Impact of English instruction on labor market outcomes

The case of Mexico

Oscar Galvez-Soriano, ¹ Alejandrina Salcedo, ² Francisco Cabrera-Hernandez ³

¹University of Houston

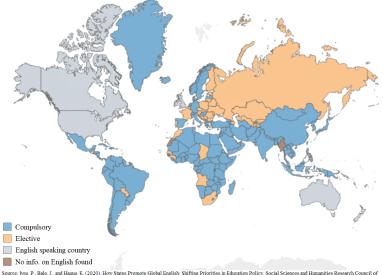
²Banco de México

 3 CIDE

March 2023



Motivation: Global English education policy





Motivation

The value of English language skills in non-English speaking countries

- Globalization
 - English is the *lingua franca*
 - Trade and information
- Mobility

I will study the expansion of English instruction in Mexico



Related literature

Most related to:

- Returns to English language skills
 - In English-speaking countries, e.g. Bleakley and Chin (2004); Chiswick and Miller (2015)
 - In non English-speaking countries, e.g. Lang and Siniver (2009); Azam, Chin and Prakash (2013)
- English instruction in schools
 - Policy change in the medium of instruction, e.g. Angrist, Chin and Godoy (2008); Eriksson (2014)
 - Policy change of English as a subject: Chakraborty and Bakshi (2016)

I study English instruction as a subject in Mexican public primary schools



Main contributions of this paper

Research question

• What is the effect of exposure to English instruction on labor market outcomes in a non-English speaking country?

Empirical strategy

- Variation in exposure driven by a policy change in Mexico
- Rich data connecting individuals first observed in primary school to their labor market outcomes
- Use school by cohort variation for very narrow cohort span

Key findings

- No average effect on wages, but effects on mobility and industries
- Heterogeneity in effects by cognitive abilities

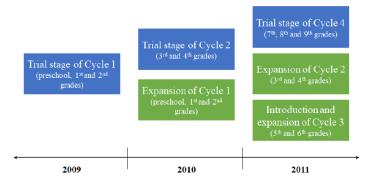


Policy background

National English Program in Basic Education (NEPBE) launched in 2009 in Mexico

- Introduced English instruction in public primary schools
- Funded by the central government
- Implemented gradually

Policy background: English program stages

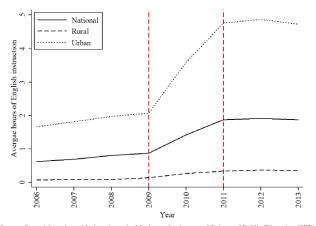


Note: NEPBE was launched in 2009 as a trial stage with the called Cycle 1. In 2010 the program continued the trial stage with the Cycle 2 and expanded Cycle 1. Finally, in 2011 the program introduced for the first time and expanded Cycle 3, benefiting fifth and sixth graders.





Policy background: English instruction over time

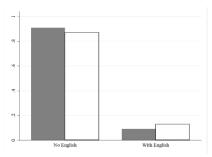


Source: Own elaboration with data from the Mexican school census, Ministry of Public Education (SEP), Note: Hours of English instruction are measured as the weekly hours average over the universe of Mexican elementary schools. Similarly, the number of English teachers refers to the average number of English teachers across elementary schools. The vertical dotted line in 2009 highlights the implementation year of the NEPBE's trial stage, while the dotted line in 2011 highlights the expansion of the program.

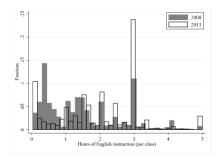




Policy background: Distribution of hours of English instruction (2008 vs 2011)



(a) Proportion of schools with English



(b) Hours of English instruction (w/o zeros)





Human capital framework

How might English instruction in primary school affect labor market outcomes?

- English language skills
 - Expand the set of jobs individuals can get (multinational firms, tourism, professional jobs)
 - Potential heterogeneity in effect by cognitive skills
- Other skills
 - Reduces time on other subjects or school activities
 - Possible complementarities with other subjects

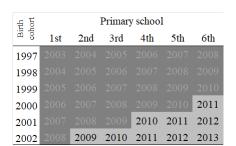


Empirical strategy

- Challenging to estimate the effect of exposure to English instruction on labor market outcomes
- Key concern: schools that offered English instruction are systematically different from those that did not
 - Likely to have positive selection bias, e.g., schools offering English instruction located in richer neighborhoods
- I address this by using a school FE approach
 - Intuition: compare students from the same school, some with more English instruction and some with less
 - Data of the universe of primary school students, able to connect to their labor market outcomes



Measure of exposure to English instruction • Hrs • Stages



- Using the Mexican school census, I calculate weekly hours of English instruction (per class), for each school-year
- For each school-cohort, I average the hours of English instruction from 1st to 6th grade
 - I assume students enter school at age 6 and had normal progression until 6th grade



Impact on labor market outcomes

I estimate the following equation to get the effect of exposure to English instruction on labor market outcomes:

$$y_{isct} = \alpha + \beta \cdot ExpEng_{sc} + X_{isct}\gamma + \zeta_c + \nu_s + \tau_t + \varepsilon_{isct}$$

where y_{isct} is the labor market outcome of individual i, who attended school s, belongs to cohort c and observed at time t

➤ Descriptive



Allowing for heterogeneity in effect by cognitive skills

Now, I allow the effect of exposure to vary by cognitive skills:

$$y_{isct} = \alpha + \beta \cdot ExpEng_{sc} + \sum_{j=2}^{4} \psi_j \cdot (ExpEng_{sc} \times Q_j)$$
$$+ \sum_{j=2}^{4} \pi_j \cdot Q_j + \mathbf{X}_{isct} \boldsymbol{\gamma} + \zeta_c + \nu_s + \tau_t + \varepsilon_{isct}$$

where Q_j are the dummy variables for cognitive skills quartiles with $j = \{2, 3, 4\}$; Q_1 is the reference category



Data

I construct a unique data set connecting restricted-use administrative data of students and their labor market outcomes for birth cohorts 1997-2002

- ENLACE (2006-2013): universe of primary school students
 - I know what school they attended
 - Reading and mathematics test scores
- Mexican school census (2003-2013)
 - School characteristics: weekly hours of English instruction
- Social Security data (2018-2021)
 - I use individual ID to match students to their labor market outcomes
 - Formal sector
 - Individuals between 16-24 years old



Data: Labor market outcomes

I investigate the effect of exposure to English instruction on four main labor market outcomes:

- Works in formal sector
 - Dummy for being in Social Security data among the universe of students
- ② Wages (average monthly wage) → IMSS
- Geographical mobility
 - Distance from home to working municipality
 - Moving from home state
- **1** Industries (NAICS) → codes
 - Dummies for agriculture, construction, manufacturing and services industries



Initial estimation results

Table 2: Exposure to English instruction and labor market outcomes (Social Security data)

	(1)	(2)	(3)	(4)
	Formal	ln(wage)	ln(distance)	Move
	sector			state
Panel A: Full san	ple			
Hrs English	-0.013***	-0.015***	-0.035***	-0.004***
	(0.001)	(0.002)	(0.008)	(0.001)
Observations	16,938,183	4,055,434	4,055,434	4,055,434
Adjusted R^2	0.105	0.270	0.477	0.555

- Concern about selection into social security data
 - Consistent with exposure to English instruction increasing school enrollment >> Census
- Use municipalities where it is less likely that they are enrolled







Proposed solution: Construction of low-enrollment sample

- Using the 2020 Mexican Population Census, I construct a municipality-enrollment rate variable for 18 years old (2002 birth cohort)
- ② I limit my sample to the municipalities with the lowest enrollment rates
- 3 The low-enrollment sample represents 6.4% of the full sample





Labor market outcomes with low-enrollment sample

Table 2: Exposure to English instruction and labor market outcomes (Social Security data)

	(1)	(2)	(3)	(4)
	Formal	ln(wage)	ln(distance)	Move
	sector			state
Panel B: Low enroll	$ment\ sample$			
Hrs English	-0.012	-0.005	-0.058	0.015*
	(0.008)	(0.011)	(0.044)	(0.008)
Observations	1,554,827	259,666	259,666	259,666
Adjusted \mathbb{R}^2	0.123	0.312	0.677	0.727
Mean of dep. var.	0.17	8.71	3.73	0.45

Labor market outcomes with low-enrollment sample

Table 2: Exposure to English instruction and labor market outcomes (Social Security data)

	(1)	(2)	(3)	(4)
	Formal	ln(wage)	ln(distance)	Move
	sector			state
Panel B: Low enroll	$lment\ sample$			
Hrs English	-0.012	-0.005	-0.058	0.015*
	(0.008)	(0.011)	(0.044)	(0.008)
Observations	1,554,827	259,666	259,666	259,666
Adjusted \mathbb{R}^2	0.123	0.312	0.677	0.727
Mean of dep. var.	0.17	8.71	3.73	0.45

Labor market outcomes with low-enrollment sample

Table 2: Exposure to English instruction and labor market outcomes (Social Security data)

	(1)	(2)	(3)	(4)
	Formal	ln(wage)	ln(distance)	Move
	sector			state
Panel B: Low enroll	$lment\ sample$			
Hrs English	-0.012	-0.005	-0.058	0.015*
	(0.008)	(0.011)	(0.044)	(0.008)
Observations	1,554,827	259,666	259,666	259,666
Adjusted R^2	0.123	0.312	0.677	0.727
Mean of dep. var.	0.17	8.71	3.73	0.45

English instruction and economic industries

Table 4: Exposure to English instruction and economic industries (Social Security data)

	(1)	(2)	(3)	(4)
	Agri-	Con-	Manu-	Serv-
	$\operatorname{culture}$	struction	facturing	ices
Panel B: Low enrolls	ment samp	le		
Hrs English	-0.012**	-0.025**	0.040**	-0.003
	(0.006)	(0.010)	(0.017)	(0.016)
Observations	259,666	259,666	259,666	259,666
Adjusted R^2	0.402	0.388	0.342	0.292
Mean of dep. var.	0.11	0.16	0.39	0.34

Summary of results so far

- Looking at individuals 16-24 year old, I find that more exposure to English instruction makes them less likely to work in formal labor
- I use a low-enrollment sample that deals with selection into formal sector
 - No average effect on wages
 - Increase in mobility
 - Shifts across industries
- Do effects vary by cognitive abilities?



Now let us allow the effect to vary by cognitive abilities

 I am able to explore this because I observe test scores in primary school

$$y_{isct} = \alpha + \beta \cdot ExpEng_{sc} + \sum_{j=2}^{4} \psi_j \cdot (ExpEng_{sc} \times Q_j)$$
$$+ \sum_{j=2}^{4} \pi_j \cdot Q_j + \boldsymbol{X_{isct}} \boldsymbol{\gamma} + \zeta_c + \nu_s + \tau_t + \varepsilon_{isct}$$

→ Distribution



Table 3: Exposure to English instruction and labor market outcomes by abilities

		(Social S	ecurity data	ı)	
		(1)	(2)	(3)	(4)
		Formal	ln(wage)	ln(distance)	Move
sl s		sector			state
Low-achieving individuals	Panel A: Low en	rollment sam	ple		
indi	Hrs English	-0.007	-0.013	-0.079	0.021**
ilig.	4	(0.009)	(0.012)	(0.049)	(0.010)
hiev	$Eng \times Q2$	-0.003	-0.003	-0.018	-0.011
N-ac	L	(0.006)	(0.009)	(0.047)	(0.008)
å	$Eng \times Q3$	-0.005	0.031***	0.012	-0.017
		(0.006)	(0.009)	(0.036)	(0.011)
	$Eng \times Q4$	-0.013**	0.012	0.106***	0.001
		(0.006)	(0.012)	(0.040)	(0.012)
	Observations	1,554,827	259,666	259,666	259,666
	Adjusted \mathbb{R}^2	0.123	0.312	0.677	0.727

Note: The quartile Q4 contains the top part of the abilities' distribution with individuals obtaining the highest Math test scores.



Table 3: Exposure to English instruction and labor market outcomes by abilities

	(Social Security data)				
		(1)	(2)	(3)	(4)
		Formal	ln(wage)	ln(distance)	Move
		sector			state
	Panel A: Low er	nrollment sam	ple		
	Hrs English	-0.007	-0.013	-0.079	0.021**
		(0.009)	(0.012)	(0.049)	(0.010)
uals	$\text{Eng} \times \text{Q2}$	-0.003	-0.003	-0.018	-0.011
individuals	_	(0.006)	(0.009)	(0.047)	(0.008)
	$Eng \times Q3$	-0.005	0.031***	0.012	-0.017
High-achieving	-	(0.006)	(0.009)	(0.036)	(0.011)
chie	$Eng \times Q4$	-0.013**	0.012	0.106***	0.001
gh-a	L	(0.006)	(0.012)	(0.040)	(0.012)
Ħ	Observations	1,554,827	259,666	259,666	259,666
	Adjusted \mathbb{R}^2	0.123	0.312	0.677	0.727

Note: The quartile Q4 contains the top part of the abilities' distribution with individuals obtaining the highest Math test scores.



Table 3: Exposure to English instruction and labor market outcomes by abilities

		(Social S	ecurity data	ı)	
		(1)	(2)	(3)	(4)
		Formal	ln(wage)	ln(distance)	Move
		sector			state
	Panel A: Low en	$rollment\ sam$	ple		
	Hrs English	-0.007	-0.013	-0.079	0.021**
		(0.009)	(0.012)	(0.049)	(0.010)
uals	$\text{Eng} \times \text{Q2}$	-0.003	-0.003	-0.018	-0.011
individuals	۲	(0.006)	(0.009)	(0.047)	(0.008)
	$Eng \times Q3$	-0.005	0.031***	0.012	-0.017
High-achieving	-	(0.006)	(0.009)	(0.036)	(0.011)
chie	$Eng \times Q4$	-0.013**	0.012	0.106***	0.001
gh-a	L	(0.006)	(0.012)	(0.040)	(0.012)
Ξ	Observations	1,554,827	259,666	259,666	259,666
	Adjusted \mathbb{R}^2	0.123	0.312	0.677	0.727

Note: The quartile Q4 contains the top part of the abilities' distribution with individuals obtaining the highest Math test scores.



English instruction and industries by abilities

Table 5: Exposure to English instruction and economic industries by abilities

(Social Security data)

		(Social S	security data	a)	
		(1)	(2)	(3)	(4)
		Agri-	Con-	Manu-	Serv-
iig		$\operatorname{culture}$	struction	facture	ices
Low-achieving	Panel A: Low	enrollmen	t sample		
ach	Hrs English	-0.005	-0.035***	0.049***	-0.008
- A		(0.007)	(0.010)	(0.018)	(0.018)
1	$\text{Eng} \times \text{Q2}$	-0.014***	0.006	-0.010	0.017
	_	(0.004)	(0.005)	(0.011)	(0.011)
50 0	Eng×Q3	-0.011*	0.020***	-0.008	-0.001
High-achieving		(0.006)	(0.006)	(0.012)	(0.012)
chi	$Eng \times Q4$	-0.005	0.022***	-0.022*	0.004
p-a	_	(0.006)	(0.007)	(0.013)	(0.010)
Hig	Observations	259,666	259,666	259,666	259,666
	Adjusted \mathbb{R}^2	0.402	0.388	0.342	0.292

→ Gender



Summary of results by abilities

- Exposure to English instruction increases wages of high-ability workers
- Exposure to English instruction increases mobility of low-ability workers
- All ability groups show shifts across industries

Exploring mechanisms

- Mechanism 1: English abilities
 - I cannot test directly this mechanism because my data set does not have a measure of English abilities
 - Evidence I will show:
 - Galvez-Soriano (2023) shows that exposure to English instruction in primary school increases the probability of speaking English
 - Workers are systematically moving to economic industries requiring English abilities
- Mechanism 2: Other cognitive abilities
 - Language (Spanish)
 - Mathematics



Mechanism 2: Other cognitive abilities

Effect of exposure to English instruction on student achievement:

$$test_score_{isc} = \theta + \phi \cdot ExpEng_{sc} + X_{isc}\gamma + \zeta_c + \nu_s + \varepsilon_{isc}$$

where $test_score_{isc}$ is the 6th grade test score of student i, who attended school s and belongs to cohort c



Mechanism 2: Other cognitive abilities • Full sample

Table 7: Exposure to English instruction and student achievement

	(1)	(2)
	Language 6th	Math 6th
Low enrollment say	mple	
Hrs English	0.0476	0.0094
	(0.0470)	(0.0344)
Observations	259,666	259,666
Adjusted R^2	0.351	0.381

Exploring mechanisms

- Mechanism 1: English abilities
 - I cannot test directly this mechanism because my data set does not have a measure of English abilities
 - Evidence I will show:
 - Galvez-Soriano (2023) shows that exposure to English instruction in primary school increases the probability of speaking English
 - Workers are systematically moving to economic industries requiring English abilities
- Mechanism 2: Other cognitive abilities
 - Language (Spanish)
 - Mathematics



Mechanism 1a: English abilities (Galvez-Soriano, 2023)

Data

- I use the 2014 Subjective Well-being Survey (BIARE)
- Representative at national and state level
- Asks if the respondent speaks English
- Only 3% reported they speak English

Empirical strategy

Take advantage of state policy changes in English instruction

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

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)



Mechanism 1a: English abilities (Galvez-Soriano, 2023)



Mechanism 1a: English abilities (Galvez-Soriano, 2023)

Data

- I use the 2014 Subjective Well-being Survey (BIARE)
- Representative at national and state level
- Asks if the respondent speaks English
- Only 3% reported they speak English

Empirical strategy

Take advantage of state policy changes in English instruction

$$y_{isc} = \theta + \psi \cdot HadPolicy_{sc} + \delta_s + \kappa_c + \boldsymbol{X_{isc}}\boldsymbol{\Psi} + \varepsilon_{isc}$$

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) \longrightarrow Event-study SDID



Mechanism 1a: English abilities (Galvez-Soriano, 2023)

Table: Intention to Treat effect of offering English instruction at school

	(1)	(2)
	$_{ m Hrs}$	Speak
	Eng	Eng
Panel A: Full sampl	e	
Had Policy	0.308***	0.015**
	(0.046)	(0.008)
Observations	13,131	13,131
Adjusted \mathbb{R}^2	0.596	0.075

Mechanism 1b: Workers moving to jobs requiring English skills

- Same Social Security data I use in the labor market analysis
- Use BIARE to I construct an index of economic industries by English skills
 - According to the NAICS at four-digit code
- For each manufacturing and services, I form the following dummies reflecting English-intensive jobs
 - Dummy for individuals having a job in top-quartile of English speakers distribution
 - Dummy for individuals having a job in bottom-three-quartiles of English speakers distribution



Mechanism 1b: Workers moving to jobs requiring English skills

Table 6: Exposure to English instruction and economic industries (Social Security data)

	(1)	(2)	(3)	(4)
	Manufacturing		Services	
	High Low		High	Low
	English	English	English	English
Panel B: Low enroll	$ment\ sample$	e		
Hrs English	0.060***	-0.026**	0.046***	-0.039***
	(0.013)	(0.012)	(0.014)	(0.011)
Observations	259,666	259,666	259,666	259,666
Adjusted \mathbb{R}^2	0.175	0.189	0.145	0.116

→ Manu Ind

>> Svcs Ind

→ Abilities

Robustness Checks

- Concern about TWFE estimator in the presence of heterogeneous treatment effects ** TWFE
- Concern about differential cohort trends across labor markets
 State by cohort
- Different exposure variable ** Exposure
- Different enrollment thresholds Threshold Test scores
- No-changes in private school enrollment Private enrollment
- No-effects on other resources >> Teachers



Conclusion • Next steps

- I exploit a policy change and construct a novel database to estimate the causal effect of English instruction
- Exposure to English instruction affects outcomes of workers across the cognitive skills distribution
 - On average: no effect on wages, increase in mobility and shifts across industries
 - High-skill workers: rise in wages, industry shifts
 - Low-skill workers: increase in mobility, industry shifts
- Consistent with English skills mediating these effects
- In Mexico, having second language skills (English) expands individual's labor market opportunities



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



Next steps • Back

- These findings are for individuals who stay in Mexico
 - Currently, I am examining effect on migration to US
- In a companion paper, using a different data set (BIARE),
 I estimate the effect of having English skills on labor market outcomes
 - Preliminary evidence is consistent with my findings here:
 English skills do not raise wages, on average, but do affect labor choices

Measuring hours of English instruction



Benito Juarez Elementary School

Weekly hours of English instruction	18
Number of classes	6
Hours of English instruction (per class)	3





▶ Distribution



Descriptive statistics (matched data sets)



Table 1: Descriptive statistics

Variable	Mean	$^{\mathrm{SD}}$	Min	Max
Dependent variables				
Ln(wage)	8.70	0.42	7.83	11.12
Ln(distance)	2.29	2.28	0.00	7.62
Move state	0.29	0.45	0.00	1.00
Agriculture	0.04	0.19	0.00	1.00
Construction	0.08	0.27	0.00	1.00
Manufacturing	0.35	0.48	0.00	1.00
Services	0.54	0.50	0.00	1.00
Independent variables				
Hours of English instruction	0.23	0.60	0.00	9.41
Female	0.39	0.49	0.00	1.00
Age	20.88	1.51	16.00	24.00
Language test score	-0.06	0.97	-2.84	3.53
Math test score	-0.04	0.97	-2.69	3.40
Number of students (6th grade)	28.87	9.49	1.00	119.00
Number of teachers with college	0.87	0.20	0.00	2.15
Number of teachers with masters	0.05	0.07	0.00	0.91
Rural	0.27	0.44	0.00	1.00
Permanent job	0.81	0.39	0.00	1.00
Number of jobs (per year)	1.48	0.83	1.00	17.00
Number of permanent jobs	1.20	0.83	0.00	14.00
Observations	4.055,434			

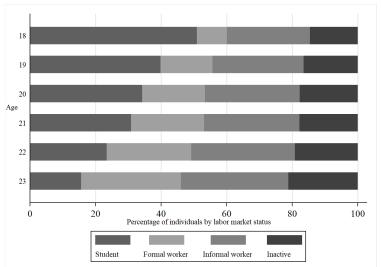
Descriptive statistics (low-enrollment sample) • Back

Table A.5: Descriptive statistics (low-enrollment sample)

Variable	Mean	SD	Min	Max
Dependent variables				
Ln(wage)	8.71	0.42	7.83	11.12
Ln(distance)	3.73	2.23	0.00	7.60
Move state	0.45	0.50	0.00	1.00
Agriculture	0.11	0.32	0.00	1.00
Construction	0.16	0.36	0.00	1.00
Manufacturing	0.39	0.49	0.00	1.00
Services	0.34	0.47	0.00	1.00
$Independent\ variables$				
Hours of English instruction	0.06	0.31	0.00	4.70
Female	0.36	0.48	0.00	1.00
Age	20.83	1.49	17.00	24.00
Language test score	-0.22	0.97	-2.73	3.19
Math test score	-0.10	1.00	-2.59	3.40
Number of students (6th grade)	22.25	10.55	1.00	70.00
Number of teachers with college	0.72	0.31	0.00	1.28
Number of teachers with masters	0.04	0.07	0.00	0.73
Rural	0.63	0.48	0.00	1.00
Permanent job	0.74	0.44	0.00	1.00
Number of jobs (per year)	1.46	0.85	1.00	17.00
Number of permanent jobs	1.06	0.82	0.00	13.00
Observations	259,666			

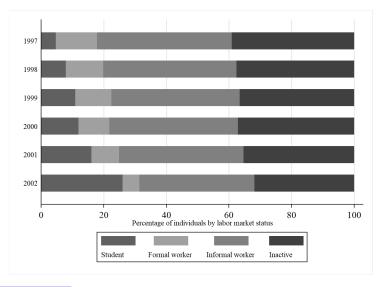


Potential problem: many 16-24 year olds are enrolled in school (2020 Mexican census) • Back





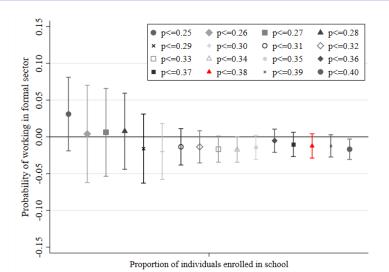
Statuses with low-enrollment sample







How I chose the 38 percent enrollment rate?



High-English intensive manufacturing industries

Table A.6: Economic Manufacturing Industries

4-digit	Industry name	5-digit	Industry name
code		code	
3110	Animal food manufacturing	31131	Sugar and confectionery product manufacturing
		31141	Fruit and vegetable preserving manufacturing
		31151	Dairy product manufacturing
		31161	Animal slaughtering and processing
3120	Beverage and tobacco industries	31211	Beverage manufacturing
3150	Apparel manufacturing	31511	Apparel knitting mills
		31521	Cut and sew apparel manufacturing
3160	Leather and hide tanning and	31611	Leather and hide tanning and finishing
	finishing	31621	Footwear manufacturing
3220	Paper industry	32211	Pulp, paper, and paperboard mills
3250	Chemical industry	32511	Basic chemical manufacturing
		32521	Resin, synthetic rubber, and artificial and synthetic fibers
		32541	Pharmaceutical and medicine manufacturing
		32551	Paint, coating, and adhesive manufacturing
		32591	Other chemical product and preparation manufacturing
3270	Nonmetallic mineral products	32711	Clay product and refractory manufacturing
		32731	Cement and concrete product manufacturing
3320	Metal products manufacturing	33241	Boiler, tank, and shipping container manufacturing
		33251	Hardware manufacturing
		33281	Coating, engraving, heat treating, and allied activities
3340	Manufacturing of computer	33461	Manufacturing and reproducing magnetic and optical media
3350	Electric appliances and electric	33511	Electric lighting equipment manufacturing
	power generation	33521	Household appliance manufacturing
		33531	Electrical equipment manufacturing
3360	Transportation equipment	33611	Motor vehicle manufacturing
		33641	Aerospace product and parts manufacturing
		33651	Railroad rolling stock manufacturing
		33661	Ship and boat building
3370	Household furniture	33710	Nonupholstered wood household furniture manufacturing



Services that require English abilities

Table A.7: Economic Services Industries

4-digit	Industry name	5-digit	Industry name
code		code	
4310	Wholesale trade of groceries, food,	43111	Grocery merchant wholesalers
	beverages and tobacco	43112	Tobacco and alcoholic beverage merchant wholesalers
4350	Wholesale trade of industrial machinery	43522	Wholesale trade of manufacturing machinery and equipment
	and equipment	43541	Computer and software merchant wholesalers
4620	Retail trade in self-service shops and	46211	Retail trade in self-service shops
	department stores	46221	Retail trade in department stores
4641	Retail trade of health care items	46412	Optical goods and other health care stores
4651	Retail trade of perfumery and jewelry	46511	Cosmetics, beauty supplies, and perfume stores
4661	Retail trade of household furniture	46611	Furniture stores
4682	Automotive parts and accessories	46821	Automotive parts, accessories, and tire stores
4841	Freight truck transportation	48410	General freight trucking
4931	Warehousing services	49310	Warehousing and storage
5170	Telecommunications	51731	Wired and wireless telecommunications carriers
5324	Commercial and industrial machinery	53242	Office machinery and equipment rental and leasing
5610	Administrative and support services	56160	Investigation and security services
		56170	Services to buildings and dwellings
7100	Artistic, cultural and sporting services	71121	Spectator sports
		71311	Amusement parks and arcades
7211	Traveler accommodation	72111	Hotels and motels
7223	Special food services	72231	Food and beverage preparation services
7224	Drinking places (alcoholic beverages)	72241	Nightclubs, bars and similar drinking places
8114	Personal and household goods repair	81140	Personal and household goods repair and maintenance
8131	Religious organizations	81311	Religious organizations
9314	Justice, public order, and safety	93141	Justice, public order, and safety activities

→ Back



NAICS codes in my classification

Industries	NAICS code	Industry Title
Agriculture	11	Agriculture, Forestry, Fishing and Hunting
	21	Mining
Construction	22	Utilities
	23	Construction
Manufacturing	31-33	Manufacturing
	42	Wholesale Trade
	44-45	Retail Trade
	48-49	Transportation and Warehousing
	51	Information
	52	Finance and Insurance
	53	Real Estate Rental and Leasing
	54	Professional, Scientific, and Technical Services
Services	55	Management of Companies and Enterprises
	56	Administrative and Support and Waste Management
	61	Educational Services
	62	Health Care and Social Assistance
	71	Arts, Entertainment, and Recreation
	72	Accommodation and Food Services
	81	Other Services (except Public Administration)
	92	Public Administration



Data: Student achievement

- I look at test scores as one of the mechanisms
- ② I standardize test scores, ts_{isct} , of each student i in school s at time t using the following formula:

$$test_score_{isc} = \frac{ts_{isct} - \mu_t}{\sigma_t}$$

where $test_score_{isc}$ is the standardized test score, while μ_t and σ_t are the mean and standard deviation of test scores, respectively, pooling all Mexican students by grade and by each observed year





Estimation results: exposure to Eng and test scores

Table 7: Exposure to English instruction and student achievement

	(1)	(2)	(3)	(4)
	Language 6th	Language 6th	Math 6th	Math 6th
Panel A: Full sam	ple in ENLACE a	latabase		
Hrs English	0.0335***	0.0099*	0.0155***	-0.0081
	(0.0033)	(0.0054)	(0.0036)	(0.0062)
Observations	16,938,183	16,938,183	16,938,183	16,938,183
Adjusted \mathbb{R}^2	0.426	0.472	0.429	0.482
Panel B: Full sam	ple in Social Secu	rity data		
Hrs English	0.0284***	-0.0015	0.0105***	-0.0225***
	(0.0033)	(0.0075)	(0.0037)	(0.0086)
Observations	4,055,434	4,055,434	4,055,434	4,055,434
Adjusted \mathbb{R}^2	0.404	0.453	0.413	0.470

→ Robustness checks

>> Test scores

→ Wages

Table 2: Exposure to English instruction and labor market outcomes (Social Security data)

	(1)	(2)	(3)	(4)
	Formal	ln(wage)	ln(distance)	Move
	sector			state
Panel C: Low enrolls	nent sample	e (Men)		
Hrs English (β^M)	-0.016	-0.002	-0.130**	0.004
	(0.011)	(0.016)	(0.057)	(0.012)
Observations	750,812	166,165	166,165	166,165
Adjusted R^2	0.149	0.315	0.680	0.729
Panel D: Low enrolls	nent sample	e (Women)		
Hrs English (β^W)	-0.010	-0.022	0.063*	0.033**
	(0.010)	(0.015)	(0.034)	(0.012)
Observations	804,015	93,501	93,501	93,501
Adjusted R^2	0.107	0.363	0.700	0.756
$\beta^M = \beta^W$ [p-value]	[0.012]	[0.448]	[0.190]	[0.090]
State of work FE	NO	YES	YES	YES







Table 3: Exposure to English instruction and labor market outcomes by abilities

(Social Security data)					
	(1)	(2)	(3)	(4)	
	Formal	ln(wage)	ln(distance)	Move	
	sector			state	
Panel B: Low en	rollment sam	ple (Men)			
Hrs English	-0.014	-0.010	-0.145**	0.008	
	(0.012)	(0.018)	(0.064)	(0.014)	
$Eng \times Q2$	0.007	-0.001	-0.023	-0.005	
	(0.009)	(0.011)	(0.060)	(0.010)	
$Eng \times Q3$	-0.006	0.040***	0.008	-0.014	
	(0.011)	(0.014)	(0.049)	(0.012)	
$Eng \times Q4$	-0.013	0.010	0.104*	-0.001	
	(0.011)	(0.017)	(0.058)	(0.014)	
Observations	750,812	166,165	166,165	166,165	
Adjusted R^2	0.149	0.315	0.680	0.729	
Panel C: Low en	rollment sam	ple (Wome	en)		
Hrs English	-0.007	-0.030*	0.029	0.042**	
	(0.010)	(0.016)	(0.084)	(0.017)	
$Eng \times Q2$	-0.006	-0.007	-0.002	-0.024**	
	(0.007)	(0.012)	(0.065)	(0.012)	
$Eng \times Q3$	-0.000	0.017*	0.017	-0.020	
	(0.006)	(0.010)	(0.087)	(0.017)	
$Eng \times Q4$	-0.008	0.017	0.109	0.004	
	(0.007)	(0.017)	(0.080)	(0.019)	
Observations	804,015	93,501	93,501	93,501	
Adjusted R^2	0.107	0.363	0.701	0.756	

Table 4: Exposure to English instruction and economic industries (Social Security data)

	(1)	(2)	(3)	(4)
	Agri-	Con-	Manu-	Serv-
	culture	struction	facturing	ices
Panel C: Low enroll	ment samp	le (Men)		
Hrs English (β^M)	-0.005	-0.026*	0.040**	-0.010
	(0.008)	(0.014)	(0.020)	(0.020)
Observations	166,165	166,165	166,165	166,165
Adjusted R^2	0.424	0.424	0.352	0.273
Panel D: Low enroll	ment samp	le (Women)		
Hrs English (β^W)	-0.024***	-0.006	0.043**	-0.012
	(0.008)	(0.006)	(0.021)	(0.024)
Observations	93,501	93,501	93,501	93,501
Adjusted R^2	0.446	0.139	0.383	0.383
$\beta^M = \beta^W$ [p-value]	[0.055]	[0.000]	[0.003]	[0.974]
Shares	0.04	0.08	0.35	0.53

▶ Back



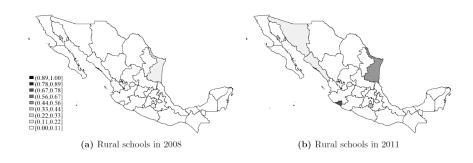
Table 6: Exposure to English instruction and economic industries (Social Security data)

	(1)	(2)	(3)	(4)			
	Manufacturing		Ser	vices			
	High	Low	High	Low			
	English	English	English	English			
Panel C: Low enrolls	ment sampl	e (Men)					
Hrs English (β^M)	0.075***	-0.035**	0.033**	-0.035**			
	(0.016)	(0.016)	(0.015)	(0.014)			
Observations	166,165	166,165	166,165	166,165			
Adjusted R^2	0.175	0.202	0.163	0.111			
Panel D: Low enrollment sample (Women)							
Hrs English (β^W)	0.038*	-0.011	0.047^*	-0.039*			
	(0.020)	(0.018)	(0.027)	(0.023)			
Observations	93,501	93,501	93,501	93,501			
Adjusted R^2	0.226	0.229	0.191	0.173			
$\beta^M = \beta^W$ [p-value]	[0.058]	[0.070]	[0.454]	[0.594]			
Shares	0.17	0.17	0.29	0.24			

→ Back

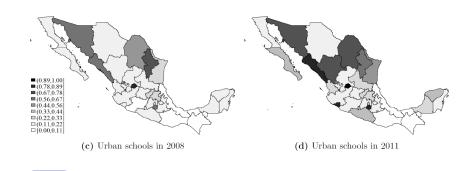


Proportion of **rural** schools with English instruction (2008 vs 2011)





Proportion of **urban** schools with English instruction (2008 vs 2011)





Industries requiring English skills by abilities

Table A.2: Exposure to English instruction and economic industries by abilities (Social Security data)

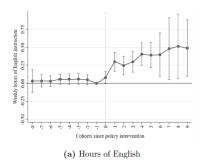
		(=====,					
			(1) (2) Manufacturing		(3) (4) Services		
Low-achieving		•	High English	Low English		High English	Low English
pie	_	Panel A: Low	enrollmen	t sample			
၁		Hrs English	0.065***	-0.020		0.040***	-0.037***
<u>.</u>	┨	0	(0.014)	(0.015)		(0.015)	(0.012)
្ន		$Eng \times Q2$	0.001	-0.012		0.021*	-0.005
	_		(0.009)	(0.010)		(0.011)	(0.008)
ng G		$Eng \times Q3$	-0.007	0.000		0.001	-0.003
evi	┨	•	(0.011)	(0.011)		(0.010)	(0.007)
Ē		$Eng \times Q4$	-0.012	-0.014		0.004	0.000
High-achieving		•	(0.011)	(0.014)		(0.009)	(0.008)
ig		Observations	259,666	259,666		259,666	259,666
Ħ		Adjusted \mathbb{R}^2	0.175	0.189		0.145	0.116

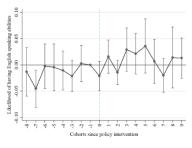




Mechanism 1a: English abilities (Galvez-Soriano, 2023)

$$y_{isc} = \theta + \sum_{c} \psi_{c} \cdot I_{(treatment_{sc} = c - c_{s}^{*})} + \delta_{s} + \kappa_{c} + \boldsymbol{X_{isc}} \boldsymbol{\Psi} + \varepsilon_{isc}$$





(b) Speak English





TWFE correction (Callaway, Goodman-Bacon and Sant'Anna (2021))

Table 8: Solutions for TWFE with heterogeneous treatment effects (Social Security data)

	(1)	(2)	(3)	(4)			
	Formal	ln(wage)	ln(distance)	Move			
	sector			state			
Panel A: Bine	ary treatmer	\overline{nt}					
Eng	-0.007	0.006	-0.037	0.014			
	(0.006)	(0.012)	(0.044)	(0.012)			
Observations	1,554,827	259,666	259,666	259,666			
Adjusted \mathbb{R}^2	0.123	0.312	0.531	0.463			
Panel B: Binary treatment w/o always treated							
Eng	-0.008	0.012	-0.017	0.015			
	(0.006)	(0.011)	(0.043)	(0.010)			
Observations	1,531,987	254,208	254,208	254,208			
Adjusted R^2	0.122	0.312	0.685	0.735			







Differential cohorts trends across labor markets?

Table 10: Exposure to English instruction and labor market outcomes (with state-by-cohort FE, Social Security data)

	(1)	(2)	(3)	(4)		
	Formal	ln(wage)	ln(distance)	Move		
	sector			state		
Panel B: Low enrollment sample						
Hrs English	-0.007	0.008	-0.045	0.012		
	(0.010)	(0.013)	(0.051)	(0.010)		
Observations	1,554,827	259,666	259,666	259,666		
Adjusted R^2	0.124	0.313	0.677	0.728		

≫ Back

⇒ Women

Differential cohorts trends across labor markets?

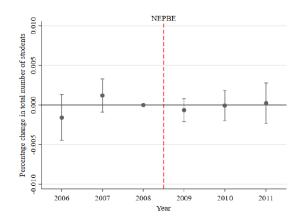
Table 10: Exposure to English instruction and labor market outcomes (with state-by-cohort FE, Social Security data)

(1)	(2)	(3)	(4)				
Formal	$\ln(\text{wage})$	$\ln(\text{distance})$	Move				
sector			state				
nent samp	le (Men)						
-0.013	0.014	-0.113*	0.005				
(0.014)	(0.019)	(0.065)	(0.013)				
750,812	166,165	166,165	166,165				
0.150	0.317	0.680	0.730				
Panel D: Low enrollment sample (Women)							
-0.003	-0.003	0.021	0.023*				
(0.011)	(0.017)	(0.090)	(0.013)				
804,015	93,501	93,501	93,501				
0.108	0.365	0.701	0.757				
	Formal sector nent samp -0.013 (0.014) 750,812 0.150 nent samp -0.003 (0.011) 804,015	Formal ln(wage) sector nent sample (Men) -0.013 0.014 (0.014) (0.019) 750,812 166,165 0.150 0.317 nent sample (Women) -0.003 -0.003 (0.011) (0.017) 804,015 93,501	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				

→ Back



No-changes in private school enrollment







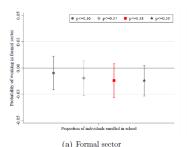
Different exposure variable

Table 9: English instruction and labor market outcomes (Alternative exposure variable)

	(1)	(2)	(3)	(4)
	Formal	$\ln(\text{wage})$	ln(distance)	Move
	sector			state
Panel B: Low enrolln	nent sample			
Eng Teachers	-0.202*	-0.127	-0.772	0.072*
	(0.120)	(0.196)	(0.751)	(0.040)
Observations	1,554,827	259,666	259,666	259,666
Adjusted \mathbb{R}^2	0.123	0.312	0.677	0.727



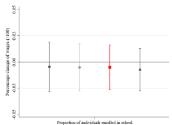
Solution to sample selection > Back

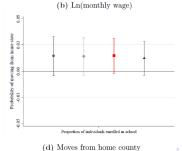




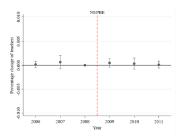
Proportion of individuals enrolled in school

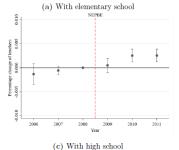
(c) Distance home-job county

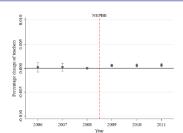


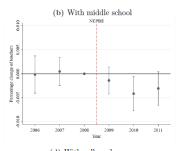


More teachers? • Back









- Increase in mobility is driven by women > Labor mkt
 - Women move away from rural areas "Industries"
- Positive effect on wages is driven by men High achieving
 - High achieving men substitute proportionally more agricultural than construction jobs for manufacturing ones
 Abilities

Examining labor market statuses using Mexican census

- Estimate effect of policy exposure on labor market statuses
- Modify empirical strategy using municipality FE (do not have school ID)

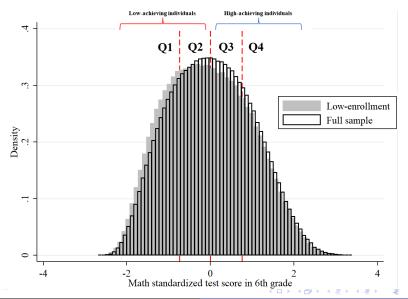
Table: English instruction (Mexican census data)

	(1)	(2)	(3)	(4)
	Student	Formal	Informal	Inactive
		sector	sector	
Hrs English	0.059*** (0.008)	-0.058*** (0.008)	-0.008 (0.005)	0.006 (0.006)
Observations Adjusted \mathbb{R}^2	$0.111 \\ 0.111$	1,415,827 0.109	1,415,827 0.083	1,415,827 0.111

▶ Back



Labor market outcomes by cognitive abilities Back



Wages in IMSS data • Back

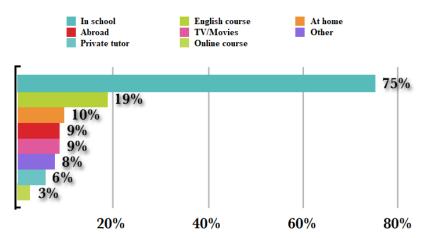
The social security data has a monthly frequency, and each month could have more than one observation for the same worker because some workers have more than one job

- I take the average of the wages reported over one year, by worker, by economic sector and by employer
- When a worker has multiple jobs, I drop the jobs with the lowest wages if those are non-permanent jobs
- If there are individuals with permanent and non-permanent jobs, I only use permanent jobs
- For individuals who have more than one job with the same wage I choose the job in which they have worked most part of the year

I assume that an employee works 30 days, on average



Where did you learn English? • Back



Note: This question was answered only by individuals who reported having English abilities. The answers are independent, i.e. do not sum 100 percent.

Source: CIDAC (2008). Encuesta CIDAC sobre Capital Humano en México. México.

