

Compliance with Labour Legislation: Evidence from a Natural Experiment

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Introduction: From enforcement to compliance

- Labour legislation in developing countries
 - ▶ Formally stringent regulation **figure 1**
 - ▶ High levels of non-compliance
- Labour inspection as the main policy tool to promote compliance
- Difficult to assess its effectiveness
 - ▶ Other factors can explain compliance (e.g. trade unions, rule of law)
 - ▶ Level of enforcement is endogenous to a country or region
- An exogenous change in enforcement intensity is needed
 - ▶ Ronconi (2010) exploits electoral cycles
 - ▶ Almeida and Carneiro (2009, 2012) use distance from labour office

A novel identification strategy

Exploit a drastic and externally induced change in labour inspection in Colombia to assess effectiveness on compliance

The Action Plan: A unique policy change

- US-Colombia trade agreement signed in November 2006
- Ratification process required approval by the Parliament
 - ▶ Colombian Congress approved the bill in June 2007 (84 yes, 3 No)
 - ▶ US Congress failed to approve amid concerns on labour rights
- New US Administration, new bargaining round
- Definition of an 'Action Plan' on labour rights
 - ▶ Constitution of Ministry of Labour, reinforcement of CB legislation
 - ▶ 480 new inspectors to be hired in 4 years (from 360 in 2010)
- Implementation of the Plan up to the Colombian government
 - ▶ Different targets in labour inspectors by department
 - ▶ Implementation delays: target still to be met in 2016

Labour inspection in Colombia

- Labour inspectors are in charge of ensuring law compliance
 - ▶ BA degree in law or public administration
 - ▶ Manual of operations with ILO guidelines
- Competent for all areas of labour law, but priority areas identified in (i) Labour formalization; and (ii) Labour intermediation
- How they operate: (i) Informative role; (ii) Mediation between parties; or (iii) Fines and sanctions
- Fines can be of different nature
 - ▶ Financial sanctions (from 1 to 50,000 times the minimum wage)
 - ▶ Temporary closure (from 3 to 30 days) or immediate shutdown

Reform of labour inspection

Some changes in the operations of inspectors as a result of the 'Action Plan' (e.g. online complaints, awareness campaigns)

Datasets and descriptive statistics

- Repeated cross-sections of the household survey (GEIH)
 - ▶ Analysis conducted between 2009 and 2014
 - ▶ Sample includes all working age population
- Administrative data from Ministry of Labour
 - ▶ Number of inspectors operating in each department/year
 - ▶ Number of new vacancies obtained from call for applications
- Institutional Environment and Performance Survey (EDID)
 - ▶ Interviews randomly selected public officials in each department
 - ▶ Perceptions on institutional environment, corruption, efficiency
- Split departments according to the intensity of the policy **table 1**
 - ▶ No substantial differences in personal and institutional characteristics
 - ▶ Some difference in labour market indicators

Identification strategy

- A unique policy change: Nice, but not enough figure 2
 - ▶ Drastic: More than doubling level of enforcement
 - ▶ Exogenous: Generated by US Congress
 - ▶ But a simple pre and post-analysis would be difficult to defend
- A differential policy change: Diff-in-diff figure 3
 - ▶ Hiring targets set by central Government to the departments
 - ▶ Generates variations in programme intensity
 - ▶ Diff-in-diff approach as in Duflo (2001) or Acemoglu et al (2004)
- A delayed policy change: Instrumental variable figure 4
 - ▶ Hiring process took place at the department level and was delayed
 - ▶ Possible endogeneity if policy intensity is used directly
 - ▶ Hiring target as an instrument for new hires (De Giorgi et al, 2015)

Identification assumptions

- Analysing determinants of inspectors allocation **table 2**
 - ▶ Macro analysis at department level in 2011
 - ▶ Dependent variable is the change in number of inspectors (2010-2014)
 - ▶ No clear determinant of inspectors' allocation across departments
- Diff-in-diff analysis **table 3**
 - ▶ Split departments in quartiles according to policy intensity
 - ▶ Analyse trends in formal employment before and after the policy
 - ▶ Parallel trend assumption likely to hold
- Instrumental variable analysis **table 4**
 - ▶ A strong first stage relationship – and a well-behaved instrument
 - ▶ Relatively easy to defend exogeneity
 - ▶ Seems important to account for delays (i.e. risk to underestimate)

Main results

- Main specification details

- ▶ Outcome of interest is formal employment (ILO definition)
- ▶ Standard errors clustered at department/year level (Abadie et al. 2017)

- Main equation will take the following form (Duflo 2001) [table 5](#)

$$FE_{ist} = c + \alpha_t + \delta_s + \beta(X_{ist} * Post) + \gamma(C_{st} * Post) + \theta(P_s * Post) + \epsilon_{ist}$$

- Interaction term analysis sheds light on common trends [table 6](#) [figure 5](#)

$$FE_{ist} = c + \alpha_t + \delta_s + \beta \sum_{t=2010}^{2014} (X_{ist} * d_t) + \gamma \sum_{t=2010}^{2014} (C_{st} * d_t) + \theta \sum_{t=2010}^{2014} (P_s * d_t) + \epsilon_{ist}$$

- Robustness tests

- ▶ Robust to (i) controlling for few clusters and (ii) bootstrapping [table 7](#)
- ▶ Replicate the analysis at the macroeconomic level [table 8](#)

Channels of transmission

- Effects on labour force composition
 - ▶ No general equilibrium effects on employment [table 9](#)
 - ▶ A (smaller) shift from self- to dependent employment [table 10](#)
- What is targeted by inspectors?
 - ▶ Effects appear only in the formal economy [table 11](#)
 - ▶ And in urban areas (but broad definition) [table 12](#)
- Differences by gender or education
 - ▶ Similar effects for men and women [table 13](#)
 - ▶ Effects are stronger for low educated individuals [table 14](#)

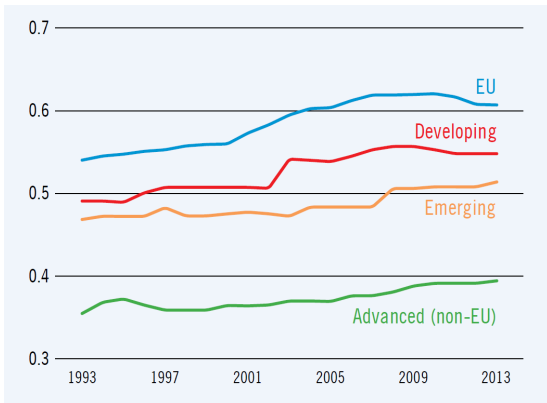
A theory of inspectors

Inspectors focus on registered firms that are easier to find (and reach); but might miss more severe forms of non-compliance (e.g. agricultural workers)

Conclusions

- Enforcement and compliance with labour legislation
 - ▶ Difficult to identify a causal link: need an exogenous shock
 - ▶ Previous identification strategies not entirely convincing
- Exploit a drastic and externally induced change in enforcement level
 - ▶ Which generates variations in enforcement over time and space
 - ▶ And taking into account possible endogeneity in implementation
- Results find a positive effect on formal employment (Ronconi, 2010)
 - ▶ Which generates from a shift from self- to dependent employment
 - ▶ No economic costs in terms of employment creation
 - ▶ But mostly an urban phenomenon (Almeida and Carneiro, 2012)

Figure 1: Employment Protection Legislation over time



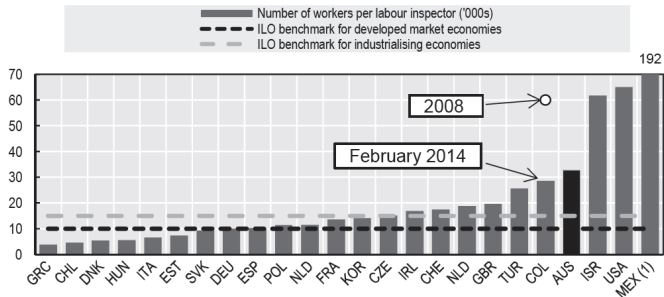
Source: ILO (2015)

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Table 1: Descriptive statistics at baseline (2010)

	Low	Medium-low	Medium-high	High
Panel A: Personal characteristics				
Age	39.06 (0.56)	39.02 (1.01)	38.72 (1.73)	38.11 (1.49)
Male	0.49 (0.01)	0.49 (0.01)	0.49 (0.01)	0.49 (0.01)
Years of education	7.63 (0.92)	7.73 (1.26)	7.56 (0.55)	7.01 (0.59)
Panel B: Labour market				
Employed	0.58 (0.06)	0.58 (0.05)	0.62 (0.03)	0.56 (0.04)
Unemployed	0.08 (0.03)	0.07 (0.02)	0.07 (0.02)	0.08 (0.03)
Inactive	0.34 (0.06)	0.35 (0.06)	0.31 (0.04)	0.36 (0.04)
Formal employment	0.27 (0.11)	0.27 (0.13)	0.25 (0.06)	0.23 (0.08)
Panel C: Quality of public sector				
Institutional Environment	3.59 (0.20)	3.62 (0.15)	3.65 (0.16)	3.61 (0.29)
Institutional Performance	3.62 (0.17)	3.63 (0.07)	3.71 (0.21)	3.67 (0.38)
Panel D: Policy indicators (per 100,000 employed)				
Total change in inspectors	1.08 (0.40)	1.36 (0.13)	1.90 (0.22)	2.49 (0.38)
Gap with respect to target	0.02 (0.32)	0.14 (0.13)	0.03 (0.08)	0.39 (0.58)
Inspectors	1.78 (0.63)	2.17 (0.83)	2.24 (0.56)	2.02 (0.68)

Figure 2: Number of workers per labour inspector('000s)



Source: OECD (2016)

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Figure 3: Number of inspectors (per 100,000 employed)

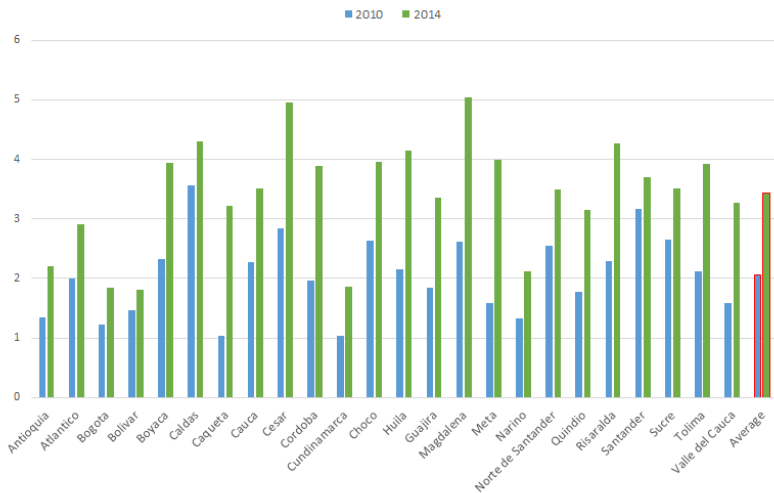


Figure 4: Target and actual number of inspectors

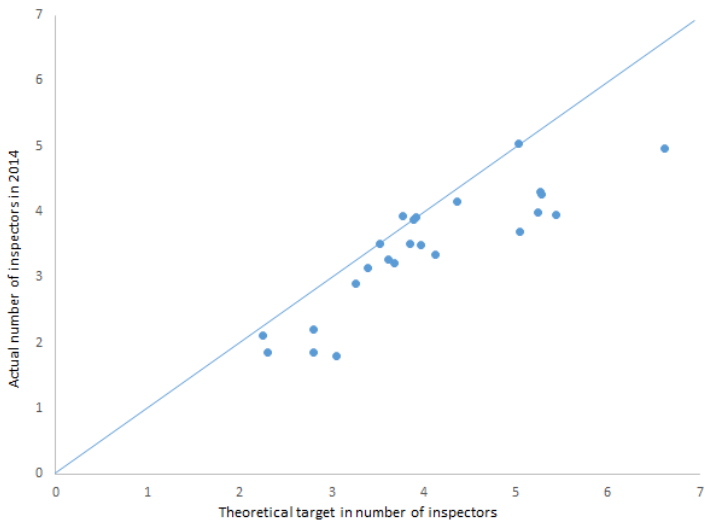


Table 2: Allocation of inspectors across department in 2011

	Theoretical change in number of inspectors per 100,000 employed (2010-2014)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rate of formal employment	-0.681 (0.820)						0.0605 (1.091)
Δ Rate formal employment		0.537 (8.4211)					
Number of inspectors (lag)			0.205 (0.151)				0.258 (0.230)
Δ Number of inspectors (lag)				-0.0681 (0.297)			
Institutional environment					-0.715 (1.206)		-1.277 (1.175)
Institutional performance					0.900 (1.351)		1.163 (1.383)
Δ Institutional environment						0.219 (1.498)	
Δ Institutional performance						-0.276 (1.461)	
Observations	24	24	24	24	24	24	24
R-squared	0.021	0.001	0.056	0.001	0.011	0.002	0.084

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Table 3: Implementation gap across department in 2014

	Gap in the number of inspectors per 100,000 employed (target-actual)			
	(1)	(2)	(3)	(4)
Institutional environment	0.289 (0.341)			
Credibility in the rules		0.637 (0.757)		
Credibility in the policies		-0.483 (0.836)		
Adequacy of resources		0.237 (0.552)		
Institutional performance			0.378*** (0.177)	
Result based management				-0.548 (1.009)
Accountability				0.708 (0.934)
Labour welfare				0.0921 (1.200)
Prevention of irregular practices				0.695*** (0.261)
Citizen participation				-0.677 (0.741)
Observations	24	24	24	24
R-squared	0.032	0.056	0.114	0.221

Table 4: Means of rates of formal employment by year and programme intensity

Panel A: Control experiment (2009-2010)				
	Low	Medium-low	Medium-high	High
2009	0.27	0.27	0.24	0.23
2010	0.27	0.27	0.25	0.23
Difference	0.00	0.00	0.01	0.00

Panel B: Experiment of interest (2010-2014)				
	Low	Medium-low	Medium-high	High
2010	0.27	0.27	0.25	0.23
2014	0.31	0.31	0.29	0.29
Difference	0.04	0.04	0.04	0.06

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Table 5: Main results of policy dummy analysis

	LPM			IV		
	(1)	(2)	(3)	(1)	(2)	(3)
Θ	0.0154*** (0.00440)	0.0153*** (0.00480)	0.00948** (0.00402)	0.0259*** (0.00558)	0.0242*** (0.00512)	0.0211*** (0.00521)
Department dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	No	Yes	Yes
Department controls	No	No	Yes	No	No	Yes
R-squared	0.065	0.153	0.153			
First stage (F)				209.954	208.709	214.576
Test of exogeneity (p)				0.0018	0.0149	0.0066
N	2,086,677	2,086,677	2,086,677	2,086,677	2,086,677	2,086,677

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Table 6: Interaction term analysis

		IV			IV	
	(1)	(2)	(3)	(4)	(5)	(6)
2010	0.000753 (0.00856)	0.00266 (0.00485)	0.00121 (0.00527)			
2011	0.0114 (0.00865)	0.00422 (0.00499)	0.00261 (0.00538)			
2012	0.0180** (0.00858)	0.00757 (0.00466)	0.00685 (0.00524)	0.0139** (0.00585)	0.00524 (0.00328)	0.00554 (0.00346)
2013	0.0357*** (0.00855)	0.0161*** (0.00455)	0.0153*** (0.00508)	0.0315*** (0.00584)	0.0137*** (0.00312)	0.0140*** (0.00324)
2014	0.0407*** (0.00951)	0.0183*** (0.00499)	0.0186*** (0.00583)	0.0365*** (0.00718)	0.0159*** (0.00373)	0.0173*** (0.00431)
Department dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	No	Yes	Yes
Department controls	No	No	Yes	No	No	Yes
R-squared	0.031	0.027	0.213	0.031	0.027	0.213
Test of exogeneity (p)	0.000	0.000	0.000	0.000	0.000	0.000
N	2,086,677	2,086,677	2,086,677	2,086,677	2,086,677	2,086,677

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Figure 5: Coefficients of the interactions between year dummies and the programme intensity in the department

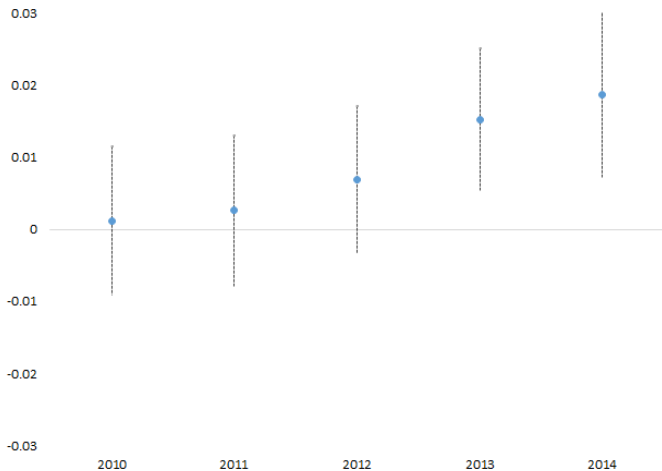


Table 7: Robustness tests

	LPM (Cameron et al. 2008)			IV (Bootstrapping)		
	(1)	(2)	(3)	(1)	(2)	(3)
Θ	0.0200*** (0.00509)	0.0145*** (0.00461)	0.0147*** (0.00433)	0.0259*** (0.00739)	0.0242*** (0.00717)	0.0211*** (0.00638)
Department dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	No	Yes	Yes
Department controls	No	No	Yes	No	No	Yes
R-squared	0.055	0.141	0.141			
First stage (F)				209.954	208.709	214.576
Test of exogeneity (p)				0.0018	0.0149	0.0066
N	2,086,677	2,086,677	2,086,677	2,086,677	2,086,677	2,086,677

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Table 8: Macroeconomic results

Panel A: Policy dummy						
	(1)	(2)	(3)			
Θ	0.0133*** (0.00407)	0.0108** (0.00467)	0.0143*** (0.00454)			
R-squared	0.994	0.995	0.995			
First stage (F)	163.231	143.549	216.098			
Test of exogeneity (p)	0.0939	0.1039	0.0136			
Panel B: Interaction term analysis						
	(1)	(2)	(3)	(1)	(2)	(3)
2010	0.00658 (0.00657)	0.00515 (0.00782)	0.00518 (0.00782)			
2011	0.00702 (0.00748)	0.00215 (0.00867)	0.00559 (0.00828)			
2012	0.0178*** (0.00651)	0.0140* (0.00768)	0.0166** (0.00705)	0.0133*** (0.00352)	0.0116*** (0.00409)	0.0131*** (0.00390)
2013	0.0141* (0.00718)	0.0115 (0.00798)	0.0152** (0.00753)	0.00951** (0.00464)	0.00906* (0.00464)	0.0116** (0.00453)
2014	0.0269*** (0.00723)	0.0251*** (0.00855)	0.0280*** (0.00782)	0.0223*** (0.00472)	0.0227*** (0.00556)	0.0244*** (0.00526)
Test of exogeneity (p)	0.0605	0.1234	0.0441	0.0123	0.0346	0.0091
N	144	144	144	144	144	144
Department dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	No	Yes	Yes
Department controls	No	No	Yes	No	No	Yes

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Table 9: Treatment effects on employment status

	Employed			Unemployed			Inactive		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Θ	-0.0001 (0.0027)	0.0001 (0.0003)	0.0002 (0.0004)	0.005 (0.003)	0.003 (0.003)	0.003 (0.003)	-0.004 (0.003)	-0.003 (0.003)	-0.003 (0.003)
Department dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Department controls	No	No	Yes	No	No	Yes	No	No	Yes
First stage (F)	207.335	206.214	213.159	207.335	206.214	213.159	207.335	206.214	213.159
Test of exogeneity (p)	0.4472	0.8363	0.6619	0.1653	0.3177	0.3796	0.1773	0.3268	0.4087
N	3,550,811	3,550,811	3,550,811	3,550,811	3,550,811	3,550,811	3,550,811	3,550,811	3,550,811

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Table 10: Treatment effects on occupations

	Employee			Sel-employed		
	(1)	(2)	(3)	(1)	(2)	(3)
Θ	0.0140** (0.00703)	0.0148** (0.00743)	0.0156** (0.00735)	-0.0137* (0.00704)	-0.0145* (0.00746)	-0.0152** (0.00739)
Department dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	No	Yes	Yes
Department controls	No	No	Yes	No	No	Yes
First stage (F)	209.954	208.709	214.576	209.954	208.709	214.576
Test of exogeneity (p)	0.8406	0.7013	0.9094	0.8769	0.6689	0.8743
N	2,086,677	2,086,677	2,086,677	2,086,677	2,086,677	2,086,677

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Table 11: Formal and informal economy

	Formal Economy			Informal Economy		
	(1)	(2)	(3)	(1)	(2)	(3)
Θ	0.0145*** (0.00531)	0.0139*** (0.00500)	0.0130** (0.00524)	-0.000602** (0.000269)	-0.000392 (0.000239)	-0.000374 (0.000241)
Department dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	No	Yes	Yes
Department controls	No	No	Yes	No	No	Yes
First stage (F)	201.715	200.972	190.267	210.423	208.944	226.697
Test of exogeneity (p)	0.001	0.001	0.001	0.6685	0.4604	0.4446
N	808,183	808,183	808,183	1,278,494	1,278,494	1,278,494

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Table 12: Urban and rural areas

	Urban Areas			Rural Areas		
	(1)	(2)	(3)	(1)	(2)	(3)
Θ	0.0277*** (0.00554)	0.0274*** (0.00509)	0.0254*** (0.00547)	0.0119 (0.00745)	0.0139* (0.00749)	0.0128* (0.00701)
Department dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	No	Yes	Yes
Department controls	No	No	Yes	No	No	Yes
First stage (F)	208.259	207.121	213.58	186.317	184.446	188.82
Test of exogeneity (p)	0.0022	0.001	0.0005	0.8402	0.389	0.1887
N	1,881,747	1,881,747	1,881,747	204,930	204,930	204,930

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Table 13: Men and women

	Men			Women		
	(1)	(2)	(3)	(1)	(2)	(3)
Θ	0.0427*** (0.00972)	0.0244*** (0.00516)	0.0214*** (0.00531)	0.0519*** (0.0111)	0.0230*** (0.00595)	0.0204*** (0.00594)
Department dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	No	Yes	Yes
Department controls	No	No	Yes	No	No	Yes
First stage (F)	215.52	214.241	223.664	202.101	200.769	200.761
Test of exogeneity (p)	0.0213	0.0034	0.0004	0.0565	0.1203	0.0231
N	1,150,680	1,150,680	1,150,680	935,997	935,997	935,997

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Table 14: High and low educated

	Low-educated			High-educated		
	(1)	(2)	(3)	(1)	(2)	(3)
Θ	0.0251*** (0.00688)	0.0286** (0.0119)	0.0229* (0.0119)	0.0234*** (0.00694)	0.0134* (0.00780)	0.0140* (0.00794)
Department dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	No	Yes	Yes
Department controls	No	No	Yes	No	No	Yes
First stage (F)	212.321	212.499	218.663	204.167	202.738	201.664
Test of exogeneity (p)	0.3506	0.4392	0.9848	0.0243	0.1633	0.1787
N	537,810	537,810	537,810	640,119	640,119	640,119

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