

English skills and labor market outcomes in Mexico

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Motivation: Returns to English language abilities

- Language skills are a form of human capital
- English is valuable in the world economy
 - Globalization: trade, technology and information
 - Mobility and better occupations
- In English-speaking countries, English language is needed for communication
- In non-English-speaking countries English skills could be useful
 - How valuable is English for non-English-speaking countries?
 - I study the labor market returns in Mexico

Related literature

- English speaking countries
 - Immigrants: Bleakley and Chin (2004); Chiswick and Miller (2015)
 - Former British colonies: Azam, Chin and Prakash (2013); Eriksson (2014); Chakraborty and Bakshi (2016)
- Non-English-speaking countries: Lang and Siniver (2009)
- English language skills in Mexico: McConnell and Leclere (2002); Flores-Yeffal (2019); Delgado-Helleseter (2020)

This paper in a nutshell

Research Question

- What are the returns to English language skills in Mexico?

What I do

- Describe the prevalence of English skills in Mexico
 - Take advantage of an unusual data set that measures English skills in Mexico
- Quantify the relationship between English skills and labor market outcomes in Mexico
 - Exploit state policy changes that give state-by-cohort variation in exposure to English instruction

Background

- Importance of English language for Mexico
 - Neighboring country with the US
 - Investment, trade and migration
- Very little is known about English language skills in Mexico
 - Who speaks English?
 - I use the 2014 Subjective Well-being Survey (BIARE) to describe English skills in Mexico
- Very little is known about returns to English skills
 - Public schools spend money on English instruction
 - Some industries and occupations demand workers who speak English

English speaking ability: a rare skill in Mexico

- BIARE is a nationally representative survey with adult respondents 18 and older (ENIGH supplemental survey)
- I use the response to the following question to form a measure of English ability
 - Do you speak English?
 - I code it as one if the respondent says yes, and zero otherwise
- 2.75% of Mexicans speak English

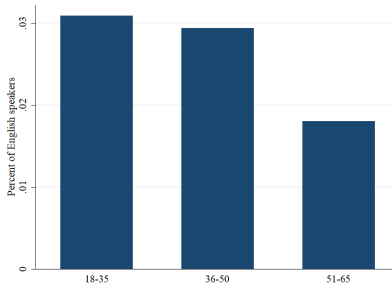


English speaking ability by gender, ethnicity and geographical context

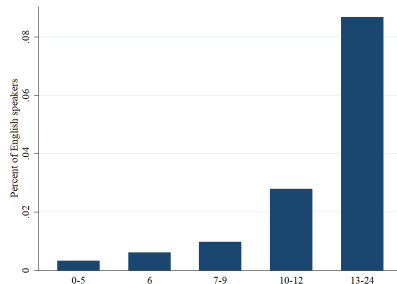
Table 1: Adult English speaking ability in Mexico

Variable	Full Sample
All individuals ages 18-65	2.75 (16.36)
<i>By gender</i>	
Male	3.44 (18.22)
Female	2.13 (14.45)
<i>By ethnicity</i>	
Indigenous	0.99 (9.88)
Non-indigenous	2.87 (16.69)
<i>By geography</i>	
Urban	3.24 (17.71)
Rural	0.92 (9.53)

English speaking ability by age and education



English speaking ability by age

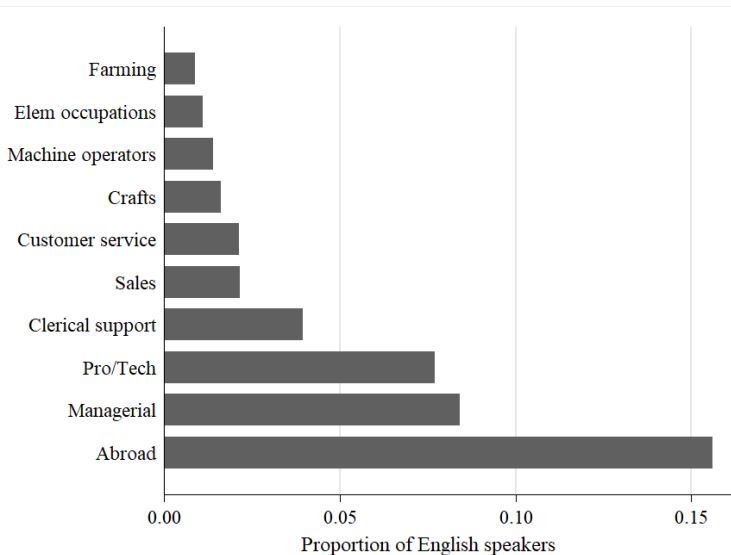


English speaking ability by education

Where are the English speakers?



English abilities by occupations



Empirical framework

We want to estimate the effect of English skills, Eng_i , on log-wages, ω_i , which can be approximated with the following equation:

$$\omega_i = \alpha + \beta \cdot Eng_i + \mathbf{X}_i \boldsymbol{\Pi} + \epsilon_i$$

where \mathbf{X}_i is a vector of controls including: education, experience, gender, marital status, ethnicity, student status, cohort FE and geographical context (rural/urban)

Empirical challenges

- Concern that English skills, Eng_i , are endogenous in the wage equation
 - Omitted variables: abilities may be correlated with both English skills and wages
 - Measurement error of English skills variable
- OLS estimation would lead to a biased estimate of β
- Take advantage of state policy changes in English instruction to form an instrument for English skills to obtain a consistent estimate of β
- Since the early 1990's some Mexican states implemented English programs to offer English instruction in public primary schools

Policy changes in Mexican states » AGS

Table: Policy changes in Mexican states

Treatment state	Year of policy change	Comparison state
Nuevo Leon	1998	SLP
Sonora	2004	BC
Coahuila	1999	Chihuahua
Tamaulipas	2001	BC
Aguascalientes	2001	Zacatecas
Durango	2002	SLP
Sinaloa	2004	Nayarit

Estimating the effect of policy changes

- Use a Difference-in-Differences strategy to get the effect of these policies
- For each treatment use one neighboring state as the comparison group
- Simple illustration with one policy change:

$$y_{isc} = \phi + \gamma \cdot (treatment_s \times after_c) + \delta \cdot treatment_s + \kappa_c + \mathbf{X}_{isc} \mathbf{\Gamma} + \varepsilon_{isc}$$

- where y_{isc} is the outcome variable of individual i who lives in state s and belongs to cohort c
- $after_c$: takes the value of one if the individual i belongs to one of the cohorts that had exposure to the policy
- $treatment_s$ takes the value of one if individual i lives in a treated state and zero otherwise

Parallel Trend Assumption (one policy change)

- Interpreting γ as the effect of the policy requires that the PTA holds
- I offer evidence on the validity of my identifying assumption using the following event study type specification:

$$y_{isc} = \phi + \sum_c \gamma_c \cdot I_{(treatment_{sc}=c)} + \delta \cdot treatment_s + \kappa_c + \mathbf{X}_{isc} \mathbf{\Gamma} + \varepsilon_{isc}$$

where $I_{(treatment_{sc}=c)}$ is an indicator function, which identifies if individual i potentially had exposure, depending on the cohort and state he/she was born. The reference cohort is the one that just missed the policy

» PTA

Combining the policy changes (Staggered Difference in Differences)



Combining the policy changes (Staggered Difference in Differences)

Instead of looking at policies one by one, examine all these policies at once

$$y_{isc} = \theta + \psi \cdot HadPolicy_{sc} + \delta_s + \kappa_c + \mathbf{X}_{isc}\Psi + \varepsilon_{isc}$$

where $HadPolicy_{sc}$ takes the value of one if individual i lives in a treated state and he/she belongs to one of the affected cohorts (zero otherwise)

Parallel Trend Assumption (combining all policies)

I use an event study specification to examine if pre-trends are present

$$y_{isc} = \theta + \sum_c \psi_c \cdot I_{(treatment_{sc}=c-c_s^*)} + \delta_s + \kappa_c + \mathbf{X}_{isc}\Psi + \varepsilon_{isc}$$

where c_s^* denotes the first cohort affected by the intervention in state s , so $c - c_s^*$ is the time relative to c_s^* with negative values reflecting older cohorts not exposed to the policy. The omitted category is -1. Before cohorts with zero effect suggest parallel trends

►► PTA

IV estimation

Equation of interest:

$$\omega_{isc} = \alpha + \beta \cdot Eng_{isc} + \mathbf{X}_{isc}\mathbf{\Pi} + \epsilon_{isc}$$

Use $HadPolicy_{sc}$ to instrument for Eng_{isc} . First stage equation:

$$Eng_{isc} = \theta^{fs} + \psi^{fs} \cdot HadPolicy_{sc} + \delta_s^{fs} + \kappa_c^{fs} + \mathbf{X}_{isc}\mathbf{\Psi}^{fs} + \varepsilon_{isc}^{fs}$$

Reduced form equation:

$$\omega_{isc} = \theta^{rf} + \psi^{rf} \cdot HadPolicy_{sc} + \delta_s^{rf} + \kappa_c^{rf} + \mathbf{X}_{isc}\mathbf{\Psi}^{rf} + \varepsilon_{isc}^{rf}$$

Data

► Descriptive Stats

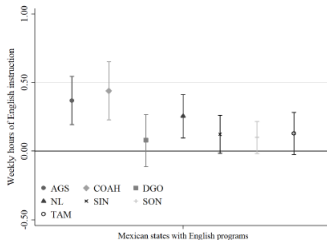
Household survey (2014 BIARE)

- Individual level data (18-38 years old)
- BIARE surveyed 44,518 households
 - Representative at national and state level
- Very rich questionnaire

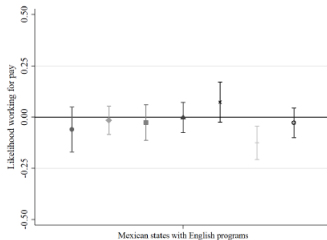
School data on exposure to Eng instruction in primary school

- Mexican School Census (1997-2007)
- Weekly hours of English instruction (exposure)
 - By school-cohort, average over primary school
 - By cohort, take locality average
- Merge English instruction measure to individual-level data (in BIARE) by locality and cohort

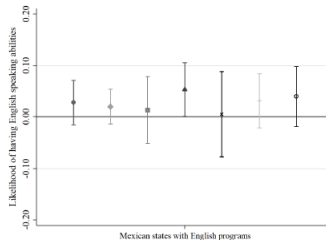
Results: Difference-in-Differences estimates



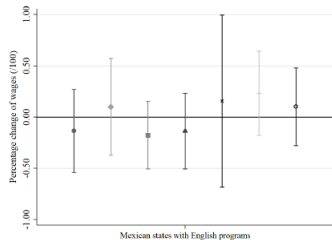
(a) Hours of English



(c) Paid work



(b) English skills



(d) Ln(wage)

Results: Effect of the policies combined (SDD)

Table : Intention to treat effect of offering English instruction at school
(SDD estimate)

	(1)	(2)	(3)	(4)	(5)
	Hrs Eng	Speak Eng	ln(wage)	Paid work	Student
<i>Panel A: Full sample</i>					
Had Policy	0.308*** (0.046)	0.015** (0.008)	0.019 (0.080)	-0.020 (0.013)	0.038*** (0.014)
Observations	13,131	13,131	13,131	22,517	22,517
Adjusted R^2	0.596	0.075	0.153	0.219	0.370
Mean Dep. Var.	0.152	0.043	8.066	0.587	0.147

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Results: Educational heterogeneous effects (SDD)

Table : Intention to treat effect of offering English instruction at school
(SDD estimate)

	(1)	(2)	(3)	(4)	(5)
	Hrs	Speak	ln(wage)	Paid	Student
	Eng	Eng		work	
<i>Panel D: Low education sample (β^L)</i>					
Had Policy	0.305***	0.010	-0.169	0.016	0.005
	(0.062)	(0.007)	(0.123)	(0.021)	(0.014)
Observations	6,624	6,624	6,624	10,898	10,898
Adjusted R^2	0.522	0.016	0.162	0.225	0.043
<i>Panel E: High education sample (β^H)</i>					
Had Policy	0.304***	0.019	0.227**	-0.025	0.031*
	(0.040)	(0.014)	(0.099)	(0.018)	(0.017)
Observations	6,507	6,507	6,507	11,619	11,619
Adjusted R^2	0.659	0.070	0.146	0.263	0.432
$\beta^L = \beta^H$ [p-value]	[0.973]	[0.590]	[0.005]	[0.119]	[0.224]

►► Geographical context

Results: IV estimate of returns to English abilities

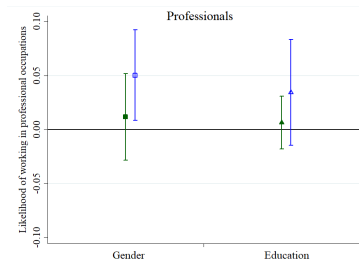
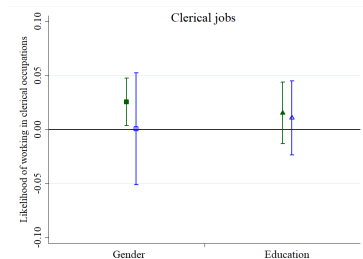
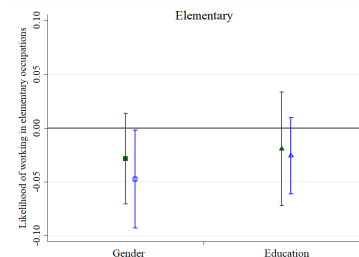
Table : Returns to English abilities
(IV estimate)

	(1) Structural-OLS	(2) First Stage	(3) Reduced Form	(4) Structural-IV
Speak Eng	0.142 (0.102)			1.252 (5.084)
Had Policy		0.015** (0.008)	0.019 (0.080)	
Observations	13,131	13,131	13,131	13,131
Adjusted R^2	0.153	0.075	0.153	

Mechanisms

- Cognitive skills
 - Acquisition of English skills
 - No effect on other skills: Language and Mathematics
([Gálvez-Soriano, 2023](#))
- Occupational choices
 - Move into occupations that require English skills
 - Better working conditions

Mechanisms: Occupational choices (SDD) ▶ All



Robustness checks

- Concern about SDD estimator in the presence of heterogeneous treatment effects [▶ SDD](#)
- Different comparison group (all neighboring states) [▶ DD](#)
- Narrower cohorts [▶ SDD](#)

Conclusion

- No returns to English skills in Mexico
 - Young adults (18-24) are still enrolled in school
 - Potentially high-earners
- However, exposure to English instruction...
 - Leads to the acquisition of English abilities
 - Increases school enrollment
 - Changes occupational choices

Discussion

Chapter 1

- Exposure to English instruction affects outcomes of workers across the cognitive skills distribution
 - On average: no effect on wages, increase in mobility
 - High-skill workers: rise in wages, industry shifts
 - Low-skill workers: increase in mobility, industry shifts
- No effects on other cognitive skills; language and math

Chapter 2

- Complementarities between English skills and education
 - On average: no effect on wages and shifts across occupations
 - Highly-educated: rise in wages, shifts into professional occupations
 - Low-educated: zero effect on wages, shifts into clerical jobs
- English instruction leads to the acquisition of English skills

Thank you!

For more about me and my research, please scan here:



Policy background in Aguascalientes

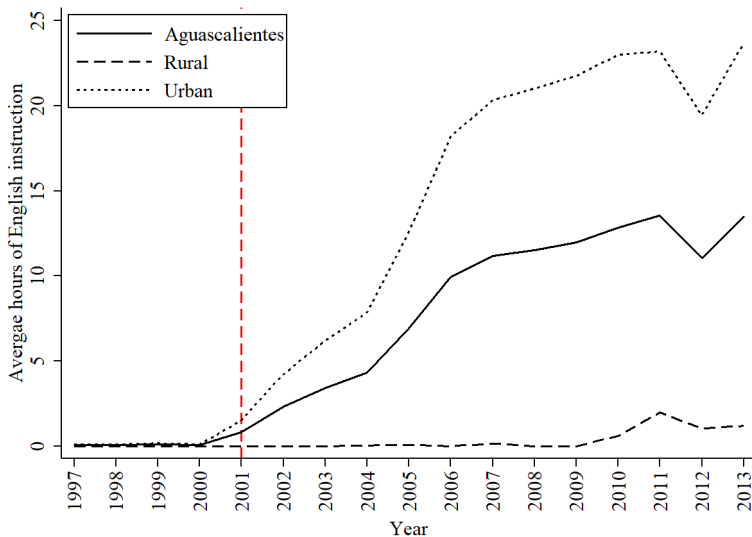
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The Mexican state of Aguascalientes introduced an English program in 2001 to offer English instruction in elementary schools

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



Policy background in Aguascalientes

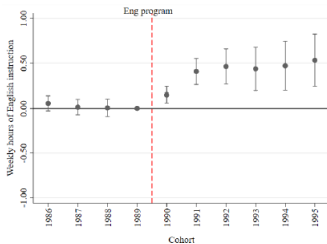
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English speakers different from non-Eng speakers [» Back](#)

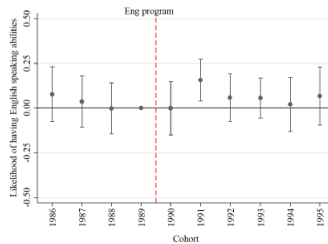
Table : Descriptive statistics

Variable	Full Sample	Speak English (a)	Don't spk English (b)	Diff. (a-b)
<i>Dependent variable</i>				
Wages (monthly pesos)	6,222.40	15,032.45	5,939.54	9,092.91***
<i>Independent variables</i>				
English (speaking ability)	0.03	1.00	0.00	-
Hrs English	0.08	0.12	0.07	0.05***
Age (years)	39.05	38.31	39.08	-0.76**
Education (years)	9.67	14.02	9.53	4.49***
Female (%)	0.38	0.33	0.38	-0.05***
Indigenous (%)	0.06	0.02	0.06	-0.04***
Married (%)	0.66	0.58	0.66	-0.08***
Rural (%)	0.20	0.08	0.20	-0.12***
Observations	49,884	1,664	48,220	49,884

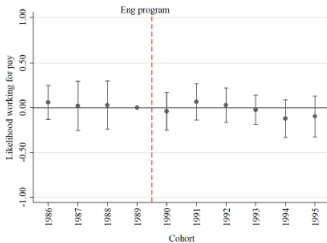
Parallel Trend Assumption (Aguascalientes)

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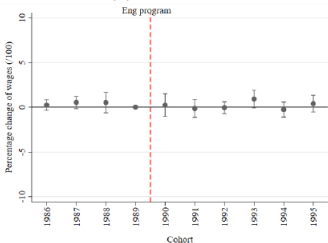
(a) Hours of English



(b) Speak English

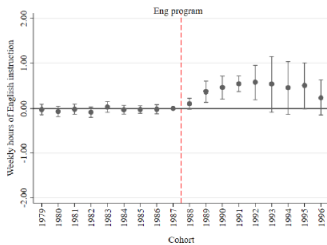


(c) Paid work

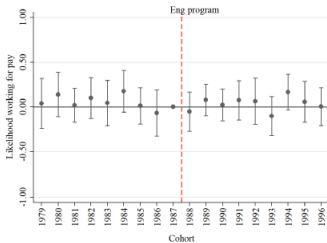


(d) Ln(wage)

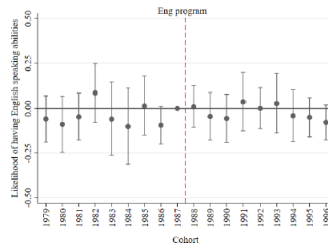
Parallel Trend Assumption (Coahuila)



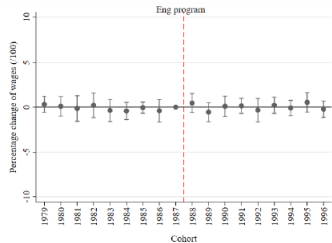
(a) Hours of English



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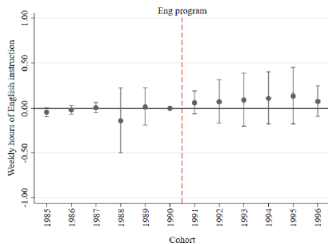


(b) Speak English

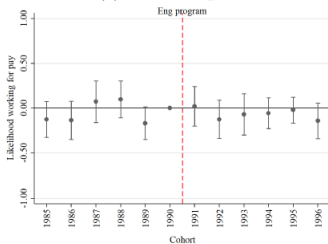


(d) Ln(wage)

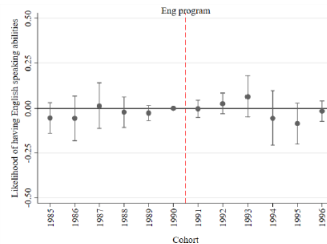
Parallel Trend Assumption (Durango)



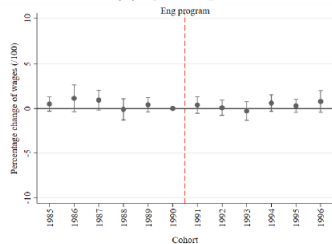
(a) Hours of English



(c) Paid work

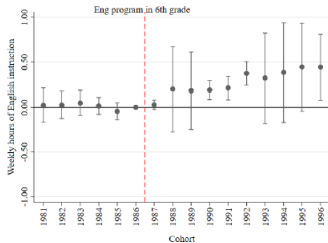


(b) Speak English

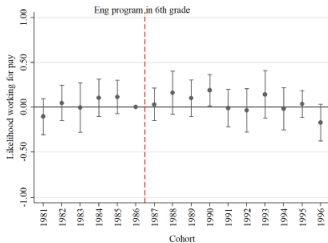


(d) Ln(wage)

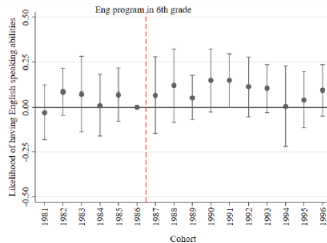
Parallel Trend Assumption (Nuevo Leon)



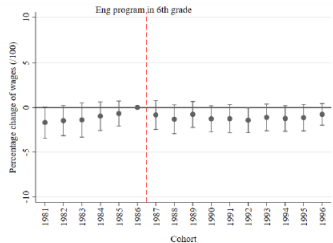
(a) Hours of English



(c) Paid work

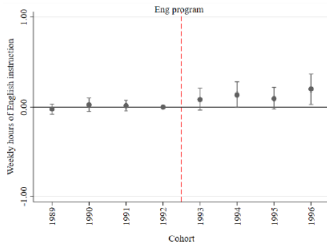


(b) Speak English

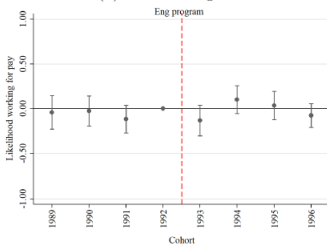


(d) Ln(wage)

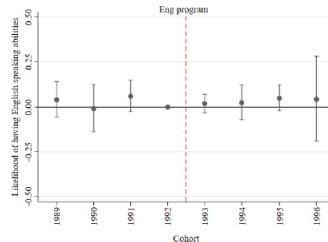
Parallel Trend Assumption (Sinaloa)



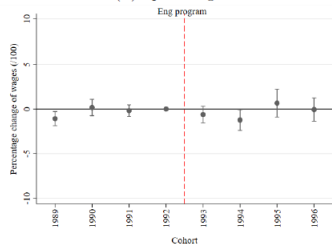
(a) Hours of English



(c) Paid work

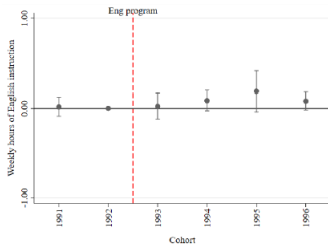


(b) Speak English

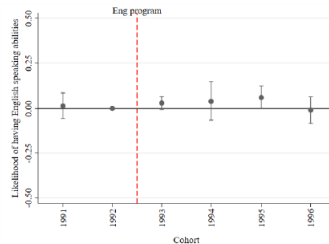


(d) Ln(wage)

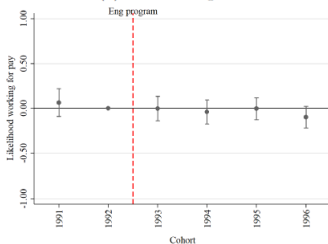
Parallel Trend Assumption (Sonora)



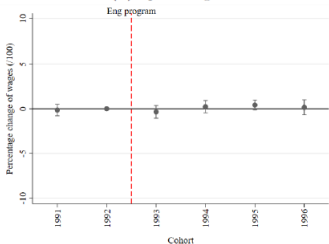
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(b) Speak English

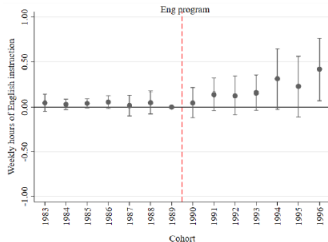


(c) Paid work

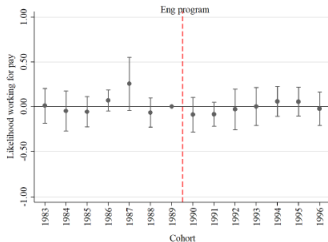


(d) Ln(wage)

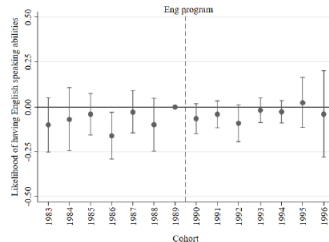
Parallel Trend Assumption (Tamaulipas)

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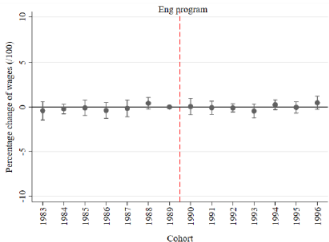
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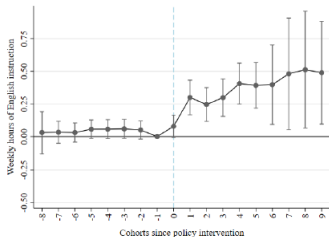


(b) Speak English

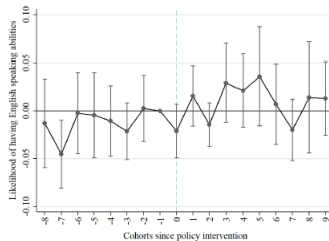


(d) Ln(wage)

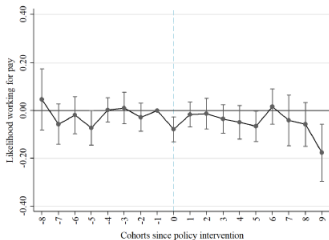
PTA Staggered DiD: All states

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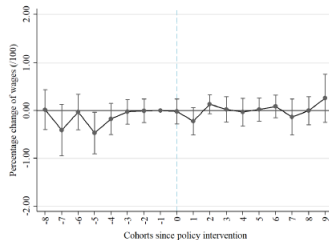
(a) Hours of English



(b) Speak English



(c) Paid work



(d) Ln(wage)

Results: Gender heterogeneous effects (SDD)

Table 1: Intention to treat effect of offering English instruction at school
(SDD estimate)

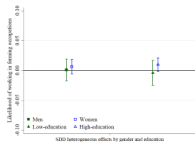
	(1) Hrs Eng	(2) Speak Eng	(3) ln(wage)	(4) Paid work	(5) Student
<i>Panel B: Men (β^M)</i>					
Had Policy	0.295*** (0.046)	0.016 (0.011)	-0.044 (0.069)	-0.023 (0.018)	0.044*** (0.017)
Observations	8,008	8,008	8,008	11,021	11,021
Adjusted R^2	0.581	0.069	0.186	0.313	0.408
<i>Panel C: Women (β^W)</i>					
Had Policy	0.331*** (0.057)	0.014 (0.014)	0.152 (0.152)	-0.003 (0.023)	0.031* (0.017)
Observations	5,123	5,123	5,123	11,496	11,496
Adjusted R^2	0.604	0.056	0.150	0.158	0.326
$\beta^M = \beta^W$ [p-value]	[0.208]	[0.870]	[0.182]	[0.443]	[0.445]

Results: Ethnicity heterogeneous effects

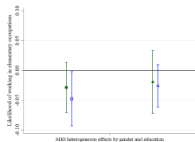
Table : Heterogeneous effects of offering English instruction at school
(SDD estimate)

	(1)	(2)	(3)	(4)	(5)
	Hrs Eng	Speak Eng	ln(wage)	Paid work	Student
<i>Panel A: By ethnicity</i>					
Indigenous (β^I)					
Had Policy	0.110 (0.160)	-0.034 (0.091)	0.309 (1.202)	0.076 (0.187)	0.286** (0.126)
Observations	188	188	188	340	340
Adjusted R^2	0.929	0.410	0.193	0.380	0.329
Non-Indigenous (β^N)					
Had Policy	0.306*** (0.046)	0.015* (0.008)	0.030 (0.081)	-0.020 (0.013)	0.036*** (0.014)
Observations	12,943	12,943	12,943	22,177	22,177
Adjusted R^2	0.593	0.076	0.148	0.219	0.371
$\beta^I = \beta^N$ [p-value]	[0.348]	[0.208]	[0.212]	[0.819]	[0.011]

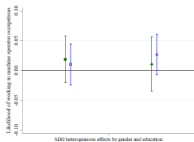
Mechanisms: Occupational choices (SDD) ▶▶ Back



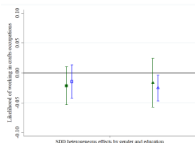
(a) Farming



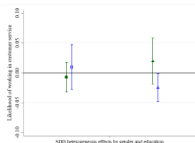
(b) Elementary



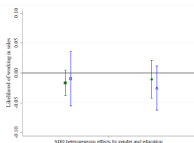
(c) Machine operator



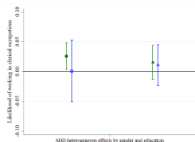
(d) Crafts



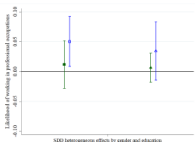
(e) Customer service



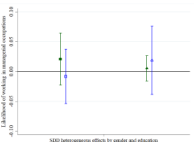
(f) Sales



(g) Clerks



(h) Professionals



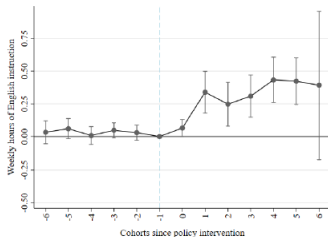
(i) Managerial

SDD correction: Sun and Abraham (2021)

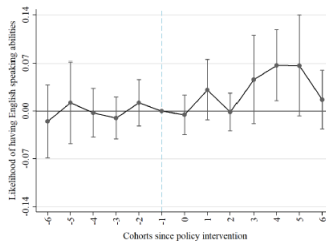
[» Back](#)**Table :** Intention to Treat effect of offering English instruction at school
(SDD estimate)

	(1) Hrs Eng	(2) Speak Eng	(3) ln(wage)	(4) Paid work	(5) Student
Had Policy	0.323*** (0.045)	0.015** (0.007)	0.021 (0.081)	-0.015 (0.012)	0.035*** (0.013)
Observations	13,063	13,063	13,063	22,493	22,493
Adjusted R^2	0.616	0.073	0.148	0.219	0.371

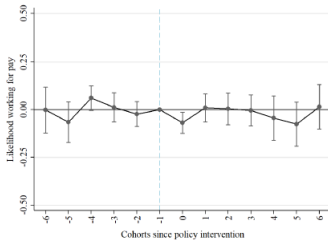
Robustness check: Narrower cohort window

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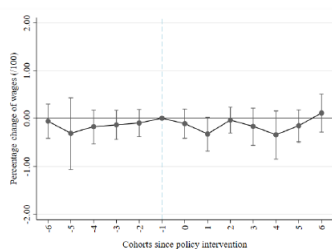
(a) Hours of English



(b) Speak English



(c) Paid work



(d) Ln(wage)

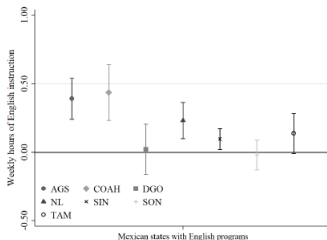
Robustness check: Narrower cohort window

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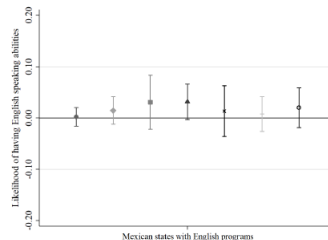
Table : Returns to English abilities
(IV estimate with narrower comparison group)

	(1) Structural-OLS	(2) First Stage	(3) Reduced Form	(4) Structural-IV
Speak Eng	0.086 (0.156)			-4.081 (6.348)
Had Policy		0.018* (0.010)	-0.073 (0.111)	
Observations	5,926	5,926	5,926	5,926
Adjusted R^2	0.159	0.050	0.159	

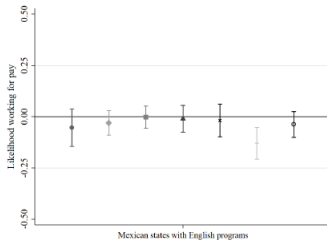
Robustness check: Different control groups

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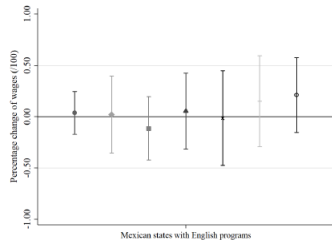
(a) Hours of English



(b) English skills



(c) Paid work



(d) Ln(wage)