary services is zero.



(A) Scenarios 1, 3: Cse BP to FFS, Vag in BP

(B) Scenarios 1, 4: Vag BP to FFS, Cse in BP

(C) Scenarios 2, 4: Cse FFS to BP, Vag in FFS

(D) Scenarios 2, 3: Vag FFS to BP, Cse in FFS

FIGURE 1: Expected Impact of FFS Contracts Conditional on Costly Ancillary Services

Note: Figure presents a graphical representation of our model predictions from Table 1. Panel A compares the health status cutoffs at which the practice is indifferent between providing a c-section and a vaginal delivery for contracting units in scenario 1 where both procedures are covered under BP and scenario 3 where c-section is covered under FFS and vaginal delivery under BP. Panel B compares the cutoffs in scenario 1 where both procedures are covered under BP and scenario 4 where c-section is covered under BP and vaginal delivery under FFS. Panel C compares the cutoffs in scenario 2 where both procedures are covered under FFS and scenario 4 where c-section is covered under BP and vaginal delivery under FFS. Panel D compares the cutoffs in scenario 2 where both procedures are covered under FFS and scenario 3 where c-section is covered under FFS and vaginal delivery under BP.

Panel A depicts the comparison of scenarios 1 and 3 under these conditions. The blue lines correspond to scenario 1 where both procedures are covered under BP and the red lines correspond to scenario 3 where c-sections are covered under FFS and vaginal deliveries under BP. The solid blue line shows the difference in total cost between c-section

and vaginal delivery in scenario 1. The common cost of ancillary services $m_O(h)$ cancels out of this difference, which is decreasing in health status given our assumption on $m_s'(h)$. The dashed blue line is the difference in prices between the two procedures. Under these conditions, h^* is the health status above which the practice chooses to provide a c-section.

The solid red line in Panel A depicts the difference in cost between c-section and vaginal delivery in scenario 3. This curve is shifted to the left relative to the solid blue line because under BP the practice bears the cost of ancillary services. The dashed red line represents the difference in prices between the two procedures and h^{**} is the cutoff health status for this combination of contracts.

As long as the difference between b_C and p_C is smaller than the difference between costs, our prediction is that $h^{**} < h^*$. Thus, the range of health statuses above which the practice chooses a c-section increases when going from scenario 1 to 3. This means a woman is more likely to receive a c-section when the contract for c-section switches from BP to FFS (holding vaginal delivery fixed at BP), and the marginal woman receiving a c-section is relatively healthier.

Panel A also depicts the extreme case in which $b_C - p_C = 0$. Here the intersection between the dashed blue line and the solid red line defines the cutoff health status h^{zero} above which the practice chooses to render c-sections. Since ancillary services are highly unprofitable in this case, our prediction is that the contract switch would result in an even higher c-section rate.

Panel B depicts the cutoff values for scenarios 1 and 4, indicating that the likelihood of receiving a c-section decreases when the vaginal delivery contract switches from BP to FFS (while c-sections are fixed at BP). In this case, the marginal woman receiving a c-section is in relatively worse health. Panel C shows the comparison between scenarios 2 and 4, predicting that the c-section rate should decrease when the c-section contract switches from FFS to BP (holding vaginal delivery fixed at FFS). Finally, Panel D predicts that the c-section rate should increase when moving from scenario 2 to 3 where the contract for vaginal delivery switches from FFS to BP (with c-section fixed at FFS).

In our empirical application, we take advantage of variation in contracts over time and across procedures to estimate whether insurers and practices are responsive to the asym-

metric incentives predicted by our model. Failure to account for differential responses to FFS by delivery procedure can lead us to underestimate the desired treatment effect. For example, comparing scenario 3 to 4 would likely result in an increase of the c-section rate since c-sections are covered under FFS in scenario 3. However, this naïve comparison confounds the impact of changes in the contract for vaginal deliveries. If vaginal deliveries are more likely to be provided in scenario 4, then the effect of the c-section contract on c-section rates will likely be attenuated.

We note that our model is a simplified representation of real-world medical decisions and may not capture several other ways in which profits may vary with and in which agents may respond to contracts. For example, physicians at these healthcare practices may be altruistic, considering both profits and patient utility when making procedure choices. Although we do not consider patient utility in the medical decision, if the degree of altruism does not vary across contracting scenarios, the patient's utility will not affect the predictions of our model.

As another example, practices under BP may have incentives to select low-risk patients who are less likely to need healthcare or insurers may have incentives to steer high-risk patients towards practices covered under BP. These risk selection incentives can make healthcare practice demand a function of the contracts, which would lead us to underestimate the impact of FFS contracts on the use of c-sections. For example, if insurers send all the high-risk women who potentially need c-sections to practices where c-sections are covered under BP, then the impact of FFS on the c-section rate will be biased toward zero. We will explore whether contracts generate this type of risk selection incentives later on.

There may be other unobserved determinants of delivery procedure choice such as convenience or practice-level capacity constraints, which we do not consider. However, if moral hazard at the practice level is the predominant way in which contracts affect delivery procedure choice and outcomes, we can expect to estimate results in line with the predictions of our model.

3 Data and Descriptives

We use health claims data for all pregnant women in the contributory system who had a childbirth between 2013 and 2019, covering nearly half of all births in the country. These data report the type of service, service date, healthcare practice, insurer, negotiated service price, and contract type for each claim. There are 1,017,830 deliveries in the raw data. We categorize women as having a high-risk pregnancy if they received a diagnosis indicating that their pregnancy was high risk any time during the 9 months of pregnancy.[8] We also categorize women as having severe maternal morbidity (SMM) based on the services and diagnosis codes rendered between 1 week and 1 month after childbirth following the Centers for Disease Control and Prevention (CDC)'s definition.[9] A woman is defined as having a chronic disease if she received any of the following diagnoses before her delivery: diabetes, cancer, cardiovascular disease, renal disease, pulmonary disease, genetic diseases, epilepsy, HIV-AIDS, transplants, and tuberculosis. We follow the ICD categorization in Riascos et al. (2014) to construct these diagnosis groups.

We focus on women of reproductive age (15-50), exclude women with multiple or breech pregnancies for whom c-sections are medically recommended, and keep nulliparous deliveries.[10] Our final analysis sample contains 800,807 deliveries. Whenever a delivery is performed at a hospital or a clinic, we observe the practice's ID number, but we do not have information on the individual physician who performed the delivery at this practice. Furthermore, although we do not directly observe whether a c-section is scheduled or emergent, we note that no women in our analysis data has an ICD-10 code O664 for failed labor.

Table 2 presents summary statistics of our analysis sample. An observation is a de-

[8]These ICD-10 codes include: supervision of high-risk pregnancies (O09), infections of genitourinary tract in pregnancy (O23), pregnancy-induced hypertension or pre-eclampsia (O10-O16), hemorrhage due to threatened abortion (O20), excessive vomiting during pregnancy (O21), venous complications and hemorrhoids in pregnancy (O22), diabetes mellitus in pregnancy, childbirth, and the puerperium (O24), malnutrition in pregnancy, childbirth and the puerperium (O25), abnormal findings on antenatal screening of mother (O28), and complications of anesthesia during pregnancy (O29)

[9]See Centers for Disease Control and Prevention (2024).

[10]We identify breech pregnancies using ICD-10 code O32 and multiple pregnancies using procedure codes from the Colombian national insurance plan 735930 for assistance with spontaneous twin or multiple birth and 735931 for assistance with an intervened twin or multiple birth. To identify nulliparous deliveries we search over our 7 years of data the woman's first delivery procedure.

TABLE 2: Summary Statistics of Analysis Sample

	C-sections		Vaginal deliveries	
	Mean	SD	Mean	SD
Fee-for-service (FFS)	0.665	(0.472)	0.608	(0.488)
Bundled payment (BP)	0.297	(0.457)	0.363	(0.481)
Pure capitation	0.039	(0.193)	0.028	(0.166)
Age≤27	0.473	(0.499)	0.590	(0.492)
Age>27	0.527	(0.499)	0.410	(0.492)
High pregnancy risk	0.434	(0.496)	0.371	(0.483)
Severe maternal morbidity (SMM)	0.050	(0.217)	0.030	(0.171)
Chronic disease	0.391	(0.488)	0.339	(0.473)
Gestational age (weeks)	38.01	(2.041)	38.58	(1.536)
5-min APGAR<8	0.018	(0.131)	0.010	(0.099)
Spending on delivery day†	535.5	(536.4)	419.2	(276.8)
Spending up to delivery day†	467.9	(632.8)	389.4	(461.5)
Deliveries	357274		421091	
Insurer-provider pairs	1949		1943	
Providers	687		686	
Insurers	15		15	

Note: Table shows the mean and standard deviation (in parenthesis) of the main variables in our analysis sample separately by delivery procedure. An observation is a delivery. The 1-minute APGAR score reflects how well the infant tolerated the birthing process and is measured on a scale from 1 to 10, with a higher score reflecting better infant health. †Measures of spending are reported in 2014 USD.

livery claim. The c-section rate equals 46%. Most deliveries are reimbursed under a FFS contract, and FFS use is more prevalent for c-sections than for vaginal deliveries. Among less retrospective contracts, we see that most insurer-practice pairs tend to use BP over capitation, and that the use of these contracts is more common for vaginal deliveries than for c-sections. More than half of vaginal deliveries performed correspond to women aged 27 or younger, while more than half of c-sections are among women over 27 years old. Less than half of pregnancies are classified as high risk, and the rate of high-risk pregnancies is higher among c-sections than vaginal deliveries. Likewise, spending up to and on the day of the delivery is higher for c-sections. Health outcomes such as the infant's likelihood of having 5-minute APGAR scores above 8 and the mother's gestational age and rate of SMM are marginally better for vaginal deliveries relative to c-sections.

3.1 Predicting Contracts

Insurers and healthcare practices typically negotiate contracts at the beginning or the middle of every calendar year, but when these negotiations end and new contracts go into effect can vary. Insurer-practice pairs negotiate contracts for each delivery procedure and may choose to index contract types to patient characteristics. One limitation of our data is that we only observe the contract for the procedure actually provided. For example, if a woman has a vaginal delivery, we observe the vaginal delivery contract but not the one for c-section. To overcome this limitation and recover the full set of contracts for observed deliveries, we predict contracts non-parametrically.

We define a woman type as a combination of age-group ($\leq$27, >27) and pregnancy risk (high vs. low defined before). The age group cutoff corresponds to the average age in the analysis sample. Then, we assign to each insurer-practice-woman type ("contracting units" hereafter) in each half year its modal contract for each procedure.[11] Our method for predicting contracts requires observing each procedure at least once per half year for each contracting unit. Using this prediction, we achieve 97.05% accuracy, incorrectly imputing contracts as FFS in 0.90% of cases and incorrectly imputing them as non-FFS in 2.05% of cases.

3.2 Trends in Contracting Decisions

The primary source of variation we use in our empirical analyses is the temporal variation in contracts within insurer-practice pair for a given woman type. Figure 2 illustrates this variation in the c-section contract for three of the 1,949 insurer-practice pairs in our analysis sample. We see that for each insurer-practice pair there is variation in contracts over time within a woman type. For example, the top right panel shows an insurer-practice pair where all c-sections were reimbursed under FFS before 2015h1 but switched to BP thereafter. Second, we see that contracts also vary across woman types. For instance, the top left panel shows an insurer-practice pair where c-section was reimbursed under FFS for all woman-types until 2017, when low-risk women aged 27 or less switched to BP.

[11] For the 2.95% of observations for which the modal contract does not equal the observed contract, we impose the modal contract. Our results are robust to excluding these observations as seen in Section 5.3.

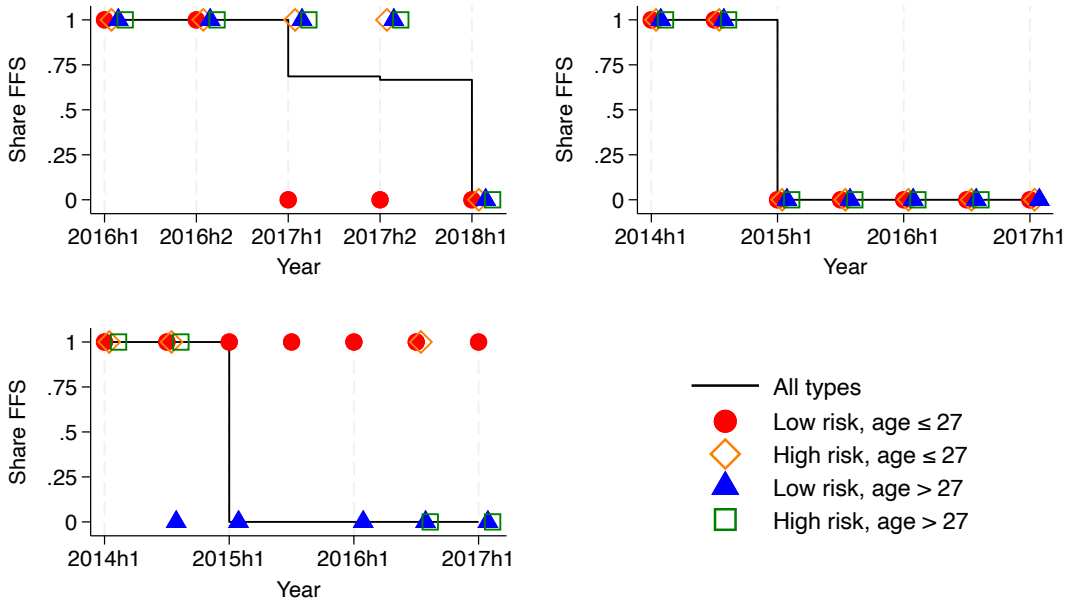
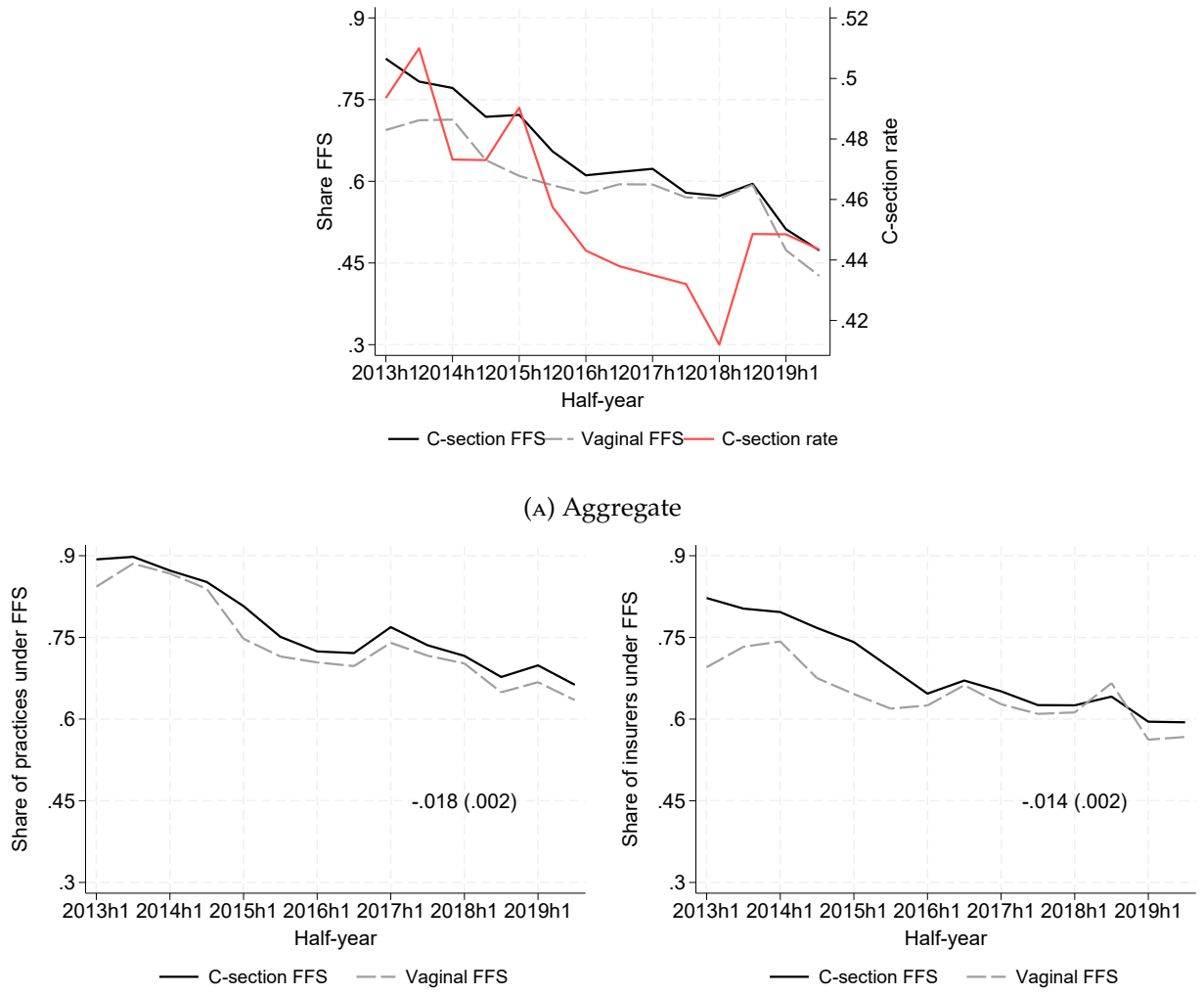


FIGURE 2: Examples of Contract Variation within Insurer-Practice Pairs

Note: Figure shows the contract for each type of woman within an insurer-practice pair between 2013 and 2019. Each panel corresponds to a different pair. The solid black line shows the share of c-sections in each half year that are reimbursed under FFS. The markers show the contract type for each woman type in each half year.

Figure 3 illustrates aggregate trends in the use of FFS. Panel A shows that, in aggregate, the use of FFS fell over the sample period by approximately 30 p.p. from a baseline of 85% for c-sections and 70% for vaginal deliveries. At the same time, the c-section rate in the contributory system declined from 50% to 40% between 2013-1 and 2018-1—a pattern confirmed by studies in the medical literature (e.g., Zuleta-Tobón and Jairo, 2023).

The contracting patterns are explained both by insurers switching most of the health-care practices in their network to BP as seen in Panel B, and by practices increasing the number of insurers that they contract with under BP as seen in Panel C. The decreasing trend in the use of FFS is stronger among practices within an insurer than among insurers within a practice, as seen by the correlation coefficient in each panel, suggesting insurers increasingly hold the bargaining power.



(A) Aggregate

(B) Practices under FFS

(C) Insurers under FFS

FIGURE 3: Trends in the Use of FFS

Note: Figure shows trends in the use of FFS for c-sections in the solid black line and for vaginal delivery in dashed gray line. Panel A reports the fraction of procedures that are covered under FFS over time in the left vertical axis and the c-section rate (in red) in the right vertical axis. Panel B reports the average fraction of practices within an insurer's network that are covered under FFS weighted by the number of deliveries. Panel C reports the average fraction of insurers that use a FFS contract with a given practice weighted by the number of deliveries. The bottom panels also report the coefficient and standard error of a regression of the share of FFS across the two procedures on half years.

4 Empirical Design

To study the effect of contracts on medical decisions, we take advantage of the variation in contracts over time described in the previous section. Because contracts are established at the procedure level, it may be the case that c-sections are more likely than vaginal deliveries to be covered under FFS across all insurer-practice pairs. It may also be the

case that women for whom c-sections are medically recommended tend to be covered under FFS. This suggests that a comparison of c-section rates *across* insurer-practice pairs would yield a mechanically higher c-section rate under FFS than BP because of selection of women into contracts. Thus, the appropriate research design should instead exploit the variation in contracts *within* procedure, insurer, practice, and type of woman, which the Colombian setting uniquely provides.

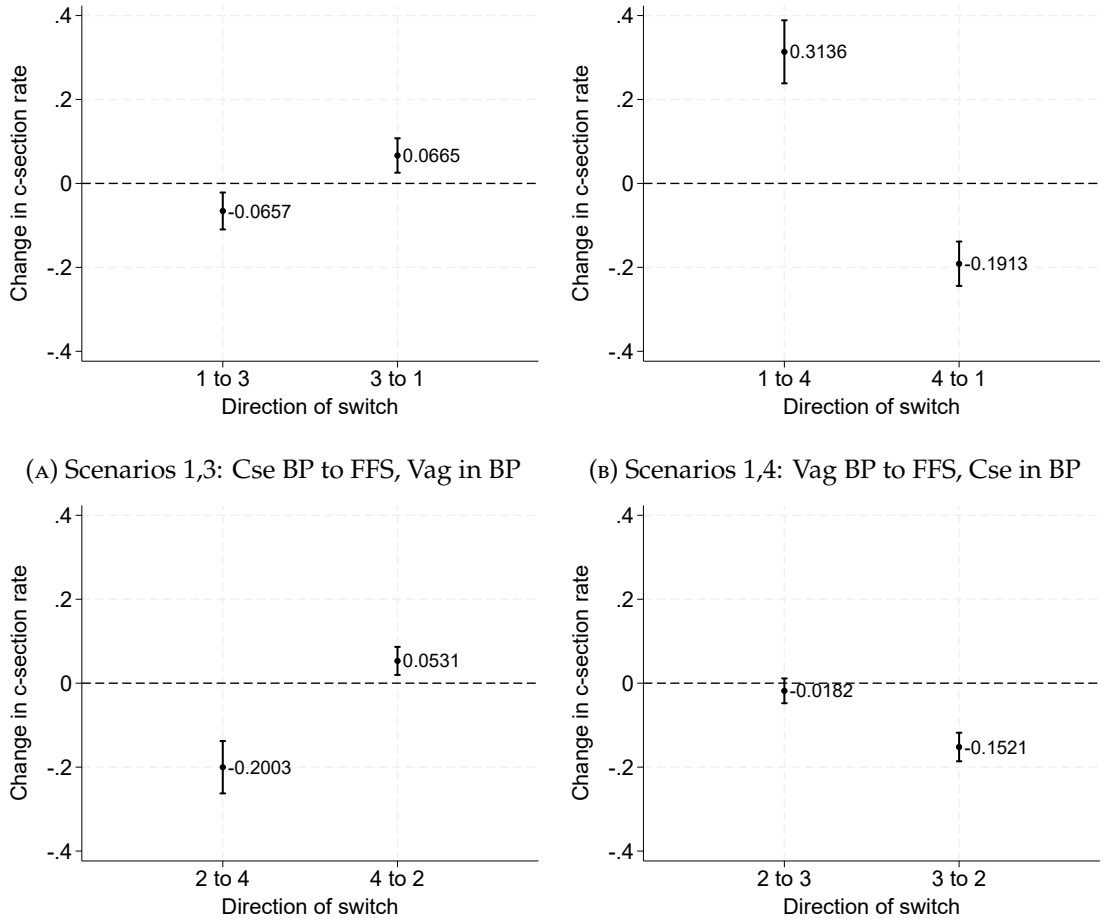
We estimate event study models as follows:

$$y_{jhmt} = \sum_{\substack{k=-5 \\ k\neq -1}}^{4} \alpha_k 1\{t - t^* = k\} \times \text{FFS}^s_{jhmt} + \gamma_{jhm} + \delta_t + \varepsilon_{jhmt} \tag{1}$$

where y_{jhmt} is an outcome for insurer j, practice h, and type of woman m in half year t, FFS^s_{jhmt} is an indicator for whether procedure $s \in \{C, V\}$ is covered under FFS, t^* is the half year when the contracting unit switches their contract, γ_{jhm} is an insurer-practice-woman type fixed effect, and δ_t is a half year fixed effect. The coefficients of interest are α_k, which measure the causal effect of FFS contracts for procedure s relative to BP in every half year relative to the switch. To estimate these models we collapse the claim-level data to the $jhmt$-level, calculating per capita outcome measures. Appendix A details our data cleaning process. We cluster standard errors at the level of insurer-practice pair to allow for correlation between women who visit the same practice or are enrolled with the same insurer.

The inclusion of fixed effects at the level of insurer-practice-woman type allows us to control for time-invariant factors that may be correlated with the use of FFS. For example, if insurer or practice quality are correlated with contract type, then the estimated effect of FFS would be biased. These fixed effects also capture market-level variation in outcomes—since practices typically operate in a single market—as well as any potential endogeneity coming from the unbalanced nature of our panel. The half year fixed effects δ_t capture any seasonality in bilateral contracting decisions. We also conduct robustness checks including insurer-by-half year and woman type-by-half year fixed effects, which can help control for changes insurers' relative bargaining power or enrollee composition over time

that may be correlated with our outcome variables.



(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

(B) Scenarios 1,4: Vag BP to FFS, Cse in BP

(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS

(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

FIGURE 4: Test of Symmetry Assumption

Note: Figure shows the average change in c-section rates and 95% confidence intervals conditional on contracting units that switch between pairs of scenarios. The horizontal axis presents the direction of the contract switch and the vertical axis presents the average change in c-section rate. These averages use only the information from contracting units that switch.

To correctly identify the causal effects, we subset the data to contracting units that fall within the contracting scenarios delineated by our theoretical model. For instance, the impact of covering c-sections under FFS is identified from contracting units that switch from scenario 1 to 3 or from 3 to 1, where the contract for vaginal deliveries is fixed at BP and the contract for c-sections changes between BP and FFS. Subsetting the data to contracting units that switch from scenarios 1 to 4 and from 4 to 1 allows us to identify the impact of covering vaginal deliveries under FFS. Focusing on those that switch from scenario 2 to 4 and vice versa recovers the causal effect of covering c-sections under BP.

Finally, contracting units that switch between scenarios 2 and 3 identify the effect of covering vaginal deliveries under BP. In all cases, the control group are contracting units that do not switch their contracting scenario.

In our regression, we examine outcomes around the first contract switch and treat contract changes between pairs of scenarios symmetrically, reversing the time period for one type of switch. For instance, we assume that switching the c-section contract from BP to FFS has an impact on outcomes of the opposite sign as switching from FFS to BP (holding vaginal deliveries fixed at BP). Without imposing this symmetry, comparing contracting units that switch from scenario 1 to 3 with those that switch from 3 to 1—without reversing the time period for one group—would cause the treatment effects to cancel out.

Figure 4 provides evidence of our symmetry assumption in contract switches between pairs of scenarios by replicating figures from Finkelstein et al. (2016).[12] The horizontal axis in each panel presents the direction of the contract switch and the vertical axis presents the associated average change in c-section rates. In each of our specifications, we find strong evidence of symmetry: the change in c-section rates has opposite signs between different directions of the switch. For example, in Panel A, contracting units that switch from scenario 3 to 1 see an average decrease in c-section rates of about 6.6 p.p., while those that switch from scenario 1 to 3 see an average increase of about 6.7 p.p. Panel D which considers switches from scenarios 2 to 3 and vice versa shows that the change in c-section rates is insignificant in one direction of the switch.

Table 3 reports summary statistics for treated units before the contract switch and for control units. The treatment groups are contracting units that switch between scenarios 1 and 3 in column (1), scenarios 1 and 4 in column (2), scenarios 2 and 4 in column (3), and scenarios 2 and 3 in column (4). Control units are those that never switch contracting scenarios. We see that across our different specifications, treatment and control groups are largely balanced in terms of maternal and infant outcomes. Although high-risk pregnancy rates and the fraction of women aged 27 or older differ between treatment and

[12] Finkelstein et al. (2016) use this symmetry assumption to identify place effects on healthcare utilization from patients who migrate across geographies in the U.S.

control groups, we will leverage within insurer-practice-woman type changes to minimize concerns over possible violations of parallel pre-trends. Appendix Figures 2 and 3 also show that observed level differences in spending on the delivery day and spending up to the delivery day do not translate into trend differences between treatment and control groups.

TABLE 3: Balance Table

	Scenarios 1,3	Scenarios 1,4	Scenarios 2,4	Scenarios 2,3	Control
	Cse BP to FFS Vag in BP	Vag BP to FFS Cse in BP	Cse FFS to BP Vag in FFS	Vag FFS to BP Cse in FFS	
C-section rate	0.564	0.432	0.591	0.428	0.515
Age > 27	0.552	0.557	0.559	0.475	0.471
High pregnancy risk	0.498	0.469	0.406	0.449	0.411
Chronic disease	0.306	0.306	0.317	0.314	0.368
Spending on delivery day†	487.1	486.5	527.9	480.8	555.2
Spending up to delivery day†	470.9	457.5	413.0	393.1	407.8
Health outcomes					
Severe maternal morbidity (SMM)	0.049	0.028	0.055	0.046	0.041
Gestational age (weeks)	38.15	38.17	38.21	38.24	38.16
Birth weight (grams)	3.069	3.051	3.125	3.093	3.093
1-min APGAR	8.303	8.285	8.244	8.163	8.189
Insurer-provider pairs	106	86	189	208	1699
Deliveries	808	502	1474	1794	22924

Note: Table shows variable means for treated units in the pre-period for those that switching between scenarios 1 and 3 in column (1), scenarios 1 and 4 in column (2), scenarios 2 and 4 in column (3) and scenarios 2 and 3 in column (4). Column (5) presents variable means for contracting units in the control group that never switch their contracts. †Measures of spending are reported in 2014 USD.

4.1 Identification Assumptions

Identification of the causal effect of contract combinations on delivery procedure choice relies on several assumptions. First, we assume that the outcomes of contracting units that change their contracts would have evolved parallel to those that never change, had the switch not occurred. While insurers and practices likely select into contracts, this is not problematic for identification as long as contract switches are unrelated to pre-switch outcome trends (i.e., if selection is only on outcome levels). However, the sharper decline in FFS use within insurers than within practices, shown in Figure 3, could indicate

that insurers hold increasing bargaining power and select into contracts based on those trends.[13]

Second, we assume that there are no changes that occur simultaneously with contract changes across contracting units. Although we cannot fully rule this out, we note that staggered contract changes reduce the risk that switches coincide with other shocks. Still, it is possible that women's unobserved preferences for c-sections change over time, prompting insurers to adopt BP contracts with practices in their networks. This could lead us to mistakenly attribute changes in c-section rates to the contract rather than to women's unobserved preferences.[14] Also, if Colombian obstetricians become more skilled at performing c-sections in practices with FFS contracts, the observed effects could reflect unobserved improvements in provider ability rather than the contracts themselves.

Third, we assume that there are no spillovers to the control group. We think this is likely the case given that our control group is fairly large and includes insurer-practice pairs that operate in different markets than those in the treatment group, minimizing the impact of bargaining externalities.

To provide encouraging evidence of the parallel pre-trends assumption and of the quasi-random timing of contract changes, we regress an indicator for whether the contracting unit switches its contracts on a wide range of lagged time-varying insurer and practice characteristics. We estimate the following regression:

$$Switch^{s}_{jhmt} = \mathbf{x}'_{jhm,t-1}\beta + \gamma_{jhm} + \delta_t + \varepsilon_{jhmt}$$

where $Switch^{s}_{jhmt}$ is a binary indicator for whether insurer j and practice h switch their contract type for delivery procedure $s \in \{C, V\}$ for women of type m relative to half year $t-1$, and $\mathbf{x}_{jhm,t-1}$ is a set of lagged per capita characteristics. As in our main specification,

[13] Conversations with contracting staff from insurers and healthcare practices confirmed that insurers typically make take-it-or-leave-it offers for delivery services, supporting our view of their relatively greater bargaining power.

[14] Gaviria (2017) documents that differences in women's attitudes toward c-sections account for part of the variation in c-section rates across Colombian states. The study reports that c-section rates among women with higher education are 15 p.p. higher than among those without formal education, controlling for health status and healthcare access. This suggests preferences for c-sections may vary systematically with education.

we include insurer-practice-woman type fixed effects γ_{jhm} and half year fixed effects δ_t. We cluster standard errors at the insurer-practice pair and reverse the direction for one of the switches as explained before.

TABLE 4: Correlates of Contract Switching

	Cse BP to FFS (1)	Vag BP to FFS (2)	Cse FFS to BP (3)	Vag FFS to BP (4)
Woman-type share of deliveries	-0.001	0.004	-0.010**	-0.002
	(0.003)	(0.004)	(0.005)	(0.005)
Lagged characteristics				
C-section rate	-0.001	-0.002	0.012***	0.002
	(0.003)	(0.002)	(0.004)	(0.004)
SMM	-0.010**	0.002	0.009	-0.008
	(0.005)	(0.004)	(0.009)	(0.007)
Birth weight (kg)	0.003	-0.003	-0.000	-0.005
	(0.002)	(0.002)	(0.004)	(0.004)
Chronic disease	-0.001	0.001	-0.001	0.001
	(0.002)	(0.002)	(0.003)	(0.003)
1-min APGAR	-0.002*	0.000	-0.002	0.000
	(0.001)	(0.001)	(0.001)	(0.002)
Gestational age	-0.000	0.001	0.001	0.000
	(0.000)	(0.001)	(0.001)	(0.001)
Spending on delivery day	-0.001	-0.001	-0.003	0.002
	(0.002)	(0.002)	(0.004)	(0.004)
Spending up to delivery day	-0.000	-0.000	-0.001	-0.002*
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.035	-0.007	0.009	0.007
	(0.024)	(0.032)	(0.045)	(0.046)
Sample	Scenarios 1,3	Scenarios 1,4	Scenarios 2,4	Scenarios 2,3
Joint significance p-value	0.324	0.573	0.015	0.413
Observations	17591	17353	18119	18374
R^2	0.316	0.320	0.300	0.282

Note: Table shows the correlates of contract switches. Column (1) is estimated using the subset of treated units switching from scenario 1 to 3, column (2) the subset switching from scenario 1 to 4, column (3) the subset switching from scenario 2 to 4, and column (4) the subset switching from scenario 2 to 3. An observation is contracting unit-half year, where a contracting unit is defined as an insurer-practice-woman type. A woman type is a combination of age group (age ≤ 27, age > 27) and pregnancy risk (high vs. low). Specifications include insurer-practice-woman type and half year fixed effects. Estimation samples exclude the first half year for each contracting unit as switching cannot be measured for these observations. Standard errors in parentheses are clustered at the insurer-practice level.
* $p < 0.01$, ** $p < 0.05$, *** $p < 0.001$.

Table 4 shows the results. For both c-sections and vaginal deliveries, we find zero correlation between contract switches and lagged per capita characteristics as seen by the joint F-test of significance reported at the bottom of the table. This helps us rule out potential biases coming from selection into trends, such as insurers leveraging their

increasing bargaining power to strategically switch practices with high c-section rates to BP contracts.

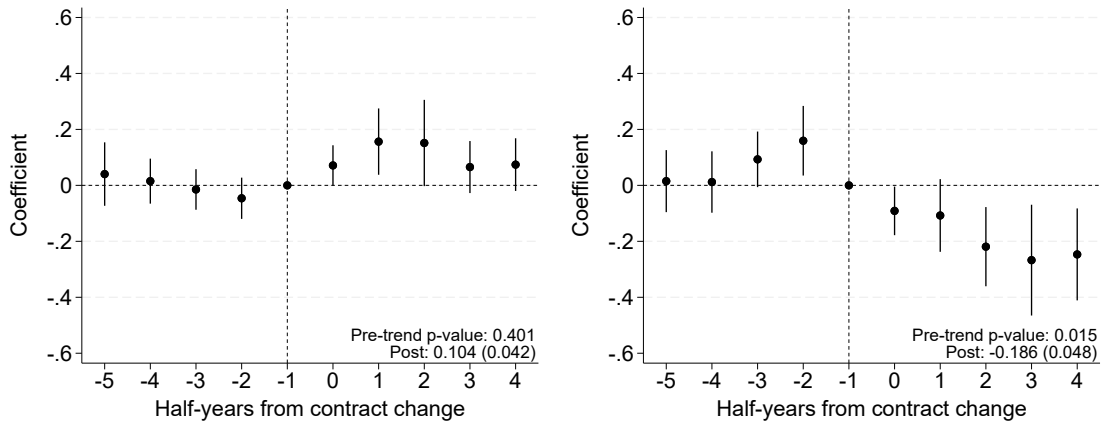
We also include in our specifications the contemporaneous share of deliveries corresponding to each woman-type within an insurer-practice-half year. Correlation between contract switches and these contemporaneous delivery shares could reflect changes in diagnostic patterns, such as upcoding, that are meant to select women into particular contract types. However, we find that this variable is insignificant across most specifications, as well as when considered jointly with the rest of variables.

The results in Table 4 show that changes in contract type and the timing of those changes are generally unrelated to pre-switch outcomes, suggesting the direction of causality runs from contracts to outcomes—not the reverse. While we cannot directly observe the motives behind contract switches, plausible explanations are level changes in bargaining power (Serna, 2025) or idiosyncratic managerial preferences, which have been shown to shape hospital behavior in other contexts (Otero and Munoz, 2022).

Appendix Figure 1 plots the residuals from a regression of contract types for c-section on insurer-practice-woman type and half year fixed effects. The figure shows that there is meaningful residual variation in contract type with which to estimate our effects of interest.

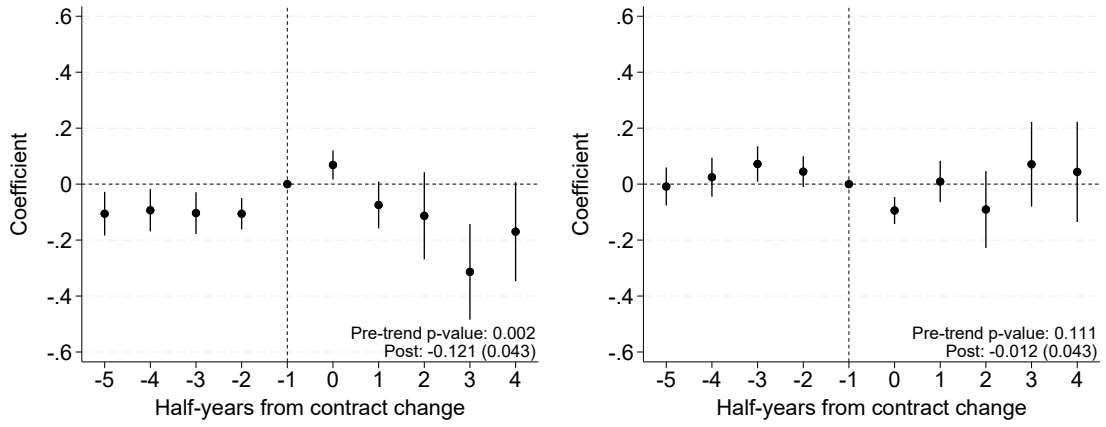
5 Results

Figure 5 presents our main event study results for the impact of contract changes on c-section rates. Panel A examines switches from BP to FFS for c-sections, holding vaginal deliveries under BP. We find that this switch increases c-section rates by approximately 20% relative to baseline, with effects persisting for up to two years after the switch. Panel B evaluates the effect of switching vaginal delivery contracts from BP to FFS while keeping c-section contracts at BP. Our findings show that the c-section rate falls 35% and treatment effects are increasing over time. In both panels, we find no strong evidence of differential pre-trends since a joint F-test for pre-treatment coefficients yields p-values above 0.01.



(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

(B) Scenarios 1,4: Vag BP to FFS, Cse in BP



(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS

(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

FIGURE 5: Impact of Contracts on C-section Rates

Note: Figure shows coefficients and 95% confidence intervals of event studies using c-section rates as the outcome variable. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D. In all specifications, the control group are insurer-provider-woman types that never switch their contracts. Each panel reports the p-value of a joint F-test of significance of pre-period coefficients and the average and standard error of post-period coefficients. Standard errors are clustered at the insurer-practice level.

Panel C considers the reverse switch: from FFS to BP for c-sections, holding vaginal delivery at FFS. In line with retrospective contracts determining procedure choices, we find that c-section rates decrease about 23% relative to baseline. Although in this case there is some pre-trend imbalance, we note that this is driven only by the average c-section rate in the half-year right before the switch. Panel D assesses switches from FFS to BP for vaginal deliveries, with c-sections fixed at FFS. Here, we find no significant effect on c-section use. Overall, the results support the model predictions in Section 2: the switch to

BP (FFS) reduces (increases) utilization of the procedure undergoing the contract change.

Appendix Table 1 further corroborates the intuition developed in our model. In column (1), we test whether estimating the effect of covering c-sections under FFS using all contract scenarios biases the estimate toward zero due to confounding changes in vaginal delivery contracts. Indeed, we find that the effect is marginally significant. In column (2) which examines the impact of covering vaginal deliveries under FFS, we also find smaller treatment effects relative to our event studies.

5.1 Price Levels versus Nonlinearities in Prices

The finding that the switch to BP reduces utilization of the procedure undergoing the contract change suggests that, on average, the price change after the switch to BP is more than offset by the change in the cost of ancillary services. As shown in Section 2, the reduction in utilization after switching to BP is largest when the change in price levels is small—that is, when $b_s \approx p_s$.

Our goal in this section is to determine the extent to which nonlinear contract features affect treatment decisions. To do so, we construct an empirical specification that mirrors the h^{zero} scenario illustrated in Figure 1. In this case, price levels are very similar across contracts, and we predict that the effects on c-section rates will be more pronounced than those estimated in Section 5. This is mainly due to the fact that prices for marginal ancillary services are zero under BP.

We begin by predicting, for each treated contracting unit, the expected price for a procedure under the new contract. This prediction equals the average price observed among control group units operating under the same contracting scenario, woman type, and practice size—defined by whether the healthcare practice has above- or below-average total deliveries during the sample period.[15] For example, if insurer j and practice h (with above-average number of deliveries) switch from scenario 1 to 3 (changing the c-section contract from BP to FFS) for low-risk women aged 27 or younger, we assign the average c-section price observed among control group units with above-average deliveries under

[15] We do not condition the payment prediction on the specific provider because we do not have enough observations for each provider in every contracting scenario.

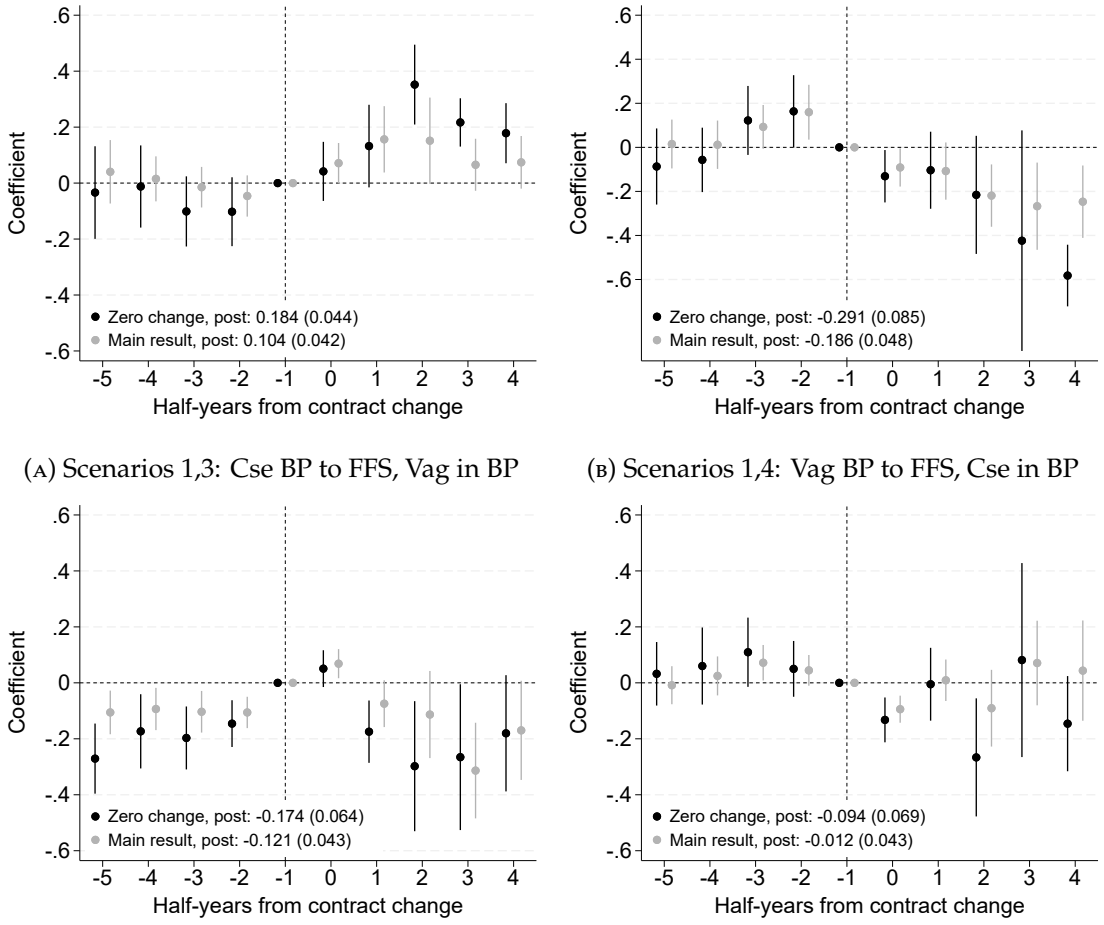
scenario 3 and for women of that type. We then compute the price change as the difference between the predicted price under the new contract and the observed pre-switch price. For contract changes related to vaginal deliveries, this difference is multiplied by -1 so that positive changes are always associated with increases in the relative price for c-section. We then re-estimate our event study specification conditional on contracting units with small predicted price changes defined as those within a half-standard deviation window of zero.[16] Appendix Figure 4 presents the distribution of predicted price changes, highlighting in dark blue the observations that we use in our estimation.

Figure 6 shows the results. Panels A and B—corresponding to switches between scenarios 1 and 3, and scenarios 1 and 4—provide evidence that zero marginal prices under BP are a driver of our main findings. In Panel A, among contracting units with small predicted price changes for c-section, we estimate a nearly 36% increase in c-section rates (in black). In contrast, our main estimates show a 20% increase (in gray). Similarly, Panel B shows a 60% reduction in c-section rates among contracting units with small predicted price changes for vaginal delivery, compared to 35% in our main results. Panel C also shows greater effects than in our main specification though pre-trend imbalance remains, while Panel D shows no evidence of differential treatment effects.

An alternative way to quantify the importance of zero prices for marginal ancillary services under BP is to compare contracting units for which many ancillary services are included in the bundle to those with few services included. The number of ancillary services maps back to d_O from our stylized model. We do not directly observe d_O, but can proxy for it using the number of claims on the delivery day. When the contract switch is from BP to FFS, we directly use the average number of claims on the delivery day for each treated unit in the pre-period to proxy for the bundle size. When the contract switch is from FFS to BP, we predict the treated unit's number of claims using the average number of claims for control group units under BP. We then re-estimate the event study separately for contracting units with above- versus below-average predicted number of claims. Our hypothesis is that BP contracts associated with a relatively high number of

[16] When the distribution of predicted price changes falls entirely above or below zero, we use observations below the mean.

ancillary services will be less profitable and generate larger treatment effects.



(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

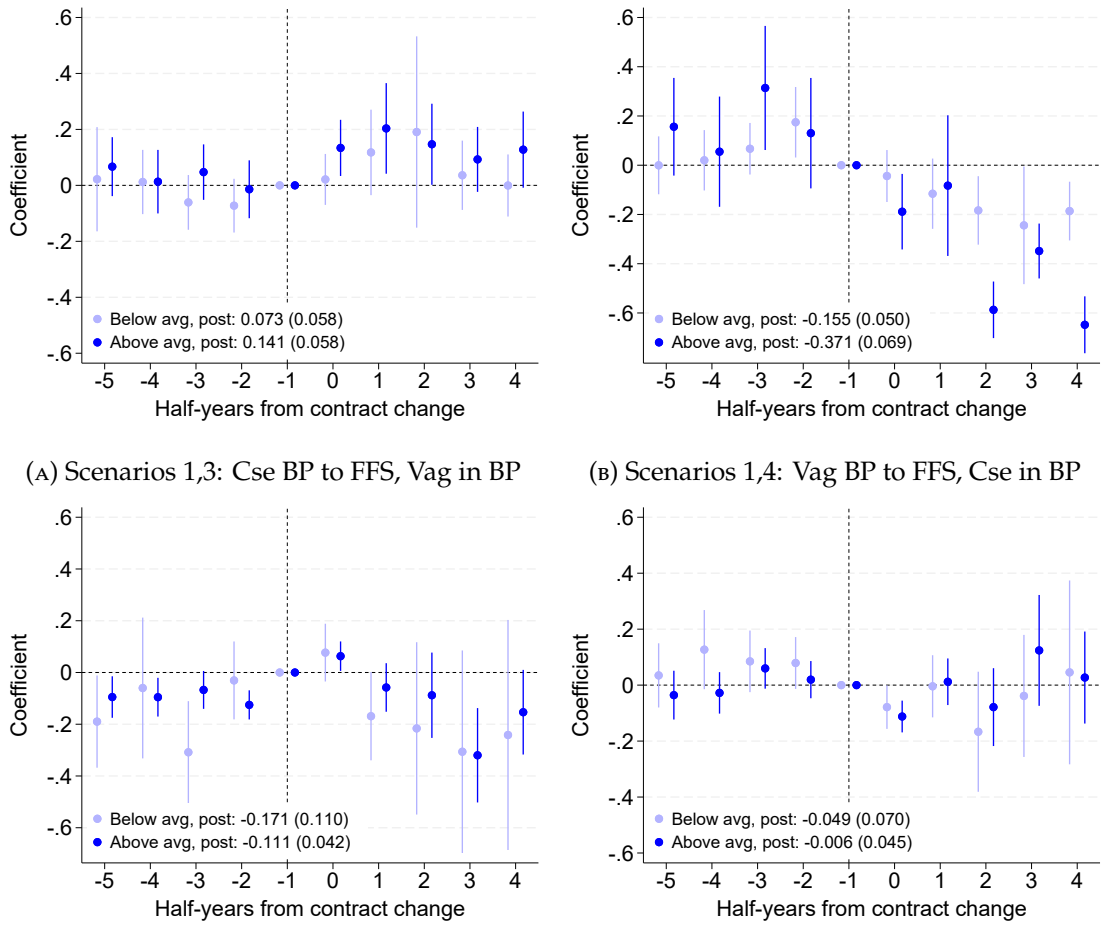
(B) Scenarios 1,4: Vag BP to FFS, Cse in BP

(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS

(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

FIGURE 6: Impact of Contracts on C-section Rates by Predicted Change in Price Levels

Note: Figure shows coefficients and 95% confidence intervals of event studies using as outcome the c-section rate. Estimates in black use contracting units in the treatment groups for which we predict small changes in procedure payments after the switch. The predicted price for a procedure after the switch equals the average price among control group units within the same contracting scenario, age group, pregnancy risk category, and type of provider. Provider type is defined as having below- or above-average total deliveries over the sample period. Estimates in gray present our main results. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D. In all specifications, the control group are insurer-provider-woman types that never switch their contracts. Each panel reports the average and standard error of post-period coefficients. Standard errors are clustered at the insurer-practice level.



(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

(B) Scenarios 1,4: Vag BP to FFS, Cse in BP

(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS

(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

FIGURE 7: Impact of Contracts on C-section Rates by Number of Services in Bundle

Note: Figure shows coefficients and 95% confidence intervals of event studies using as outcome the c-section rate. Estimates in dark blue and light blue use insurer-provider-woman types with predicted number of claims on the delivery day under BP above- or below-average, respectively. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D. In all specifications, the control group are insurer-provider-woman types that never switch their contracts. Each panel reports the average and standard error of post-period coefficients. Standard errors are clustered at the insurer-practice level.

Figure 7 presents the results. Overall, the findings support the view that nonlinear pricing elements—particularly zero prices for marginal services under BP—create meaningful incentives for treatment decisions. In Panel A, we find that among contracting units with above-average number of claims (i.e., those where ancillary services may be highly unprofitable), the estimated effect of switching c-section contracts from BP to FFS is twice as large as among those with below-average number of claims. Panel B shows a similar pattern for switches in vaginal delivery contracts from BP to FFS. In contrast, Panels C and

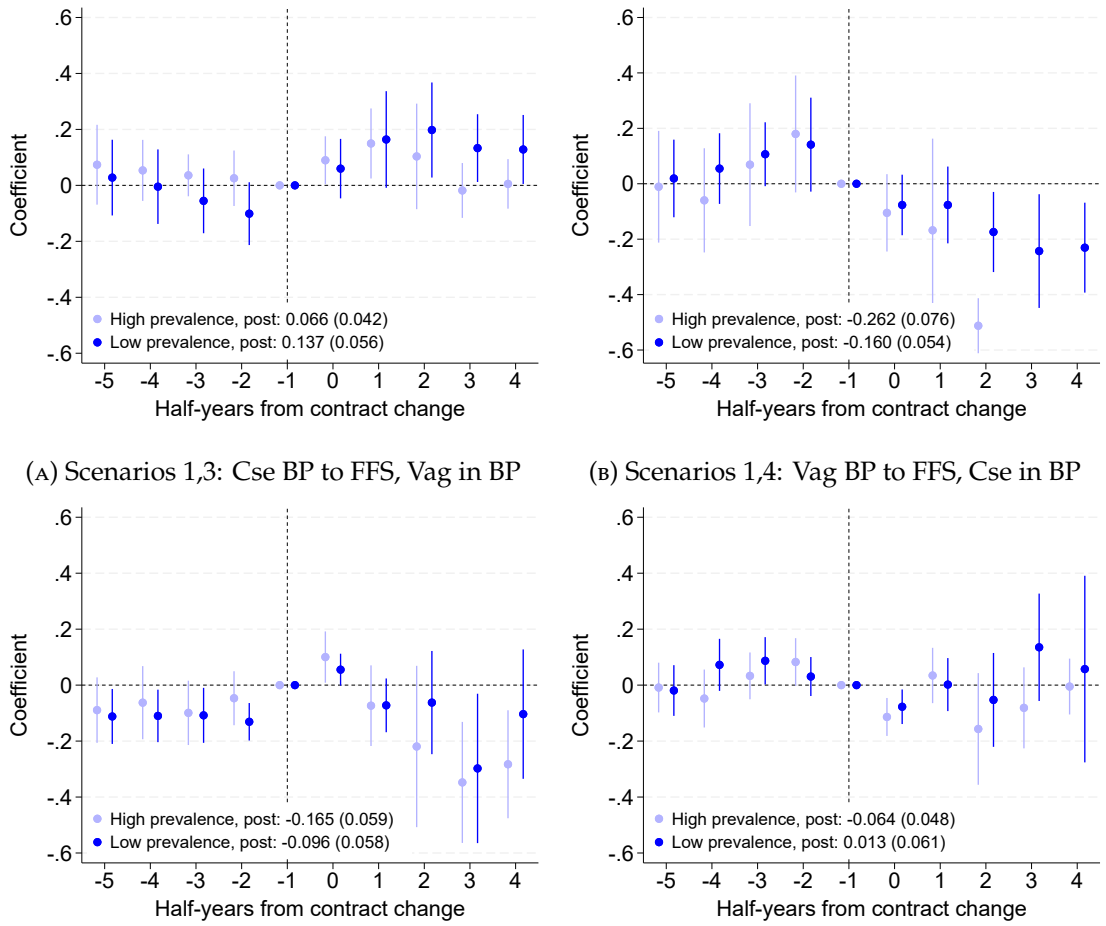
D show no evidence of heterogeneous treatment effects.

5.2 Marginal Women and Marginal Practices

When the price difference between contracting scenarios is less than the difference in costs, our model in Section 2 predicts that contract changes increasing c-section rates may do so by encouraging providers to perform c-sections on marginally healthier women. Conversely, contract changes that reduce c-section rates are predicted to shift care away from women in better health. To test these predictions, we explore heterogeneity in treatment effects by patient health, proxied by the prevalence of chronic diseases and the rates of placenta previa and placenta abruptia—two clinical indicators of health status and c-section suitability, respectively (Corredor-Waldron et al., 2024).

Figure 8 presents event study results stratified by chronic disease prevalence. Dark blue estimates represent contracting units with below-average chronic disease rates in the pre-period and light blue estimates represent their counterparts. In Panel A, which examines the effect of switching the c-section contract from BP to FFS (holding vaginal delivery under BP), we find that c-section rates increase by 25% among healthcare practices serving healthier women versus no significant changes among those with higher chronic disease rates. These findings are consistent with providers targeting lower-risk patients and align with the model's predictions. In Panel B, which analyzes a contract change that reduces c-section rates, the effects are driven entirely by healthcare practices with healthier patients; we detect very noisy changes among practices serving sicker populations, suggesting the marginal woman is in relatively worse health. Panels C and D find no differential effects by health status for the corresponding contract change.

The marginal woman receiving a c-section following each contract change also tends to have different clinical suitability for the procedure. In Figure 9, we examine heterogeneity in treatment effects based on the pre-period rates of placenta previa/abruptia. Panel A, which considers a switch from BP to FFS for c-sections, shows statistically significant increases in c-section rates only among contracting units with below-average rates of these conditions, suggesting that the additional procedures are performed on women less



(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

(B) Scenarios 1,4: Vag BP to FFS, Cse in BP

(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS

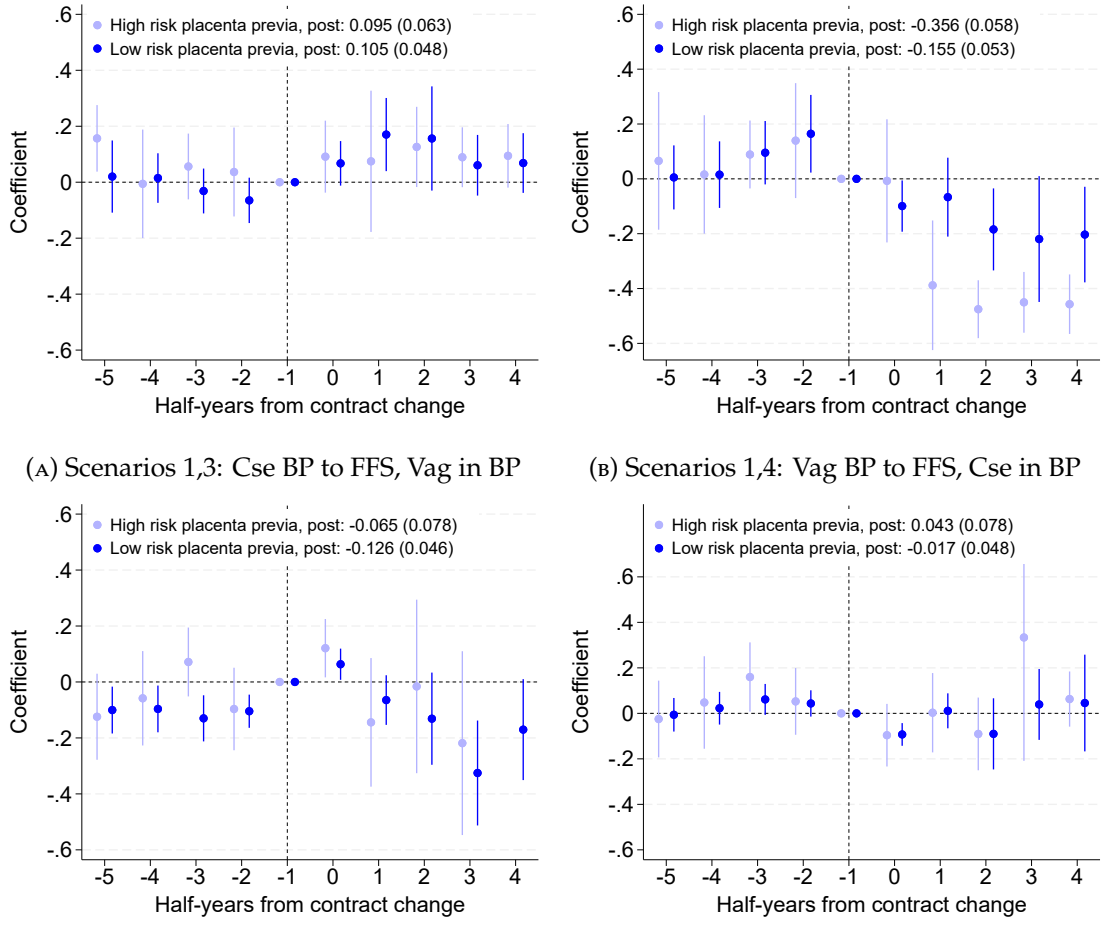
(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

FIGURE 8: Impact of Contracts on C-section Rates by Chronic Disease Prevalence

Note: Figure shows coefficients and 95% confidence intervals of event studies using as outcome the c-section rate. Estimates in dark blue and light blue use contracting units with below- and above-average rates of chronic disease, respectively. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D. In all specifications, the control group are insurer-provider-woman types that never switch their contracts. Each panel reports the average and standard error of post-period coefficients. Standard errors are clustered at the insurer-practice level.

suited for them. Panel B presents similar patterns: switching vaginal deliveries from BP to FFS leads to a reduction in c-section rates nearly three times greater among units with above-average rates of placenta-related complications, consistent with these women being suitable for a c-section but not receiving one. Notably, Panel C shows that a switch in c-section contracts from FFS to BP reduces c-section rates by a greater magnitude among units with below-average rates of complications. These results emphasize the importance of considering contracting scenarios separately (as the effect of a contract change

depends on the contract under which the alternative service is provided) and suggests that diagnostic skill does little to mitigate practices' responses to financial incentives.



(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

(B) Scenarios 1,4: Vag BP to FFS, Cse in BP

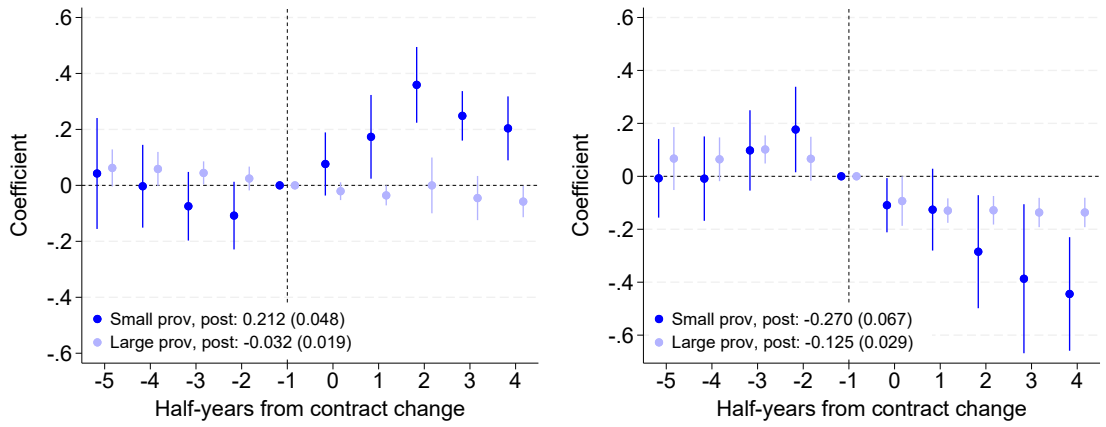
(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS

(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

FIGURE 9: Impact of Contracts on C-section Rates by Rates of Placenta Previa/Abruptia

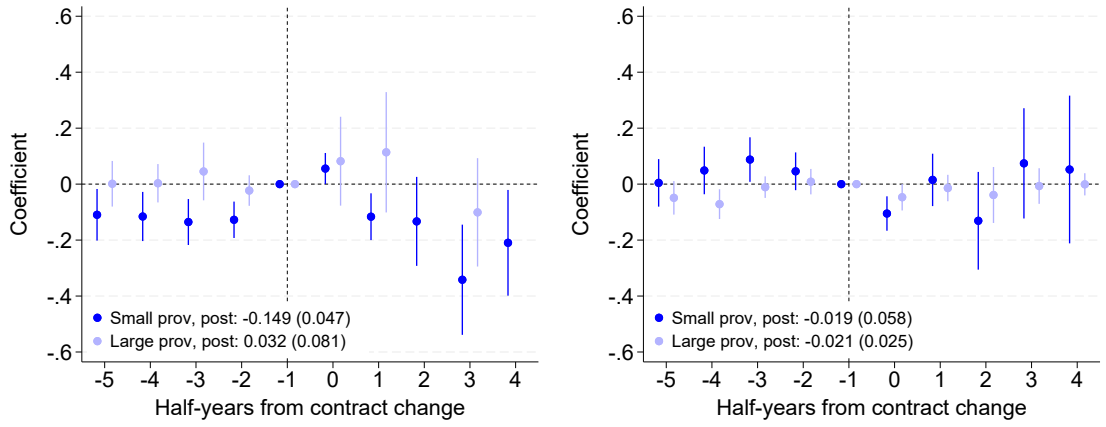
Note: Figure shows coefficients and 95% confidence intervals of event studies using as outcome the c-section rate. Estimates in dark blue and light blue use contracting units with below- and above-average rates of placenta previa and placenta abruptia in the pre-period, respectively. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D. In all specifications, the control group are insurer-provider-woman types that never switch their contracts. Each panel reports the average and standard error of post-period coefficients. Standard errors are clustered at the insurer-practice level.

We now evaluate which healthcare practices are more likely to respond to the financial incentives generated by FFS and BP contracts. We hypothesize that smaller practices—where administrators or managers involved in contract negotiations have greater influence over physicians' decisions and where level changes in insurers' bargaining power may have greater effects—are more sensitive to these incentives. To test this, we estimate our



(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

(B) Scenarios 1,4: Vag BP to FFS, Cse in BP



(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS

(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

FIGURE 10: Impact of Contracts on C-section Rates by Provider Size

Note: Figure shows coefficients and 95% confidence intervals of event studies using as outcome the c-section rate. Estimates in dark blue and light blue use providers with total number of deliveries during the sample period below and above average, respectively. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D. In all specifications, the control group are insurer-provider-woman types that never switch their contracts. Each panel reports the average and standard error of post-period coefficients. Standard errors are clustered at the insurer-practice level.

event study specification separately for practices with above- and below-average delivery volumes over the sample period.

Figure 10 presents the results, with estimates for small practices shown in dark blue and for large practices in light blue. Across all contract switches, treatment effects on c-section rates are largely driven by small practices. For example, Panel A shows that a switch in c-section contracts from BP to FFS (holding vaginal delivery fixed at BP), increases the c-section rate among small practices by 38% relative to baseline, but has no impact on

procedure choice among large practices. Similarly, Panel B shows that switching vaginal delivery contracts from BP to FFS (while holding c-sections at BP) lowers c-section rates by 52% in small practices, compared to 25% in large ones. Panel C yields comparable findings, while Panel D shows no significant differences by practice size.

Our findings suggest that physicians at small practices are more responsive to changes in incentives generated by contract switches. This may be because physicians at small practices are better informed of such changes. The communication of contract incentives established at the practice-level to physicians likely takes the form of internal incentives, such as differences in physician compensation, scheduling autonomy, or clinical discretion.[17] The fact that treatment effects are pronounced only in smaller practices, where administrative and clinical roles are often less distinct, reinforces this interpretation. In such settings, the individuals negotiating contracts may also be directly involved in care delivery, heightening the responsiveness to financial incentives embedded in contract design.

5.3 Robustness Checks

We conduct several robustness checks to assess the validity of our identification strategy and support a causal interpretation of the results. To address potential concerns about endogenous changes in the composition of women—such as selective switching across insurers or practices in response to contracts—we implement two alternative sample restrictions. First, in Appendix Figure 5, we restrict the sample to women who remain with the same insurer throughout the sample period. Second, in Appendix Figure 6, we focus on women who visited their delivery practice in the first trimester of their pregnancy and made at least two claims there, helping ensure that delivery practice choice is not influenced by delivery contracts. In both cases, results are consistent with our main findings.

We also address concerns that unobserved preferences for c-sections—potentially correlated with income or education—may drive both contract choice and outcomes. Using

[17] See Smith (2024) for a description of these patterns.

per capita income as a proxy for c-section preferences, we test for heterogeneity in treatment effects in Appendix Figure 7 and find that our main estimates are homogeneous across contracting units with above- and below-average per capita income.

In Appendix Figure 8 we present event study results including insurer-by-half year and woman type-by-half year fixed effects, as well as using Callaway and Sant'Anna (2021)'s estimator to address potential biases coming from staggered contract switches. The three alternative estimators yield similar results as our main specification, although in Panel A *csdid* provides more conservative estimates of the c-section contract switch from BP to FFS.

As additional robustness checks we consider the following: excluding the 2.95% of observations for which the modal predicted contract does not equal the observed contract in Appendix Figure 9, and excluding municipalities where a large insurer that was terminated by the government in 2015 had more than 25% market share in Appendix Figure 10 (see Serna (2025)). In all cases, our main results remain robust.

5.4 Risk Selection

As discussed in Section 2, healthcare contracts may influence incentives to engage in both risk selection and moral hazard. Under moral hazard, conditional on the pool of enrollees, healthcare practices may choose to perform the most profitable procedure. Under risk selection, insurers with disproportionate use of FFS may choose to enroll women with lower risk scores or lower ex-ante healthcare costs compared to insurers with disproportionate use of BP. Our exercises so far show evidence of substantial moral hazard at the practice level, since c-section rates vary significantly with contract type conditional on enrollment and women's characteristics.

In this subsection, we explore whether contracts generate outcomes consistent with risk selection on the extensive and intensive margins. On the extensive margin, we assess whether contracts influence women's enrollment decisions. On the intensive margin, we follow the approach of Brown et al. (2014) to evaluate whether contracts generate differences in lagged healthcare spending.

We estimate the following regression:

$$y_{it(i)} = \sum_{l=1}^{4} \beta_l s^l_{jm(i)k(i)t(i)} + \gamma_{jm(i)k(i)} + \delta_{t(i)} + \epsilon_{it(i)}$$

where i denotes a woman, j denotes insurers, k denotes municipalities (markets), m denotes a woman type (combination of age group and pregnancy risk), and t denotes the year in which the woman has the delivery. $y_{it(i)}$ is an indicator for whether woman i switched her insurer in year t relative to $t-1$, $s^l_{jm(i)k(i)t(i)}$ is the fraction of healthcare practices in insurer j's network that are under contracting scenario l for woman type m in market k, $\gamma_{jm(i)k(i)}$ are insurer-woman type-market fixed effects, and $\delta_{t(i)}$ are year fixed effects. In a different specification we use as dependent variable the woman's lagged healthcare spending. We cluster standard errors at the insurer-woman type-market level.

Table 5 reports the results. We find no evidence that women's switching across insurers is systematically related to procedure contracts in column (1), as indicated by the high p-value of the joint significance test at the bottom of the table. This suggests limited risk selection on the extensive margin. While column (2) shows a statistically significant correlation between contracts and lagged healthcare spending for practices under scenario 2, the overall pattern suggests limited selection on the intensive margin as well.

To further assess whether contract changes influence patient composition, we re-estimate our event study using per capita maternal characteristics as outcomes. Appendix Figure 11 shows that contract switches are unrelated with these characteristics, reinforcing the conclusion that selection into contracts is minimal.

Together, these findings support the plausibility of exogenous contract variation within insurer-practice-woman types. They also suggest that observed effects on procedure choice and care intensity are primarily driven by moral hazard at the provider level, rather than by changes in patient selection.

TABLE 5: Impact of Contracts on Risk Selection Incentives

	Switch rate (1)	Lagged spending (2)
Scenario 1 (Cse BP, Vag BP)	(ref)	(ref)
Scenario 2 (Cse FFS, Vag FFS)	0.015	-0.093***
	(0.009)	(0.032)
Scenario 3 (Cse FFS, Vag BP)	0.031	-0.067
	(0.024)	(0.061)
Scenario 4 (Cse BP, Vag FFS)	-0.001	-0.200
	(0.017)	(0.131)
Insurer-woman type-market FE	Yes	Yes
Year FE	Yes	Yes
Joint significance p-value	0.195	0.030
N	625,929	588,214
R^2	0.324	0.066

Note: Table presents OLS regressions using as dependent variable an indicator for whether the woman switched her insurer the year of the delivery in column (1) and the woman's lagged healthcare spending (measured in millions of pesos) in column (2). An observation is a woman. The independent variables are the fraction of providers within the insurer's network that are covered under each contracting scenario for the woman's type and in her municipality of residence. A woman type is a combination of age group (age $\leq$ 27, age $>$ 27) and pregnancy risk (high vs. low). Specifications include insurer-woman type-market fixed effects and year fixed effects. Standard errors in parentheses are clustered at the insurer-woman type-market level.
* $p < 0.01$, ** $p < 0.05$, *** $p < 0.001$.

5.5 Health Outcomes

Given our findings that vertical contracts significantly influence procedure choice, we turn to assessing whether these changes have downstream effects on maternal and infant health. Understanding the health consequences is especially important because public policy has long expressed concern about the potential "overuse" of c-sections among women with low clinical need for the procedure (California Health Care Foundation, 2022). The literature offers mixed evidence on the relationship between c-sections and maternal health outcomes (Card et al., 2023; Fischer et al., 2024), raising the question of whether financial incentives embedded in contracts may not only alter treatment patterns but also impact health.

In Table 6, we estimate equation (1) using a range of maternal and infant health outcomes as dependent variables: the average gestational age, the rates of SMM within one week and one month post-delivery, and the rates of 5-minute APGAR scores below 8. Across all our measures of maternal health, we find no statistically significant effects.

In terms of infant health, although the impacts of switching contracts from FFS to BP are different (and marginally worse) compared to the opposite switch, our estimates are still noisy. These results suggest that although vertical contracts meaningfully alter delivery procedure choices these changes do not appear to translate into measurable impacts on short-term maternal or infant health outcomes.

TABLE 6: Impact of Contracts on Average Maternal and Infant Health Outcomes

	Rate of 5-min APGAR scores below 8			
Treated x Post	-0.00503	-0.00178	0.0139**	0.00937*
	(0.00474)	(0.00624)	(0.00666)	(0.00564)
N	23595	23376	24173	24361
R^2	0.232	0.229	0.232	0.230
	SMM rate			
Treated x Post	0.0105	-0.00272	-0.00533	-0.00932
	(0.00995)	(0.0118)	(0.0106)	(0.00673)
N	23595	23376	24173	24361
R^2	0.246	0.245	0.246	0.243
	Average gestational age			
Treated x Post	-0.0843	-0.199	0.0169	0.0774
	(0.0933)	(0.200)	(0.0865)	(0.0812)
N	23013	22779	23575	23749
R^2	0.371	0.368	0.373	0.371
Sample	Scenarios 1,3 Cse BP to FFS Vag in BP	Scenarios 1,4 Vag BP to FFS Cse in BP	Scenarios 2,4 Cse FFS to BP Vag in FFS	Scenarios 2,3 Vag FFS to BP Cse in FFS

Note: Table shows the impact of contract combinations on maternal and infant health outcomes: the fraction of births with 5-minute APGAR score above 8, the rate of severe maternal morbidity, and the average gestational age. Columns (1) and (2) show the effect reimbursing c-section and vaginal delivery under FFS, respectively, holding the other delivery procedure fixed under BP. Columns (3) and (4) show the effect of reimbursing c-section and vaginal delivery under BP, respectively, holding the other delivery procedure fixed under FFS. An observation is an insurer-practice-woman type-half year. A woman type is a combination of age group (age $\leq$ 27, age $>$ 27) and pregnancy risk (high vs. low). Specifications include insurer-practice-woman type fixed effects as well as half year fixed effects. Standard errors in parentheses are clustered at the insurer-practice level. Table reports the percentage change in the outcome due to the given contract change, calculated as the coefficient on FFS divided by the average value of the relevant outcome in the sample.

6 Conclusions

There is an impressive theoretical literature establishing the incentives that health insurers and healthcare practices face under uniform linear prices. Yet, in practice, contracts often include nonlinear terms—such as thresholds or bundled payments—whose effects on

treatment decisions remain poorly understood. Empirical evidence is limited in part because studies lack detailed information on the contracting unit, the timing of contracts, and in many cases the contracts themselves. With our data and setting, we are able to overcome each of these limitations.

In this paper, we estimate the causal effect of fee-for-service (FFS) and bundled payment (BP) contracts on the decision to provide c-sections versus vaginal deliveries. These contracts differ not only in their prices levels but also in whether prices for marginal services are positive or zero, creating nonlinearity in payments. Our data comes from the Colombian healthcare system where insurers and practices may cover c-sections and vaginal deliveries under different contracts. We describe how contracts are determined in this setting, what are the resulting incentives for insurers and practices, and how these incentives vary across delivery procedures.

Using an event study approach leveraging contract switches within insurer, practice, and type of woman, we find switching a delivery procedure from FFS to BP substantially reduces its utilization. We show that these effects are explained mainly by nonlinear contract terms rather than by the payment amount negotiated between the insurer and the healthcare practice. Despite these large shifts in treatment decisions, we find no meaningful impacts on maternal and infant health.

Our results indicate that bilateral contracting decisions in healthcare causally impact the type, cost, and intensity of care that women receive. This causal relation matters for health policy as regulation of insurer-practice bilateral contracting decisions may have downstream effects on medical practice.

References

Acquatella, A. (2021): "Evaluating Prospective Payment Contracts," Working paper.

Adida, E., H. Mamani, and S. Nassiri (2017): "Bundled Payment vs. Fee-for-Service: Impact of Payment Scheme on Performance," *Management Science*, 63, 1606–1624.

AHRQ (2018): "Healthcare Cost and Utilization Project Statistical Brief 281," https:

//hcup-us.ahrq.gov/reports/statbriefs/sb281-Operating-Room-Procedures-During-Hospitalization-2018.jsp.

Aizer, A., J. Currie, and E. Moretti (2007): "Does Managed Care Hurt Health? Evidence from Medicaid Mothers," *The Review of Economics and Statistics*, 89, 385–399.

Allin, S., M. Baker, M. Isabelle, and M. Stabile (2015): "Physician Incentives and the Rise in C-sections: Evidence from Canada," National Bureau of Economic Research Working Paper 21022.

Baker, L. C. (1997): "The Effect of HMOs on Fee-for-Service Health Care Expenditures: Evidence from Medicare," *Journal of Health Economics*, 16, 453–481.

——— (1999): "Association of Managed Care Market Share and Health Expenditures for Fee-for-Service Medicare Patients," *Journal of the American Medical Association*, 281, 432–437.

Betrán, A. P., J. Ye, A.-B. Moller, J. Zhang, A. M. Gülmezoglu, and M. R. Torloni (2016): "The Increasing Trend in Caesarean Section Rates: Global, Regional and National Estimates: 1990-2014," *PLOS One*, 11, e0148343.

Bonnet, C., P. Dubois, S. B. Villas Boas, and D. Klapper (2013): "Empirical Evidence on the Role of Nonlinear Wholesale Pricing and Vertical Restraints on Cost Pass-Through," *Review of Economics and Statistics*, 95, 500–515.

Brown, J., M. Duggan, I. Kuziemko, and W. Woolston (2014): "How Does Risk Selection Respond to Risk Adjustment? New Evidence from the Medicare Advantage Program," *American Economic Review*, 104, 3335–3364.

California Health Care Foundation (2022): "Reducing unnecessary cesarean-section deliveries in California," https://www.chcf.org/wp-content/uploads/2017/12/PDF-ReducingCSectionsFlier.pdf.

Callaway, B. and P. H. Sant'Anna (2021): "Difference-in-Differences with Multiple Time Periods," *Journal of Econometrics*, 225, 200–230.

Card, D., A. Fenizia, and D. Silver (2023): "The Health Impacts of Hospital Delivery Practices," *American Economic Journal: Economic Policy*, 15, 42–81.

Centers for Disease Control and Prevention (2024): "Identifying Severe Maternal Morbidity (SMM)," *Maternal Infant Health*, accessed through https://www.cdc.gov/maternal-infant-health/php/severe-maternal-morbidity/icd.html.

Clemens, J. and J. D. Gottlieb (2014): "Do Physicians' Financial Incentives Affect Medical Treatment and Patient Health?" *American Economic Review*, 104, 1320–1349.

Conlon, C. T. and J. H. Mortimer (2013): "All-units discounts: Experimental evidence from the vending industry," National Bureau of Economic Research Working Paper 19709.

Corredor-Waldron, A., J. Currie, and M. Schnell (2024): "Drivers of Racial Differences in C-sections," *National Bureau of Economic Research*.

Crawford, G. S. and A. Yurukoglu (2012): "The Welfare Effects of Bundling in Multichannel Television Markets," *American Economic Review*, 102, 643–685.

Currie, J. and B. MacLeod (2017): "Diagnosing Expertise: Human Capital, Decision Making and Performance Among Physicians," *Journal of Labor Economics*, 35, 1–43.

Draganska, M., D. Klapper, and S. B. Villas-Boas (2010): "A Larger Slice or a Larger Pie? An Empirical Investigation of Bargaining Power in the Distribution Channel," *Marketing Science*, 29, 57–74.

Einav, L., A. Finkelstein, Y. Ji, and N. Mahoney (2022): "Voluntary Regulation: Evidence from Medicare Payment Reform," *The Quarterly Journal of Economics*, 137, 565–618.

Ellis, R. P. and T. G. McGuire (1986): "Provider Behavior under Prospective Reimbursement: Cost Sharing and Supply," *Journal of Health Economics*, 5, 129–151.

——— (1996): "Hospital Response to Prospective Payment: Moral Hazard, Selection, and Practice-Style Effects," *Journal of Health Economics*, 15, 257–277.

Finkelstein, A., M. Gentzkow, and H. Williams (2016): "Sources of Geographic Variation in Health Care: Evidence from Patient Migration," *The Quarterly Journal of Economics*, 131, 1681–1726.

Fischer, S., H. Royer, and C. White (2024): "Health Care Centralization: The Health Impacts of Obstetric Unit Closures in the United States," *American Economic Journal: Applied Economics*, 16, 113–41.

Foo, P. K., R. S. Lee, and K. Fong (2017): "Physician Prices, Hospital Prices, and Treatment Choice in Labor and Delivery," *American Journal of Health Economics*, 3, 422–453.

Gaviria, A. (2017): "La Epidemia de Cesáreas," Accessed through https://agaviria.co/2017/07/la-epidemia-de-cesareas.html.

Gaynor, M., N. Mehta, and S. Richards-Shubik (2023): "Optimal Contracting with Altruistic Agents: Medicare Payments for Dialysis Drugs," *American Economic Review*, 113, 1530–1571.

Godager, G. and D. Wiesen (2013): "Profit or Patients' Health Benefit? Exploring the Heterogeneity in Physician Altruism," *Journal of Health Economics*, 32, 1105–1116.

Gowrisankaran, G., A. Nevo, and R. Town (2015): "Mergers When Prices are Negotiated: Evidence From the Hospital Industry," *American Economic Review*, 105, 172–203.

Ho, K. and R. Lee (2017): "Insurer Competition in Health Care Markets," *Econometrica*, 85, 379–417.

Ho, K. and R. S. Lee (2024): "Contracting Over Pharmaceutical Formularies and Rebates," National Bureau of Economic Research Working Paper 32790.

Ho, K. and A. Pakes (2014): "Hospital Choice, Hospital Prices, and Financial Incentives to Physicians," *American Economic Review*, 104, 3841–3884.

Johnson, E. M. and M. M. Rehavi (2016): "Physicians Treating Physicians: Information and Incentives in Childbirth," *American Economic Journal: Economic Policy*, 8, 115–141.

Katz, M. L. (1989): "Vertical Contractual Relations," *Handbook of Industrial Organization*, 1, 655–721.

Kozhimannil, K. B., A. J. Graves, A. M. Ecklund, N. Shah, R. Aggarwal, and J. M. Snowden (2018): "Cesarean delivery rates and costs of childbirth in a state Medicaid program after implementation of a blended payment policy," *Medical care*, 56, 658–664.

Kuziemko, I., K. Meckel, and M. Rossin-Slater (2018): "Does Managed Care Widen Infant Health Disparities? Evidence from Texas Medicaid," *American Economic Journal: Economic Policy*, 10, 255–83.

Lee, R. S., M. D. Whinston, and A. Yurukoglu (2021): "Structural Empirical Analysis of Contracting in Vertical Markets," *Handbook of Industrial Organization*, 4, 673–742.

Ma, C.-t. A. and H. Y. Mak (2019): "Incentives in Healthcare Payment Systems," *Oxford Research Encyclopedia, Economics and Finance*.

Meng, Z., K. Zou, N. Ding, M. Zhu, Y. Cai, and H. Wu (2019): "Cesarean delivery rates, costs and readmission of childbirth in the new cooperative medical scheme after implementation of an episode-based bundled payment (EBP) policy," *BMC public health*, 19, 557.

Miller, G. and K. Barbiarz (2013): "Pay-for-performance incentives in low-and middle-income country health programs," *Encyclopedia of Health Economics*.

Mohanan, M., K. Donato, G. Miller, Y. Truskinovsky, and M. Vera-Hernández (2021): "Different Strokes for Different Folks? Experimental Evidence on the Effectiveness of Input and Output Incentive Contracts for Health Care Providers with Varying Skills," *American Economic Journal: Applied Economics*, 13, 34–69.

Mortimer, J. H. (2008): "Vertical Contracts in the Video Rental Industry," *The Review of Economic Studies*, 75, 165–199.

Ostad-Ahmadi, Z., V. Yazdi-Feyzabadi, R. Goudarzi, A. E. Quinn, M. Heidarzadeh, and M. Nekoei-Moghadam (2025): "Effects of different payment methods on perinatal care outcomes: a systematic review," *BMC Health Services Research*, 25, 1065.

Otero, C. and P. Munoz (2022): "Managers and Public Hospital Performance," Working paper.

Rennhoff, A. D. and K. Serfes (2009): "The Role of Upstream-Downstream Competition on Bundling Decisions: Should Regulators Force Firms to Unbundle?" *Journal of Economics & Management Strategy*, 18, 547–588.

Riascos, A., E. Alfonso, and M. Romero (2014): "The Performance of Risk Adjustment Models in Colombian Competitive Health Insurance Market," https://ssrn.com/abstract=2489183orhttp://dx.doi.org/10.2139/ssrn.2489183.

Robinson, S., H. Royer, and D. Silver (2024): "Geographic Variation in Cesarean Sections in the United States: Trends, Correlates, and Other Interesting Facts," *Journal of Labor Economics*, 42, S219 – S259.

Sakala, C., S. Delbanco, and H. Miller (2013): "The Cost of Having a Baby in the United States," Truven Health Analytics Marketscan Study, https://www.nationalpartnership.org/our-work/resources/health-care/maternity/archive/the-cost-of-having-a-baby-in-the-us.pdf.

Scheefhals, Z. T., J. N. Struijs, A. Wong, M. E. Numans, Z. Song, and E. F. de Vries (2024): "Integrating Maternity Care Through Bundled Payments In The Netherlands: Early Results And Policy Lessons: Article examines senior focused primary care organizations," *Health Affairs*, 43, 1263–1273.

Serna, N. (2025): "Exogenous Exits, Market Structure, and Equilibrium Contracts in Health Care," *American Economic Review: Insights*, 7.

Smith, T. (2024): "It matters how your practice is paid. A primer for young doctors." *American Medical Association*, accessed through https://www.ama-assn.org/medical-residents/transition-resident-attending/it-matters-how-your-practice-paid-primer-young.

Zuleta-Tobón, M. and J. Jairo (2023): "Evolución de la cesárea en Colombia y su asociación

con la naturaleza jurídica de la institución donde se atiende el parto," *Revista Colombiana de Obstetricia y Ginecología*, 74, 15–27.

Appendix A Data Cleaning

The raw data contains all the delivery procedures for women enrolled with insurers participating in the contributory health care system during 2013 to 2019. The total number of observations in this data set is N= 1,017,830. To obtain our final analysis sample we proceed in the following steps:

1. Keep singleton, non-breech, first-time births (N=851,464).

2. Keep women in reproductive age (N=849,775).

3. Keep deliveries that are reimbursed under fee-for-service, capitation, or bundled payment (N=800,807).

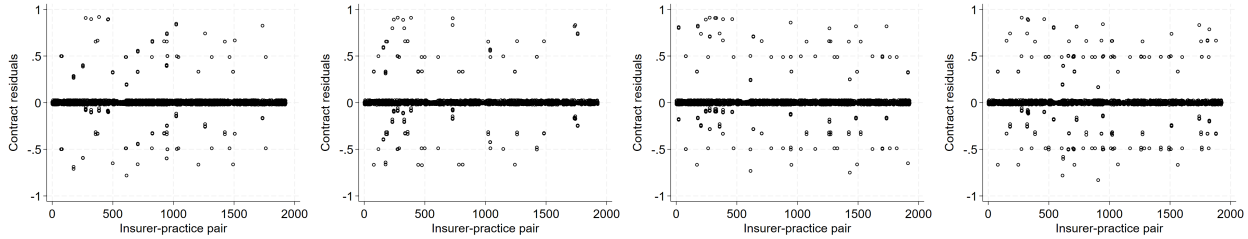
4. Obtain the modal contract for each service (c-section and vaginal delivery), insurer, practice, type of woman, and half year. A type of woman is defined by a combination of age group (<=27, >27) and pregnancy risk. The age group cutoff represents the average age in the data.

5. Collapse the data to the insurer, practice, type of woman (contracting unit), and year, retaining the modal contract and computing c-section rates and average per-capita measures of health care spending and of maternal and infant health outcomes.

6. For every contracting unit identify the first contract switch. Keep observations between the baseline contract and the subsequent contract. For example, for a contracting unit that has the following trend in contracting scenarios: (1, 1, 1, 3, 3, 2, 2), we keep observations between the first and the fifth half-year defining the first switch, which is between scenarios 1 and 3.

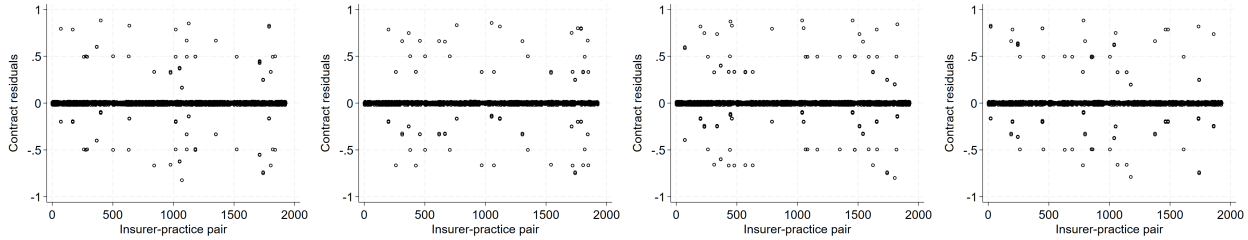
7. For treated contracting units (i.e., those that switch) we keep observations between half-years -5 to +4 relative to the switch.

Panel I. Scenarios 1,3



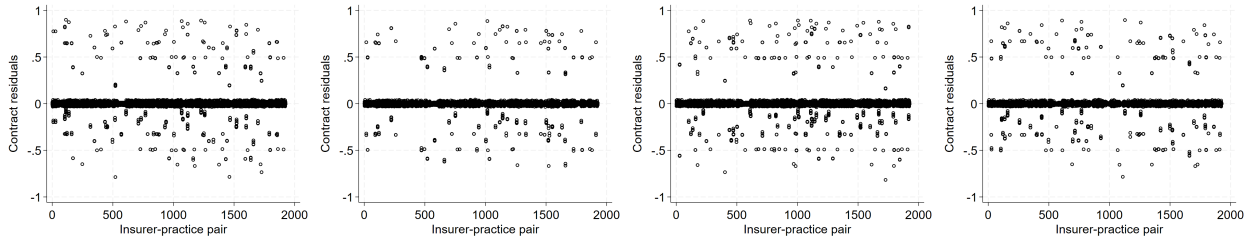
(A) Age≤27, Low risk (B) Age≤27, High risk (C) Age >27, Low risk (D) Age >27, High risk

Panel II. Scenarios 1,4



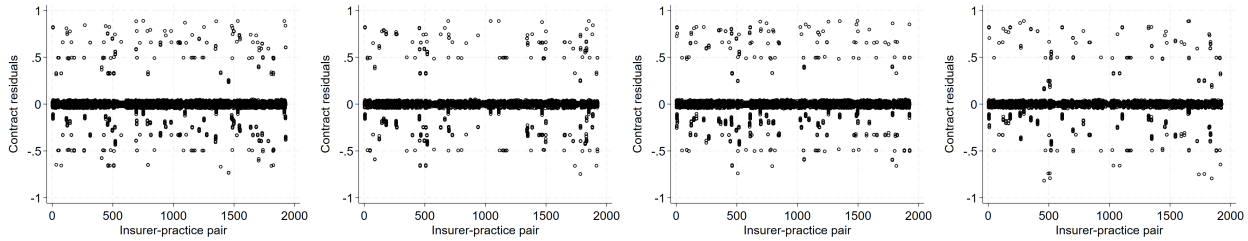
(E) Age≤27, Low risk (F) Age≤27, High risk (G) Age >27, Low risk (H) Age >27, High risk

Panel III. Scenarios 2,4



(I) Age≤27, Low risk (J) Age≤27, High risk (K) Age >27, Low risk (L) Age >27, High risk

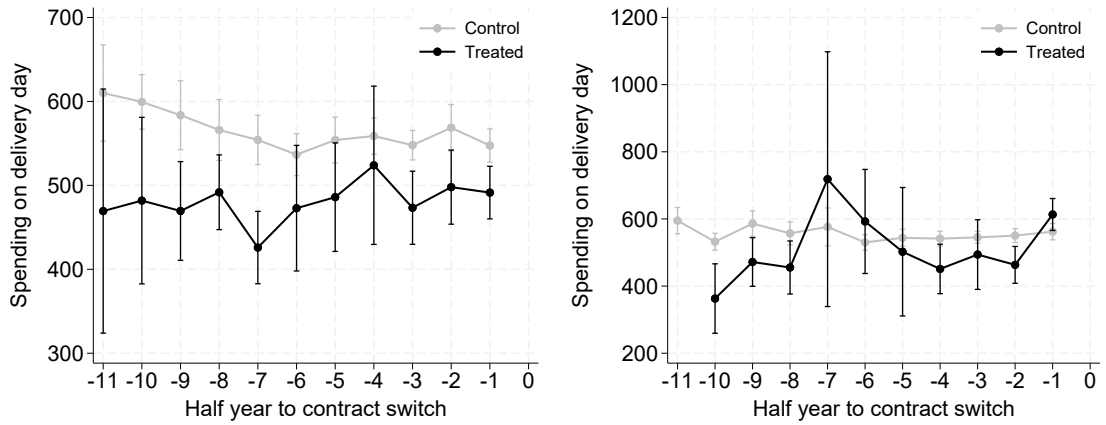
Panel IV. Scenarios 2,3



(M) Age≤27, Low risk (N) Age≤27, High risk (O) Age >27, Low risk (P) Age >27, High risk

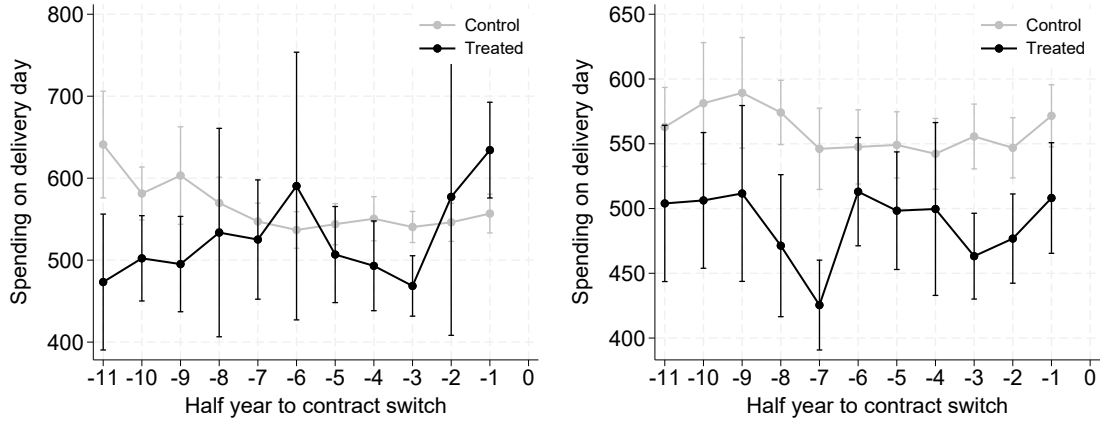
APPENDIX FIGURE 1: Residual Variation in FFS Use for C-sections

Note: Figure shows residuals from a regression of an indicator for c-section under FFS on insurer-practice-woman type fixed effects and insurer-half year fixed effects. Distributions reported conditional on the woman's age group and pregnancy risk.



(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

(B) Scenarios 1,4: Vag BP to FFS, Cse in BP

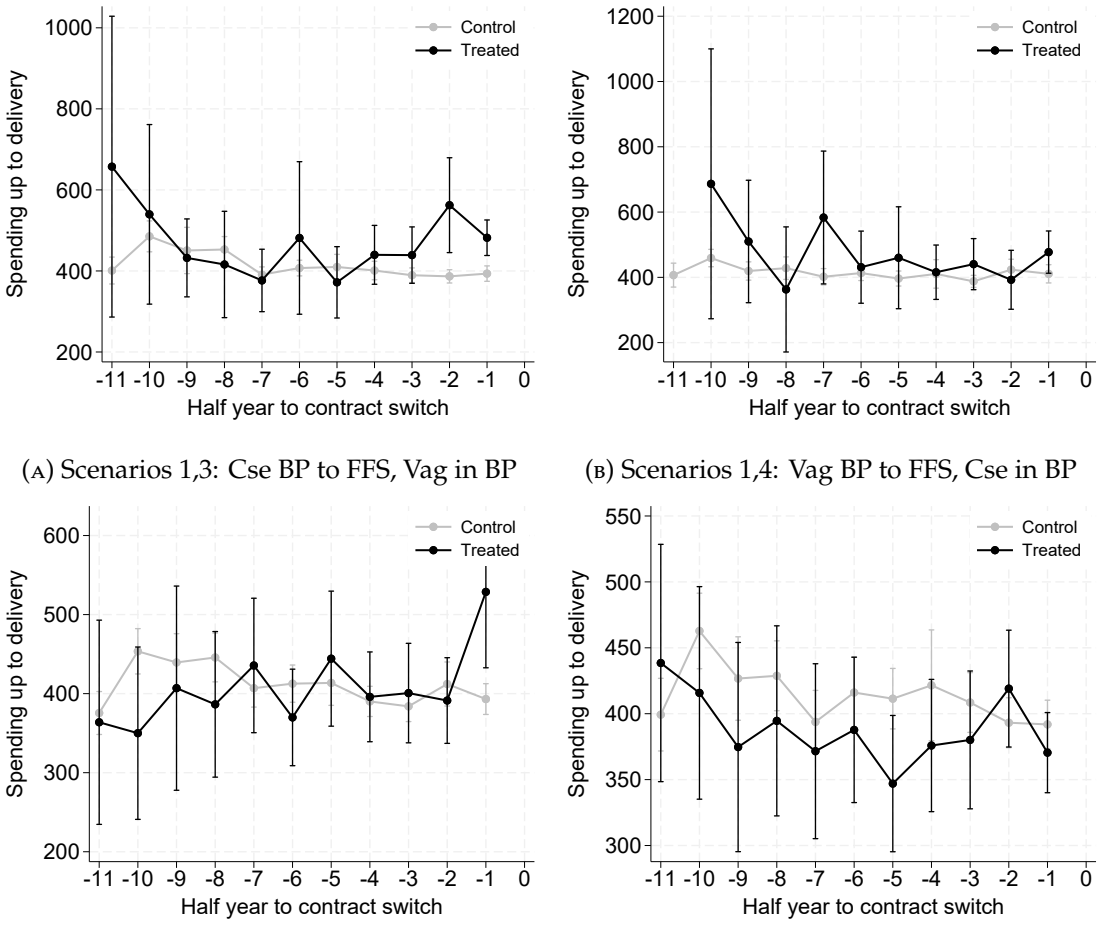


(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS

(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

APPENDIX FIGURE 2: Trends in Spending on Delivery Day Before Contract Switch

Note: Figure presents the average spending on the delivery day (in dollars) by half year relative to the contract switch for treatment and control groups. We assign a placebo switch date to control group units by randomly selecting available switch dates from the treated units. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D.



(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

(B) Scenarios 1,4: Vag BP to FFS, Cse in BP

(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS

(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

APPENDIX FIGURE 3: Trends in Spending Up To Delivery Day Before Contract Switch

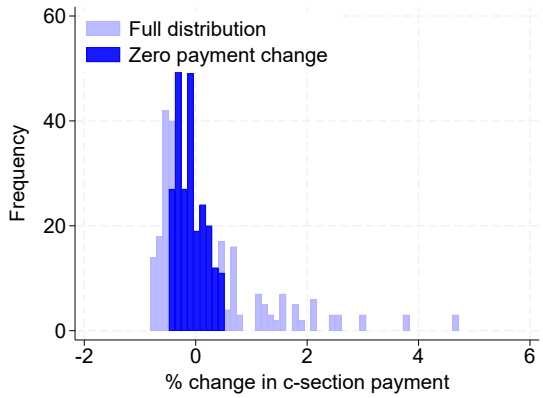
Note: Figure presents the average spending up to the delivery day (in dollars) by half year relative to the contract switch for treatment and control groups. We assign a placebo switch date to control group units by randomly selecting available switch dates from the treated units. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D.

Appendix B Robustness Checks and Additional Results

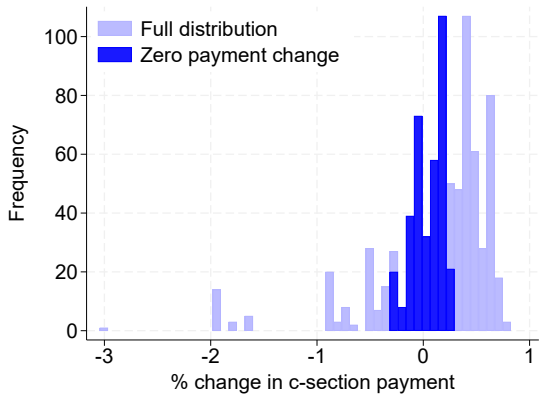
Appendix Table 1: Impact of FFS Use on C-section Rates

	C-section rate	
	(1)	(2)
C-section FFS	-0.0383*	
	(0.0201)	
Vaginal delivery FFS		0.121***
		(0.0194)
Sample	All scenarios	All scenarios
Outcome change (%)	-8.638	27.29
N	27499	27499
R^2	0.362	0.364

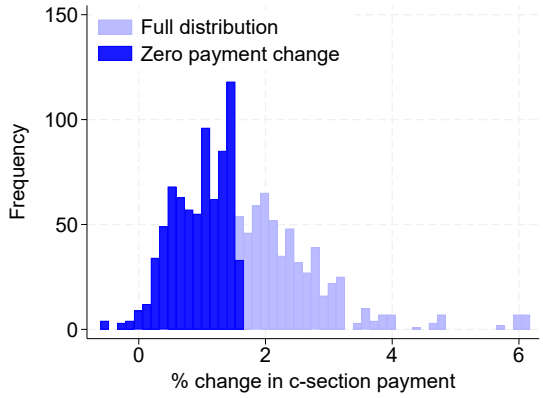
Note: Table shows the impact of FFS reimbursement of c-section and vaginal delivery on c-section rates in columns (1) and (2), respectively. An observation is an insurer-practice-woman type-half year. A woman type is a combination of age group (age $\leq$ 27, age > 27) and pregnancy risk (high vs. low). Specifications include insurer-practice-woman type and half year fixed effects. Standard errors in parentheses are clustered at the insurer-practice level. Table reports the percentage change in the outcome due to the given contract change, calculated as the coefficient on FFS divided by the average c-section rate in the sample.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.



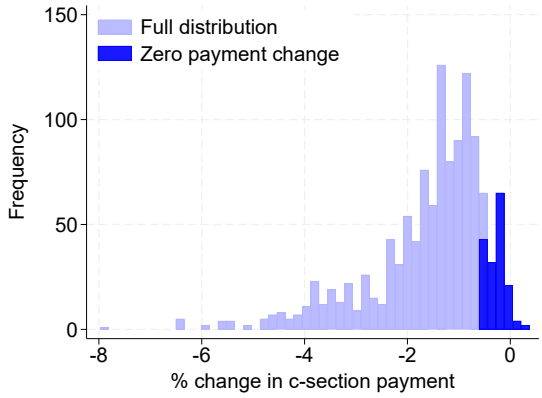
(A) Scenarios 1,3: Cse BP to FFS, Vag in BP



(B) Scenarios 1,4: Vag BP to FFS, Cse in BP



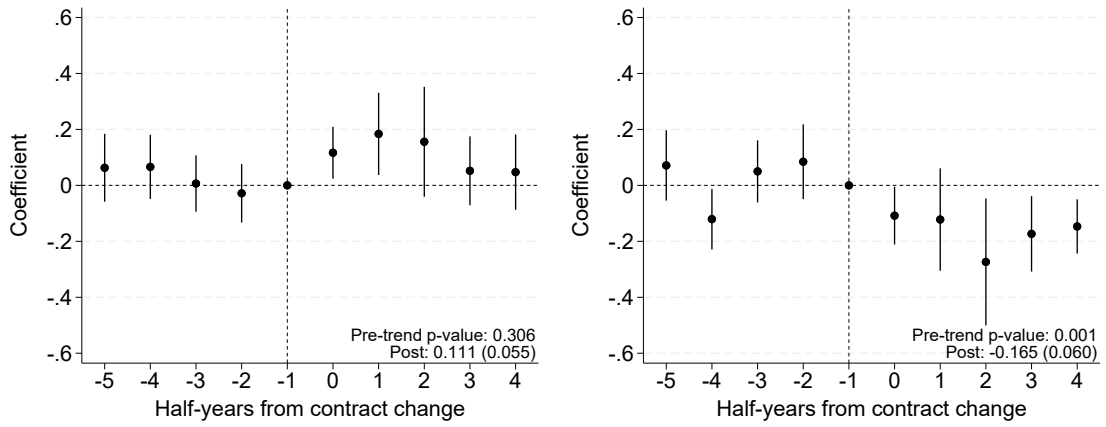
(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS



(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

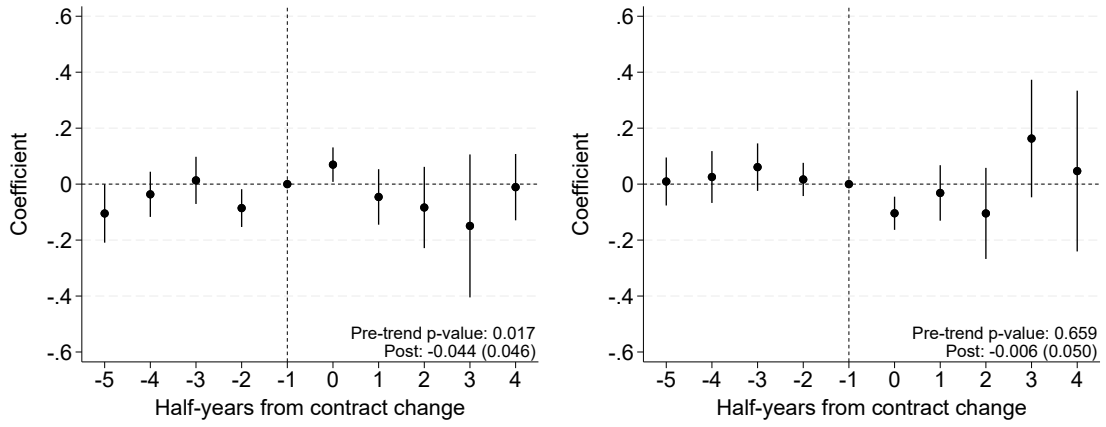
APPENDIX FIGURE 4: Impact of Contracts on C-section Rates Among Women Inertial to their Insurer

Note: Figure presents the distribution of predicted changes in payments for c-section among contracting units in the treatment groups. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D. The predicted payment for a procedure after the switch equals the average payment among control group units within the same contracting scenario, age group, pregnancy risk category, and type of provider. Provider type is defined as having below- or above-average total deliveries over the sample period. The dark blue bars depict the observations with small predicted payment changes and correspond to those within a half-standard deviation window about zero.



(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

(B) Scenarios 1,4: Vag BP to FFS, Cse in BP

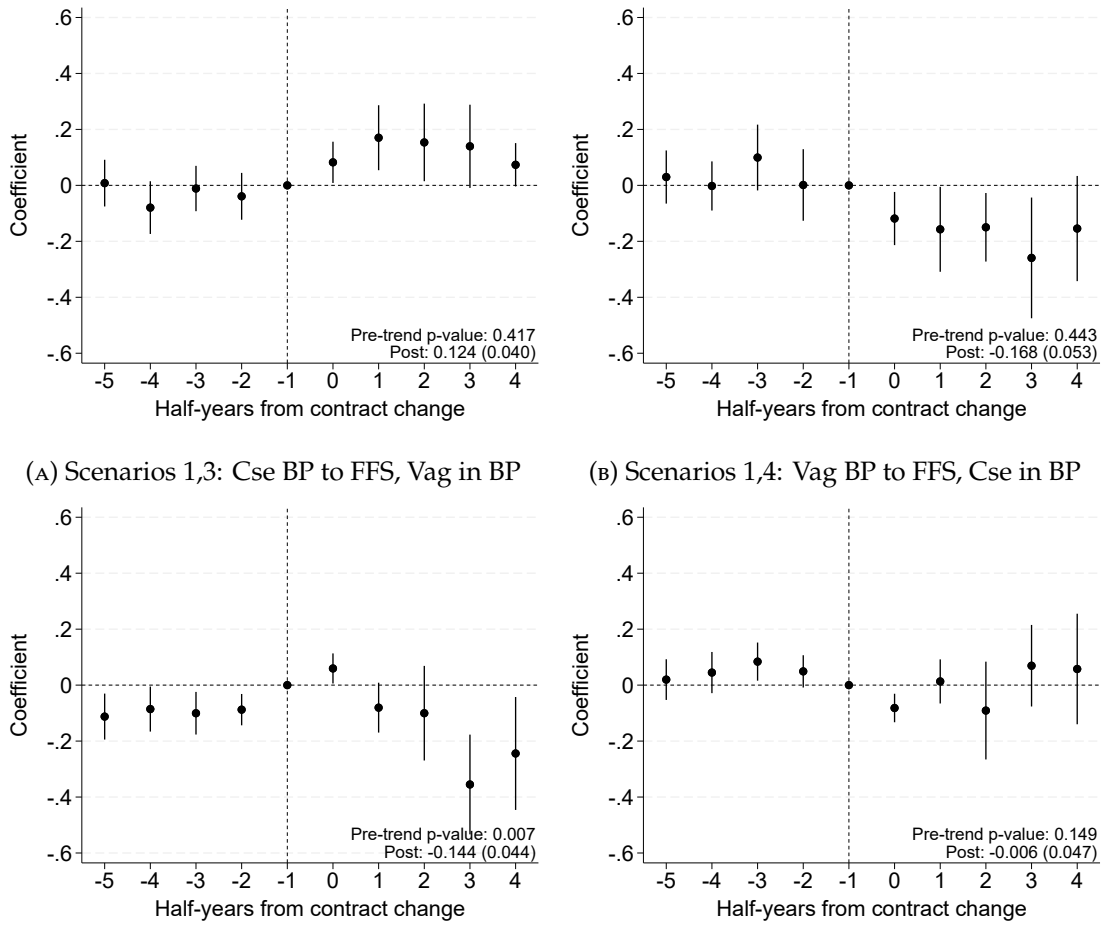


(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS

(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

APPENDIX FIGURE 5: Impact of Contracts on C-section Rates Among Women Inertial to their Insurer

Note: Figure shows coefficients and 95% confidence intervals of event studies using as outcome the c-section rate. We drop women who switch their insurer over the sample period. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D. In all specifications, the control group are insurer-provider-woman types that never switch their contracts. Each panel reports the average and standard error of post-period coefficients. Standard errors are clustered at the insurer-practice level.



(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

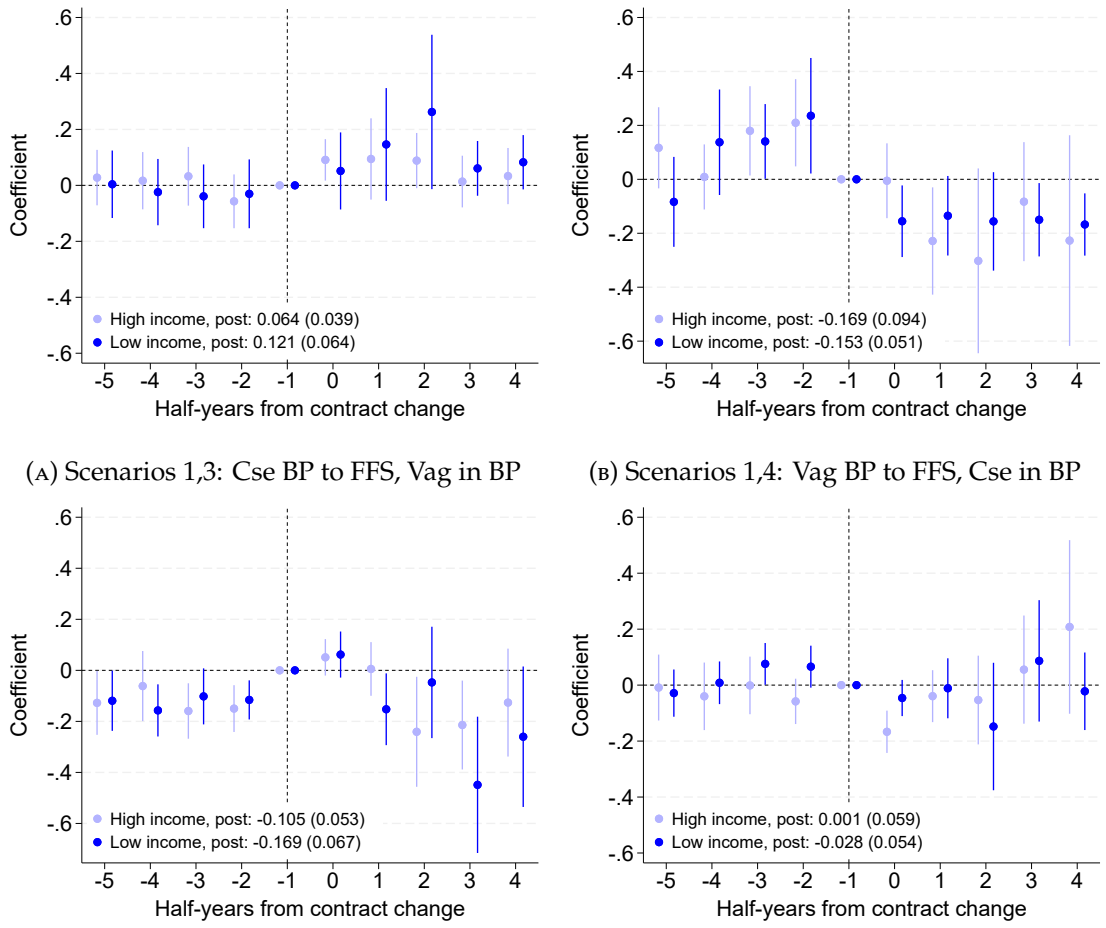
(B) Scenarios 1,4: Vag BP to FFS, Cse in BP

(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS

(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

APPENDIX FIGURE 6: Impact of Contracts on C-section Rates Among Women with Prior Visits to Delivery Provider

Note: Figure shows coefficients and 95% confidence intervals of event studies using as outcome the c-section rate. We keep only women who visited their delivery healthcare practice in the first trimester of their pregnancy and made at least two claims there. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D. In all specifications, the control group are insurer-provider-woman types that never switch their contracts. Each panel reports the average and standard error of post-period coefficients. Standard errors are clustered at the insurer-practice level.



(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

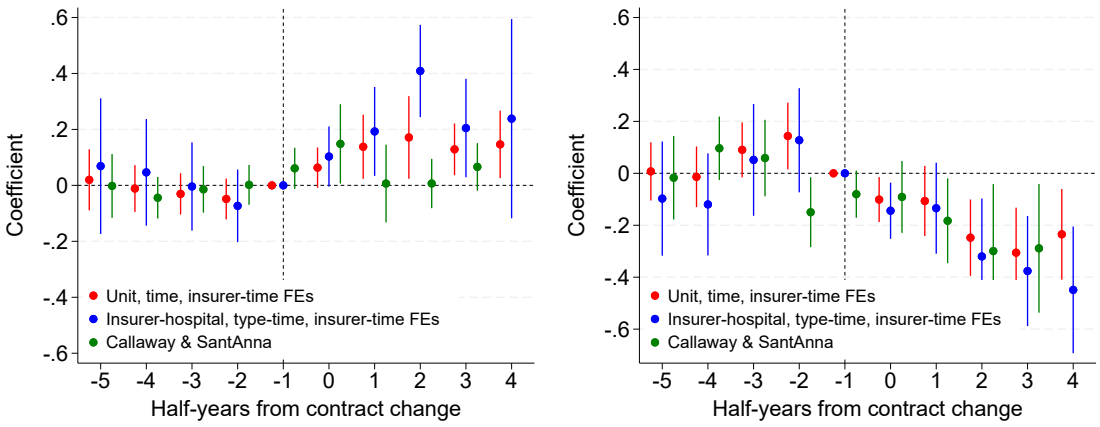
(B) Scenarios 1,4: Vag BP to FFS, Cse in BP

(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS

(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

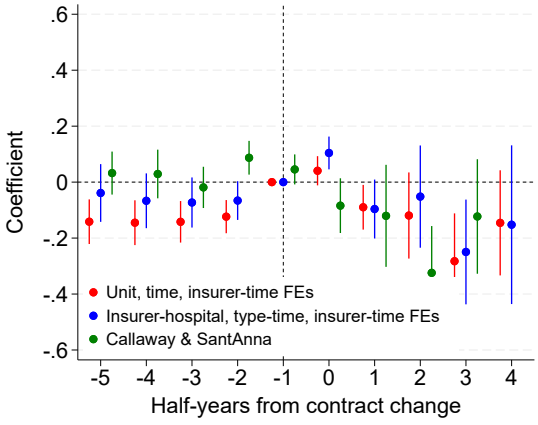
APPENDIX FIGURE 7: Impact of Contracts on C-section Rates by Average Income

Note: Figure shows coefficients and 95% confidence intervals of event studies using as outcome the c-section rate. Estimates in dark blue and light blue represent contracting units with below- and above-per capita income, respectively. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D. In all specifications, the control group are insurer-provider-woman types that never switch their contracts. Each panel reports the average and standard error of post-period coefficients. Standard errors are clustered at the insurer-practice level.

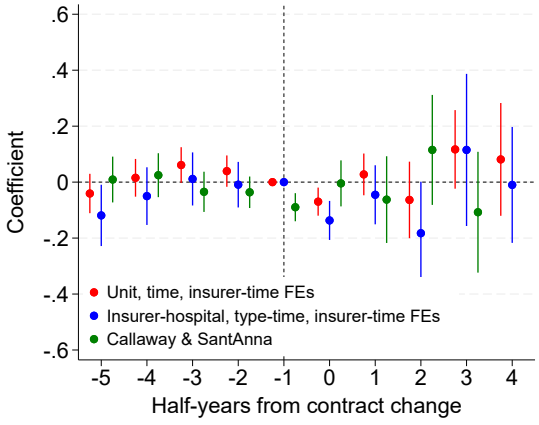


(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

(B) Scenarios 1,4: Vag BP to FFS, Cse in BP



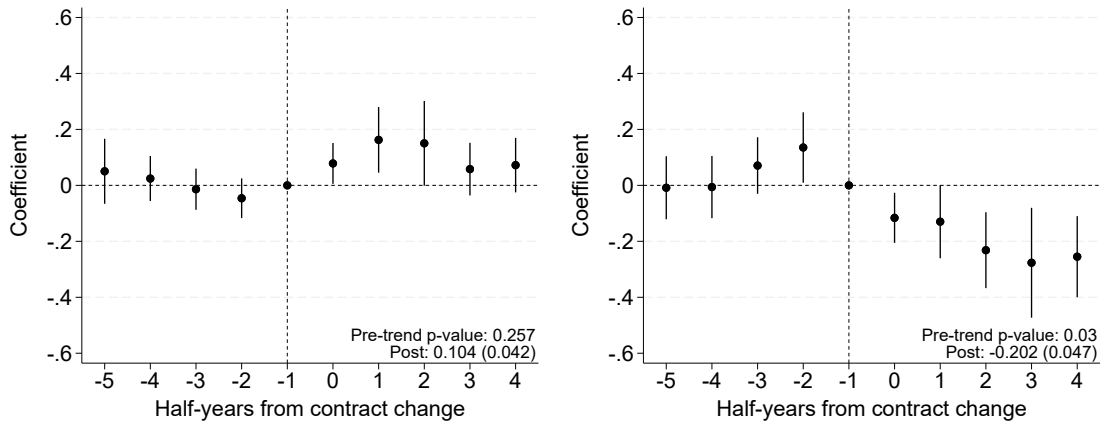
(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS



(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

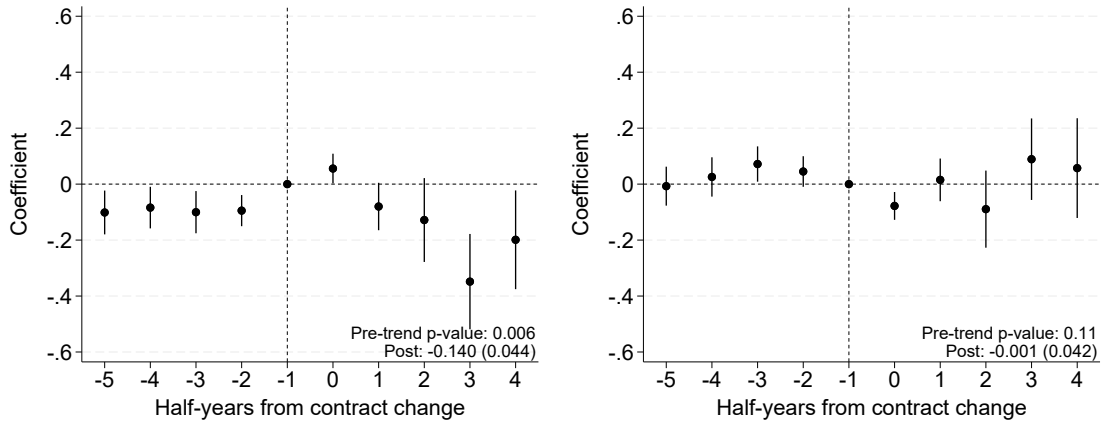
Appendix Figure 8: Impact of Contracts on C-section Rates With Different Estimators

Note: Figure shows coefficients and 95% confidence intervals of event studies using as outcome the c-section rate. Estimates in red correspond to a specification that includes contracting unit and insurer-half year fixed effects. Estimates in blue correspond to a specification that includes insurer-practice, woman type-half year, and insurer-half year fixed effects. Estimates in green use Callaway and Sant'Anna (2021)'s estimator to deal with staggered treatment. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D. In all specifications, the control group are insurer-provider-woman types that never switch their contracts. Each panel reports the average and standard error of post-period coefficients. Standard errors are clustered at the insurer-practice level.



(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

(B) Scenarios 1,4: Vag BP to FFS, Cse in BP

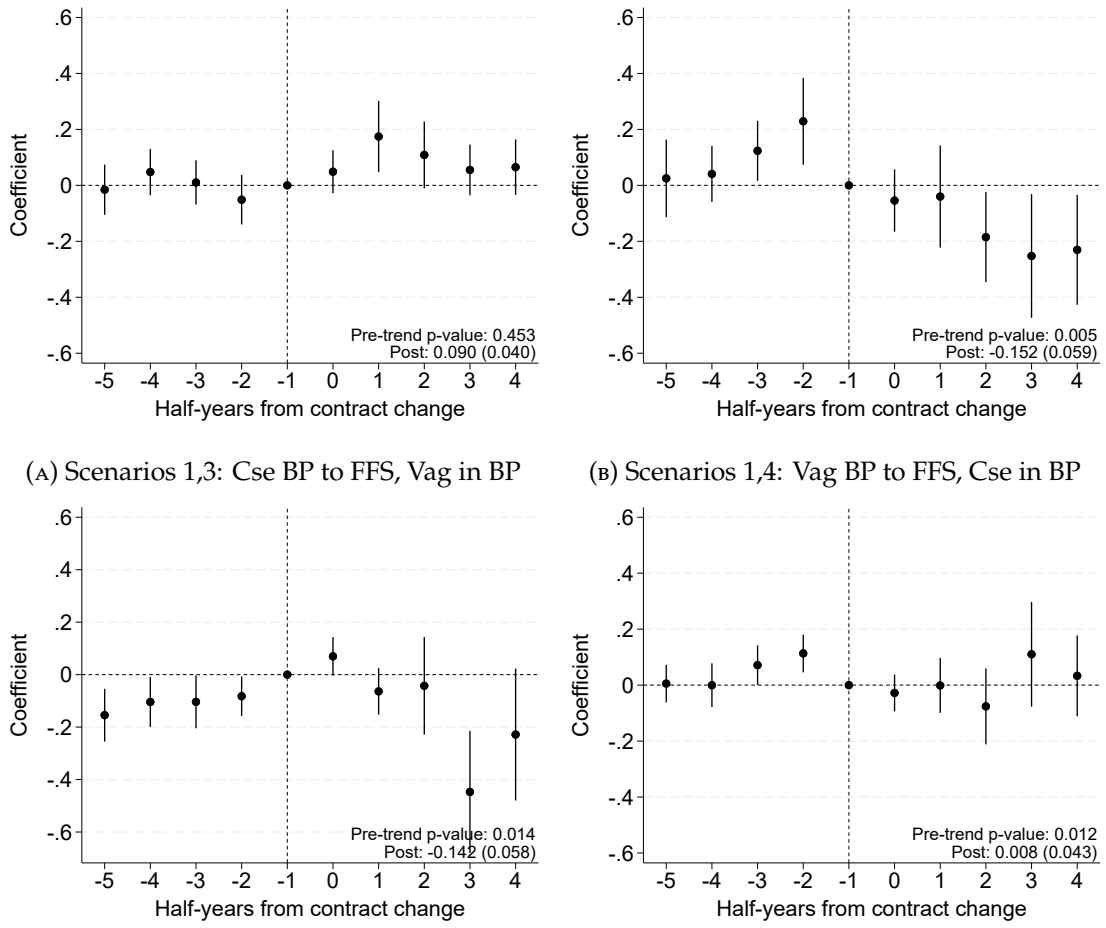


(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS

(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

Appendix Figure 9: Impact of Contracts on C-section Rates Excluding Contracts that Do Not Equal Mode

Note: Figure shows coefficients and 95% confidence intervals of event studies using as outcome the c-section rate. We exclude deliveries for which our model contract prediction does not equal the observed contract. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D. In all specifications, the control group are insurer-provider-woman types that never switch their contracts. Each panel reports the average and standard error of post-period coefficients. Standard errors are clustered at the insurer-practice level.



(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

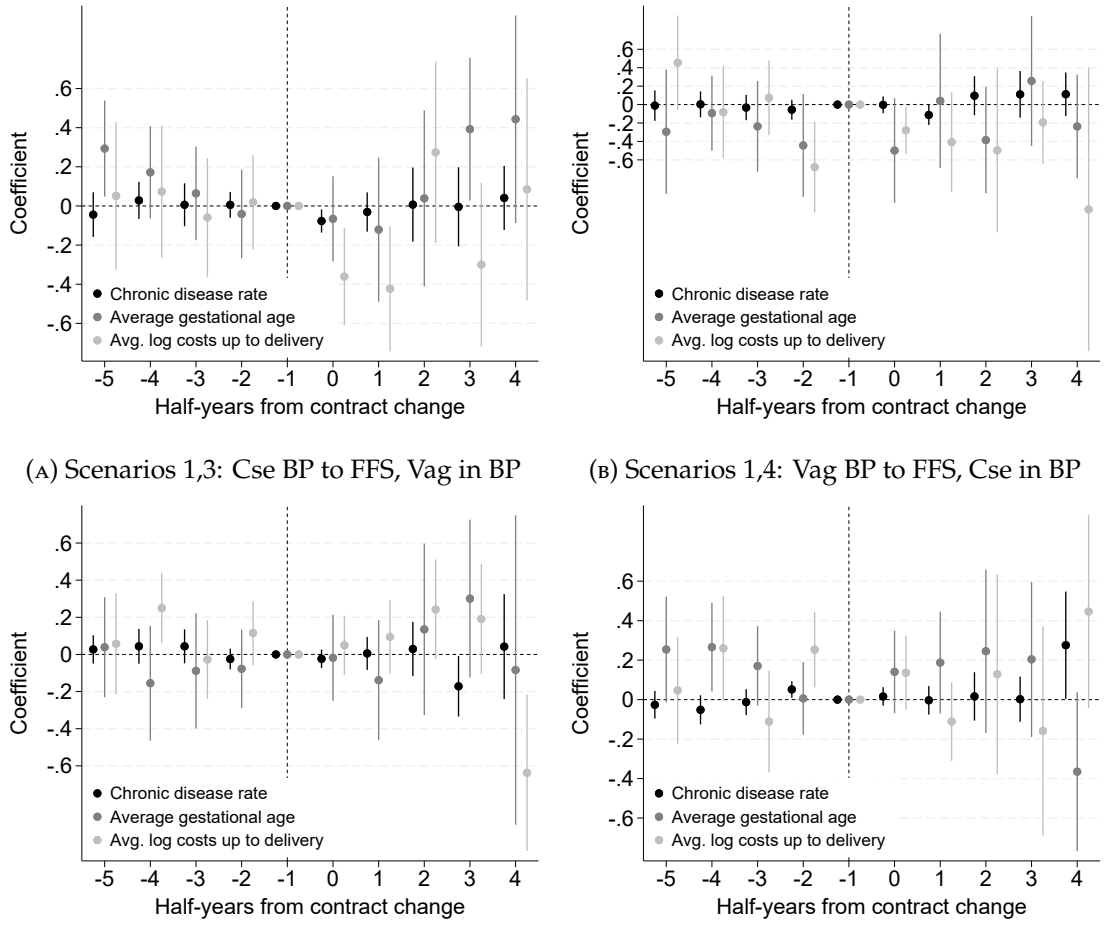
(B) Scenarios 1,4: Vag BP to FFS, Cse in BP

(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS

(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

APPENDIX FIGURE 10: Impact of Contracts on C-section Rates Excluding Markets with Presence of Terminated Insurer

Note: Figure shows coefficients and 95% confidence intervals of event studies using as outcome the c-section rate. We exclude municipalities where SaludCoop had more than 25% market share in 2014. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D. In all specifications, the control group are insurer-provider-woman types that never switch their contracts. Each panel reports the average and standard error of post-period coefficients. Standard errors are clustered at the insurer-practice level.



(A) Scenarios 1,3: Cse BP to FFS, Vag in BP

(B) Scenarios 1,4: Vag BP to FFS, Cse in BP

(C) Scenarios 2,4: Cse FFS to BP, Vag in FFS

(D) Scenarios 2,3: Vag FFS to BP, Cse in FFS

APPENDIX FIGURE 11: Impact of Contracts on per capita Characteristics

Note: Figure shows coefficients and 95% confidence intervals of event studies using as outcome the chronic disease rate in black, the average gestations age in dark gray, and the average log of costs up to the delivery in light gray. The treatment group is comprised of insurer-provider-woman types that: switch c-sections from BP to FFS while holding vaginal delivery fixed at BP in Panel A, switch vaginal delivery from BP to FFS while holding c-section fixed at BP in Panel B, switch c-sections from FFS to BP while holding vaginal delivery fixed at FFS in Panel C, switch vaginal delivery from FFS to BP while holding c-sections fixed at FFS in Panel D. In all specifications, the control group are insurer-provider-woman types that never switch their contracts. Standard errors are clustered at the insurer-practice level.