A demand-smoothing incentive for cesarean deliveries : Appendix

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A Institutional Setting

A.1 Health insurance in Chile

Private insurance is supplied by private firms called ISAPRES (the Spanish acronym for *Institución de Salud Previsional*). ISAPRES offer multiple health plans with different combinations of premiums and health coverage. Premiums are risk-adjusted by age and gender. Public insurance is administered by the *Fondo Nacional de Salud* (FONASA) and is financed by a 7% tax on enrollees' taxable incomes and government transfers.[1] Individuals with public insurance are assigned to one of four groups: A, B, C or D. Group A includes only individuals who are below the indigence line, receive government subsidies or demonstrate they receive no income. The remaining three groups are classified by monthly income: those with incomes of less than 360 dollars are in group B, those with incomes between 360 and 530 dollars are in group C, and those with incomes greater than 530 dollars are in group D.[2] These groups are important because the coinsurance rate in public hospitals (but not in private hospitals) depends on group affiliation: it is zero for individuals in groups A and B, 10% for individuals in group C, and 20% for individuals in group D. In 2016, 18% of the population was in group A, 25% in B, 11% in C and 20% in D.[3]

Even though individuals can switch between public and private insurance at any time (or between firms in the private insurance system), in practice this mobility is reduced due to the right of ISAPRES to either deny affiliation or to offer reduced

[1]The 7% tax on the enrollee's taxable income is up to a maximum of approximately 200 dollars.

[2]If an individual has more than three dependents, he/she is included in the next group with lower income requirements.

[3]Source: FONASA [2017].

coverage because of pre-existing conditions of the individual. In particular, until 2014 pregnancy was considered a pre-existing condition and women were required to disclose it at the time of signing a contract with an insurance firm. If that was the case, the coverage provided by the insurance would be proportional to the remaining length of her pregnancy.

A.2 The PAD Program

Individuals with public insurance have two options for receiving their benefits: *Modalidad Atención Institucional* (MAI), which involves the network of public providers, and *Modalidad Libre Elección* (MLE), which grants access to private hospitals for individuals in groups B, C and D.[4] In 1996, as part of a program aimed to reduce the waiting lists in public hospitals[5], the government made MLE more attractive by the introduction of a diagnosis-related group (DRG) payment system called PAD (the Spanish acronym for *Pago Asociado a Diagnóstico*). Under this system, both the patient's copayment and the hospital price are fixed amounts defined by FONASA for the treatment associated with a diagnosis, irrespective of the actual medical procedures performed. The PAD was originally available for 23 diagnoses[6], with an average copayment of around 60% of the hospital price. Beginning in 2002, several policy changes increased the number of diagnoses in the PAD system from 23 in 1996 to 62 in 2015. Moreover, two policy changes in 2003 and 2012 decreased the copayment for some of the existing diagnoses. Our policy of interest is a 2003

[4]Private health insurance, on the other hand, only provides access to private hospitals, except in special cases like an emergency.

[5]This program was called *Programa Oportunidades de Atención y Reducción de Listas de Espera*.

[6]The original diagnoses include diagnoses like delivery, cholelithiasis (vesicle), criptorquidia, prostate hyperplasia, abdominal hernia, and uterine prolapse.

policy change that decreased the copayment for delivery from 60% to 25%, within a broader policy change in MLE that decreased the copayments for hemodialysis from 50% to 20% and for emergency procedures (*Pago Asociado a Emergencia*) from 50% to 40% (medium complexity) and 30% (high complexity).[7] According to FONASA,[8] the above policies helped to reduce the number of medical loans granted by the institution, mainly devoted to cover copayments, and the high default rates in those loans.

The policies described above were part of a process of increasing coverage and financial protection that include more general policies like the AUGE/GES (*Garantias Explicitas de Salud*) in 2005. Through this policy, the government granted coverage for individuals with certain health conditions belonging either to public or private insurance through a specific network of providers. It also reduced copayments for several of the original pathologies included originally in PAD (particularly cancer treatments) from 60% to a maximum of 20% of the hospital price.

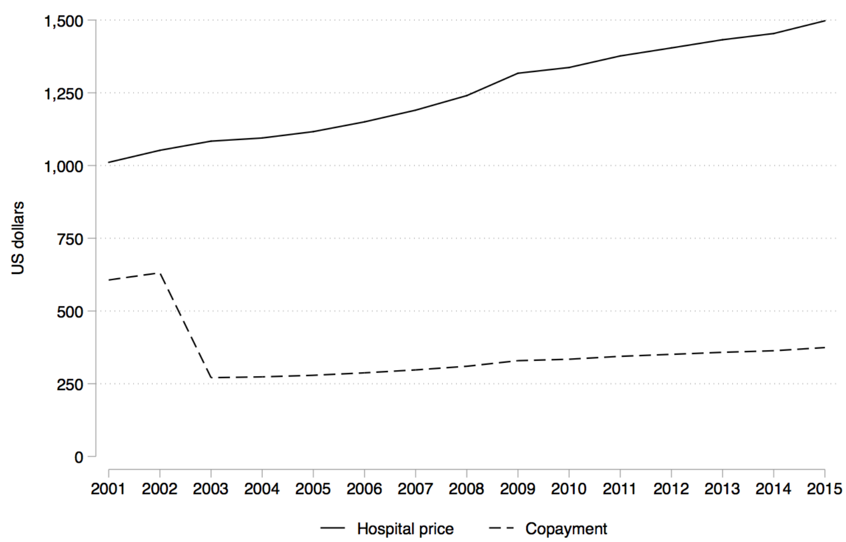
Since in this paper we study the effects of the 2003 decrease in copayment for PAD delivery, it is important to explain in more detail the functioning of PAD delivery. PAD delivery covers both vaginal and cesarean delivery. Thus, with PAD delivery, a private hospital receives the same payment independent of the mode of delivery. The PAD delivery covers doctor and midwife fees, hospital stay, medical exams, medication and immunization costs, and postnatal care for 15 days after the patient is discharged. Importantly, to be eligible for PAD delivery, a woman with public insurance must: (i) be enrolled in group B, C or D, (ii) expect a single baby,

[7]Decreto 48 of the Ministry of Health promulgated on February 11th, 2003, and came into force on April 2nd, 2003. Link

[8]See FONASA [2004].

(iii) have a pregnancy with a gestational age of 37 weeks or more (at the time of delivery), and (iv) have a non-high-risk pregnancy.

To satisfy these eligibility requirements, on week 37, a woman must present a medical certificate about her pregnancy risk status in her chosen hospital. Since the high-risk status is loosely defined in the PAD requirements, the hospital can request additional tests for the patient and eventually reject the case. If the hospital accepts the case, the woman pays the copayment and gets PAD coverage.



Source: FONASA, Ministerio de Salud, Chile.

Figure A.1: Evolution of hospital prices and copayments for PAD delivery

The decrease in the copayment for PAD delivery in 2003 was significant in monetary terms and, as a consequence, utilization of PAD delivery increased rapidly for eligible women. As shown in Figure A.1, the copayment for delivery fell from around 630 dollars in 2002 to 270 dollars in 2003.[9]

[9] Author's calculation using the exchange rate for February 1, 2019: 657.81 pesos per US dollar.

A.3 PAD Hospitals

In 2005, there were 233 hospitals with positive deliveries: 61 PAD private hospitals, 9 non-PAD private hospitals, and 163 public hospitals. The hospitals identified as "non-PAD" have a share of around 3% of total deliveries through the period under analysis. Moreover, they work basically (more than 90%) with (higher-income) women with private insurance before and after the policy. To understand the differences between PAD and non-PAD private hospitals we computed the mean (weighted by deliveries) of several variables in table A.1. As can be seen in Figure A.2, the nine hospitals identified as "non-PAD" have a share of around 3% of total deliveries through the period under analysis. Moreover, they work basically (more than 90%) with (higher-income) women with private insurance before and after the policy. Therefore, participant hospitals were already attending women of public insurance before the policy. As shown in Figure A.2, the policy implied a decrease in the share of deliveries by public hospitals from 83 to 77%, with PAD private hospitals increasing their share equivalently.

Table A.1: Summary statistics for private hospitals

Variables	Non-PAD private hospitals	PAD private hospitals
C-section rate	0.37	0.67
Share of deliveries by insurance affiliation		
Private insurace	0.90	0.42
Public insurance B, C or D	0.09	0.57
Public insurance A	0.01	0.01
Ratio deliveries over hospitalizations	0.08	0.17
N. of deliveries	637	739

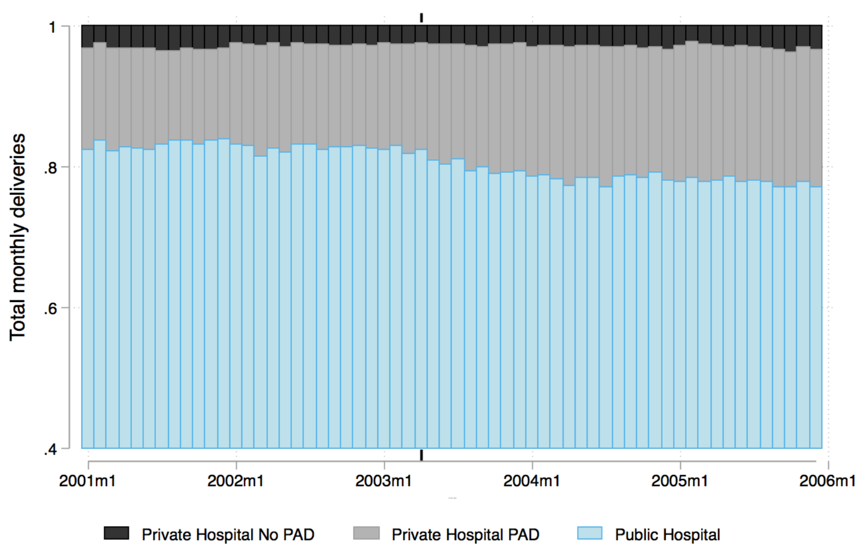


Figure A.2: Total deliveries by hospital type

An important reason behind the increasing share of deliveries in the private sector after the policy change is the perception that medical attention in private hospitals is more personalized than in public hospitals. As Murray and Elston [2005] described, patients in the private sector can obtain continuity of attention from their obstetrician and his/her team for antenatal and postnatal care. In contrast, delivery in the public health system is performed by midwives or doctors on duty, regardless of who provided antenatal care.

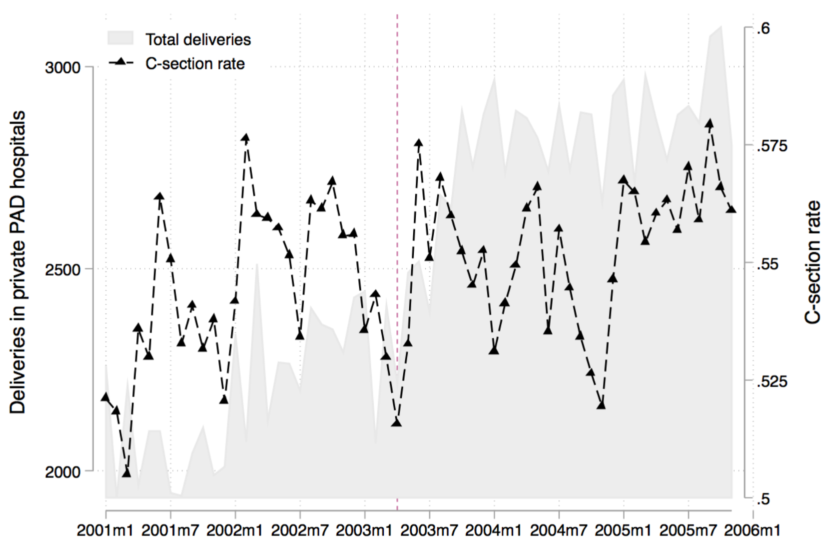


Figure A.3: Deliveries and c-section rates in PAD private hospitals

B Effects on deliveries at private hospitals

Table B.1 presents the estimates of equation (1) for the probability of delivery at a PAD private hospital and Table B.2 the results for the IV specification.

Figure B.1a shows, together with the estimates from equation (2) in the paper, the estimates of an alternative specification that attempts to correct for pre-existing linear trends. Figure B.1b shows the reduced form estimates of a dynamic version of the equation (3) Notice, first, that the coefficients fluctuate around zero before and start to increase just after the implementation of the policy.

Table B.1: Effect of decreasing copayments on PAD delivery

	(1)	(2)	(3)	(4)
Public Insurance B, C or D × Post	0.152***	0.145***	0.132***	0.070***
	[0.001]	[0.001]	[0.002]	[0.002]
Age-Year FE	No	Yes	Yes	Yes
County-Year FE	No	Yes	Yes	Yes
Linear trend Public Insurance A	No	No	Yes	Yes
Linear trend Public Insurance B, C, D	No	No	No	Yes
Mean DV	0.067			
R-squared	0.431	0.445	0.445	0.446
Observations	850,004	849,991	849,991	849,991

Note: This table reports estimates of the effect of decreasing copayments on PAD delivery on the probability of a delivery at a PAD private hospital. PAD private hospitals are hospitals that participate in the PAD program but are not in the public healthcare system. *Public Insurance B, C or D* is a dummy for a delivery by a woman with public insurance B, C or D, and *Post* is a dummy that equals one after April 2003.
All regressions include *Public Insurance A*, *Public Insurance B, C or D*, and mother's age, county, and month fixed effects. The mean of dependent variable corresponds to the treated in the pre-treatment period.
Robust standard errors reported in brackets.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Table B.2: IV/2SLS estimates of the effect of decreasing copayments on PAD delivery on the probability of a delivery at a PAD private hospital

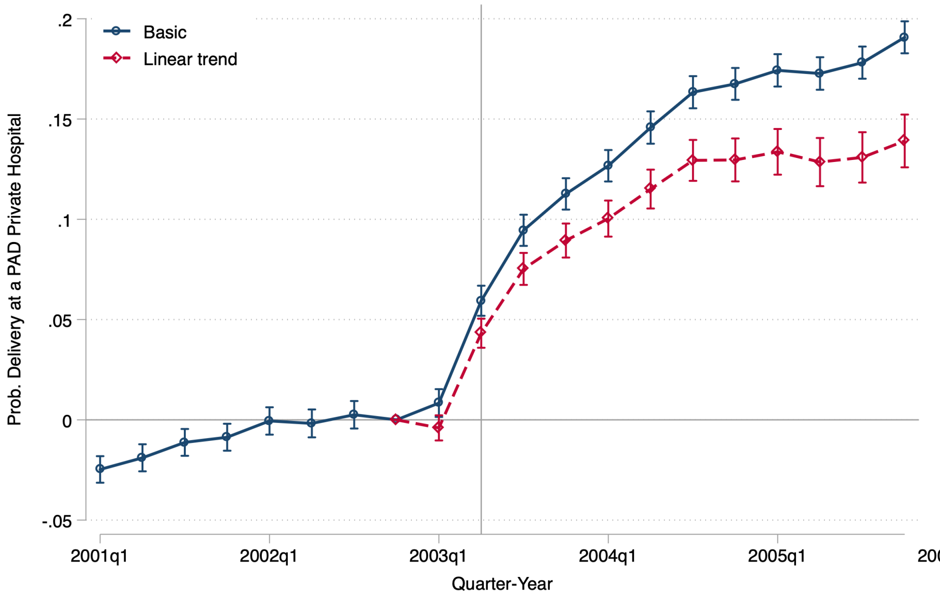
	PAD Private Hospital		First stage	
	OLS	IV/2SLS	Treatment	Treatment × Post
	(1)	(2)	(3)	(4)
Public Insurance B, C or D × Post	0.152***	0.150**		
	[0.001]	[0.071]		
Share Public Insurance B, C or D			0.416***	−0.180***
			[0.012]	[0.016]
Share Public Insurance B, C or D			−0.282***	0.401***
× Post			[0.023]	[0.036]
F stat (weak inst.)			617.2	132.3
p-value (weak inst.)			0.000	0.000
Mean DV	0.067			
Observations	843,375	843,375	843,375	843,375

Notes: This table reports IV estimates of the effect of decreasing copayments on PAD delivery on the probability of a delivery at a PAD private hospital. PAD private hospitals are hospitals that participate in the PAD program but are not in the public healthcare system. *Public Insurance B, C or D* is a dummy for a delivery by a woman with public insurance B, C or D, and *Post* is a dummy that equals one after April 2003.
The instruments are *Share Public Insurance B, C or D* and its interactions with *Post*, where *Share Public Insurance B, C or D* is the share of deliveries in 2002 by women with public insurance B, C or D of age a and living in county c.
All regressions include *Public Insurance B, C or D*, and mother's age-year, county-year, and month fixed effects.
The test for weak instruments uses the F statistics and p-values from Sanderson and Windmeijer [2016].
The mean of dependent variable corresponds to the treated in the pre-treatment period.
Robust standard errors for column (1), and standard errors, clustered by mother's county of residence, for column (2) - (4) reported in brackets.

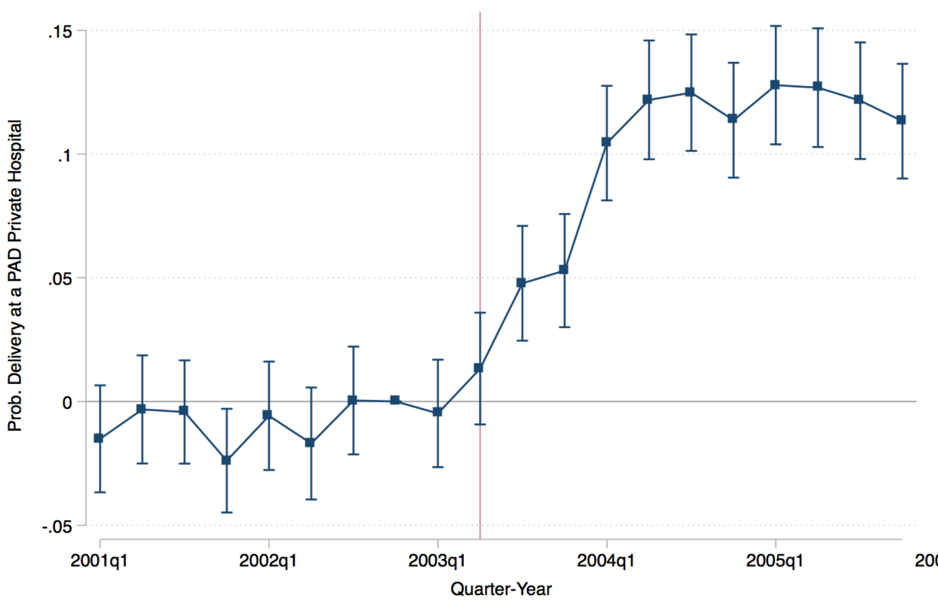
*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.



(a) OLS Time varying effects



(b) Reduced form effects

Figure B.1: Time-varying effects of the program on the probability of delivery at a PAD private hospital. OLS and reduced form effects

C Robustness exercises

C.1 Placebo regressions

Tables C.1 and C.2 show the results of a placebo exercise for the probability of delivery at a PAD private hospital and c-section, respectively. Columns (1) to (3) of each correspond to the actual policy and in columns (4) to (6) we assume that the policy was implemented one year earlier (April 2002). Columns (1) and (2), and (4) and (5) show the estimates of the OLS specification taking a window of 12 months around the policy date, and columns (3) and (6) show the results for a 9-month window. Columns (2) and (4) include a linear trend in the treatment group.

In both cases, we find an impact on the placebo exercise for a 12-month window, with the effect disappearing when either we reduce the window to 9 months (April-December post-policy period), or control for linear trends. Specifically, for delivery at a PAD private hospital we observe an impact of 0.8 percentage points for the 12-month window (versus 9.4 percentage points for the actual policy), and no impact if we control for linear trends or reduce the window to 9 months. Note in columns (2) and (3) that while the main results are robust to the inclusion of a linear trend or reducing the time window, it is not the case with the placebo policy.

In the case of the probability of a c-section, we observe in column (4) an impact of 1.2 percentage points for the 12-month window (versus 5.1 percentage points), and no impact when include a linear trend or consider a 9-month window. On the other hand, when we analyze the actual policy we observe that including linear trends reduce the estimates from to 3.3 percentage points (from 18% to 12% of the sample mean) and changing the windows from a 12-month to a 9-month decreases the impact to 43 percentage points (18% to 15%).

The previous exercises make us think about the possibility of an anticipation effect since for the placebo the impact appears to occur in the January--March 2003 period.

Table C.1: Effect of decreasing copayments on the probability of a delivery at a private hospital - Placebo: policy on April 2002

	Actual: April 2003			Placebo: April 2002		
	± 12 months		± 9 months	± 12 months		± 9 months
	(1)	(2)	(3)	(4)	(5)	(6)
Public Insurance B, C or D	0.094***	0.072***	0.083***	0.008***	0.002	0.004*
× Post	[0.002]	[0.003]	[0.002]	[0.002]	[0.003]	[0.002]
Age-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
County-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Linear trend FONASA B, C, D	No	Yes	No	No	Yes	No
Mean DV	0.081	0.081	0.082	0.070	0.070	0.070
R-squared	0.470	0.470	0.476	0.521	0.521	0.521
Observations	343,737	343,737	259,244	339,710	339,710	256,675

Note: Public Insurance B, C or D is a dummy for a delivery by a woman with public insurance B, C or D, and *Post* is a dummy that equals one after April 2003 for the actual policy and a dummy that equals one after April 2002 for the placebo policy.
All regressions include *Public Insurance A*, *Public Insurance B, C or D*, and mother's age-year, county-year, and month fixed effects. Columns (1) and (2), and (4) and (6) use sample period of 12 months around the treatment period. Columns (3) and (6) use sample period of 9 months around the treatment period. Columns (2) and (4) include a linear trend on FONASA B,C,D. The mean of dependent variable corresponds to the treated in the pre-treatment period.
Robust standard errors reported in brackets.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Table C.2: Effect of decreasing copayments on the probability of a c-section - Placebo: policy on April 2002

	Actual: April 2003			Placebo: April 2002		
	± 12 months		± 9 months	± 12 months		± 9 months
	(1)	(2)	(3)	(4)	(5)	(6)
Public Insurance B, C or D	0.051***	0.033***	0.043***	0.012***	−0.005	0.005
× Post	[0.003]	[0.005]	[0.003]	[0.003]	[0.004]	[0.003]
Age-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
County-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Linear trend FONASA B, C, D	No	Yes	No	No	Yes	No
Mean DV	0.261	0.261	0.264	0.254	0.254	0.252
R-squared	0.121	0.121	0.119	0.130	0.130	0.130
Observations	343,737	343,737	259,244	339,710	339,710	256,675

Note: Public Insurance B, C or D is a dummy for a delivery by a woman with public insurance B, C or D, and *Post* is a dummy that equals one after April 2003 for the actual policy and a dummy that equals one after April 2002 for the placebo policy.
All regressions include *Public Insurance A*, *Public Insurance B, C or D*, and mother's age-year, county-year, and month fixed effects. Columns (1) and (2), and (4) and (6) use sample period of 12 months around the treatment period. Columns (3) and (6) use sample period of 9 months around the treatment period. Columns (2) and (4) include a linear trend on FONASA B,C,D. The mean of dependent variable corresponds to the treated in the pre-treatment period.
Robust standard errors reported in brackets.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

C.2 Effect on covariates

The only characteristic that we can analyze using hospital discharge data (which contains the type of insurance) is mothers' age. Figure C.1 shows the evolution of the age of mothers by type of insurance over the period under analysis. We observe an increase in the age of the mothers for all three insurance types over time: women in FONASA group A between 24 and 25 years of age, those in group B, C or D between 27 and 28 years, and those with private insurance between 29 and 30 years. We also observe an increase in age for women in all groups of public insurance (either A, or B, C, or D) before the policy (between July 2002 to January 2003). Since women with public insurance are more than 80% of our sample, this change does not seem to be due to a change in composition. In the case of mothers with private insurance, the increase in age is more modest before the policy and most of the change starts after the policy (since September 2003). In summary, we do observe changes in mother's age but: (i) it seems more a long-run trend that affects women in all types of insurance (a trend that we control for in our main specification), and (ii) the timing of the changes is not consistent with a change in composition due to the policy.

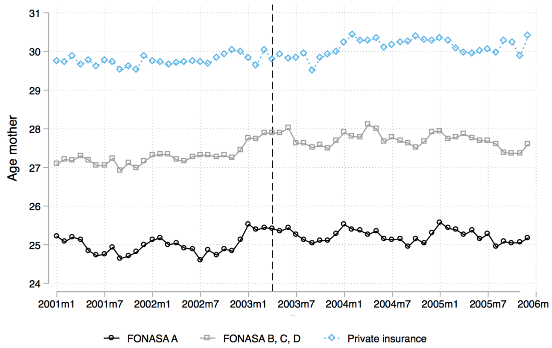


Figure C.1: Age of mothers by insurance

Table C.3 shows the estimates of the specification of equation (1) on mother's age for the full sample (in Column (1)) and two different time windows around the policy: 12 and 9 months. In the case of the full sample we can observe an increase of 0.08 years in the age of women of Public Insurance B, C or D. This impact disappears if we restrict the sample to a window of 12 months before and after the law or when we include linear trends in FONASA group A. Table C.4 shows the impact also disappear when we divided the sample in Young (women age 26 or younger) and Old mothers (women age 27 and older). Figure C.2 shows a dynamic regression with no distinguishable pattern.

Table C.3: Effect of decreasing copayments on mother's age: Different time windows

	Full sample		± 12 months	± 9 months
	(1)	(2)	(3)	(4)
Public Insurance B, C or D × Post	0.088***	0.029	0.031	0.039
	[0.030]	[0.038]	[0.047]	[0.054]
County-Year FE	Yes	Yes	Yes	Yes
Linear trend FONASA A	No	Yes	No	No
R-squared	0.072	0.072	0.074	0.075
Observations	849,991	849,991	343,737	259,244

Note: All regressions include *Public Insurance A*, *Public Insurance B, C or D*, and county, and month fixed effects. Column (1) uses the full sample. Column (2) uses sample period of 12 months around the treatment period. Column (3) uses sample period of 9 months around the treatment period.
Robust standard errors reported in brackets.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Table C.4: Effect of decreasing copayments on mother's age by age group

	Age $\leq$ 26	Age 27 and over
	(1)	(2)
Public Insurance B, C or D $\times$ Post	-0.013	0.002
	[0.020]	[0.027]
R-squared	0.042	0.009
Observations	431,090	418,873

Note: All regressions include *Public Insurance A*, *Public Insurance B, C or D*, and county-year, and month fixed effects. Robust standard errors reported in brackets.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

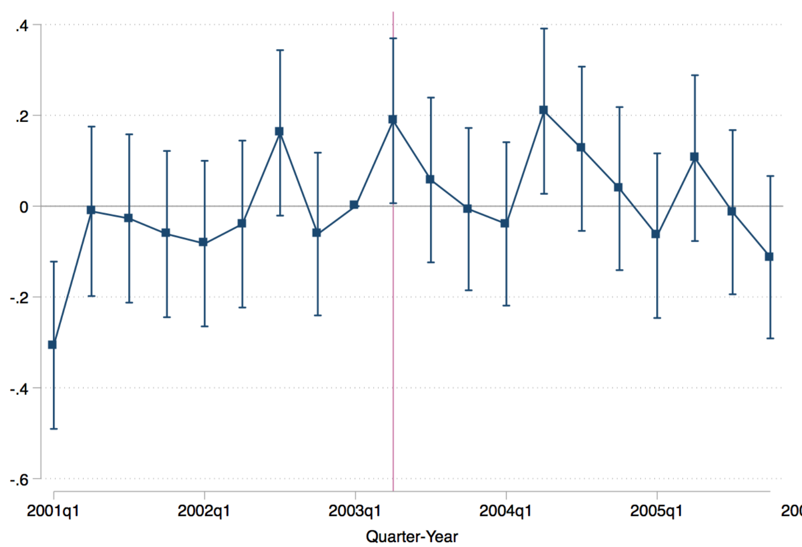


Figure C.2: Impact of the policy on age
Regressions include include county and month fixed effects.

Table C.5 shows the estimates placebo regressions using the reduced form specification on birth data. Columns (1) to (3) show the estimates of the impact of the policy over three control variables: Mother's years of education, marital status (married mother), and the number of alive children.

Table C.5: Effect of decreasing copayments on mother's characteristics

	Years education	Married	Number of children
	(1)	(2)	(3)
Share Public Insurance B, C or D in 2002 × Post	−0.009	0.006	0.010
	[0.046]	[0.008]	[0.021]
Share Public Insurance B, C or D in 2002	-0.393^{***}	0.008	0.010
	[0.121]	[0.009]	[0.023]
Mean DV	11.082	0.523	1.979
R-squared	0.192	0.177	0.317
Observations	1,601,307	1,602,061	1,601,351

Note: Share Public Insurance B, C or D is the share of deliveries in 2002 by women with public insurance B, C or D of age a and living in county c. and *Post* is a dummy that equals one after April 2003.
All regressions include sex, and mother's age-year, county, and month fixed effects.
Columns (2) to (4) includes age-year interactions.
The mean of dependent variable corresponds to the treated in the pre-treatment period.
Standard errors, clustered by mother's county of residence, reported in brackets.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

C.3 Heterogeneous impacts

Table C.6 shows the impact of the policy by age group of the mother (terciles). The impact of the policy is higher in absolute terms for older mothers, but this group has a higher c-section rate before the policy was implemented. If we compute the effect in percentage terms, the policy increases the probability of a c-section in 36% for women aged 15-23 years, 39% for women aged 24-30 years, and 30% for women aged 31 or more. Then it seems that the policy affected all age groups.

Table C.6: Effect of decreasing copayments on the probability of a c-section - Heterogeneous effects by mother's age

	All	Age 15-23	Age 24-30	Age 31 and over
	(1)	(2)	(3)	(4)
Public Insurance B, C or D × Post	0.086***	0.057***	0.097***	0.103***
	[0.002]	[0.003]	[0.003]	[0.004]
Mean DV	0.252	0.158	0.250	0.344
R-squared	0.121	0.082	0.091	0.100
Observations	849,991	312,539	280,194	257,204

Note: All regressions include *Public Insurance A*, *Public Insurance B, C or D*, and mother's age-year, county, and month fixed effects. Columns (1) uses the full sample, column (2) women between 15 and 23 years old, column (3) women between 24 and 30 years old, and column (4) women older than 31 years. The mean of dependent variable corresponds to the treated in the pre-treatment period.

Robust standard errors reported in brackets.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

C.4 Elective c-sections and obstructed labor diagnoses

Table C.7 shows the impacts of the policy on deliveries classified as "elective c-sections", those with an "obstructed labor" diagnosis and unclassified c-sections. With that purpose, we have expanded our sample with ICD codes corresponding with obstructed labor diagnoses (ICD codes O.64, O.65 and O.66) and defined a c-section in this case when the data indicates a surgery. Our main database contains only cases where the main diagnosis is delivery (ICD codes O.80 to O.84). Among all c-sections registered in hospital discharge data, 21% are classified as elective, 9% have obstruction diagnosis and 5% are classified as "emergency c-section". Most of the c-sections (around 70%) are classified as "other/unspecified". Not surprisingly, these unclassified c-sections the major driving force of the results, as shown in Table C.7. However, the results indicate that the number of c-sections with "obstructed labor" diagnoses appears to increase with the policy, which should not be the case. One interpretation is that the specialization on c-sections in PAD private hospitals increases the likelihood of diagnosing obstructions, which may be reflecting some degree of "procedural skill".

A second interpretation of the previous results is that some of the "obstructed labor" diagnoses are affected by the doctor bias to perform c-sections. Table C.8 shows the estimates of the impact of the policy on four additional outcomes: Hysterectomy c-section, C-section due to internal bleeding, C-section due to fetal suffering, and C-section due to umbilical cord complications. Similar to the case of obstructions, we also find a positive impact of the policy on umbilical cord complications. However, we believe that the outcome that might be less affected by the doctor's suggestive assessment is Hysterectomy, which shows no impact due to the policy.

Table C.7: Effect of decreasing copayments on Elective c-section and Obstructed labor

	Elective c-section (1)	Obstructed Labor c-section (2)	Other/ Unspecified (3)
Public Insurance B, C or D × Post	0.031***	0.004***	0.045***
	[0.001]	[0.001]	[0.002]
Mean DV	0.055	0.012	0.173
R-squared	0.079	0.073	0.102
Observations	891,174	891,174	891,174

Note: Public Insurance B, C or D is a dummy for a delivery by a woman with public insurance B, C or D, and *Post* is a dummy that equals one after April 2003.
All regressions include *Public Insurance A*, *Public Insurance B, C or D*, and mother's age, county, and month fixed effects. Columns (2) to (4) includes age-year and county-yearinteractions. The mean of dependent variable corresponds to the treated in the pre-treatment period.
Robust standard errors reported in brackets.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Table C.8: Effect of decreasing copayments on c-sections due to complications

	Hysterectomy c-section	Internal bleeding c-section	Fetal suffering c-section	Umbilical cord c-section
	(1)	(2)	(3)	(4)
Public Insurance B, C or D × Post	−0.00008	−0.00006**	−0.00052	0.00076***
	[0.00018]	[0.00003]	[0.00037]	[0.00017]
Mean DV	0.0011	0.0001	0.0076	0.0012
R-squared	0.0457	0.0017	0.0147	0.0055
Observations	891,174	891,174	891,174	891,174

Note: Public Insurance B, C or D is a dummy for a delivery by a woman with public insurance B, C or D, and *Post* is a dummy that equals one after April 2003.
All regressions include *Public Insurance A*, *Public Insurance B, C or D*, and mother's age-year, county-year, and month fixed effects. The mean of dependent variable corresponds to the treated in the pre-treatment period.
Robust standard errors reported in brackets.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

D Impact of the policy on gestational age at birth and birth weight

In this section, we use an alternative dataset (birth data) to evaluate the impact of the policy on two newborn outcomes: birth weight and gestational age at birth. Since birth data does not contain information on insurance affiliation, to estimate this impact, we use our reduced form equation (4), with the share of deliveries in 2001-2005 of women in groups B, C or D by county and age as the proxy of the treatment variable.

Table D.1 reports the effects of the policy on birth weight (columns (1) and (2)) and gestational age at birth (columns (3) and (4)). We find that the policy change causes a decrease of 29 grams in birth weight and of around 0.07 weeks in gestational age at birth.

Table D.1: Effect of decreasing copayments on birth weight and gestational age

	Birth weight	Gestational age
	(1)	(2)
Share Public Insurance B, C or D in 2002 × Post	-29.342^{***}	-0.068^{***}
	[7.399]	[0.023]
Share Public Insurance B, C or D in 2002	18.015^{***}	0.033^{**}
	[4.578]	[0.015]
Mean DV	3372.087	38.830
R-squared	0.032	0.026
Observations	1,601,206	1,601,351

Note: This table reports reduced form estimates of the effect of decreasing copayments on birth weight and gestational age.
Share Public Insurance B, C or D is the share of deliveries in 2002 by women with public insurance B, C or D of age a and living in county c. and *Post* is a dummy that equals one after April 2003.
All regressions include sex, number of children, mother's educational level, and mother's age, county, and month fixed effects.
The mean of dependent variable corresponds to the treated in the pre-treatment period.
Standard errors, clustered by mother's county of residence, reported in brackets.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

E A model of maternity services

E.1 Model calibration

We extend the basic model to replicate some features in the data and run counterfactual experiments. The following are the differences between this extended model and the basic model.

First, the optimal policy of a given hospital i will now depend on its capacity, K_i. Therefore, we will not normalize capacity to one, as this will not be innocuous as it was in the basic model.[10]

Second, we use a more flexible functional form for the distribution of vaginal deliveries. Specifically, we assume that vaginal deliveries for hospital i at time t follows a Gamma distribution: $Y_{it} \sim \Gamma(a_i, b_i)$ where the shape parameter a_i and the scale parameter b_i are functions of $\alpha_{i,t-1}$. $\alpha_{i,t}$, n_i and K_i. We choose a_i and b_i such that $E(Y_{it}) = (w\alpha_{i,t-1} + (1-w)\alpha_{i,t})n_i K_i$ and $Var(Y_{it}) = \sigma^2 \frac{(\alpha_{i,t-1}+\alpha_{i,t})}{2} n_i K_i$, where w is a parameter that captures the weights of early-term and full-term births in period t. [11]

Finally, we assume that reputational costs are a quadratic function in the number of referrals. i.e. $\theta\, q^r(Y_{it}, \alpha_{i,t}; n_i)^2$. This convexity assumption in the reputational costs contributes to the concavity of the profit function and helps computationally in finding the steady-state equilibrium.

We calibrate the model using data on private hospitals for the period 2006–2007,

[10] This is because the distribution of deliveries is not uniform as in the basic model.

[11] The functional form for $E(Y_{it})$ and $Var(Y_{it})$ is consistent with the expectation and variance for a sum of Bernoulli random variables with different success probability. For example, let us define $Y = \sum_{i=1}^{n_1} X_{1,i} + \sum_{i=1}^{n_2} X_{2,i}$ where $X_{1,i}$ is a Bernoulli random variable with success probability w and $X_{2,i}$ is a Bernoulli random variable with success probability $1-w$. Then $E(Y) = n_1 w + n_2(1-w)$ and $Var(Y) = w(1-w)(n_1+n_2)$.

as detailed in Table E.1. Parameters w (share of full-term births in vaginal deliveries), K_i, and n_i were obtained from hospital discharge data. Specifically, we calculate hospital capacity K_i using the 90 percentile of weekly deliveries per hospital in 2006-2007 and n_i from a regression between utilization and capacity and squared capacity.

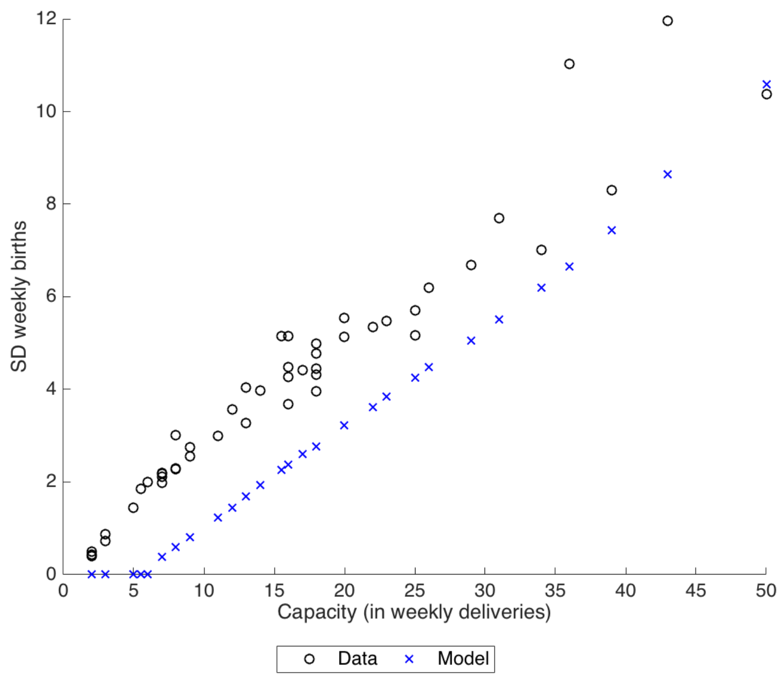
The price of a delivery p is the PAD price obtained from FONASA. The cost parameter c was calculated using the gross margin from several hospital balance sheets published by the *Comisión para el Mercado Financiero* (CMF). To calculate the extra cost of cesarean deliveries y we use the price differentials from private insurance claims data in 2007. Finally, parameters σ (from $Var(Y)$ above) and θ are chosen to match the average c-section rate and capacity utilization of PAD private hospitals in 2006–2007.[12]

[12] The means are weighted by hospital capacity.

Table E.1: Calibrated parameters

Parameter	Value	Source
Discount factor δ	0.96	
Price of a vaginal or cesarean delivery p	1,568	PAD delivery price in 2007 (in dollars)
Marginal cost of vaginal deliveries c	0.7 p	Profit margins from balance sheet data for several hospitals.
Incremental marginal cost of c-sections y	.15	Claims data for private insurance in 2007
Weight of term births in vaginal deliveries w	0.63	Share of vaginal births with gestational age of 39 weeks or more
Hospital capacity K	[2, 50]	90 percentile in weekly deliveries in 2006–2007
Demand of maternity services n	[0.56, 0.71]	Quadratic fit of capacity utilization on capacity in 2006–2007
Reputational costs θ	1.17 p	Set to match average c-section rate and capacity utilization in 2006–2007
SD of vaginal deliveries σ	2.15	Set to match average c-section rate and capacity utilization in 2006–2007

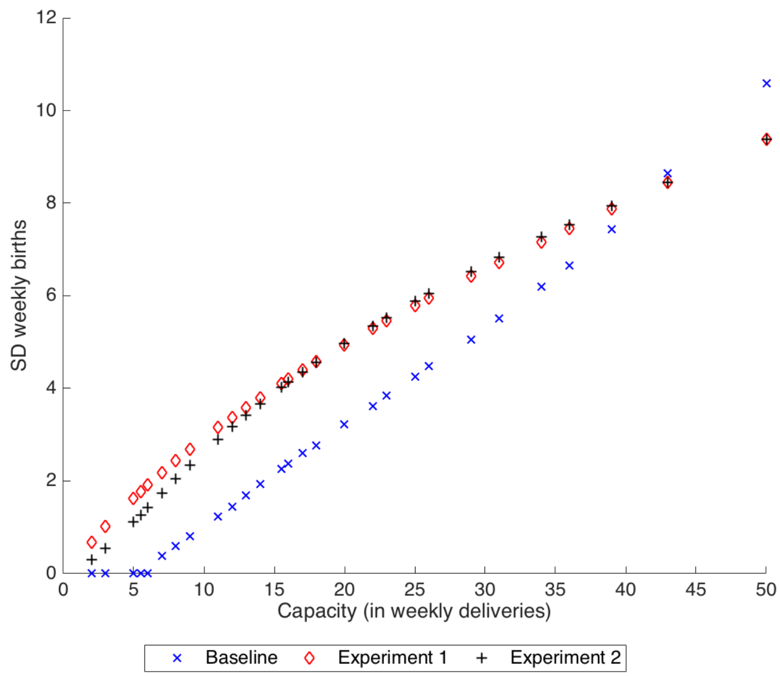
Notes: This table reports the values for calibrated parameters.



Notes: The graph reports the standard deviation of weekly deliveries and capacity for PAD private hospitals. For each hospital, a black circle is the standard deviation of weekly deliveries in 2006–2007 and a blue cross is the prediction of the same variable from the model. Hospital capacity is the 90 percentile of weekly births in the period 2006–2007.

Figure E.1: Model fit: SD weekly deliveries

E.2 Counterfactual experiments



Notes: The graph reports the standard deviation of weekly deliveries and capacity for PAD private hospitals for the baseline and two counterfactual experiments.
Counterfactual experiment 1 sets a c-section rate of 0.26 (the mean c-section rate for public and non-PAD private hospitals) for each hospital. Counterfactual experiment 2 sets a c-section rate of 0.26 and an upper bound on the ratio of referrals over capacity of 0.02 for each hospital.
Hospital capacity is the 90 percentile of weekly births in the period 2006–2007. Hospital capacity is the 90 percentile of weekly births in the period 2006–2007.

Figure E.2: Counterfactual experiments: SD weekly deliveries

F Expected demand and scheduling of deliveries

F.1 Alternative specifications

Equation (7) in the paper defines a nonlinear specification according to the yearly distribution of weekly births for a given hospital. Table F.1 shows the results using a linear and a quadratic specification, being the results consistent with those from the nonlinear specification.

Table F.1: Effect of expected hospital demand on the probability of early-term birth by (linear and quadratic specification)

	Public Hospitals		non-PAD Private Hospitals		PAD Private Hospitals	
	(1)	(2)	(3)	(4)	(5)	(6)
Theoretical 100 births	0.0012	−0.0100	0.0132	−0.0300	0.0456***	0.0915***
	[0.0045]	[0.0104]	[0.0281]	[0.0451]	[0.0154]	[0.0171]
Theoretical 100 births sq.		0.0059		0.0323		−0.0301***
		[0.0046]		[0.0235]		[0.0065]
Mean DV	0.309	0.309	0.399	0.399	0.496	0.496
R-squared	0.042	0.042	0.058	0.058	0.076	0.076
Observations	2,296,428	2,296,428	172,232	172,232	906,157	906,157

Notes: This table reports OLS estimates of expected hospital demand on early-term birth (gestational age 37 or 38 weeks) for the period 2002–2016.
All regressions control for *Single*, number of children, mother's educational level and labor force participation, mother's age-year fixed effects, mother's county of residence fixed effects and hospital-month fixed effects.
The mean of dependent variable corresponds to the treated in the pre-treatment period.
Standard errors, clustered by hospital, reported in brackets.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Table F.2 shows the results for a specification similar to the one in equation (7), but with the “demand” variable based on the number of births in the county rather than those at a given hospital. Therefore, the results below indicate that, provided that a child will be born in *any* PAD hospital, the probability of early delivery is an increasing function of the number of deliveries from the same county conceived in the same week.

F.2 Impact of expected demand on post-term births

Table F.3 reports OLS estimates of expected hospital demand in post-term births (gestational age 41 or 42 weeks) for the period 2002-2016. We do not observe an increase in post-term births.

Table F.2: Effect of expected demand on the probability of early-term birth (county-level)

	Public and Non-PAD Private Hospitals	PAD Private Hospitals
	(1)	(2)
25th pctl < Demand ≤ 50th pctl	−0.001	0.005**
	[0.001]	[0.002]
50th pctl < Demand ≤ 75th pctl	0.000	0.003**
	[0.001]	[0.002]
Demand > 75th pctl	0.001	0.004**
	[0.001]	[0.002]
Mean DV	0.315	0.497
R-squared	0.053	0.097
Observations	2,443,805	903,556

Notes: This table reports OLS estimates of expected demand (county-level) on early-term birth (gestational age 37 or 38 weeks) for the period 2002–2016. *Demand* is the expected demand in week w of year y for county c. 25th pctl < Demand ≤ 50th pctl is a dummy that indicates if that expected demand is in the 25 to 50 percentile of the distribution of expected demand for county c in year y. Similar definitions apply for other dummies.
All regressions control for single birth, sex of the baby, number of children, mother's educational level, and mother's age-year, mother's county of residence-month, and hospital fixed effects.
The mean of dependent variable corresponds to the treated in the pre-treatment period.
Standard errors, clustered by hospital, reported in brackets.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table F.3: Effect of expected hospital demand on the probability of post-term birth

	Public Hospitals	non-PAD Private Hospitals	PAD Private Hospitals
	(1)	(2)	(3)
25th pctl $<$ Demand $\leq$ 50th pctl	−0.000	0.002*	0.000
	[0.001]	[0.001]	[0.000]
50th pctl $<$ Demand $\leq$ 75th pctl	−0.000	−0.001	−0.000
	[0.000]	[0.001]	[0.001]
Demand $>$ 75th pctl	−0.001	−0.001	0.000
	[0.001]	[0.001]	[0.001]
Mean DV	0.071	0.022	0.013
R-squared	0.026	0.026	0.030
Observations	2,274,943	170,743	895,403

Notes: This table reports OLS estimates of expected hospital demand on post-term birth (gestational age 41 or 42 weeks) for all hospitals in the period 2002–2016. *Demand* is the expected hospital demand in week w of year y for hospital h. 25th pctl $<$ Demand $\leq$ 50th pctl is a dummy that indicates if that expected demand is in the 25 to 50 percentile of the distribution of expected demand for the hospital h in year y.
The mean of dependent variable corresponds to the treated in the pre-treatment period.
Standard errors, clustered by hospital, reported in brackets.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

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