Difference-in-Difference — Examples

Mauricio Romero

Difference-in-Difference: Examples

Abortion laws in CDMX

Age-of-marriage laws in Mexico

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Grandmothers and the gender gap in the Mexican labor market

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Abortion in CDMX

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Abortion laws and women's health☆

Damian Clarke[a,*], Hanna Mühlrad[b]

[a] Department of Economics, Universidad de Chile and IZA, Diagonal Paraguay 257, Santiago, Chile
[b] IFAU – Institute for Evaluation of Labour Market and Education Policy & Department of Clinical Sciences, Danderyd Hospital (KI DS) | Karolinska Institutet, Sweden

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ABSTRACT

We examine the impact of progressive and regressive abortion legislation on women's health in Mexico. Following a 2007 reform in the Federal District of Mexico which decriminalised and subsidised early-term elective abortion, multiple other Mexican states increased sanctions on illegal abortion. We observe that the original legalisation resulted in a sharp decline in maternal morbidity, particularly morbidity due to haemorrhage early in pregnancy. We observe small or null impacts on women's health from increasing sanctions on illegal abortion. These results quantify the considerable improvements in non-mortal health outcomes flowing from legal access to abortion.

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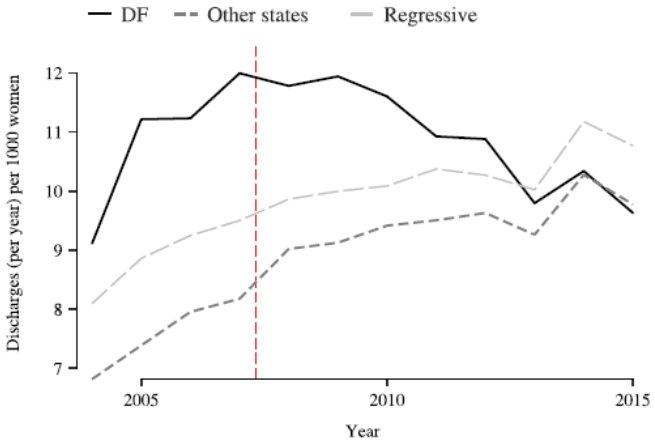
In a nutshell

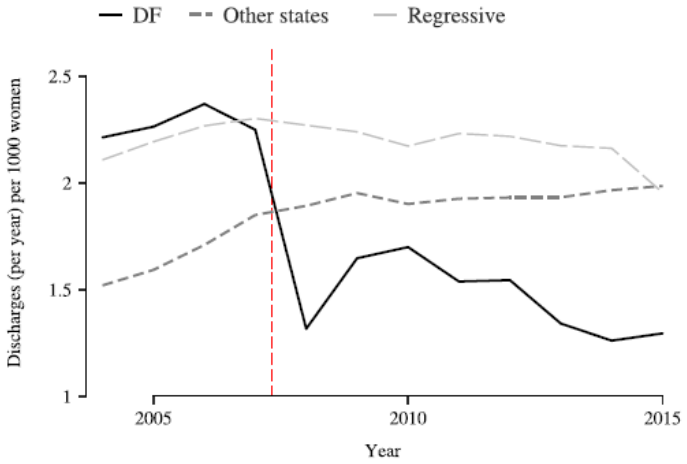
- After 2007 CDMX decriminalized and subsidized early-term elective abortion
- Use sate-level variation over time resulting from legislative changes in abortion laws to identify their effect
- Data: Vital statistics data recording over 30 million births, 18.4 thousand maternal deaths and 46 million inpatient cases for causes related to maternal health

Raw data



(e) Abortion-related Morbidity (Full sample, per 1000 women)

Raw data



(f) Haemorrhage (Full sample, per 1000 women)

Estimating equation

$$Health_{st} = \alpha_0 + \alpha_1 \text{ILE}_{st} + X'_{st}\Gamma_1 + \phi_s + \mu_t + (\phi_s \times month) + \varepsilon_{st} \quad (1)$$

$$Health_{st} = \beta_0 + \beta_1 \text{Regressive}_{st} + X'_{st}\Gamma_2 + \phi_s + \mu_t + (\phi_s \times month) + \eta_{st}. \quad (2)$$

Results

Table 2
Difference-in-differences estimates of legal reforms on morbidity

	Abortion-related morbidity				Haemorrhage early in pregnancy			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: ILE versus non-reformers								
Post-ILE Reform (DF)	−0.064***	−0.071***	−0.063***	−0.075***	−0.014***	−0.016***	−0.014[XX]	−0.013**
	(0.013)	(0.006)	(0.016)	(0.012)	(0.004)	(0.004)	(0.007)	(0.007)
Observations	2496	2496	2496	2496	2496	2496	2496	2496
Mean of Dependent Variable	0.338	0.338	0.338	0.338	0.044	0.044	0.044	0.044
Panel B: Regressive reforms versus non-reformers								
Post-Regressive Law Change	−0.001	0.000	−0.009	−0.007	−0.005	−0.003	−0.005	−0.002
	(0.013)	(0.011)	(0.011)	(0.011)	(0.006)	(0.004)	(0.006)	(0.004)
Observations	5952	5952	5952	5952	5952	5952	5952	5952
Mean of Dependent Variable	0.328	0.328	0.328	0.328	0.042	0.042	0.042	0.042
State and Year × Month FEs	Y	Y	Y	Y	Y	Y	Y	Y
Population Weights		Y		Y		Y		Y
Time-Varying Controls			Y	Y			Y	Y

Notes: Each column displays a difference-in-differences regression of the impact of abortion reform on rates of morbidity (inpatient cases). Each morbidity class is measured as cases per 1000 fertile-aged women each month, and average levels in the full set of data are available at the foot of the table. Each regression is estimated using states that adopt reforms (ILE in Panel A, regressive reforms in Panel B) versus other non-adopting states. All standard errors are clustered at the level of the state.

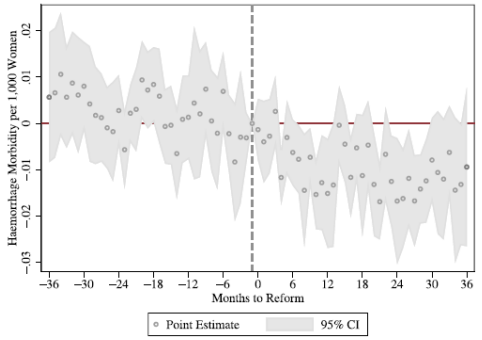
[XX] $p < 0.10$.

Event study

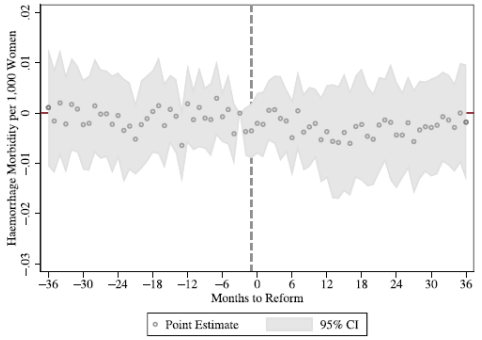
$$Health_{st} = \kappa_0 + \sum_{j=-36}^{36} \delta_{-j} \Delta \text{ILE}_{s,t+j} + X'_{st}\Gamma_1 + \phi_s + \mu_t + (\phi_s \times month) + \nu_{st} \quad (3)$$

$$Health_{st} = \kappa_1 + \sum_{k=-36}^{36} \gamma_{-k} \Delta \text{Regressive}_{s,t+k} + X'_{st}\Gamma_2 + \phi_s + \mu_t + (\phi_s \times month) + \upsilon_{st}. \quad (4)$$

Event study



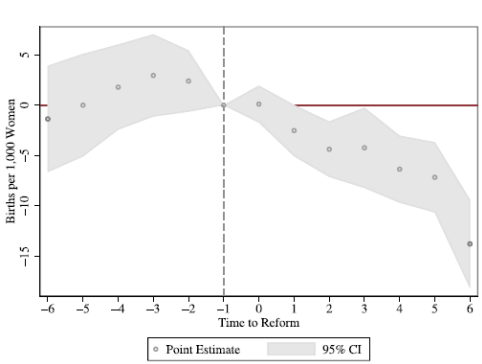
(a) Progressive Abortion Reform (ILE)



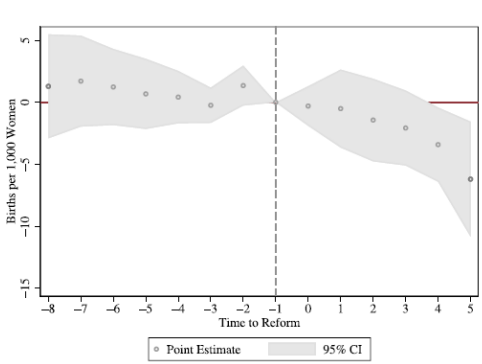
(b) Regressive Abortion Laws (Legal Tightening)

Fig. 2a. Event studies for rates of haemorrhage early in pregnancy.

Event study

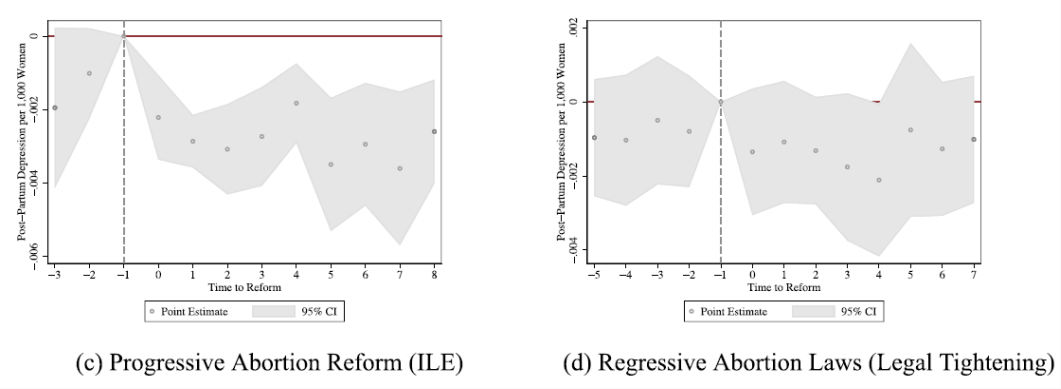


(c) Progressive Abortion Reform (ILE)



(d) Regressive Abortion Laws (Legal Tightening)

Event study



(c) Progressive Abortion Reform (ILE)

(d) Regressive Abortion Laws (Legal Tightening)

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Age-of-marriage laws in Mexico

Will You Marry Me, Later?

Age-of-Marriage Laws and Child Marriage in Mexico

Cristina Bellés-Obrero
María Lombardi

ABSTRACT

We examine the impact of raising the minimum age of marriage to 18 years old in Mexico. Using a difference-in-differences model that takes advantage of the staggered adoption of this reform across states, we find a large reduction in the number of registered child marriages. However, we find no effect on school attendance or early fertility rates. We provide evidence that this is driven by a substitution of formal marriage for informal unions. This suggests that when informal unions are a viable option for young couples, age-of-marriage reforms are not enough to prevent early unions and their negative consequences.

In a nutshell

- Between 2008 and 2018,most states in Mexico increased their minimum age of marriage

- Data: Granular data on marriages, births, and school attendance

Law changes

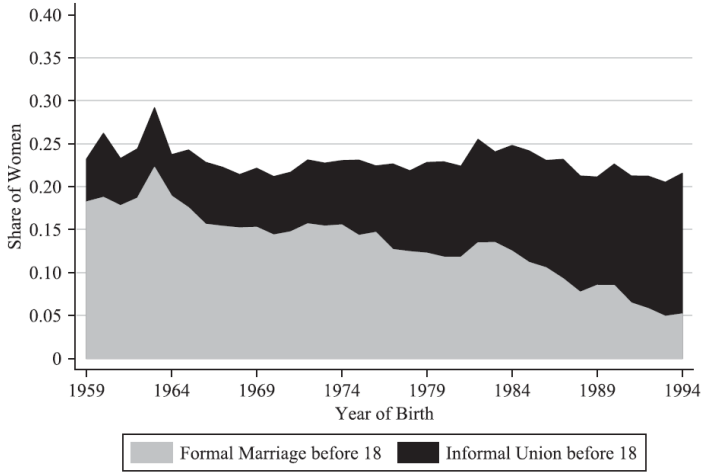


Figure 2

Evolution in the Share of Women Who Were Child Brides

Law changes

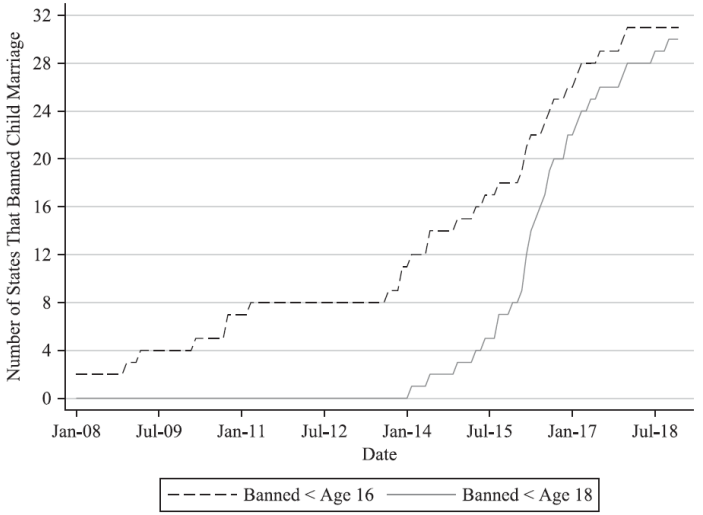


Figure 1

Estimating equation

$$(1) \quad Y_{st} = \beta \, Child\ marriage\ banned_{st} + X_{st}\rho + \gamma_s + \gamma_t + U_{st}$$

Results

Table 2
Effect of Banning Child Marriage on Formal Child Marriage Rates

	(1)	(2)	(3)	(4)	(5)
Panel A: Ages 14–15					
Child marriage banned	0.007	0.010	−0.063	−0.089	−0.097
	(0.131)	(0.133)	(0.093)	(0.073)	(0.093)
	[0.994]	[0.991]	[0.597]	[0.311]	[0.432]
Observations	4,224	4,224	4,224	4,224	4,224
R^2	0.237	0.256	0.561	0.638	0.623
Dependent variable mean (control)	0.268	0.268	0.268	0.268	0.258
Panel B: Ages 16–17					
Child marriage banned	−0.476***	−0.445***	−0.716***	−0.695***	−0.702***
	(0.156)	(0.156)	(0.178)	(0.175)	(0.154)
	[0.000]	[0.000]	[0.002]	[0.002]	[0.004]
Observations	4,224	4,224	4,224	4,224	4,224
R^2	0.358	0.394	0.747	0.761	0.766
Dependent variable mean (control)	1.432	1.432	1.432	1.432	1.352
Year FE	✓				
Month–year FE		✓	✓	✓	✓
State FE			✓	✓	✓

Event study

$$(2) \quad Y_{st} = \sum_{j \in [-K,L],\, j \neq 1} \beta_j Child\ marriage\ banned_{s(t+j)} + X_{st}\,\rho + \gamma_s + \gamma_t + U_{st}$$

Event study

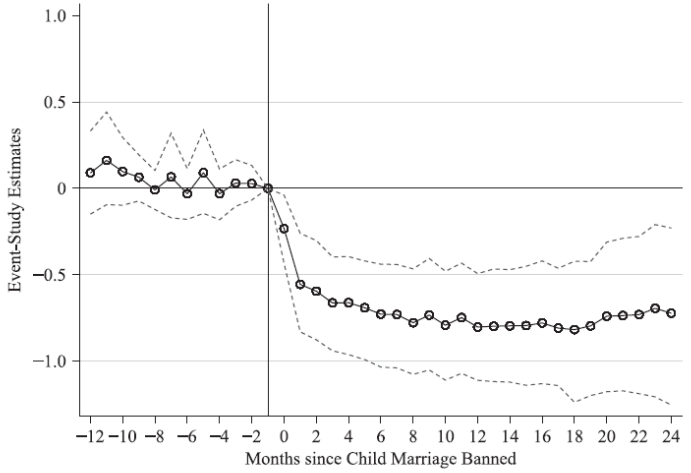


Figure 5

Event-Study Estimates of the Effect of Banning Child Marriage on Formal Marriage Rates of 16- and 17-Year-Old Girls

Event study

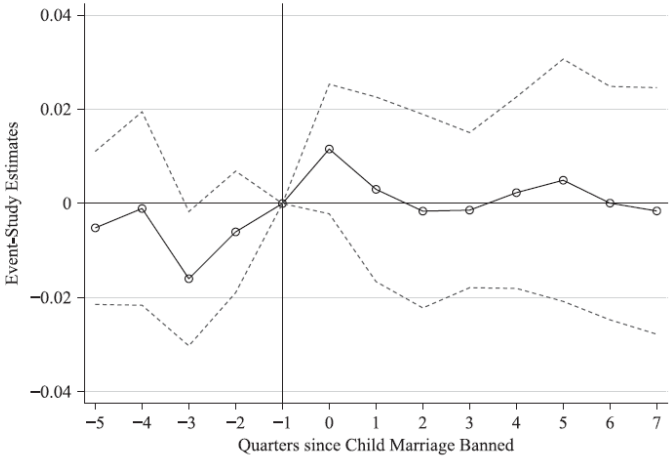


Figure 7

Event-Study Estimates of the Effect of Banning Child Marriage on School Attendance of 16- and 17-Year-Old Girls

Event study

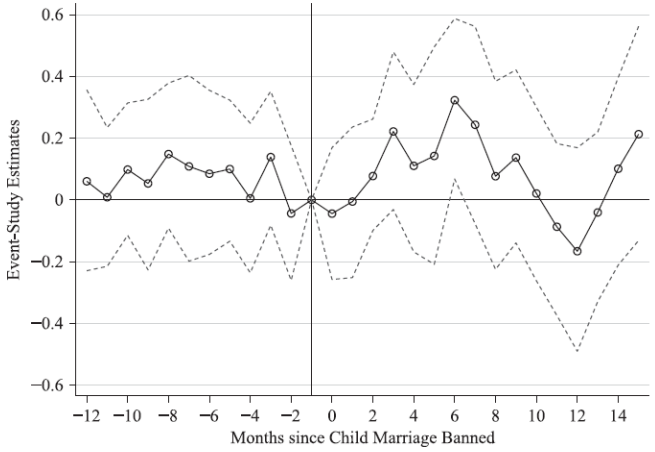
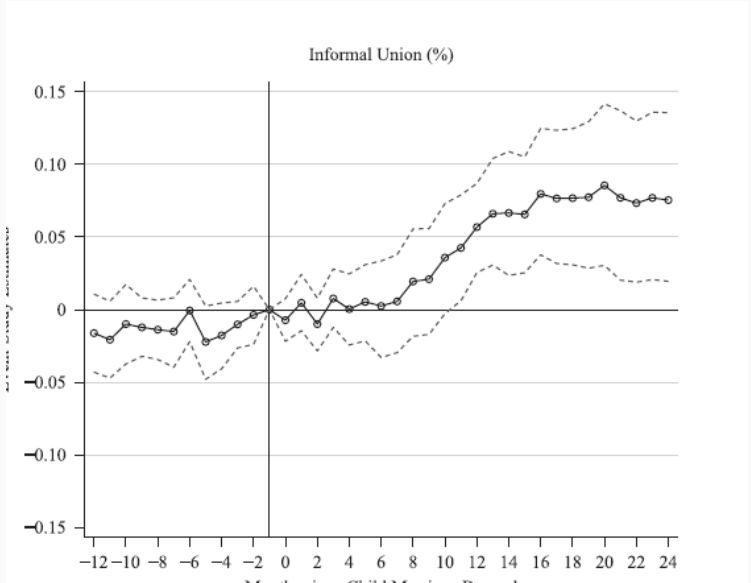


Figure 8

Event-Study Estimates of the Effect of Banning Child Marriage on Early Motherhood of 16- and 17-Year-Old Girls

Event study


Informal Union (%)
0.15
0.10
0.05
0
−0.05
−0.10
−0.15
−12 −10 −8 −6 −4 −2 0 2 4 6 8 10 12 14 16 18 20 22 24

Difference-in-Difference: Examples

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Political competition and state capacity

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POLITICAL COMPETITION AND STATE CAPACITY: EVIDENCE FROM A LAND ALLOCATION PROGRAM IN MEXICO*

Leopoldo Fergusson, Horacio Larreguy and Juan Felipe Riaño

We develop a model of the politics of state capacity building undertaken by incumbent parties that have a comparative advantage in clientelism rather than in public goods provision. The model predicts that, when challenged by opponents, clientelistic incumbents have the incentive to prevent investments in state capacity. We provide empirical support for the model's implications by studying policy decisions by the Institutional Revolutionary Party that affected local state capacity across Mexican municipalities and over time. Our difference-in-differences and instrumental variable identification strategies exploit a national shock that threatened the Mexican government's hegemony in the early 1960s.

In a nutshell

- Exploits a national shock that threatened the Institutional Revolutionary Party's (PRI) hegemony in the early 1960s with varying intensity across municipalities
- To capture local bureaucratic capacity decisions by the PRI, look at a land allocation program that transferred property rights to communities in the form of ejidos
- Proximity to municipal headquarters was a central determinant of the cost of public good provision, and, consequently, of municipal bureaucratic state capacity.
- Data: Granular data on marriages, births, and school attendance

Estimating equation

$$\text{Distance}_{e,m,t} = \gamma \cdot \left(\text{Post1960}_{e,m,t} \times \text{Political Competition}_{m}\right) + \eta_m + \delta_t + \varepsilon_{e,m,t}, \qquad (4)$$

Results

Baseline results, *ejidos* allocated from 1914 to 1992

Dependent variable:	(1)	(2)	(3)	(4)
	Distance of *ejido* from municipality head			Post-1960 × competition
Econometric specification	OLS	IV	Reduced form	First stage
Panel A: competition measured as the vote share of opposition parties				
Post-1960 × competition	3.243**	7.077***		
	(1.308)	(2.717)		
Post-1960 × months with droughts during 1950–9			0.34***	2.43**
			(0.05)	(0.99)
R^2	0.579	–	–	0.621
F-statistic (Kleibergen-Paap rk wald)				38.99
Observations	17,059	17,059	17,059	17,059
Panel B: competition measured as the number of events of social and political discontent during 1960–9				
Post-1960 × competition	2.391**	9.847**		
	(1.056)	(4.728)		
Post-1960 × months with droughts during 1950–9			0.21***	2.08**
			(0.07)	(0.96)
R^2	0.581	–	–	0.516
F-statistic (Kleibergen-Paap rk Wald)				9.518
Observations	17,239	17,239	17,239	17,239
Controls for all specifications:				
Municipality fixed effects	✓	✓	✓	✓
Year of allocation fixed effects	✓	✓	✓	✓

Event study

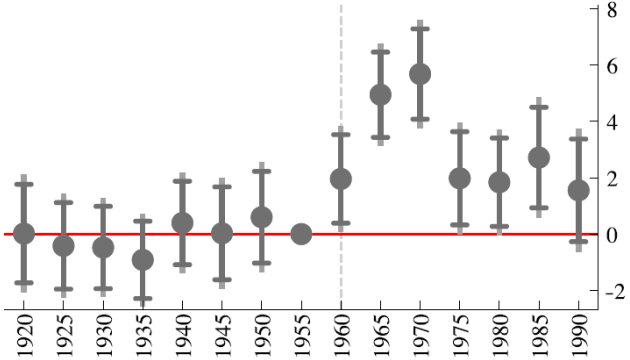

Fig. 2. *The Effect of Expected Political Competition (Opposition Vote Share) on the Distance of Ejidos from Municipal Headquarters.*

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Regular article

Grandmothers and the gender gap in the Mexican labor market

Miguel Ángel Talamas Marcos[1]

Inter-American Development Bank, Kellogg School of Management, United States of America

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Triple-difference
Motherhood penalty
Childcare
Mexico

ABSTRACT

This paper estimates the effect of childcare availability on parents' employment probability using the timing of the grandmothers' death – the primary childcare provider in Mexico – as identifying variation. I use a triple-difference to disentangle the effect of coinhabiting grandmothers' deaths due to their impact on childcare from their effects due to alternative mechanisms. Through their impact on childcare availability, grandmothers' deaths reduce mothers' employment rate by 12 percentage points (27 percent) and do not affect fathers' employment rate. The negative effect on mothers' employment is smaller where public daycare is more available, or private daycare or schools are more affordable.

In a nutshell

- Natural experiment based on the plausibly exogenous timing of the death of coinhabiting grandmothers

Estimating equation

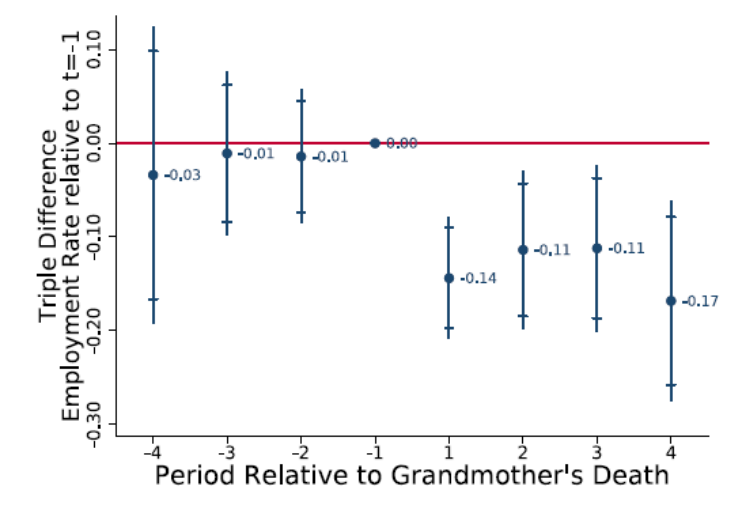
$$
\begin{aligned}
Employed_{i,l,t} = {} & \beta_1 Post_{i,l,t} \times Death_{i,l}^{GM} + \beta_2 Post_{i,l,t} \\
& \times Death_{i,l}^{GM} \times YoungChild_{i,l} \\
& + \phi_i + \zeta_{l,t} + \gamma_{t,YoungChild} + \eta_{t,DeathGM} + \varepsilon_{i,l,t}
\end{aligned} \tag{1}
$$

Results

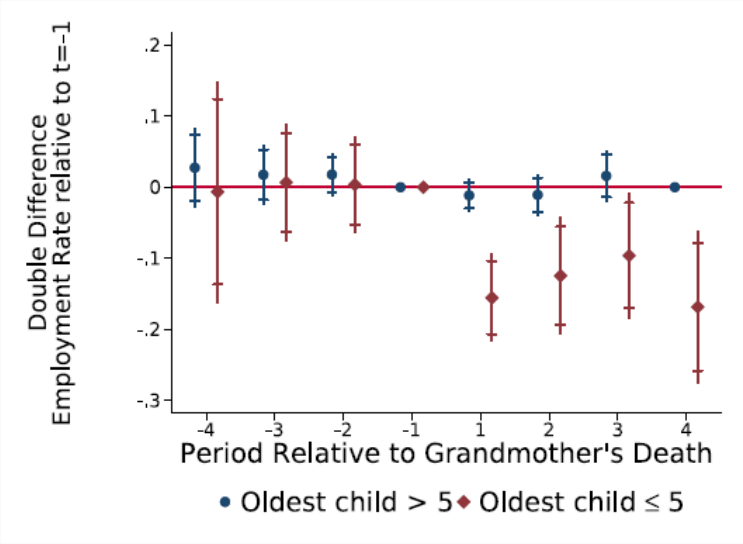
Table 1
Grandmother's death and parents' employment rate.

	(1)	(2)	(3)	(4)
Panel (A) Mothers				
Post x Grandmother died	−0.0154	−0.0223*	−0.0159	0.00740
	(0.0133)	(0.0123)	(0.0133)	(0.00960)
Post x Grandmother died x Oldest	−0.124***	−0.107***	−0.121***	−0.122***
Grandchild at most 5 years old	(0.0307)	(0.0278)	(0.0307)	(0.0313)
N	484,464	484,464	484,464	484,464
Panel (B) Mothers and Fathers				
Post x Grandmother died	−0.00971	−0.00930	−0.00428	0.0201
	(0.0219)	(0.0211)	(0.0219)	(0.0153)
Post x Grandmother died x Oldest	0.0232	0.0267	−0.0116	0.0265
Grandchild at most 5 years old	(0.0418)	(0.0371)	(0.0416)	(0.0423)
Post x Grandmother died x Mother	−0.00569	−0.0130	−0.0116	−0.0127
	(0.0252)	(0.0243)	(0.0252)	(0.0183)
Post x Grandmother died x Oldest	−0.147***	−0.134***	−0.109**	−0.148***
grandchild at most 5 x Mother	(0.0489)	(0.0431)	(0.0486)	(0.0492)
N	743,733	743,733	743,733	743,733
Individual FE	Y	Y	Y	Y
Y - Q - Locality - Gender FE	Y	–	Y	Y

Event study


Triple Difference
Employment Rate relative to t=-1
0.10
0.00
-0.10
-0.20
-0.30
-0.03
-0.01
-0.01
0.00
-0.14
-0.11
-0.11
-0.17
-4
-3
-2
-1
1
2
3
4
Period Relative to Grandmother's Death

Event study


Double Difference
Employment Rate relative to t=-1
.2
.1
0
-.1
-.2
-.3
-4
-3
-2
-1
1
2
3
4
Period Relative to Grandmother's Death
Oldest child > 5
Oldest child ≤ 5

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Informality and transit improvements

Spatial Misallocation, Informality, and Transit Improvements: Evidence from Mexico City*

Román David Zárate†

World Bank

December 2022

Abstract

Developing countries have failed to enforce taxes across establishments leading to inefficiently high informality. Can transit infrastructure improve input allocation by reducing informality? This paper studies this question in Mexico City. I combine a rich collection of administrative microdata and exploit the construction of new subway lines. Transit improvements reduce informality by seven percent in areas near the new subway stations. I develop a spatial general equilibrium model that accounts for the direct effects of transit infrastructure in purely efficient economies and on allocative efficiency in economies with distortions. Changes in allocative efficiency driven by workers' reallocation to the formal sector amplify the gains by around 25%.

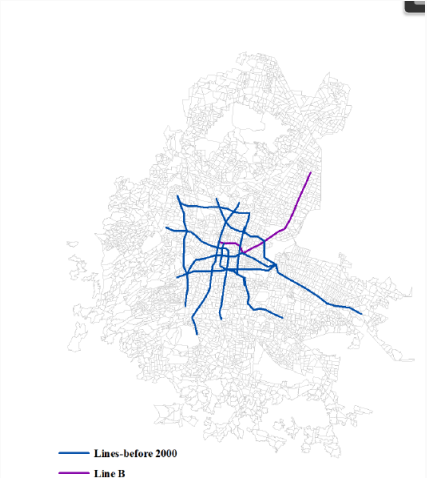
Keywords: Informality, allocative efficiency, urban transit infrastructure.

In a nutshell

- Estimate the effect of transit improvements (Linea B) on workers' reallocation across the formal and informal sectors

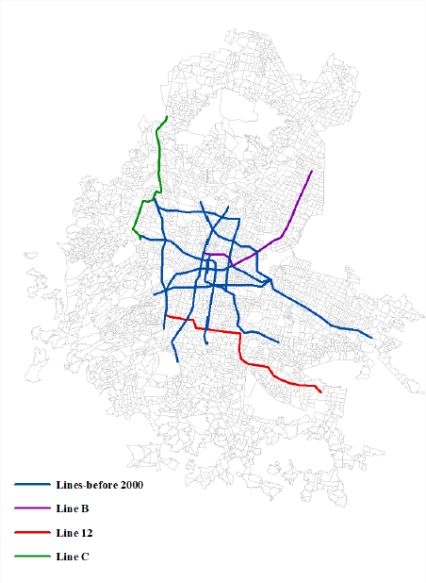
- difference-in-differences specifications that use variation in access to new transit (census tracts close and far away from new line)

Motivation



(a) Line B

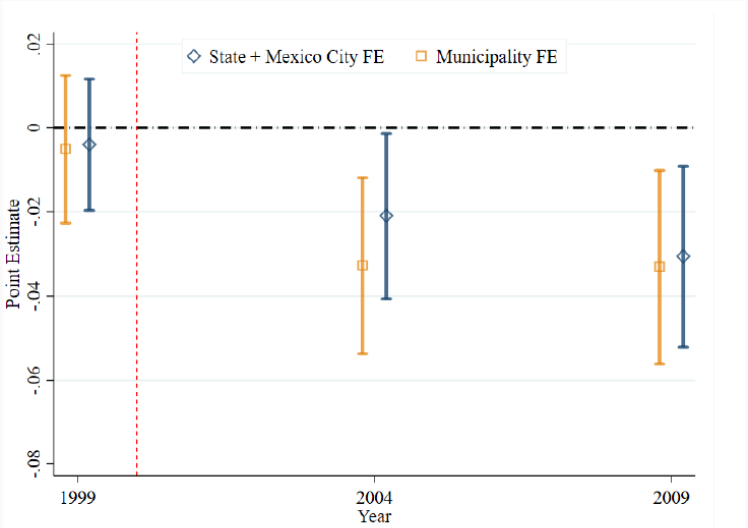
Motivation



Results

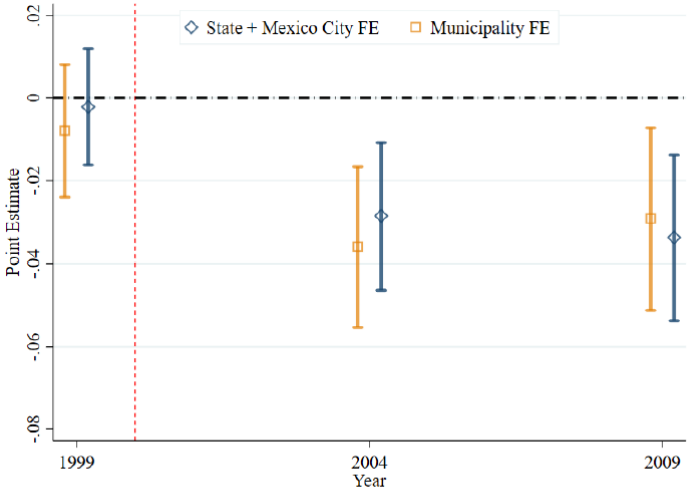
	(1)	(2)	(3)	(4)	(5)
Outcome:	$\Delta(\ln L_F - \ln L_I)$	$\Delta(\ln L_F - \ln L_I)$	$\Delta(\ln L_F - \ln L_I)$	$\Delta(\ln L_F - \ln L_I)$	$\Delta(\ln L_F - \ln L_I)$
			Panel A: Continuous treatment measure-Pool of residents		
- ln distance	0.040***	0.054***	0.045***	0.058***	0.014*
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
Observations	3,192	3,192	3,192	3,192	3,192
R-squared	0.162	0.248	0.162	0.248	0.230
			Panel B: Treatment dummy variable-Pool of residents		
T_i	0.038**	0.069***	0.033**	0.067***	0.024
	(0.016)	(0.016)	(0.016)	(0.016)	(0.018)
Observations	3,192	3,192	3,192	3,192	3,192
R-squared	0.156	0.241	0.156	0.240	0.230
			Panel C: Continuous treatment measure-Low skilled residents		
-ln distance	0.049***	0.056***	0.053***	0.060***	0.017*
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)
Observations	3,192	3,192	3,192	3,192	3,192
R-squared	0.137	0.230	0.138	0.230	0.203
			Panel D: Treatment dummy variable-Low skilled residents		
T_i	0.051***	0.071***	0.046***	0.069***	0.027
	(0.017)	(0.016)	(0.017)	(0.016)	(0.019)
Observations	3,192	3,192	3,192	3,192	3,192
R-squared	0.130	0.222	0.130	0.221	0.202
			Panel E: Continuous treatment measure-Outskirt area		
-ln distance	0.072***	0.088***	0.079***	0.095***	0.037***
	(0.009)	(0.009)	(0.010)	(0.010)	(0.010)
Observations	2,171	2,171	2,171	2,171	2,171
R-squared	0.199	0.279	0.200	0.279	0.279

Event study



(a) Informal workers

Event study



(b) Informal and non-salaried workers

Difference-in-Difference: Examples

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Age-of-marriage laws in Mexico

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Grandmothers and the gender gap in the Mexican labor market

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Full-time schools, policy-induced school switching, and academic performance☆

María Padilla-Romo

University of Tennessee, Department of Economics, United States

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ABSTRACT

While many developing countries are extending their school day from half- to full-time, little is known about the effects of such programs on student outcomes. Mexico recently extended its school-day duration from 4.5 h to 8 h through a full-time schools program. Using administrative student-level panel data, I exploit variation in the rollout of this program to identify its effect on math and language test scores. Controlling for endogenous switching between schools, I find that full-time schooling improves students' math and language test scores, respectively, by 2.4 and 1.5 percent of a standard deviation in the first year of implementation. These results persist, growing to 13.7 and 10.8 percent of a standard deviation after five years. Moreover, the main results indicate that failure to control for endogenous school switching inflates the effects of five years of exposure to full-time schooling by a factor of 1.2 on math test scores and by a factor of 1.6 on language test scores.

In a nutshell

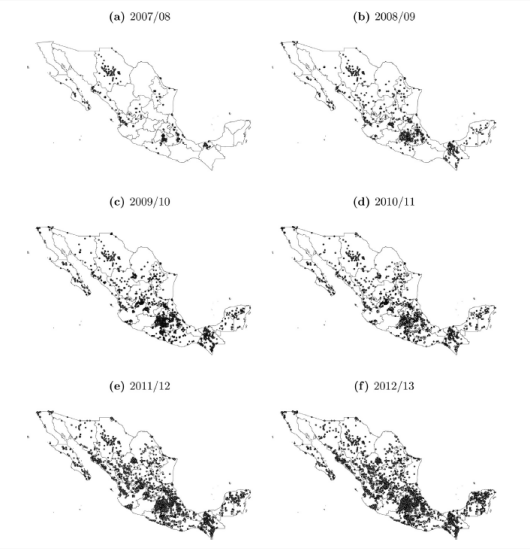
- Many developing countries are extending their school day from half- to full-time
- Mexico full time schools: Started in 2007 and had reached more than 25,000 schools by 2018
- Extended school-day duration by 3.5 hours (4.5 to 8) and provided school lunch

Table 1
Comparison of the time allocation between half-time and full-time schools.

		Half-time schools		Full-time schools	
		Academic year	Week	Academic year	Week
Core	Math	200	5	280	7
	Spanish	240	6	320	8
	Sciences	120	3	160	4
	History	60	1.5	60	1.5
	Geography	60	1.5	60	1.5
	Civic and Ethical Education	40	1	40	1
	Physical Education	40	1	80	2
	Art	40	1	80	2
New	Second Language	0	0	120	3
	Information Technology	0	0	50	1.25
	Lunch	0	0	200	5
	Break	100	2.5	150	3.75
	Total	900	22.5	1600	40

Notes: Schools' time allocation information is based on SEP (2010) and SEP (1993). All time amounts are expressed in hours.

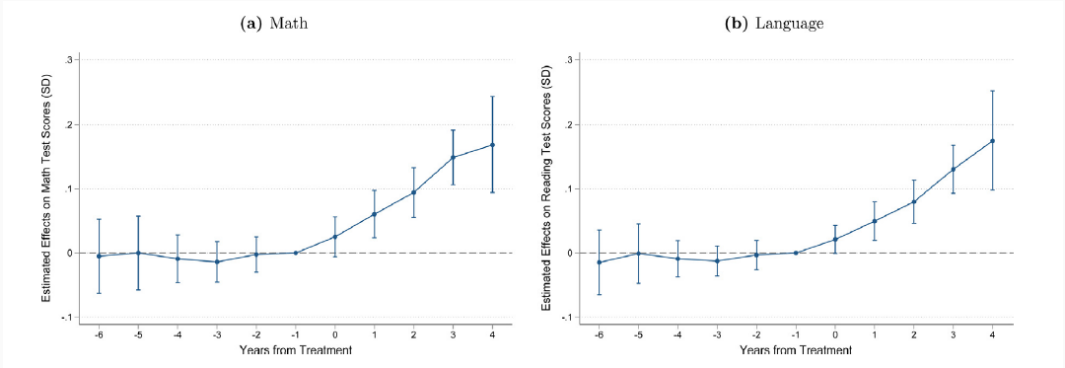
Motivation



Estimating equation

$$TS_{igst} = \sum_{k=1}^{5} \delta_k FTS_{igstk} + experienced_{ist}\alpha + X_{sgt}\beta + \nu_{sg} + \gamma_{gt} + u_{igst}$$

Event study


(a) Math
Estimated Effects on Math Test Scores (SD)
.3
.2
.1
0
-.1
-6
-5
-4
-3
-2
-1
0
1
2
3
4
Years from Treatment
(b) Language
Estimated Effects on Reading Test Scores (SD)
.3
.2
.1
0
-.1
-6
-5
-4
-3
-2
-1
0
1
2
3
4
Years from Treatment

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Rules versus Discretion in Public Service: Teacher Hiring in Mexico

> Volume 37, Number 2

PREVIOUS ARTICLE NEXT ARTICLE

Rules versus Discretion in Public Service: Teacher Hiring in Mexico

Ricardo Estrada

CAF–Development Bank of Latin America

PDF PDF PLUS Abstract Full Text Supplemental Material

Abstract

This paper compares the performance of teachers hired on the basis of a standardized exam to those hired at the union's discretion in Mexico. My results show that the discretionary hires perform considerably worse than the rule-based hires (as measured by value added to student achievement). The evidence presented here shows the impact of personnel selection mechanisms on the quality of public service delivery.

Details Figures References Cited

Journal of Labor Economics
Volume 37, Number 2
April 2019

In a nutshell

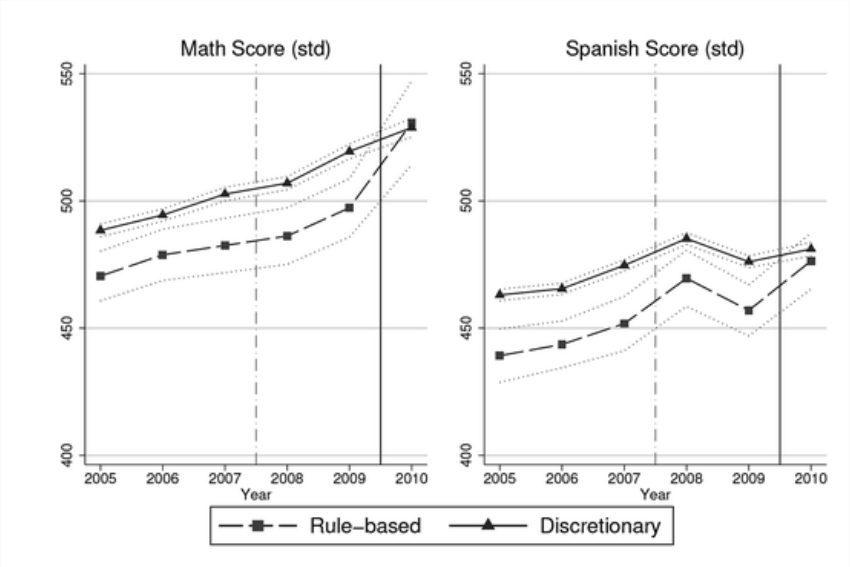
- In Mexico, public school teachers enjoy high hourly wages and high job security
- Classroom observations: 50% of instructional time is lost in Mexico City's primary schools
- Until 2014, the national teachers' union (SNTE) had the leading voice in a highly discretionary process used to hire new teachers
- This process was controversial; widespread nepotism and the selling of jobs
- 2008 reform: national examination based on a standardized exam to fill some teaching positions
- 2013 Constitutional amendment: all vacant teaching positions in public schools to be filled through a national and competitive examination
- Compare the performance of teachers hired in the discretionary process with that of teachers hired based on test scores in the standardized exam

Motivation

Table 7. Teacher Characteristics—Rule-Based Applicants: Means

	Difference (1)	Rule-Based Hires (2)	Discretionary Hires (3)
Age	−2.41***	25.96	28.37
	(.58)		
Female (%)	.00	.58	.58
	(.05)		
Public sector experience (%)	−.28***	.22	.50
	(.05)		
Private sector experience (%)	.04	.12	.08
	(.03)		
Graduation year	1.26***	2,007.68	2,006.42
	(.35)		
University GPA (SD)	.47***	.35	−.12
	(.11)		
Observations	536		

Motivation


Math Score (std)
Spanish Score (std)
550
500
450
400
2005
2006
2007
2008
2009
2010
Year
Rule−based
Discretionary

Estimating equation

$$y_{st} = \beta_0 + \beta_1 share_{st} + \Gamma X_{st} + \tau_t + \alpha_s + v_{st},$$

Main results

Table 5. Difference in Differences: Results

Variable	Final Enrollment (%) (1)	Math Score (SD) (2)	Spanish Score (SD) (3)
Share of rule-based hires	−.0130	52.64***	31.63***
	(.0304)	(15.94)	(11.20)
Observations	8,262		
R^2	.068	.162	.108
Number of schools	1,397		
Mean Control	.938	528.8	481.1

Pre Trends

Table 4. Difference in Differences: Pretreatment Trends in Outcomes

Variable	Final Enrollment (%) (1)	Math Score (SD) (2)	Spanish Score (SD) (3)
2006 × share of rule-based hires	.0133	−3.726	−10.04
	(.0310)	(9.864)	(10.09)
2007 × share of rule-based hires	−.00979	−8.248	−6.066
	(.0394)	(13.93)	(15.15)
2008 × share of rule-based hires	.102***	−16.53	−9.823
	(.0386)	(13.79)	(13.54)
2009 × share of rule-based hires	−.00182	−2.338	−2.356
	(.0337)	(15.08)	(12.77)
Observations	6,867		
R^2	.072	.127	.107
Number of schools	1,396		
H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$:			
F-statistic	3.111	.683	.382
Probability > *F*	.0146	.604	.822

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Family Rules: Nepotism in the Mexican Judiciary*

Pablo Brassiolo† Ricardo Estrada‡ Gustavo Fajardo§
Julian Martinez-Correa¶

February 2023

Abstract

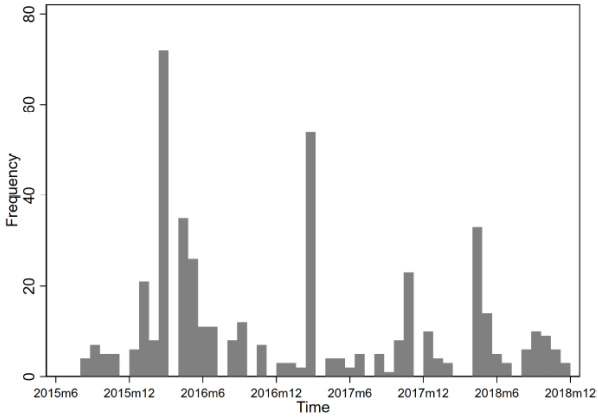
We show that bureaucrats can exploit discretion in hiring decisions to engage in forms of favoritism that hinder organizational performance. We do this in the context of the Mexican federal judiciary. The arrival of a judge at a circuit results in the hiring of 0.05 relatives to key staff positions within the following year on average, a figure which is probably a lower bound of the overall effect. Moreover, we find that related appointees are negatively selected in terms of educational level and that their hiring leads to a reduction in the court's productivity, which indicates that such hires are motivated by rent-seeking rather than by efficiency purposes. Importantly

In a nutshell

- The selection of federal judges is made through competitive examinations
- Judges, in turn, have leeway to appoint individuals to work in their courts, even in the most important positions such as that of judicial clerk
- Use data on the curricular information of judicial officials
- Event-study design to estimate whether the arrival of a judge at a circuit increases the prevalence of that judge's relatives (proxied by family names) among the staff of the corresponding judicial circuit.

Motivation

Figure 1: Judge arrivals, by month

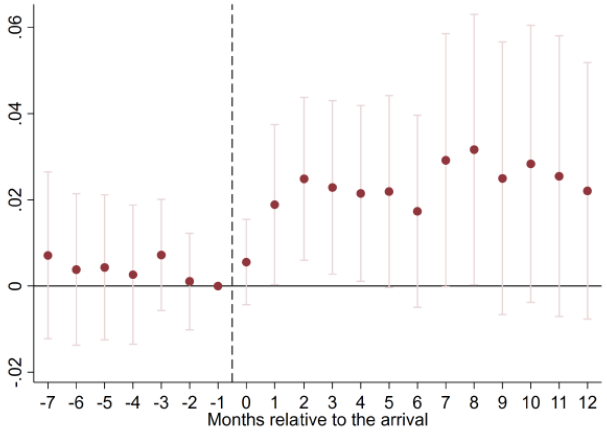


Estimating equation

$$Y_{ict} = \sum_{\tau=-7, \tau \neq -1}^{12} \beta_\tau \cdot \mathbb{1}[\tau = t - e_{ic}] + \theta_i + \lambda_t + \epsilon_{it} \quad (1)$$

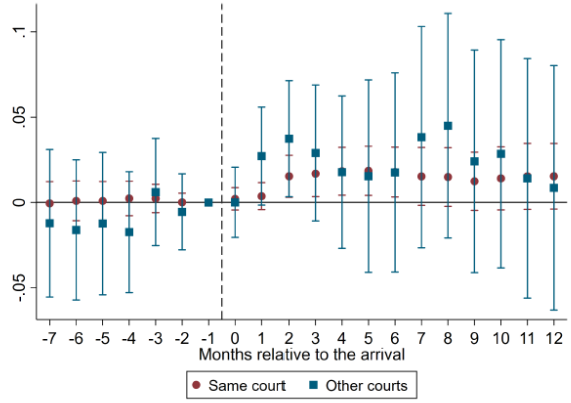
Main results

Figure 3: Effect on the percentage of staff members sharing the judge's family name



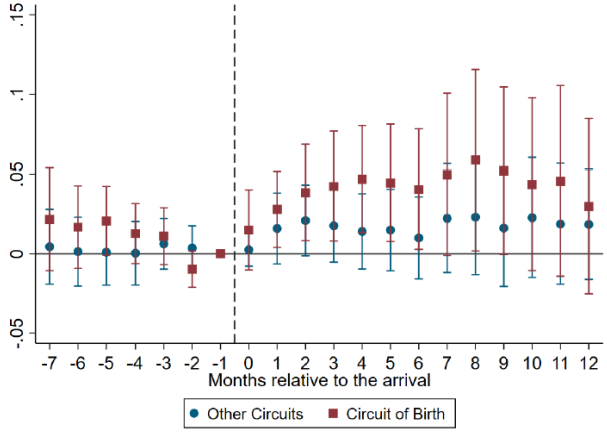
Main results

Figure 5: Effect on the number of staff members sharing the judge's family name by court of placement



Main results

Figure 6: Effect on the percentage of staff members sharing the judge's family name by circuit of (birth) assignment



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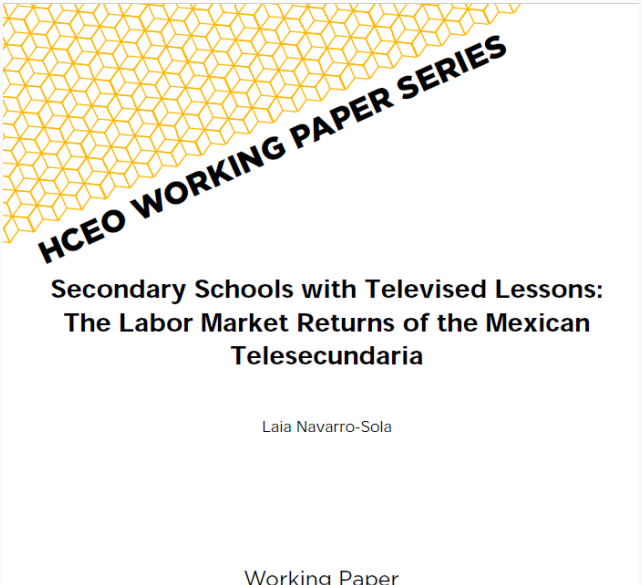


Telesecundarias

Broadcasting Human Capital?

The Long-Run Effects of Mexico's Telesecundarias*

Raissa Fabregas†

June 2021

For most recent version click here.

Abstract

Every year over one million children in rural Mexico attend *telesecundarias*, lower secondary schools with classes transmitted through satellite television. *Telesecundarias* substitute on-site subject-specialized teachers with televised content, substantially reducing the costs of education delivery in remote locations. Using census data from 2010, this paper estimates the long-term educational and labor market outcomes of adolescents living in rural areas who were exposed to a telesecundaria expansion policy in the 1990s. I obtain causal estimates by exploiting geographical differences in the intensity of telesecundaria school openings and cohort exposure induced by the timing of the policy. As adults, exposed men and women are more likely to have completed primary and lower secondary education. The roll-out had positive effects on the labor force participation and earnings of men. While I do not find much evidence of labor market improvements for women, they appear to have benefited in other dimensions. Those exposed to the program are less likely to receive income from the government as adults.

In a nutshell

- Over one million children in rural Mexico attend telesecundarias, lower secondary schools with classes transmitted through satellite television
- Not an isolated program: A dozen low- and middle-income countries started using televisions in education between 1950 and 1970, and many more have implemented similar programs since then
- Take advantage of a telesecundaria expansion that took place between 1994 and 2000, following legislation that made lower secondary schooling mandatory
- Using census data from 2010, estimate impacts on measures of educational attainment, labor market outcomes, and living standards in adulthood

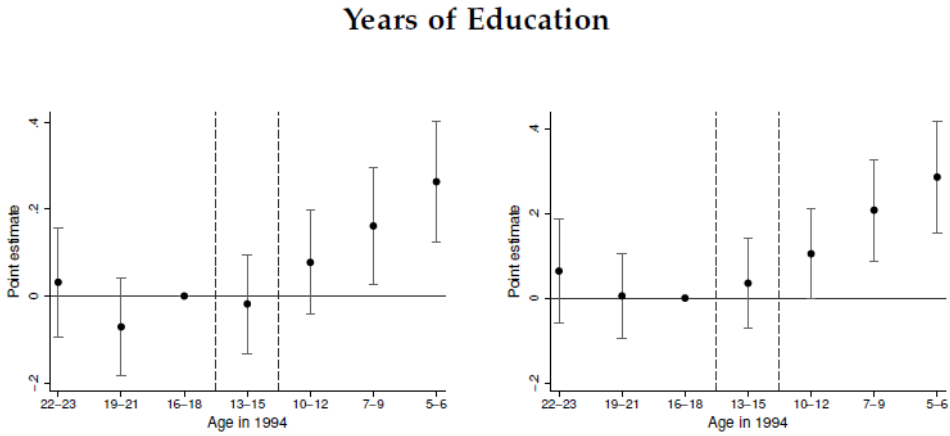
Estimating equation

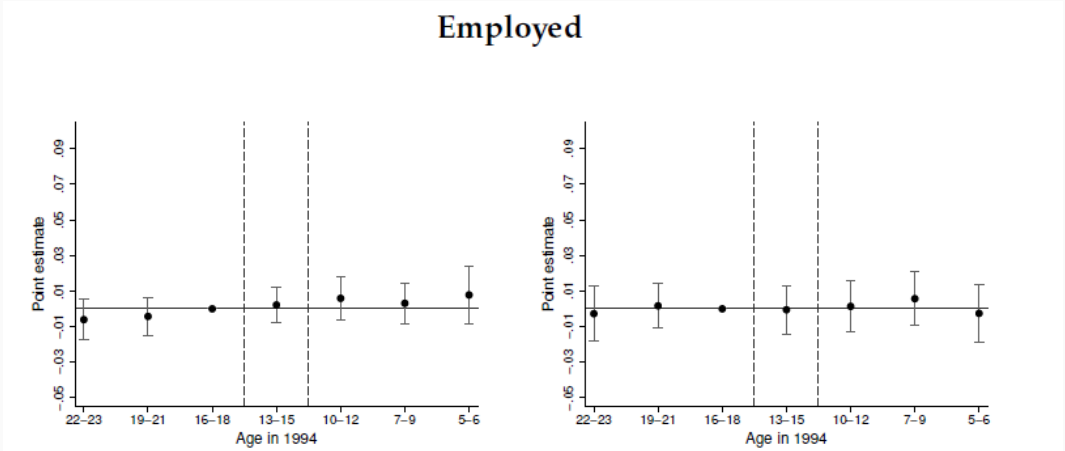
$$y_{imc} = \alpha + (I_m \cdot d_c)\beta_1 + \mu_c + \theta_m + \gamma_s c + X_{cm}\delta + \epsilon_{imc}$$

Estimating equation

I also graphically show a multiple cohort difference-in-differences strategy, exploiting exposure to the expansion program by interacting the measure of telesecundaria intensity with multi-year cohort dummies. The coefficient of interest is an estimate of the impact of the expansion of telesecundarias for a given cohort group k. Cohorts are binned into groups to improve power and reduce noise. Those who were 16-18 years of age in 1994 are left as the comparison group (the omitted dummy). The equation is of the form:

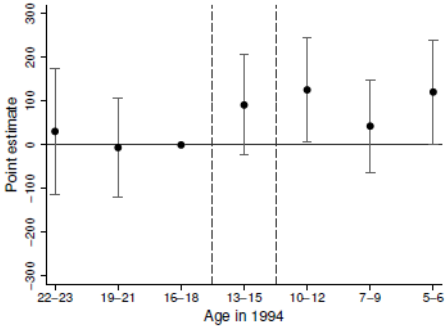
$$y_{imsk} = \alpha + \sum_{k=1}^{7} (I_m \cdot d_{ik})\beta_{1k} + \mu_c + \theta_m + \gamma_s c + X_{cm}\delta + \epsilon_{imsk} \quad (2)$$


Years of Education
Point estimate
−2
0
.2
.4
22–23
19–21
16–18
13–15
10–12
7–9
5–6
Age in 1994
(a) Men
(b) Women

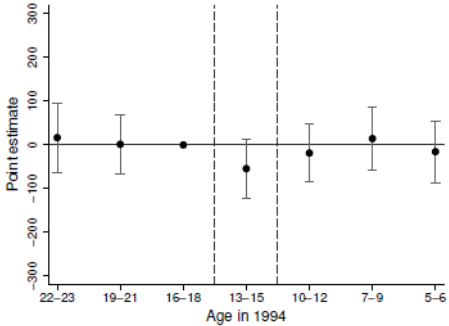

Employed
Point estimate
−.05
−.03
−.01
.01
.03
.05
.07
.09
22–23
19–21
16–18
13–15
10–12
7–9
5–6
Age in 1994
Point estimate
−.05
−.03
−.01
.01
.03
.05
.07
.09
22–23
19–21
16–18
13–15
10–12
7–9
5–6
Age in 1994

(c) Men (d) Women

Monthly Earnings

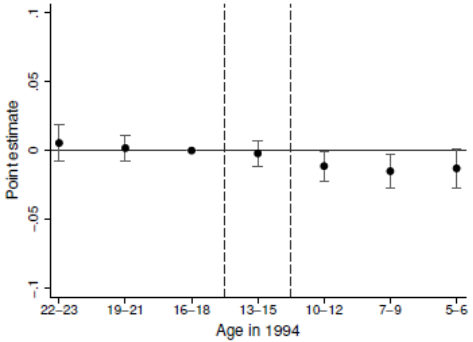


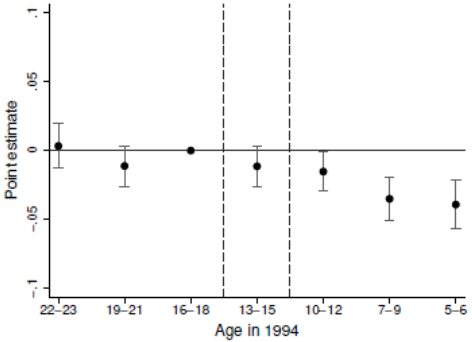
(g) Men



(h) Women

Welfare Programs





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American Economic Journal: Economic Policy 2014, 6(4): 207–238
http://dx.doi.org/10.1257/pol.6.4.207

Cash for Coolers: Evaluating a Large-Scale Appliance Replacement Program in Mexico†

By Lucas W. Davis, Alan Fuchs, and Paul Gertler*

This paper evaluates a large-scale appliance replacement program in Mexico that from 2009 to 2012 helped 1.9 million households replace their old refrigerators and air conditioners with energy-efficient models. Using household-level billing records from the universe of Mexican residential customers, we find that refrigerator replacement reduces electricity consumption by 8 percent, about one-quarter of what was predicted by ex ante analyses. Moreover, we find that air conditioning replacement actually increases electricity consumption. Overall, we find that the program is an expensive way to reduce externalities from energy use, reducing carbon dioxide emissions at a program cost of over $500 per ton. (*JEL* L68, L94, O12, O13, Q41, Q54)

In a nutshell

- Appliance replacement program in Mexico that from 2009 to 2012 helped 1.9 million households replace their old refrigerators and air conditioners with energy efficient models

Estimating equation

$$y_{it} = \sum_{k=-12}^{12} \alpha_k 1[\tau_{it} = k]_{it} + \gamma_i + \omega_{ct} + \varepsilon_{it},$$

Event Study

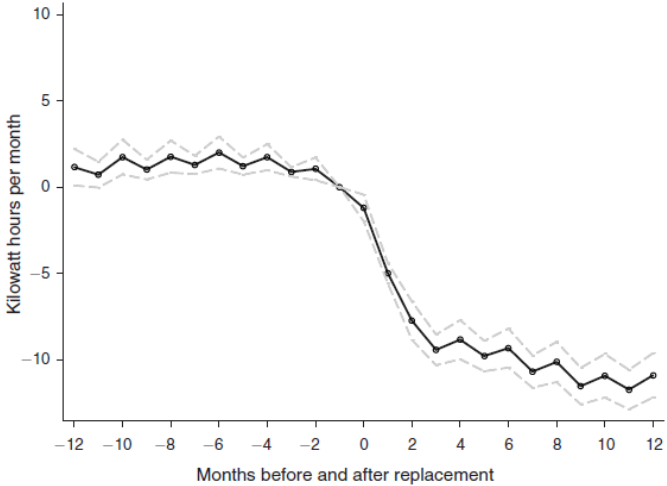

FIGURE 3. THE EFFECT OF REFRIGERATOR REPLACEMENT ON HOUSEHOLD ELECTRICITY CONSUMPTION