Returns to English abilities and occupational decisions in Mexico

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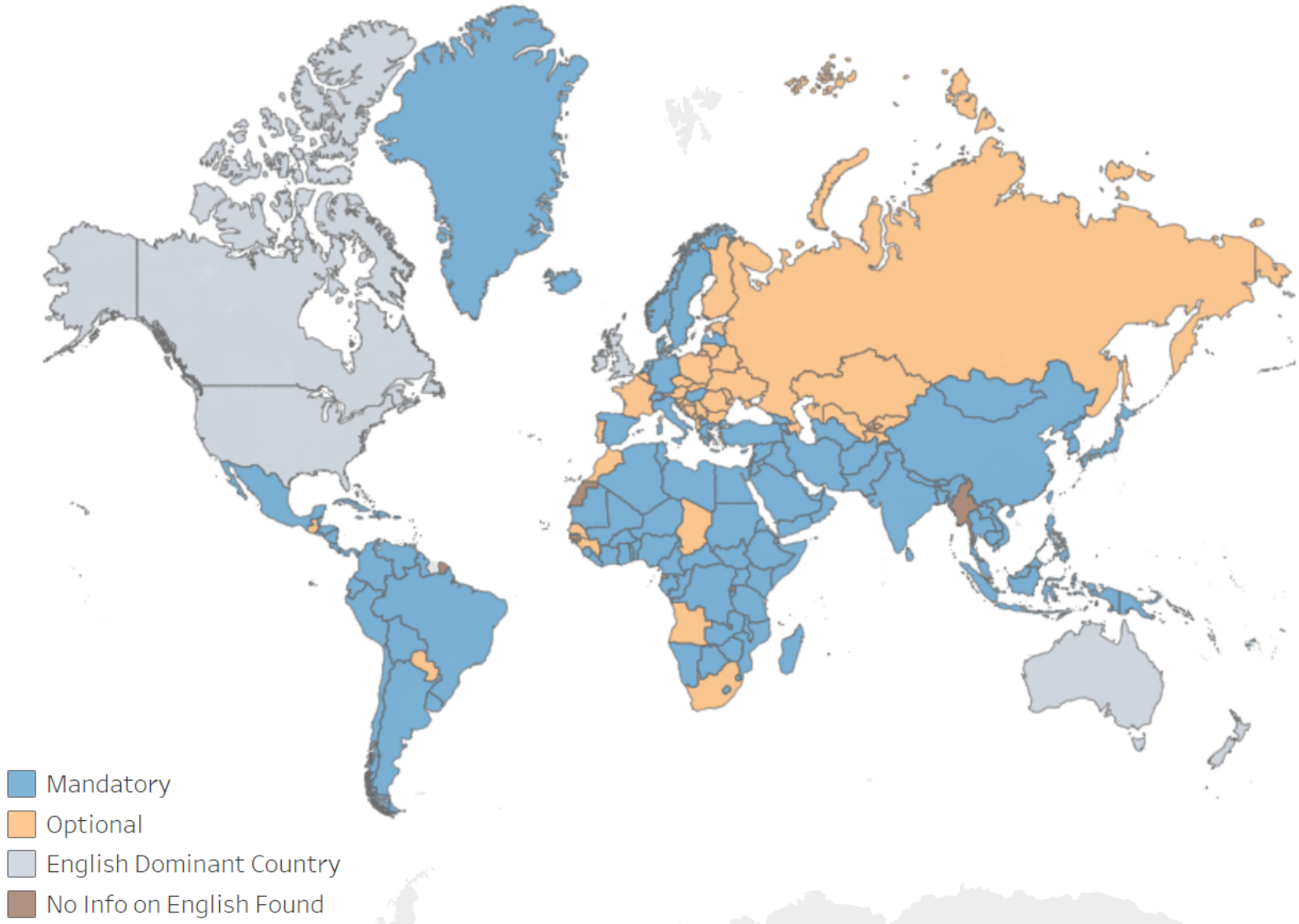
Motivation: Global English education policy



Source: Ives, P., Bale, J., and Haque, E. (2020). How States Promote Global English: Shifting Priorities in Education Policy. Social Sciences and Humanities Research Council of Canada.

Motivation: Returns to English language skills

- Formation of human capital ⇒ Better labor market outcomes (why?)
  - Globalization: trade, technology and culture
  - Migration: national and international
- Does government investment in English programs lead to the acquisition of English abilities?
- I study the expansion of English instruction in several Mexican states

Related Literature

- Returns to English language skills
  - In English-speaking countries: Isphording (2014); Chiswick and Miller (2015)
  - In non English-speaking countries: Azam, Chin and Prakash (2013); Eriksson (2014)
- Exposure to English instruction
  - Policy change in the medium of instruction: Angrist, Chin and Godoy (2008)
  - Exposure of English language as a subject: Chakraborty and Bakshi (2016)
- In Mexico
  - Returns to English language skills using job ads (Delgado-Helleseter, 2020)
  - Exposure to English instruction and labor market outcomes (Gálvez-Soriano, 2022)

This paper in a nutshell

Research Question

- What are the returns to English language skills in a non-English speaking country?
  - Does exposure to English instruction leads to the acquisition of English abilities?
  - Does exposure affect occupational decisions?

Empirical strategy

- Use state by cohort variation in exposure to English instruction in Mexican primary schools
- Difference in Differences (DiD) strategy

Summary of policy backgrounds

Table : Policy changes in Mexican states

State	Year of impl.	Policy change	Cohorts affected	Hrs of English		Policy details	Comparison state
				Before policy	After policy		
Morelos	1992	1992	1967-1996	0.00	5.46	Trial stage	Puebla
Nuevo Leon	1993	1998	1981-1996	0.97	2.75	Only sixth grades	SLP
Sonora	1993	2004	1989-1996	1.64	5.52	Only 1st and 2nd grades	BC
Coahuila	1995	1999	1979-1996	2.73	9.09	Trial stage	Chihuahua
Tamaulipas	2001	2001	1983-1996	1.21	2.89	Only fourth grades	BC
Aguascalientes	2001	2001	1986-1995	2.36	8.13	No info. available	Zacatecas
Durango	2002	2002	1985-1996	0.33	1.00	Trial stage	SLP
Sinaloa	2004	2004	1989-1996	0.70	1.86	No info. available	Nayarit

Empirical strategy

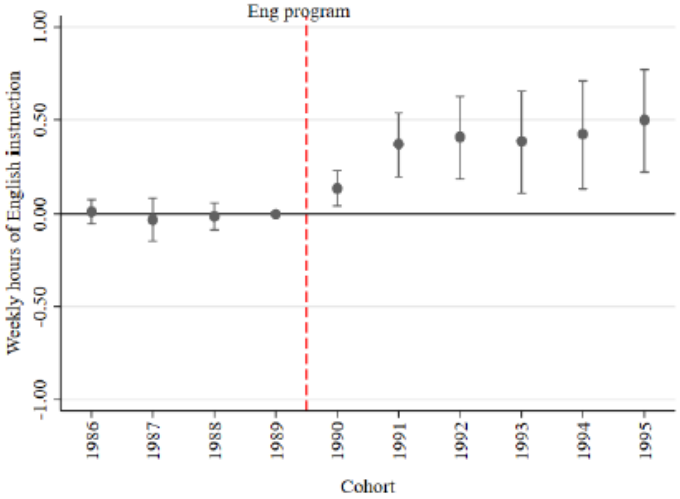
I estimate the intention to treat effect of offering English instruction in elementary school on exposure, English abilities and labor market outcomes (y_{isc}) using a DiD approach

- $after_c$: takes the value of one if the individual i belongs to one of the cohorts that had exposure
- $treatment_s$ takes the value of one if individual i lives in a treated state and zero otherwise

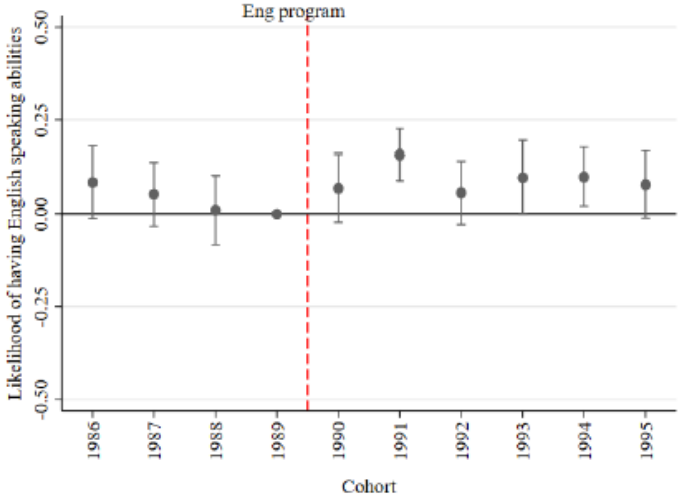
$$y_{isc} = \alpha + \beta \cdot (treatment_s \times after_c) + \delta \cdot treatment_s + \gamma_c + \boldsymbol{X_{isc}\lambda} + \varepsilon_{isc}$$

$$y_{isc} = \alpha + \sum_c \beta_c \cdot I_{(treatment_{sc}=c)} + \delta \cdot treatment_s + \gamma_c + \boldsymbol{X_{isc}\lambda} + \varepsilon_{isc}$$

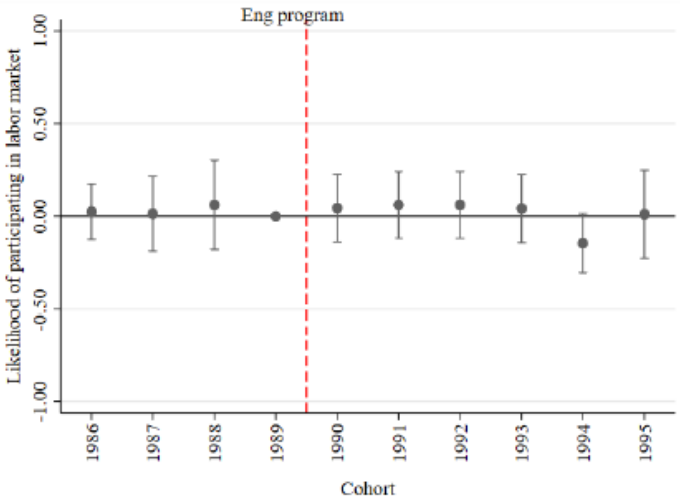
Parallel Trend Assumption (Aguascalientes)



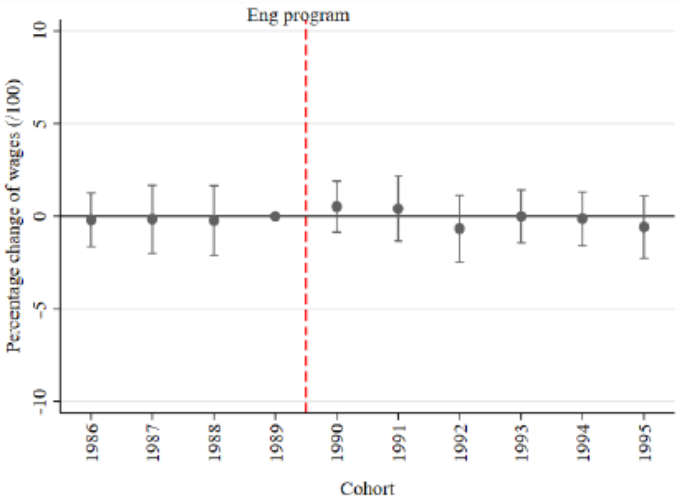
(a) Hours of English



(b) Speak English

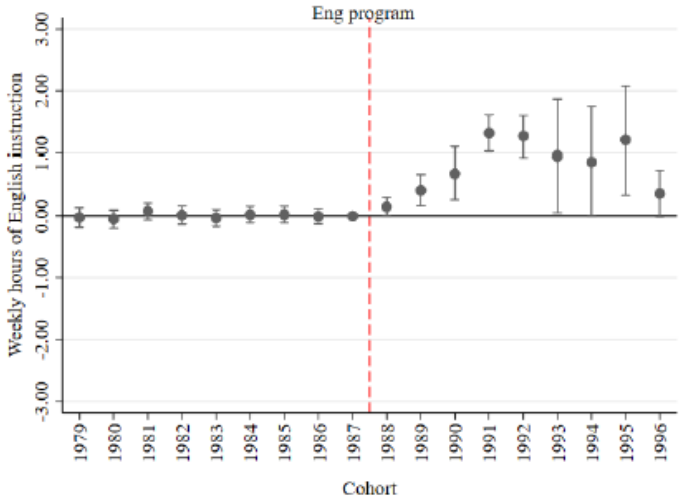


(c) Labor force



(d) Ln(wage)

Parallel Trend Assumption (Coahuila)



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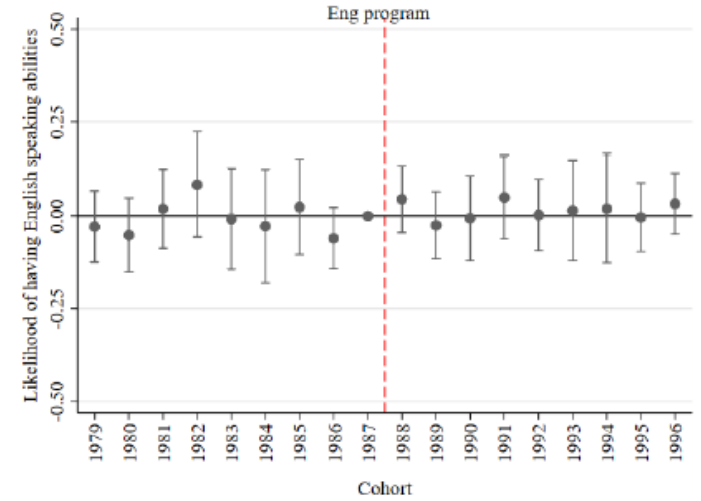
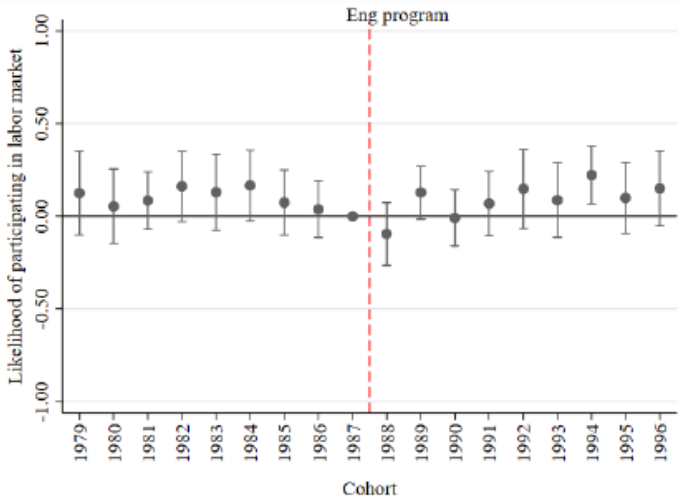
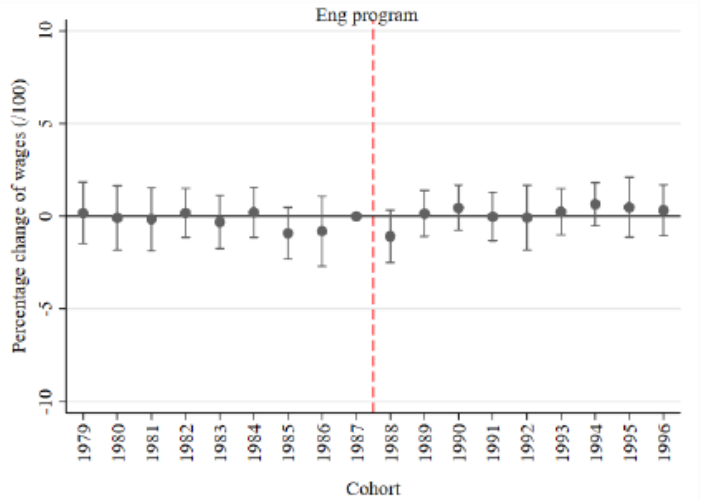


(b) Speak English

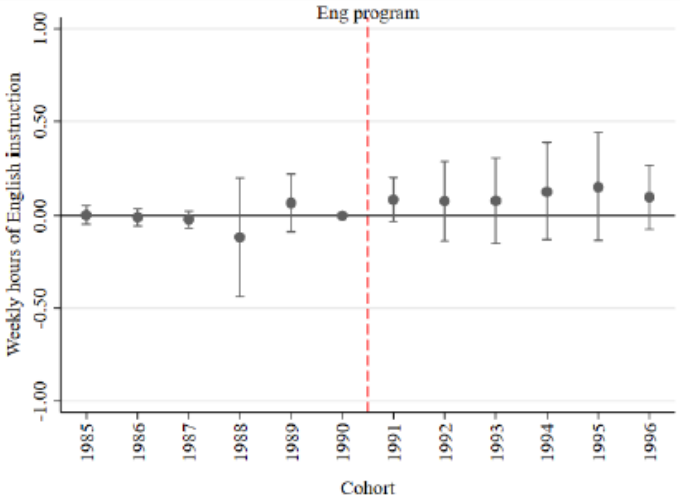


(c) Labor force

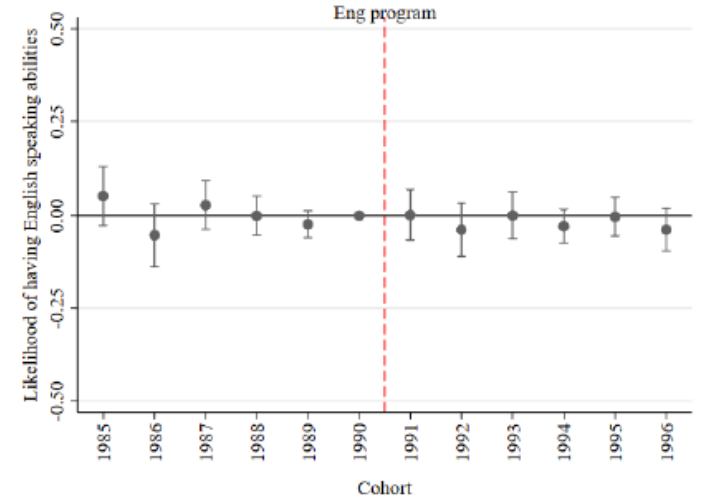


(d) Ln(wage)

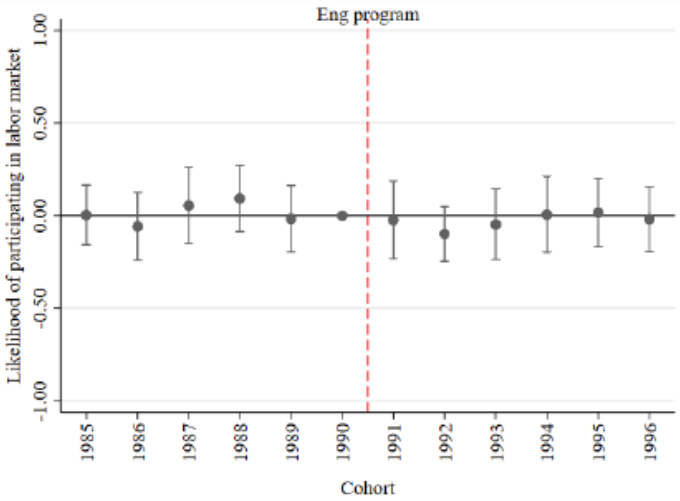
Parallel Trend Assumption (Durango)



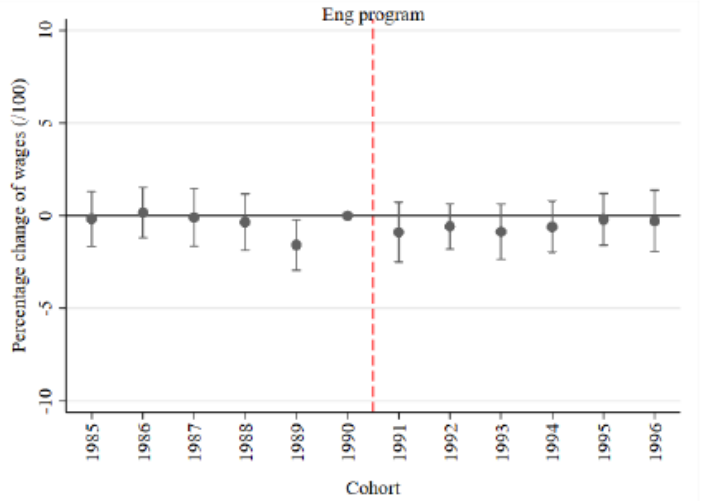
(a) Hours of English



(b) Speak English

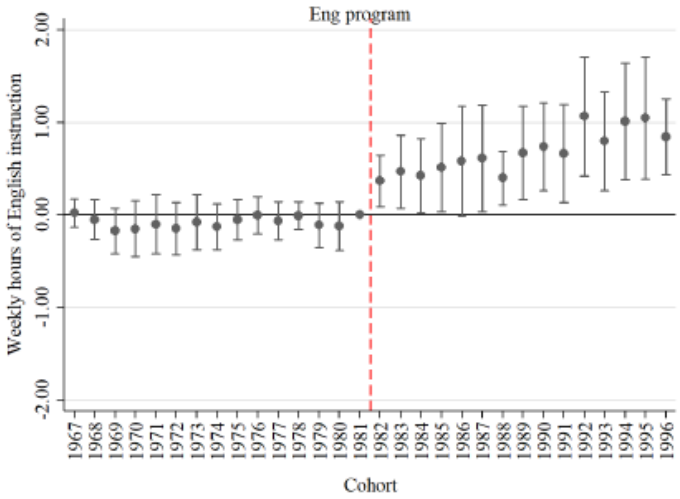


(c) Labor force



(d) Ln(wage)

Parallel Trend Assumption (Morelos)



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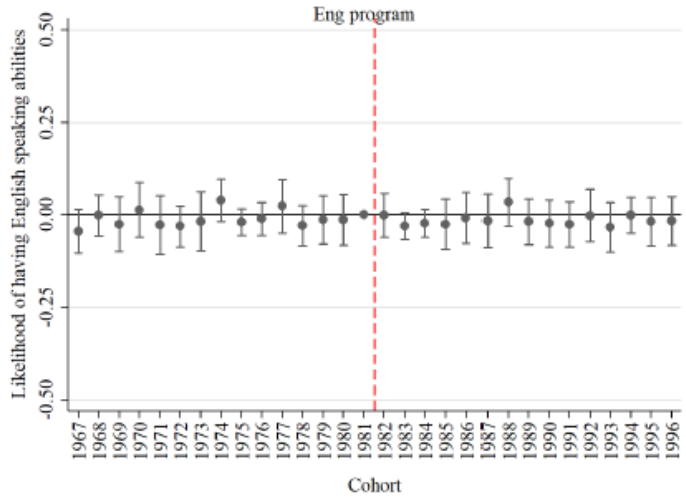

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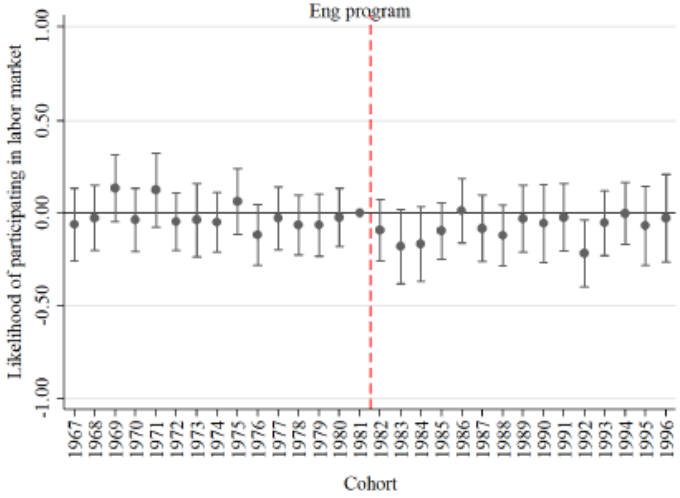
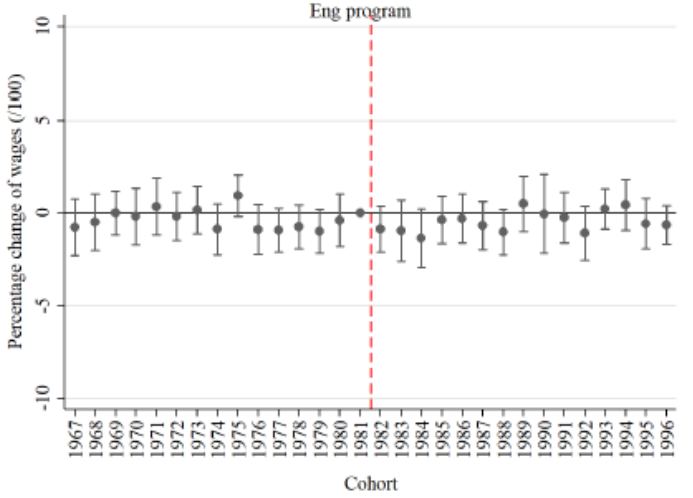
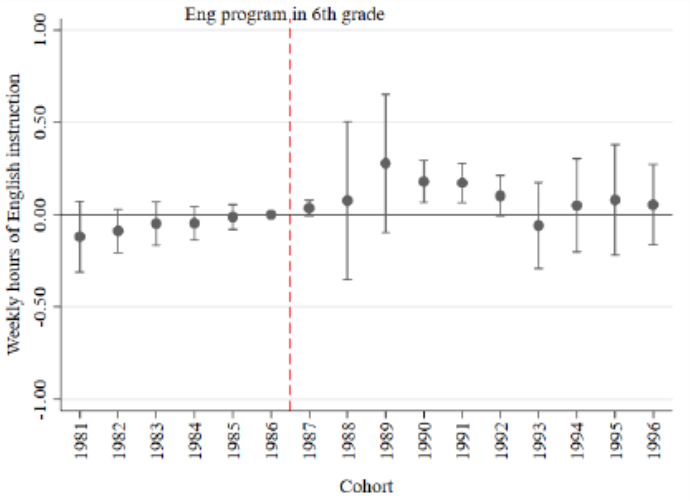


(c) Labor force

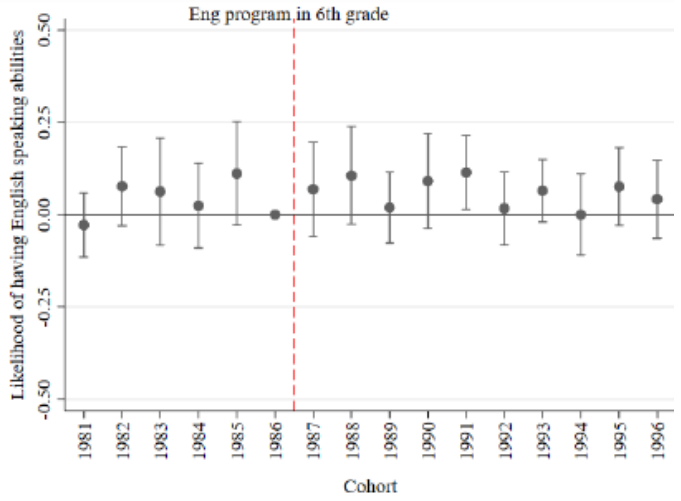


(d) Ln(wage)

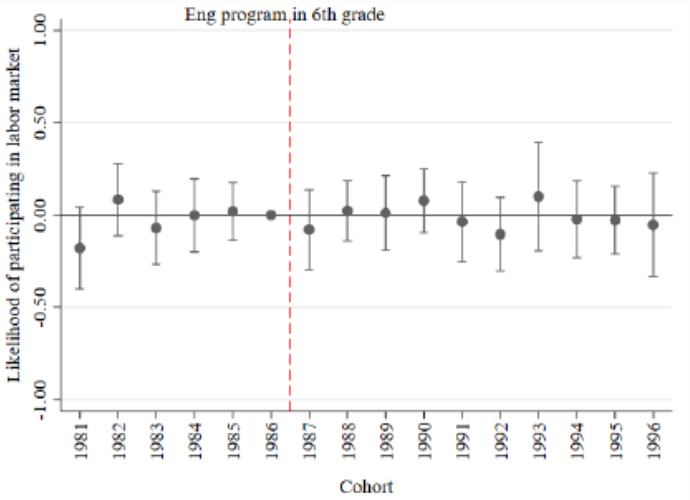
Parallel Trend Assumption (Sinaloa)



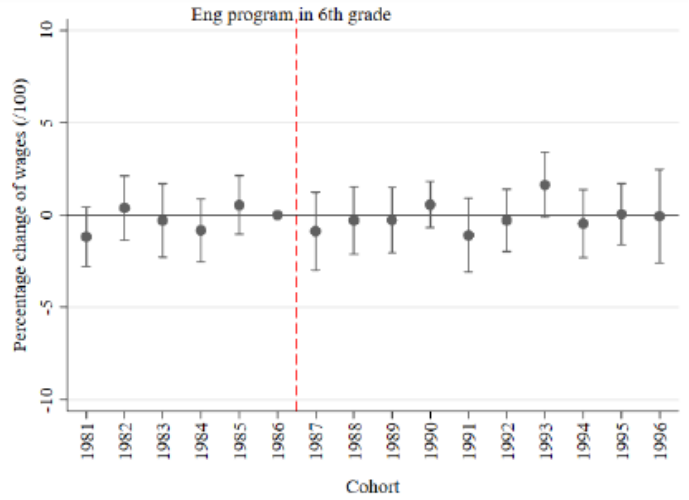
(a) Hours of English



(b) Speak English

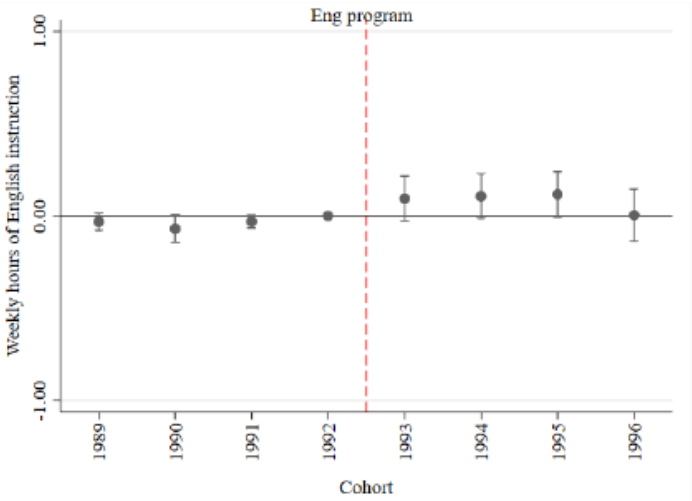


(c) Labor force

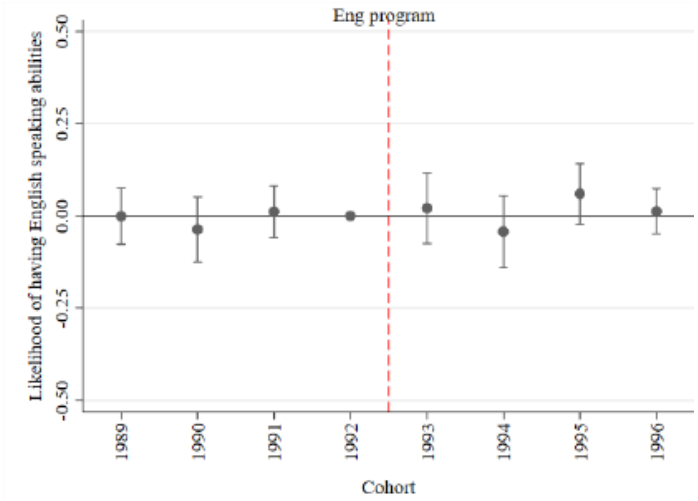


(d) Ln(wage)

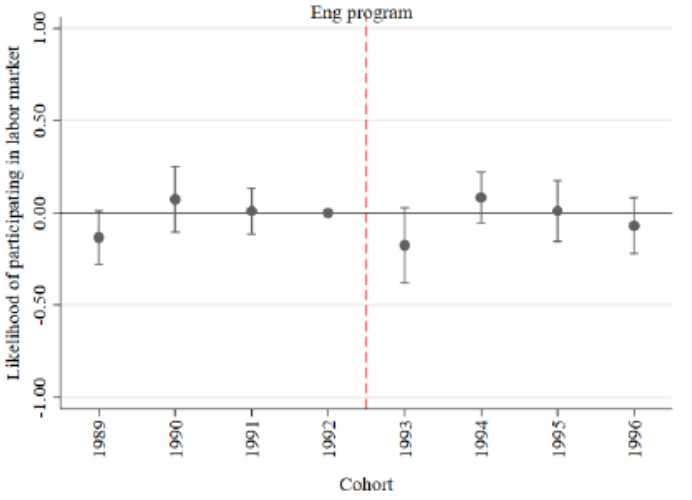
Parallel Trend Assumption (Tamaulipas)



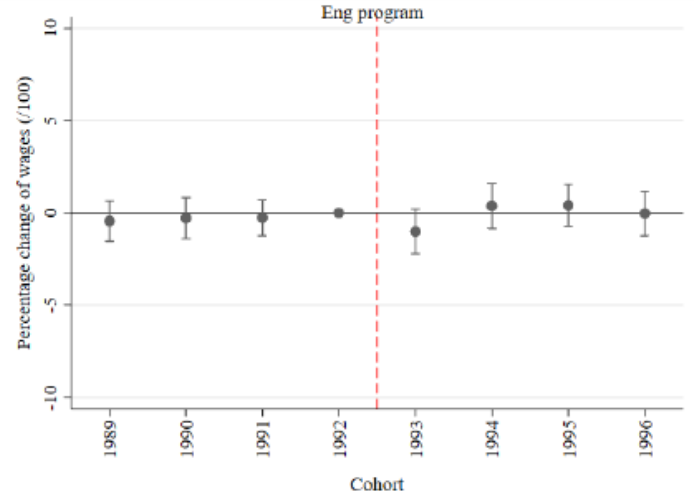
(a) Hours of English



(b) Speak English



(c) Labor force



(d) Ln(wage)

Data

Household survey

- I use the 2014 Subjective Well-being Survey (BIARE)
- Representative at national and state level
- Individuals surveyed are 18 years of age and older
- Asks if the respondent knows how to speak English

Linked to

- Mexican School Census (Statistics 911)
- Weekly hours of English instruction (exposure)
  - By school-cohort, average over primary school
  - Locality average, by cohort
- Use locality-cohort to match with BIARE

English speakers different from non-Eng speakers

Table : Descriptive statistics

Variable	Full Sample	Speak English (a)	Don't spk English (b)	Diff. (a-b)
Individual characteristics				
English (speaking ability)	0.03	1.00	0.00	-
English instruction (hours)	0.09	0.15	0.08	0.07***
Education (years)	9.43	13.93	9.30	4.62***
Experience (years)	23.80	17.32	23.99	-6.67***
Age (years)	38.23	36.24	38.29	-2.05***
Female (%)	0.52	0.41	0.53	-0.12***
Married (%)	0.63	0.49	0.64	-0.15***
Wage (monthly pesos)	4,211.47	11,277.79	4,011.46	7,266.33***
Student (%)	0.09	0.18	0.08	0.09***
Worker (%)	0.68	0.78	0.68	0.10***
Household characteristics				
Rural (%)	0.21	0.07	0.21	-0.14***
Female household head (%)	0.22	0.25	0.22	0.03**
Age household head (years)	48.65	46.26	48.72	-2.45***
Education household head (%)	5.58	8.11	5.51	2.60***
Household size (persons)	4.46	3.31	4.49	-1.18***
Observations	83,630	2,532	81,098	83,630

Note: These summary statistics consist of Mexicans ages 18–65 who self-reported their ability to speak in English. Statistics shown in this table are obtained considering the survey weights.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Comparable states using DiD (an example)

Table 6: Descriptive statistics (Aguascalientes)

	Treatment state		Comparison state		
Variable	After	Before	After	Before	DiD
Outcome variables					
Hrs English	0.89	0.49	0.17	0.09	0.32***
Eng (ability)	0.06	0.04	0.03	0.05	0.04**
Labor force (%)	0.64	0.80	0.59	0.70	-0.04
Ln(wage)	5.54	6.58	4.98	5.63	-0.35
Control variables					
Education (years)	11.03	10.92	10.64	10.65	0.12
Female (%)	0.52	0.54	0.49	0.54	0.03
Student (%)	0.31	0.07	0.22	0.04	0.06
Indigenous (%)	0.01	0.00	0.00	0.00	0.01**
Household income (pesos)	9.02	8.80	8.73	8.12	-0.41*
Education HH (%)	5.82	5.98	5.43	5.36	-0.22
Experience (years)	5.42	10.65	5.89	10.81	-0.12
Married (%)	0.31	0.60	0.43	0.62	-0.08*
Rural (%)	0.19	0.22	0.39	0.37	-0.05
Household size (persons)	4.97	4.33	4.95	4.45	0.13
Observations	463	233	465	264	1,425

Aguascalientes English program and English abilities

Table : Returns to English abilities in Aguascalientes

	Full sample				Low education sample			
	(1) Hrs Eng	(2) Speak Eng	(3) LFP	(4) ln(wage)	(5) Hrs Eng	(6) Speak Eng	(7) LFP	(8) ln(wage)
Panel A: Men and Women								
After×Treat	0.372***	0.054***	-0.014	0.076	0.347***	0.026*	0.000	0.448
	(0.095)	(0.016)	(0.054)	(0.356)	(0.114)	(0.015)	(0.065)	(0.541)
Observations	1,425	1,425	1,425	1,425	672	672	672	672
Adjusted R^2	0.927	0.016	0.234	0.167	0.920	0.045	0.366	0.229
Panel B: Men (β^M)								
After×Treat	0.388***	0.073**	-0.029	-0.034	0.357***	0.034	-0.008	0.281
	(0.083)	(0.030)	(0.060)	(0.459)	(0.119)	(0.031)	(0.042)	(0.672)
Observations	686	686	686	686	322	322	322	322
Adjusted R^2	0.925	-0.025	0.232	0.170	0.930	0.117	0.191	0.188
Panel C: Women (β^W)								
After×Treat	0.359***	0.049***	-0.006	-0.065	0.368***	0.013	-0.052	0.004
	(0.105)	(0.017)	(0.075)	(0.606)	(0.114)	(0.010)	(0.143)	(1.157)
Observations	739	739	739	739	350	350	350	350
Adjusted R^2	0.926	0.001	0.163	0.061	0.909	0.350	0.129	0.026
$\beta^M = \beta^W$	[0.368]	[0.387]	[0.048]	[0.192]	[0.856]	[0.228]	[0.199]	[0.313]

Coahila English program and English abilities

Table : Returns to English abilities in Coahuila

	Full sample				Low education sample			
	(1) Hrs Eng	(2) Speak Eng	(3) LFP	(4) ln(wage)	(5) Hrs Eng	(6) Speak Eng	(7) LFP	(8) ln(wage)
Panel A: Men and Women								
After×Treat	0.811***	0.022*	0.001	0.319	0.721***	0.007	0.011	0.617
	(0.191)	(0.013)	(0.030)	(0.279)	(0.173)	(0.015)	(0.059)	(0.399)
Observations	2,123	2,123	2,123	2,123	999	999	999	999
Adjusted R^2	0.632	0.033	0.217	0.222	0.605	-0.016	0.322	0.225
Panel B: Men (β^M)								
After×Treat	0.866***	0.073***	-0.000	0.014	0.756***	0.017	0.039	0.728*
	(0.200)	(0.023)	(0.034)	(0.299)	(0.201)	(0.025)	(0.063)	(0.387)
Observations	1,070	1,070	1,070	1,070	510	510	510	510
Adjusted R^2	0.633	0.019	0.298	0.328	0.596	0.046	0.032	0.203
Panel C: Women (β^W)								
After×Treat	0.799***	-0.023	0.008	0.945	0.782***	0.007	-0.036	0.751
	(0.218)	(0.016)	(0.061)	(0.582)	(0.182)	(0.009)	(0.110)	(0.959)
Observations	1,053	1,053	1,053	1,053	489	489	489	489
Adjusted R^2	0.630	0.031	0.121	0.095	0.628	0.159	0.083	0.045
$\beta^M = \beta^W$	[0.235]	[0.035]	[0.122]	[0.197]	[0.924]	[0.244]	[0.696]	[0.998]

Durango English program and English abilities

Table : Returns to English abilities in Durango

	Full sample				Low education sample			
	(1) Hrs Eng	(2) Speak Eng	(3) LFP	(4) ln(wage)	(5) Hrs Eng	(6) Speak Eng	(7) LFP	(8) ln(wage)
Panel A: Men and Women								
After×Treat	0.113	-0.019	-0.038	-0.201	0.077	-0.013	-0.062	-0.114
	(0.081)	(0.015)	(0.060)	(0.373)	(0.082)	(0.014)	(0.060)	(0.496)
Observations	1,711	1,711	1,711	1,711	793	793	793	793
Adjusted R^2	0.676	0.014	0.280	0.203	0.692	0.211	0.416	0.254
Panel B: Men (β^M)								
After×Treat	0.127	-0.039	0.052	0.304	0.118	0.012	0.060	0.622
	(0.088)	(0.033)	(0.065)	(0.623)	(0.098)	(0.045)	(0.051)	(0.735)
Observations	834	834	834	834	394	394	394	394
Adjusted R^2	0.670	-0.004	0.257	0.280	0.663	0.117	0.120	0.221
Panel C: Women (β^W)								
After×Treat	0.112	0.003	-0.091	-0.779*	0.045	-0.016	-0.170*	-1.252
	(0.086)	(0.018)	(0.079)	(0.445)	(0.107)	(0.017)	(0.100)	(0.857)
Observations	877	877	877	877	399	399	399	399
Adjusted R^2	0.664	-0.053	0.183	0.112	0.669	0.271	0.126	0.101
$\beta^M = \beta^W$	[0.867]	[0.608]	[0.853]	[0.826]	[0.573]	[0.338]	[0.768]	[0.843]

Morelos English program and English abilities

Table : Returns to English abilities in Morelos

	Full sample				Low education sample			
	(1) Hrs Eng	(2) Speak Eng	(3) LFP	(4) ln(wage)	(5) Hrs Eng	(6) Speak Eng	(7) LFP	(8) ln(wage)
Panel A: Men and Women								
After×Treat	0.817***	-0.003	-0.051*	-0.027	0.601**	-0.009	-0.077*	-0.392
	(0.291)	(0.011)	(0.031)	(0.190)	(0.238)	(0.007)	(0.043)	(0.281)
Observations	4,683	4,683	4,683	4,683	2,524	2,524	2,524	2,524
Adjusted R^2	0.603	0.086	0.274	0.219	0.495	0.033	0.336	0.215
Panel B: Men (β^M)								
After×Treat	0.829***	-0.004	0.004	0.153	0.660**	-0.021	-0.011	0.045
	(0.298)	(0.015)	(0.038)	(0.294)	(0.269)	(0.014)	(0.036)	(0.362)
Observations	2,192	2,192	2,192	2,192	1,163	1,163	1,163	1,163
Adjusted R^2	0.605	0.058	0.213	0.216	0.496	-0.038	0.130	0.110
Panel C: Women (β^W)								
After×Treat	0.820***	0.002	-0.099**	-0.101	0.573**	-0.002	-0.126*	-0.501
	(0.301)	(0.013)	(0.045)	(0.299)	(0.231)	(0.006)	(0.071)	(0.424)
Observations	2,491	2,491	2,491	2,491	1,361	1,361	1,361	1,361
Adjusted R^2	0.591	0.129	0.128	0.118	0.458	0.140	0.121	0.105
$\beta^M = \beta^W$	[0.866]	[0.363]	[0.848]	[0.762]	[0.340]	[0.110]	[0.966]	[0.126]

Nuevo Leon English program and English abilities

Table 12: Returns to English abilities in Nuevo Leon

	Full sample				Low education sample			
	(1) Hrs Eng	(2) Speak Eng	(3) LFP	(4) ln(wage)	(5) Hrs Eng	(6) Speak Eng	(7) LFP	(8) ln(wage)
Panel A: Men and Women								
After×Treat	0.143**	0.012	0.003	0.106	0.126**	0.012	-0.042	-0.346
	(0.059)	(0.017)	(0.040)	(0.288)	(0.061)	(0.011)	(0.080)	(0.606)
Observations	1,897	1,897	1,897	1,897	860	860	860	860
Adjusted R^2	0.779	0.048	0.221	0.177	0.787	0.042	0.328	0.209
Panel B: Men (β^M)								
After×Treat	0.127**	0.026	-0.044	0.159	0.082	0.017	-0.034	-0.284
	(0.062)	(0.030)	(0.040)	(0.439)	(0.072)	(0.019)	(0.064)	(0.611)
Observations	946	946	946	946	425	425	425	425
Adjusted R^2	0.762	0.029	0.269	0.251	0.734	0.040	0.227	0.198
Panel C: Women (β^W)								
After×Treat	0.156**	-0.007	0.054	0.231	0.155**	0.009	-0.012	0.016
	(0.062)	(0.033)	(0.053)	(0.530)	(0.070)	(0.009)	(0.109)	(0.964)
Observations	951	951	951	951	435	435	435	435
Adjusted R^2	0.781	0.051	0.142	0.097	0.818	0.151	0.092	0.017
$\beta^M = \beta^W$	[0.363]	[0.990]	[0.002]	[0.215]	[0.082]	[0.829]	[0.225]	[0.469]

Sinaloa English program and English abilities

Table 13: Returns to English abilities in Sinaloa

	Full sample				Low education sample			
	(1) Hrs Eng	(2) Speak Eng	(3) LFP	(4) ln(wage)	(5) Hrs Eng	(6) Speak Eng	(7) LFP	(8) ln(wage)
Panel A: Men and Women								
After×Treat	0.111	0.016	0.020	0.395	0.071	-0.003	0.100	1.600**
	(0.067)	(0.023)	(0.051)	(0.480)	(0.057)	(0.015)	(0.095)	(0.774)
Observations	1,112	1,112	1,112	1,112	342	342	342	342
Adjusted R^2	0.865	0.009	0.223	0.153	0.874	0.027	0.458	0.285
Panel B: Men (β^M)								
After×Treat	0.116	-0.010	0.125**	0.975**	0.086	-0.021	0.019	2.667**
	(0.075)	(0.033)	(0.054)	(0.467)	(0.080)	(0.031)	(0.085)	(1.242)
Observations	576	576	576	576	187	187	187	187
Adjusted R^2	0.851	0.056	0.263	0.216	0.832	0.162	0.215	0.189
Panel C: Women (β^W)								
After×Treat	0.137*	0.029	0.036	-0.298	0.104	0.014	0.342*	-0.129
	(0.071)	(0.032)	(0.104)	(0.766)	(0.076)	(0.038)	(0.205)	(1.435)
Observations	0.876	0.086	0.074	0.051	0.895	0.305	0.200	0.148
Adjusted R^2	0.873	-0.046	0.061	0.044	0.892	0.296	0.225	0.106
$\beta^M = \beta^W$	[0.065]	[0.084]	[0.271]	[0.458]	[0.242]	[0.280]	[0.024]	[0.489]

Next steps

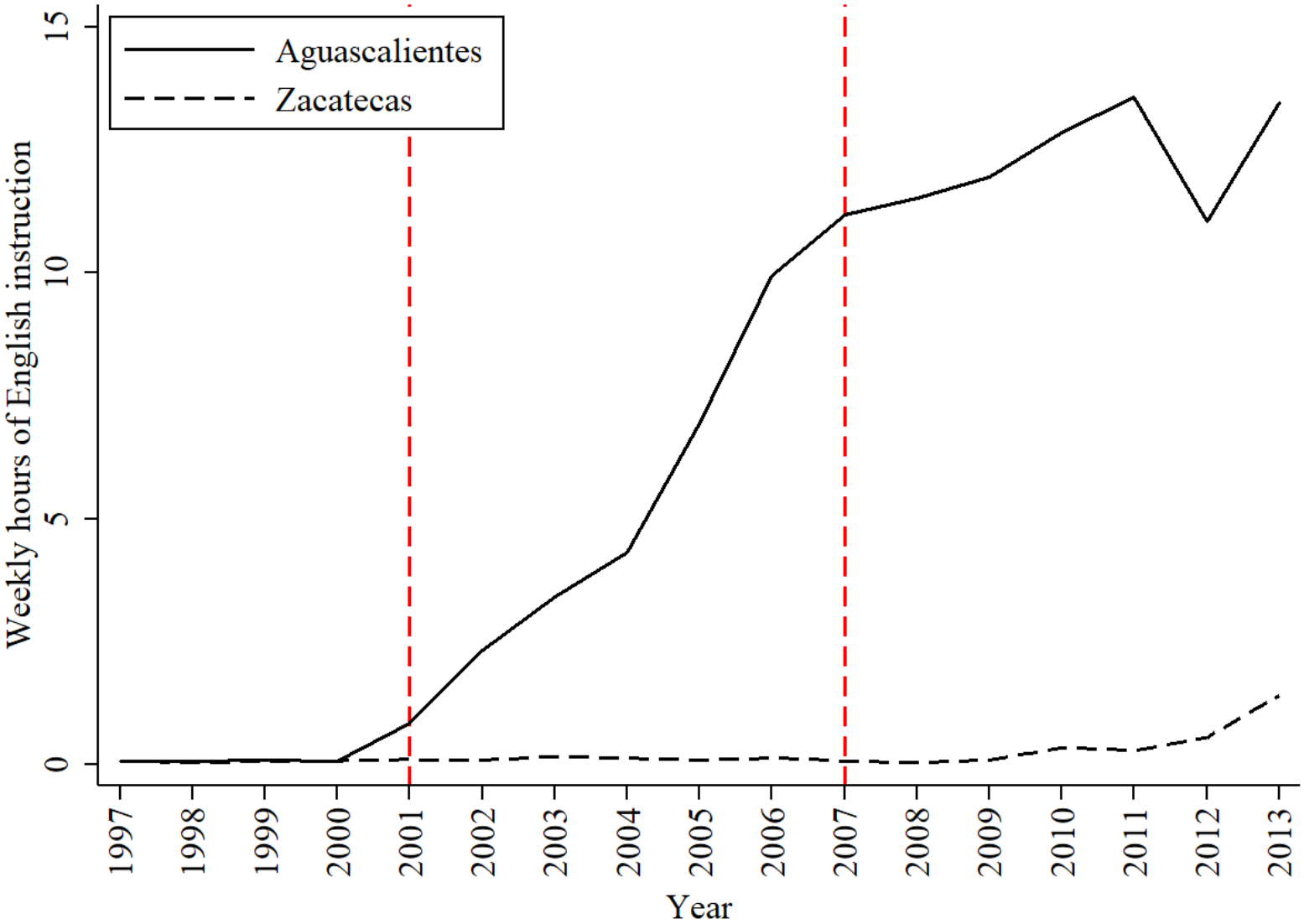
- Work with the other natural experiments: Sonora and Tamaulipas
- Work on descriptive analysis

Policy background in Aguascalientes

The Mexican state of Aguascalientes introduced an English program in 2001 to offer English instruction in elementary schools

- Cohorts 1990-1996 had exposure to Eng instruction in elementary schools of Aguascalientes
- Same cohorts in Zacatecas had no exposure

Aguascalientes (treatment) vs Zacatecas (comparison)

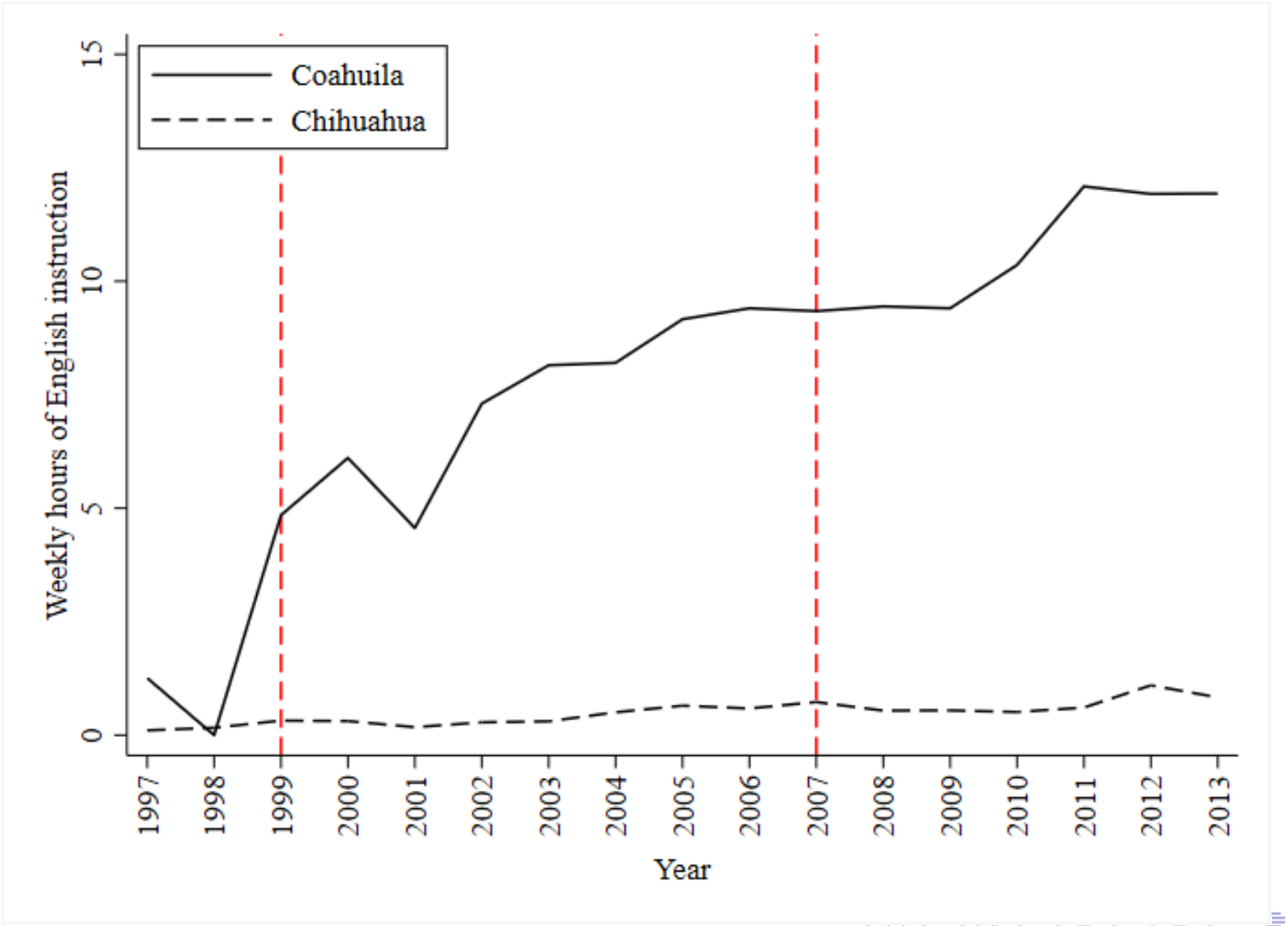


Policy background in Coahuila

The Mexican state of Coahuila expanded its English program in 1999 to offer English instruction in elementary schools

- Cohorts 1988-1996 had exposure to Eng instruction in elementary schools of Coahuila
- Same cohorts in Chihuahua had no exposure

Coahuila (treatment) vs Chihuahua (comparison)

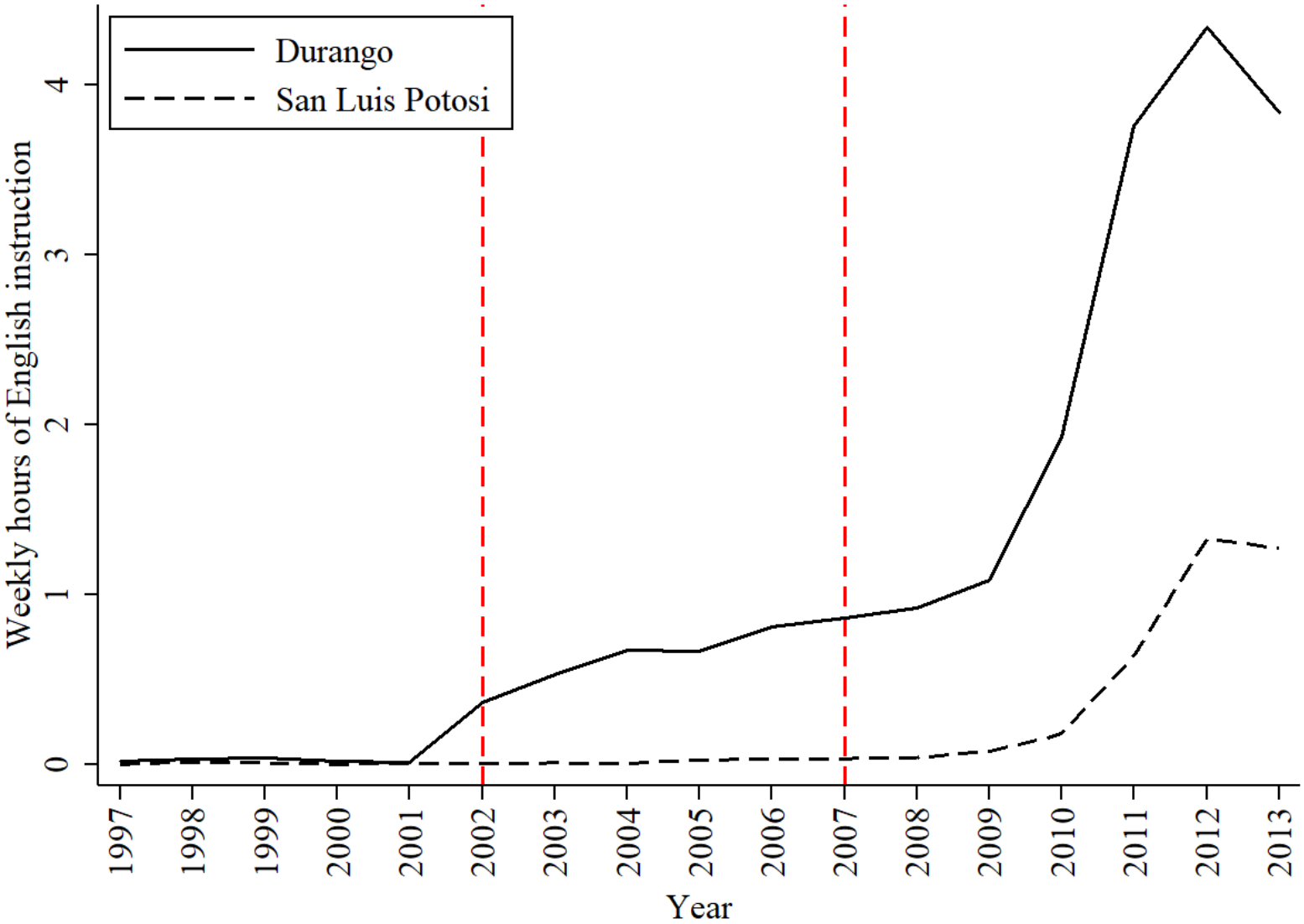


Policy background in Durango

The Mexican state of Durango introduced an English program in 2002 to offer English instruction in elementary schools

- Cohorts 1991-1996 had exposure to Eng instruction in elementary schools of Durango
- Same cohorts in San Luis Potosi had no exposure

Durango (treatment) vs San Luis Potosi (comparison)

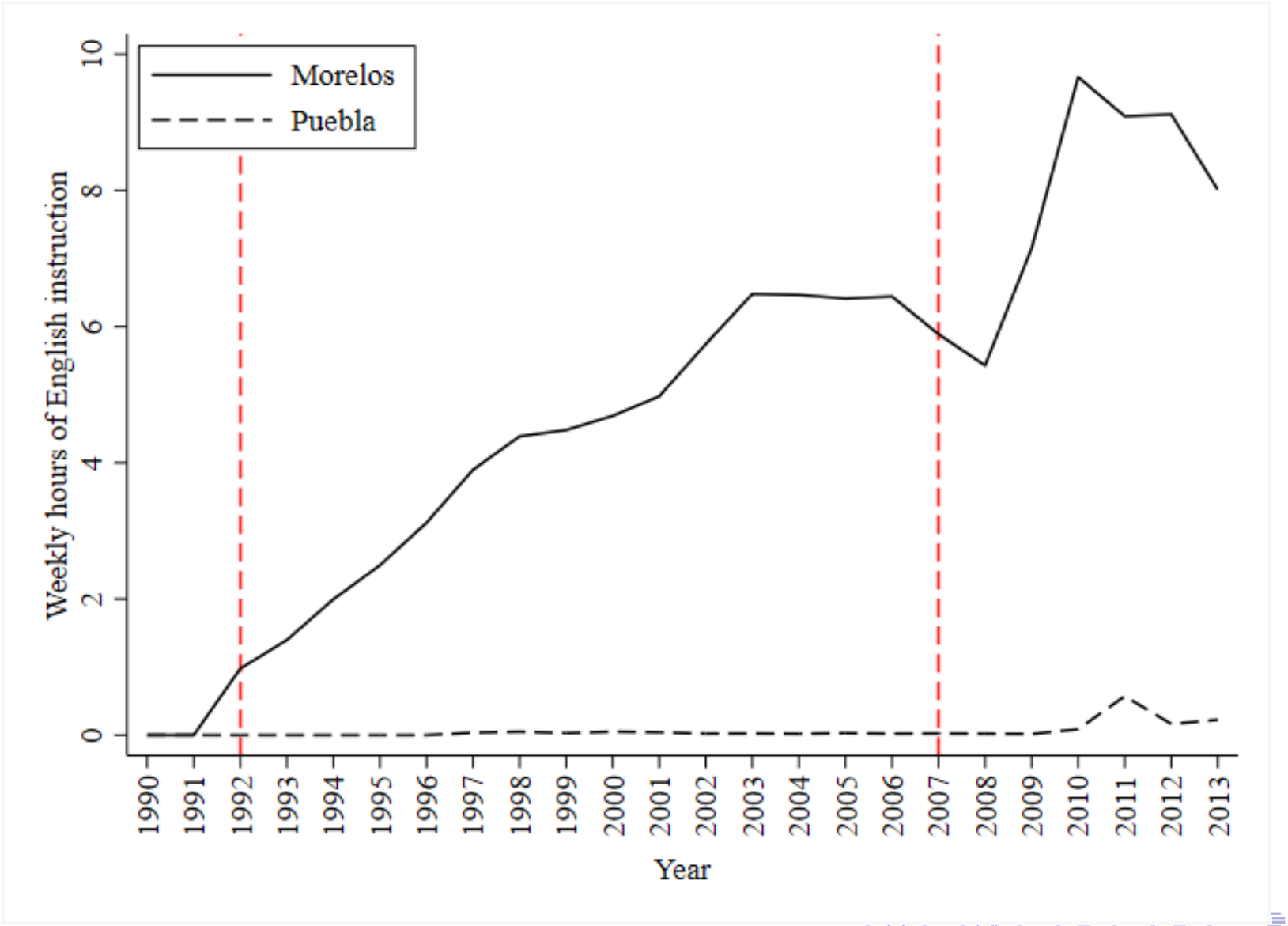


Policy background in Morelos

The Mexican state of Morelos introduced an English program in 1992 to offer English instruction in elementary schools

- Cohorts 1967-1996 had exposure to Eng instruction in elementary schools of Morelos
- Same cohorts in Puebla had no exposure

Morelos (treatment) vs Puebla (comparison)

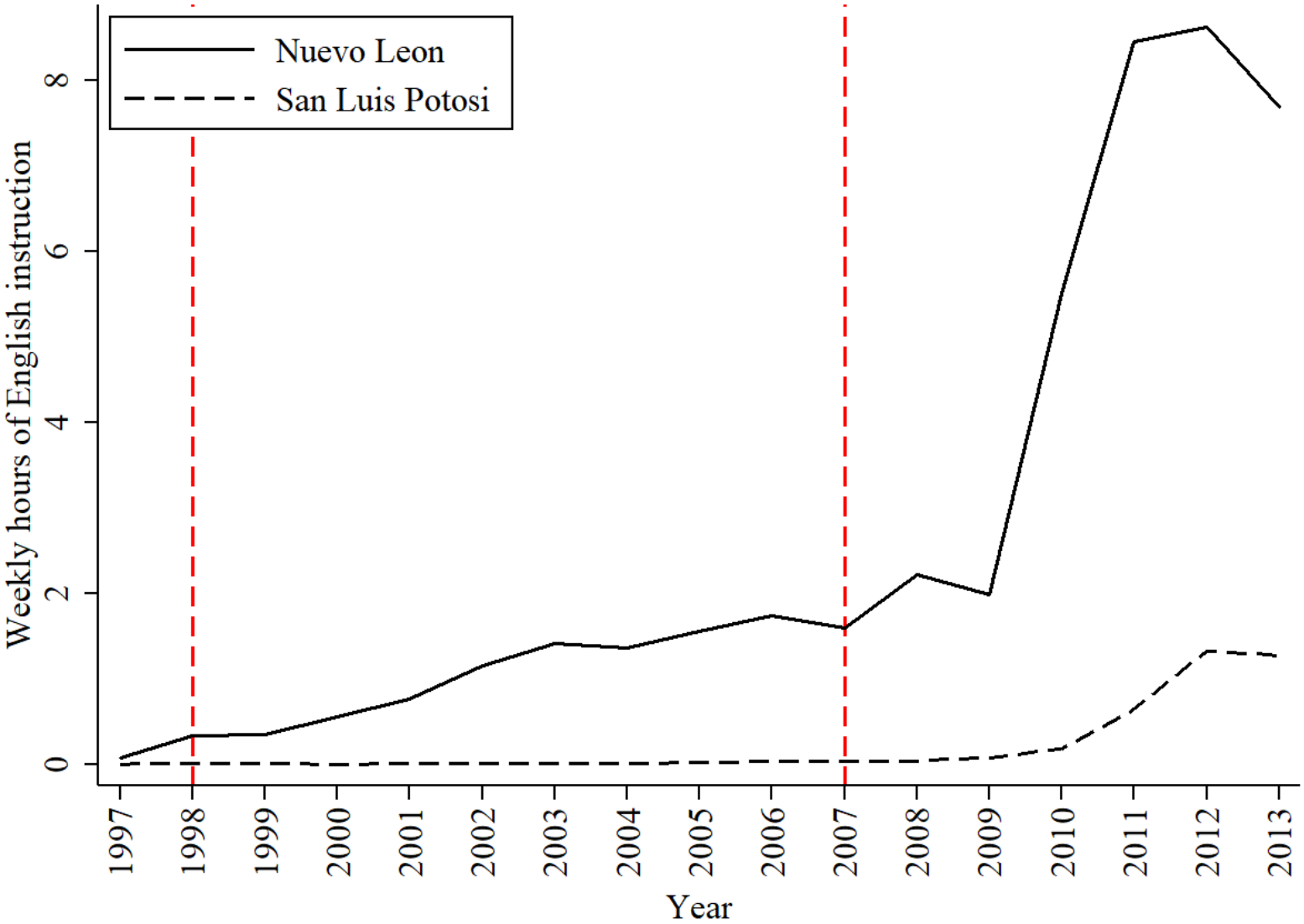


Policy background in Nuevo Leon

The Mexican state of Nuevo Leon expanded an English program in 1998 to offer English instruction in elementary schools

- Cohorts 1981-1996 had exposure to Eng instruction in elementary schools of Nuevo Leon
- Same cohorts in San Luis Potosi had no exposure

Nuevo Leon (treatment) vs SLP (comparison)



Policy background in Sinaloa

The Mexican state of Sinaloa introduced an English program in 2004 to offer English instruction in elementary schools

- Cohorts 1989-1996 had exposure to Eng instruction in elementary schools of Sinaloa
- Same cohorts in Nayarit had no exposure

Sinaloa (treatment) vs Nayarit (comparison)