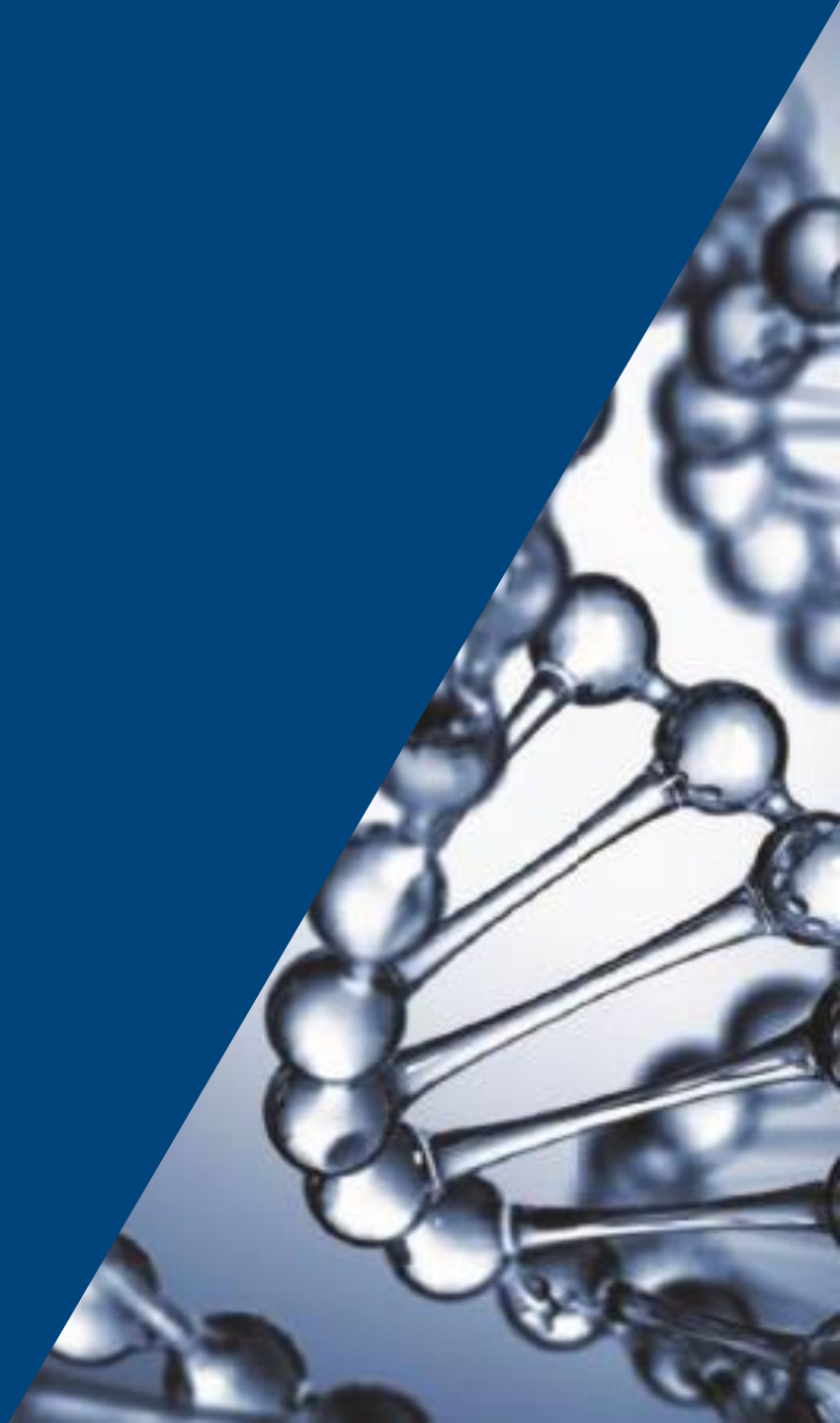


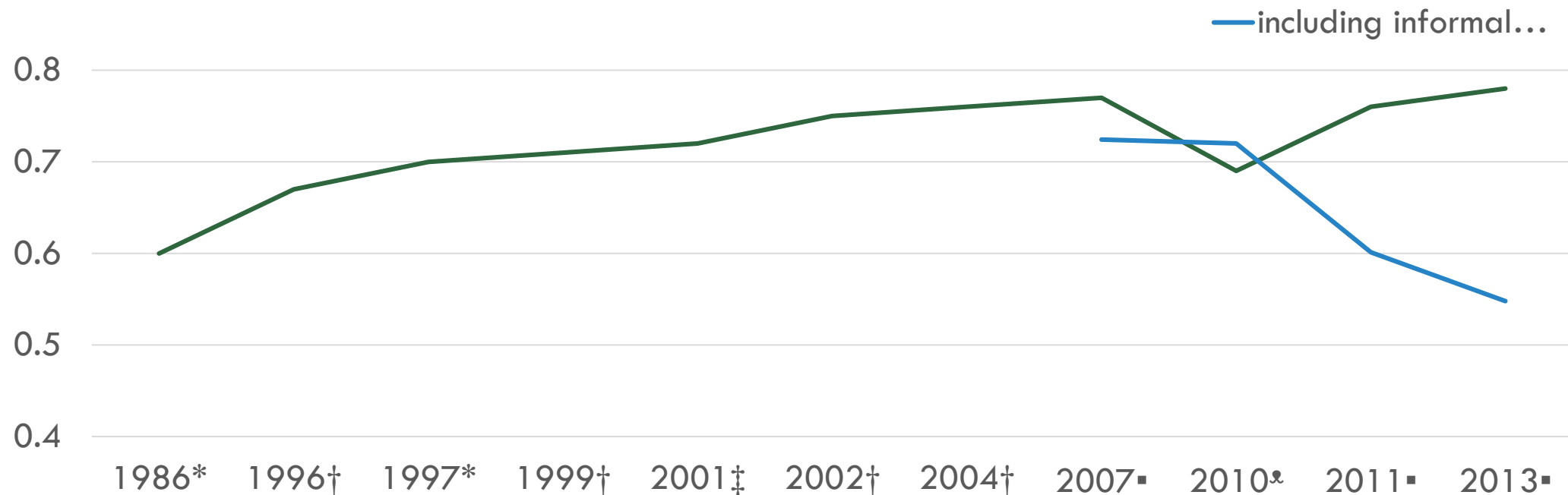
Sticky floors in developing countries - a distributional analysis of the formal and informal sector

Lisa Cameron and Diana Contreras Suarez

Australian Gender Economics Workshop
Monday, 26 March 2018



FEMALE/MALE RATIO FOR WAGE WORKERS



Source: * Feridhanusetyawan et al., (2001) using Sakernas. † Pirmana, (2006) using Sakernas. ‡ Siegmann, (2003) using Susenas. * Taniguchi et al., (2014) using Sakernas. ▪ Authors' calculations using Susenas. The figures for 2011 and 2013 include wages for all employed workers

GENDER WAGE GAPS MIGHT REFLECT

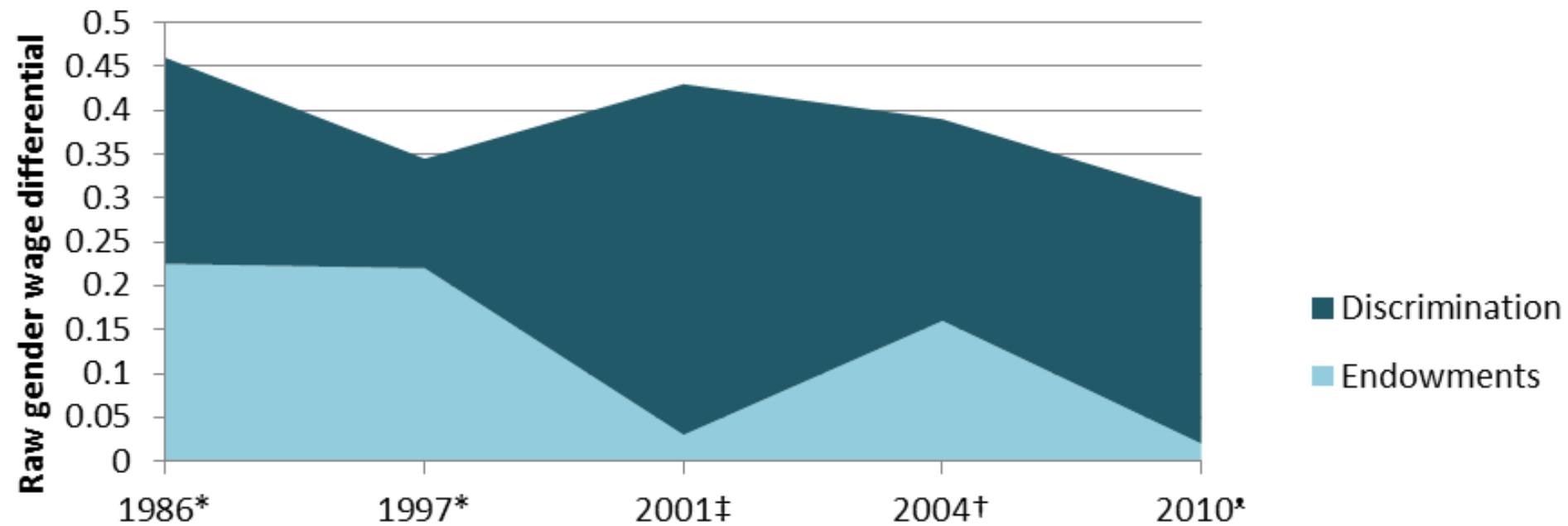
- ❖ Differences in individual characteristics (Productivity)
- ❖ Social beliefs, expectations, preferences, norms (e.g. Wang et al, 2013)
- ❖ Labour market dynamics (rigidities or market failures)
- ❖ Discriminatory hiring practices (Unconscious bias)
- ❖ Other practices

See Blau and Kahn (2017) JEL for a review

BLINDER-OAXACA DECOMPOSITION

- ❖ Differences in characteristics (*endowments*)
- ❖ Differences in the way they are rewarded (*Unexplained/discrimination*)
 - ❖ Unobserved productive characteristics

BLINDER-OAXACA DECOMPOSITION



Source: * Feridhanusetyawan et al., (2001) using Sakernas. This is an unweighted average of the rural and urban estimates† Pirmana, (2006) using Sakernas. ‡ Siegmann, (2003) using Susenas. * Taniguchi et al., (2014) using Sakernas. Schaner and Das (2015)

WHY TO LOOK AT IT ALONG THE WAGE DISTRIBUTION?

- ❖ Evidence from developed countries: wage gap is higher at the top end of the distribution – “Glass ceilings” effect. [Arulampalam, Booth, and Bryan \(2007\)](#), [Kassenboehmer and Sinning \(2014\)](#).
- ❖ Evidence from developing countries: wage gap is higher among lower earners – “Sticky floors” effect. [Chi and Li \(2008\)](#), [Popli \(2013\)](#), [Ahmed and Maitra \(2015\)](#), [Ahmed and McGillivray \(2015\)](#), [Sohn \(2015\)](#).

QUESTIONS

- ❖ How does the gap change if we look at it along the wage distribution?
- ❖ Does it look the same in the formal and informal sector?
- ❖ What proportion of the gap can be explained by differences in productivity?
- ❖ What are the observed productivity factors (endowments) driving gender wage gap in Indonesia?
- ❖ Is there a change over time?

DATA

National Socioeconomic Survey (SUSENAS) in 2011

- ❖ Representative at individual, household and district level
- ❖ Provides information on 285,186 households across Indonesia
- ❖ Includes information on years of education and fertility decisions
 - ❖ Experience (Wellington, 1993)
- ❖ From 2011 captures earnings from informal jobs (80% of women employed in the informal sector)
 - ❖ Formal: Employer assisted by permanent and paid workers; employees
 - ❖ Informal: Self-employed; employer with casual and unpaid workers; casual workers; unpaid workers

SAMPLE

Individuals: 332,718 (Formal: 161,040; Informal: 171,678)

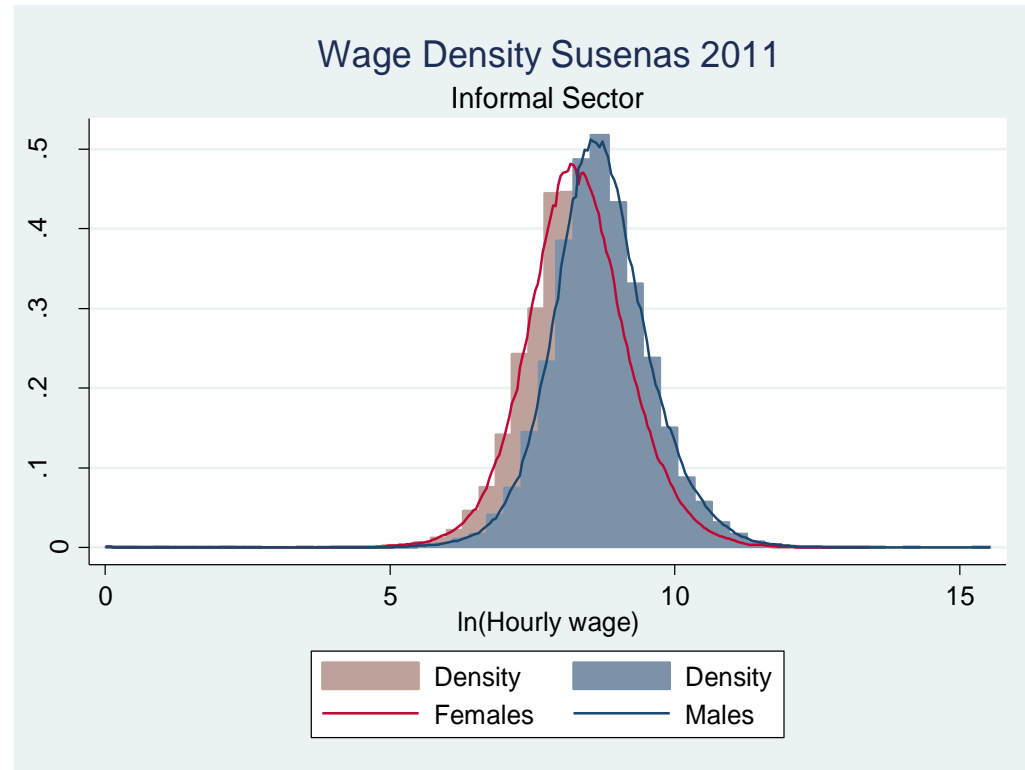
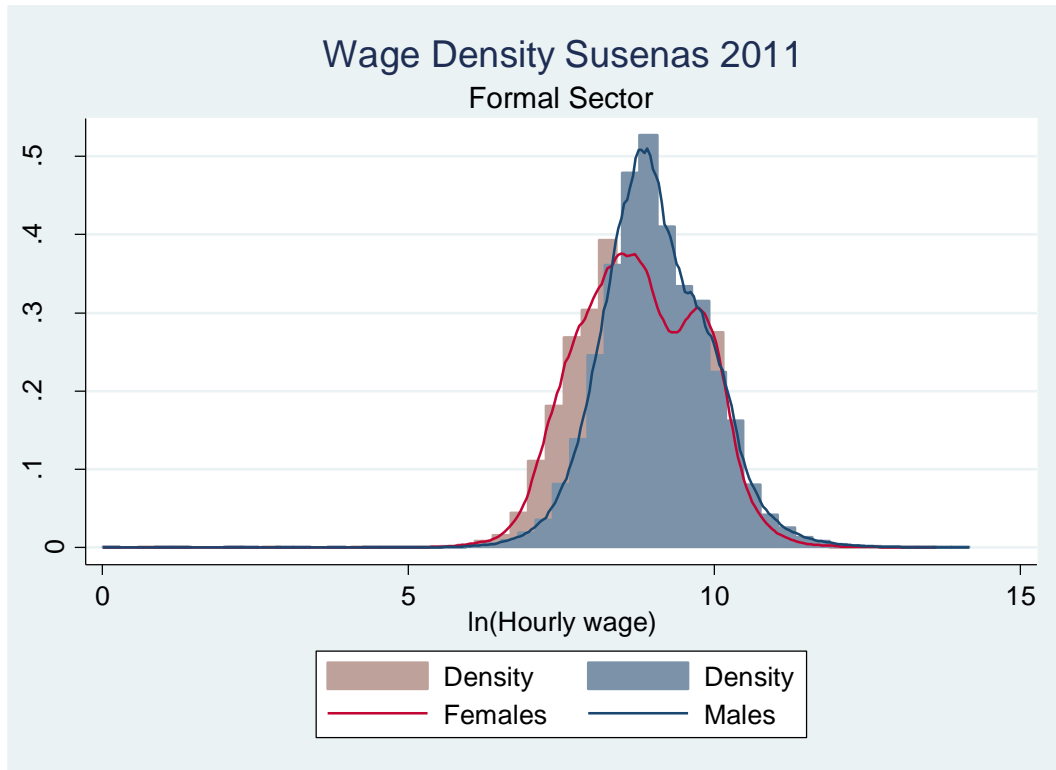
❖ Age: 15 – 64

❖ Hours of work: 16 – 84

❖ Reported wages

❖ Hourly wage

HOURLY WAGES (IN LOGS) BY GENDER



OBSERVED HOURLY WAGE GAP BY GENDER

	Formal			Informal		
	Male	Female	Wage ratio	Male	Female	Wage Ratio
Mean	\$ 8,575.59	\$ 6,572.44	77%	\$ 6,099.98	\$ 4,068.79	67%
Percentile						
10	\$ 3,012.35	\$ 1,855.82	62%	\$ 2,199.49	\$ 1,358.51	62%
30	\$ 4,849.89	\$ 3,233.26	67%	\$ 3,534.90	\$ 2,309.47	65%
50	\$ 8,131.86	\$ 6,415.19	79%	\$ 5,893.96	\$ 3,966.72	67%
70	\$ 15,330.09	\$ 14,313.89	93%	\$ 10,216.20	\$ 7,072.75	69%
90	\$ 26,302.26	\$ 23,575.89	90%	\$ 18,523.88	\$ 12,830.38	69%

CHARACTERISTICS DIFFERENCES: EDUCATION

	Formal		Informal	
	Male	Female	Male	Female
	Mean	Mean	Mean	Mean
No school	0.08	0.07	0.22	0.26
Primary	0.2	0.15	0.39	0.37
Junior HS	0.17	0.12	0.19	0.18
Senior HS	0.38	0.32	0.19	0.17
Vocational training in HS	0.11	0.09	0.04	0.04
Diploma I/II	0.02	0.05	0	0
Diploma III/IV/S1	0.14	0.27	0.02	0.02
Postgraduate	0.01	0.01	0	0

CHARACTERISTICS DIFFERENCES: WORKING

	Formal		Informal	
	Male	Female	Male	Female
Years of experience	20.84	16.25	27.86	26.07
Used internet in the last 3 months	0.21	0.25	0.03	0.02
Any health complaint last month	0.25	0.24	0.29	0.33
Married	0.75	0.63	0.86	0.75
Career interruptions due to childbearing	0	1.58	0	2.97

Years of experience: Age – Years of education – N children born – 5

CHARACTERISTICS DIFFERENCES: STATUS OF EMPLOYMENT

	Formal		Informal	
	Male	Female	Male	Female
Employer assisted by permanent paid	0.1	0.04		
Paid worker/Employee	0.9	0.96		
Self-employed			0.4	0.53
Employer assisted by temporary/unpaid			0.38	0.29
Casual worker			0.22	0.19

CHARACTERISTICS DIFFERENCES: INDUSTRY

	Formal		Informal	
	Male	Female	Male	Female
	Mean	Mean	Mean	Mean
Industry: Agriculture	0.16	0.09	0.56	0.33
Industry: Mine	0.16	0.01	0.11	0.01
Industry: Manufacture	0.14	0.18	0.04	0.09
Industry: Trade	0.11	0.13	0.15	0.45
Industry: Service	0.43	0.60	0.15	0.12

No differences in the geographic characteristics

WAGE EQUATION

Returns to productive characteristics (OLS)

$$W_{i,g} = X'_{i,g}\beta_g + \varepsilon_{i,g}$$

$$[\varepsilon_{i,g}] = 0, \quad g = \textit{male}, \textit{female}$$

$W_{i,g}$ is the log of the hourly wage for individual i of gender g

$X_{i,g}$ are productive characteristics (Years of experience, educational attainment, vocational training, computer skills, health status, geographic indicators, industry type, status of employment and marital status)

OLS ESTIMATES OF WAGE BY GENDER

VARIABLES	Formal		Informal	
	Male	Female	Male	Female
Years of experience	0.0463***	0.0576***	0.0194***	0.0318***
Years of experience ² /100	-0.0625***	-0.0759***	-0.0282***	-0.0467***
Married	0.1934***	0.1271***	0.1792***	-0.0393***
Any health complaint last month	-0.0167***	-0.0072	-0.0185***	-0.0446***
Vocational training in high school	0.0147*	0.0953***	-0.0427***	-0.0696***
Used internet in the last 3 months	0.2569***	0.2114***	0.2468***	0.3748***
Self-employed			-0.0113*	-0.0606***
Employer assisted by permanent paid	0.4753***	0.4944***		
Casual worker			-0.1267***	-0.2262***
Primary	0.0905***	0.2212***	0.0648***	0.0643***
Junior HS	0.2367***	0.5762***	0.1469***	0.1882***
Senior HS	0.5284***	1.0739***	0.2477***	0.3088***
Diploma I/II	0.8686***	1.5253***	0.3435***	0.4873***
Diploma III/IV/S1	1.0403***	1.7114***	0.5518***	0.6416***
Postgraduate	1.4402***	2.1605***	0.8449***	1.5324***
Constant	7.4332***	6.9738***	8.1369***	7.9208***
Observations	109,882	51,158	124,791	46,887
R-squared	0.3537	0.4428	0.1768	0.1393

In the formal sector equation the reference category is Paid worker/Employee. In the informal sector the references is Employer assisted by temporary/unpaid. In education No schooling is the reference category. We include regional fixed effects. Standard errors in parentheses. Significance levels *** p<0.01, ** p<0.05, * p<0.1.

METHOD: BLINDER-OAXACA DECOMPOSITION

Having a wage function

$$W_{i,g} = X'_{i,g}\beta_g + \varepsilon_{i,g}, \quad E[\varepsilon_{i,g}] = 0, \quad g = \text{male, female,}$$

The Raw wage gap is defined as

$$\begin{aligned} R &= E(W_m) - E(W_f) = E(X_m)' \hat{\beta}_m - E(X_f)' \hat{\beta}_f + E(X_f)' \hat{\beta}_m - E(X_f)' \hat{\beta}_m \\ &= [E(X_m) - E(X_f)]' \hat{\beta}_m + E(X_f)' [\hat{\beta}_m - \hat{\beta}_f] \\ &= [\overline{X_m} - \overline{X_f}]' \hat{\beta}_m + \overline{X_f}' [\hat{\beta}_m - \hat{\beta}_f] \\ &= \underbrace{\hat{\Delta}_X^\mu}_{\text{Endowments}} + \underbrace{\hat{\Delta}_S^\mu}_{\text{Unexplained}} \end{aligned}$$

Endowments

Unexplained

RESULTS (AT THE MEAN)

VARIABLES	OLS	
	Formal	Informal
Raw difference	0.2660***	0.4049***
	30.5%	49.9%
Total Explained	0.0846***	0.1251***
	32%	31%
Total Unexplained	0.1815***	0.2798***
	68%	69%
Observations	161,040	171,678

Contributions to the Explained Gap:

	Formal	Informal
Experience	0.1089***	0.0034***
	41%	1%
Married	0.0223***	0.0142***
	8%	4%
Skills	-0.0116***	0.0043***
	-4%	1%
Education	-0.1353***	0.0071***
	-51%	2%
Region	0.0126***	0.0136***
	5%	3%
Status of employment	0.0274***	0.0009
	10%	0%
Industry	0.0601***	0.0815***
	23%	20%

UNCONDITIONAL QUANTILE REGRESSION

(FIRPO, FORTIN, & LEMIEUX, 2009)

Perform a B-O decomposition using a Re-centered Influence Function (RIF) for wages

$IF(W; Q_\tau)$ is given by $[\tau - \mathbb{I}\{W \leq Q_\tau\}][f_W(Q_\tau)]^{-1}$

$\mathbb{I}\{\cdot\}$ is an indicator function

$f_W(\cdot)$ is the density of the marginal distribution of W

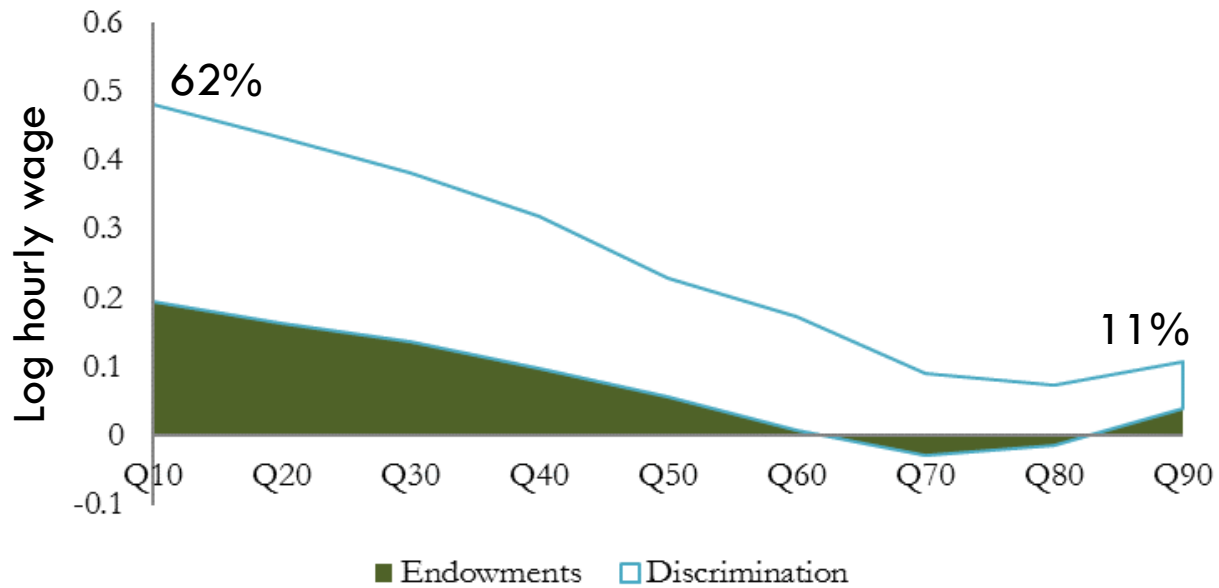
Q_τ is the population τ -quantile of the unconditional distribution of W

$$RIF(W; Q_\tau) = Q_\tau + \frac{\tau - \mathbb{I}\{W \leq Q_\tau\}}{f_W(Q_\tau)} = \begin{cases} Q_\tau + \frac{\tau}{f_W(Q_\tau)} & \text{if } W \geq Q_\tau \\ Q_\tau - \frac{1-\tau}{f_W(Q_\tau)} & \text{if } W < Q_\tau \end{cases}$$

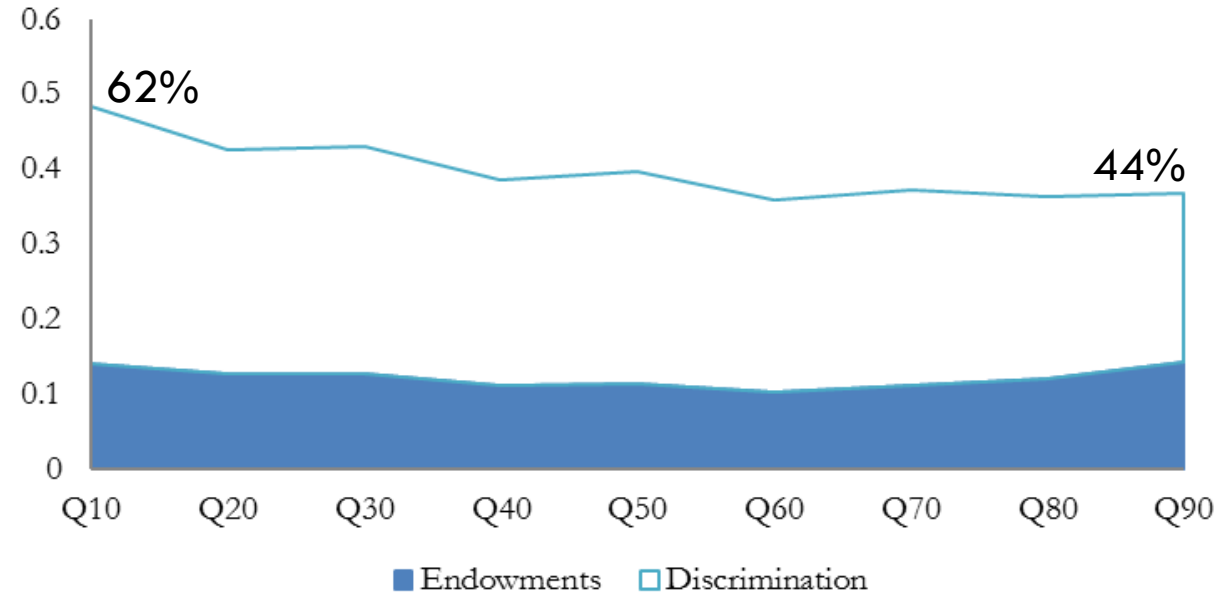
Q: 10th, 30th, 70th and 90th percentile

GENDER WAGE GAP ACROSS THE DISTRIBUTION

Formal Sector



Informal Sector



RESULTS (ACROSS THE WAGE DISTRIBUTION)

	Formal				Informal			
	P10	P30	P70	P90	P10	P30	P70	P90
Raw difference	0.4813***	0.3814***	0.0899***	0.1078***	0.4833***	0.4301***	0.3711***	0.3676***
	61.8%	46.4%	9.4%	11.4%	62.1%	53.7%	44.9%	44.4%
Total Explained	0.1949***	0.1373***	-0.0288***	0.0402***	0.1410***	0.1261***	0.1105***	0.1432***
	40%	36%	-32%	37%	29%	29%	30%	39%
Total Unexplained	0.2864***	0.2441***	0.1187***	0.0675***	0.3423***	0.3040***	0.2606***	0.2244***
	60%	64%	132%	63%	71%	71%	70%	61%
Observations	161,040	161,040	161,040	161,040	171,678	171,678	171,678	171,678

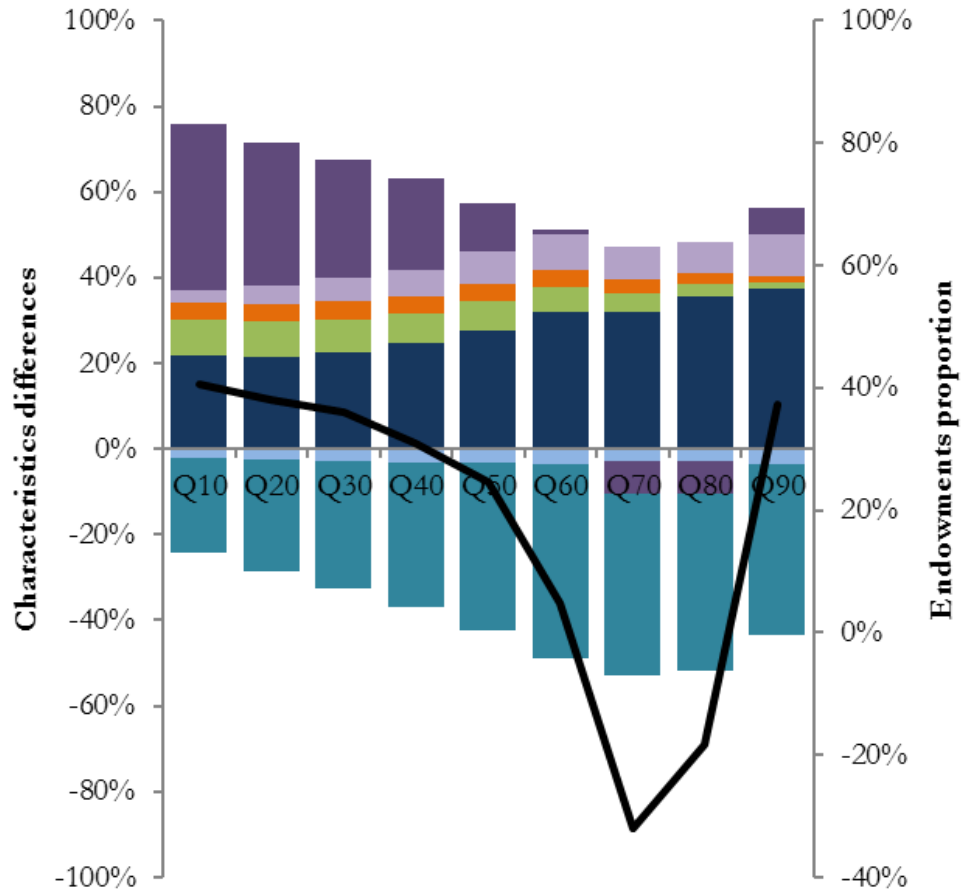
Notes: The raw difference in percentage is calculated as $(e^{\text{raw difference}} - 1) \times 100$. The components in percentage is the contribution to the total wage gap. Results are grouped as Experience (Experience and Experience/100²), skills (vocational training and health status), Region (regional dummies, Jakarta dummy and urban dummy). Standard errors in parentheses. Significance levels *** p<0.01, ** p<0.05, * p<0.1

CONTRIBUTION TO THE EXPLAINED GAP

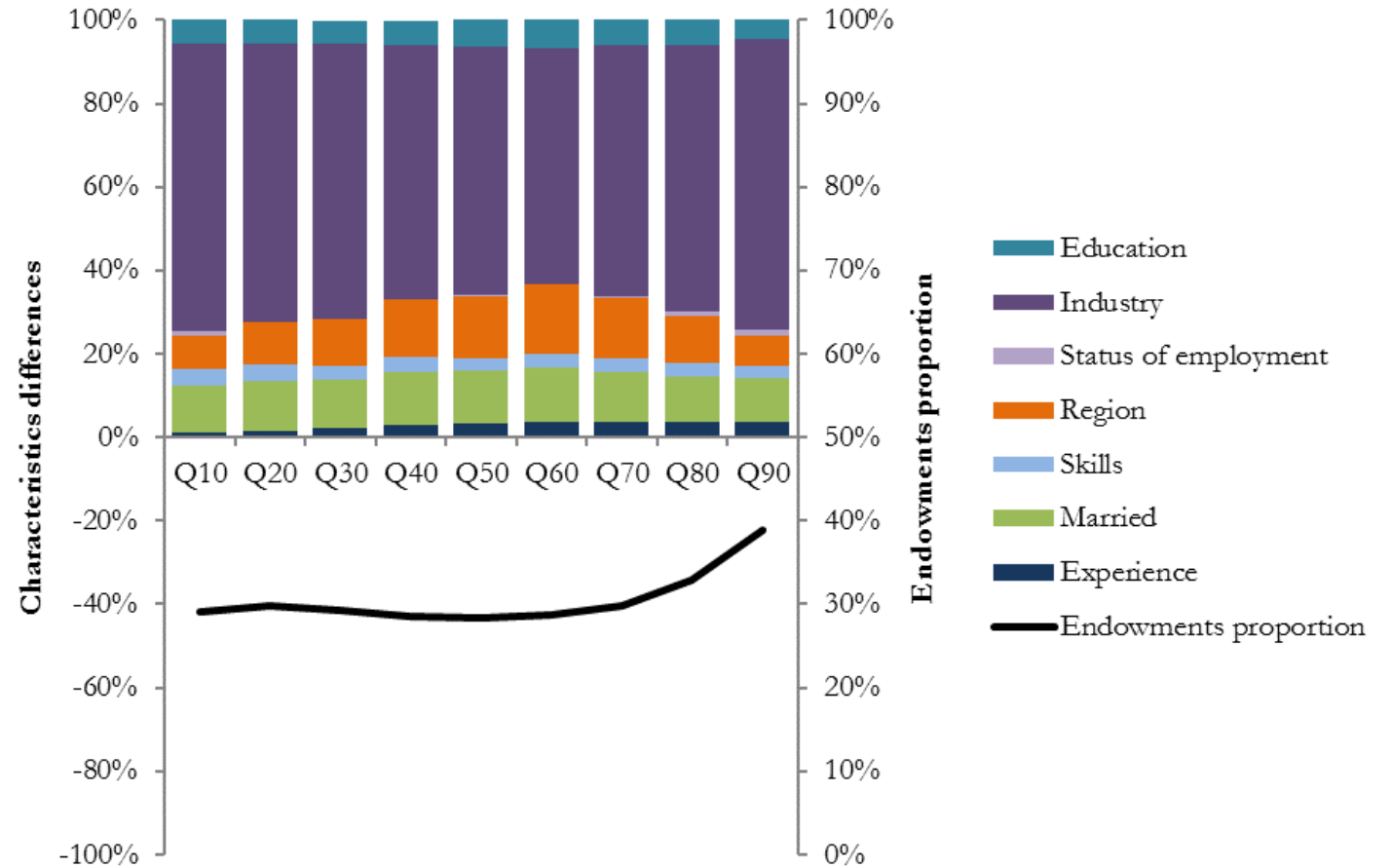
	Formal				Informal			
	P10	P30	P70	P90	P10	P30	P70	P90
Experience	0.0819***	0.0874***	0.1537***	0.1173***	0.0016	0.0030***	0.0042***	0.0052***
	17%	23%	171%	109%	0%	1%	1%	1%
Married	0.0322***	0.0305***	0.0214***	0.0040***	0.0159***	0.0144***	0.0131***	0.0150***
	7%	8%	24%	4%	3%	3%	4%	4%
Skills	-0.008***	-0.011***	-0.014***	-0.011***	0.0055***	0.0044***	0.0035***	0.0044***
	-2%	-3%	-15%	-10%	1%	1%	1%	1%
Education	-0.084***	-0.116***	-0.205***	-0.125***	0.0082***	0.0069***	0.0068***	0.0068***
	-17%	-30%	-228%	-116%	2%	2%	2%	2%
Region	0.0147***	0.0162***	0.0159***	0.0046***	0.0111***	0.0139***	0.0161***	0.0102***
	3%	4%	18%	4%	2%	3%	4%	3%
Status of employment	0.0117***	0.0210***	0.0354***	0.0307***	0.0018*	-0.0001	0.0004	0.0019
	2%	6%	39%	28%	0%	0%	0%	1%
Industry	0.1462***	0.1085***	-0.036***	0.0200***	0.0969***	0.0836***	0.0663***	0.0997***
	30%	28%	-40%	19%	20%	19%	18%	27%

DEC. EXPLAINED COMPONENT

Formal Sector



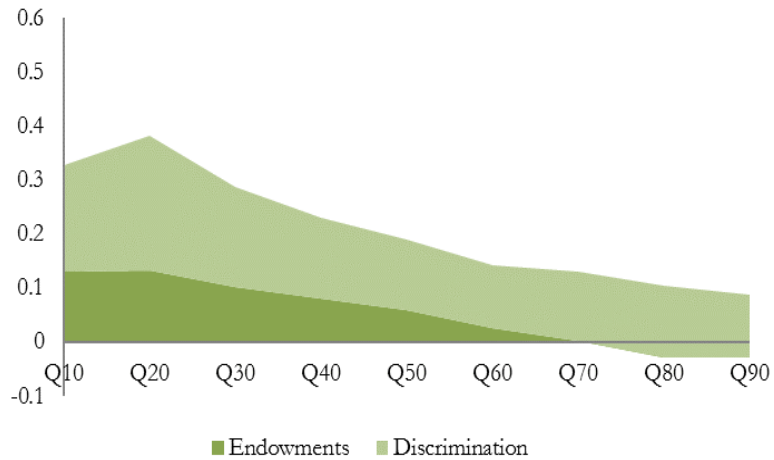
Informal Sector



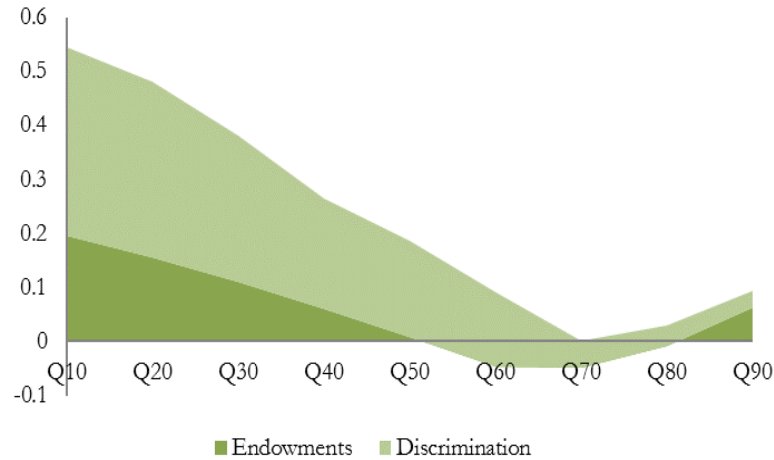
- Education
- Industry
- Status of employment
- Region
- Skills
- Married
- Experience
- Endowments proportion

AGE COHORT ANALYSIS - FORMAL

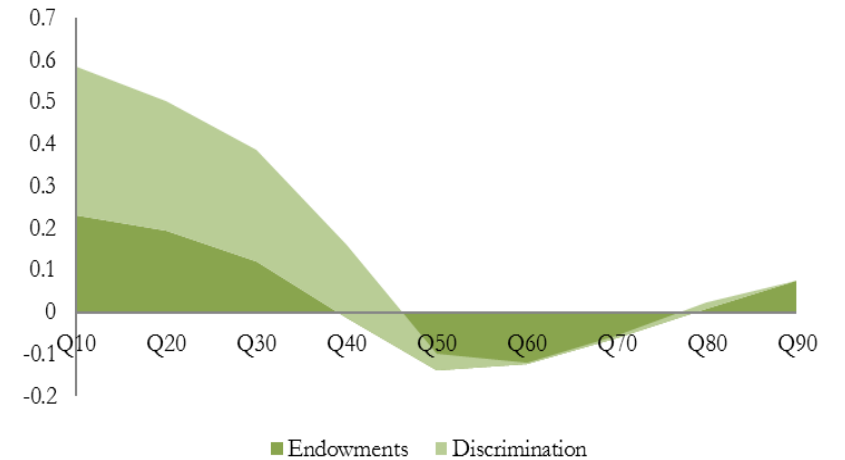
People aged 15 to 29



People aged 30 to 44

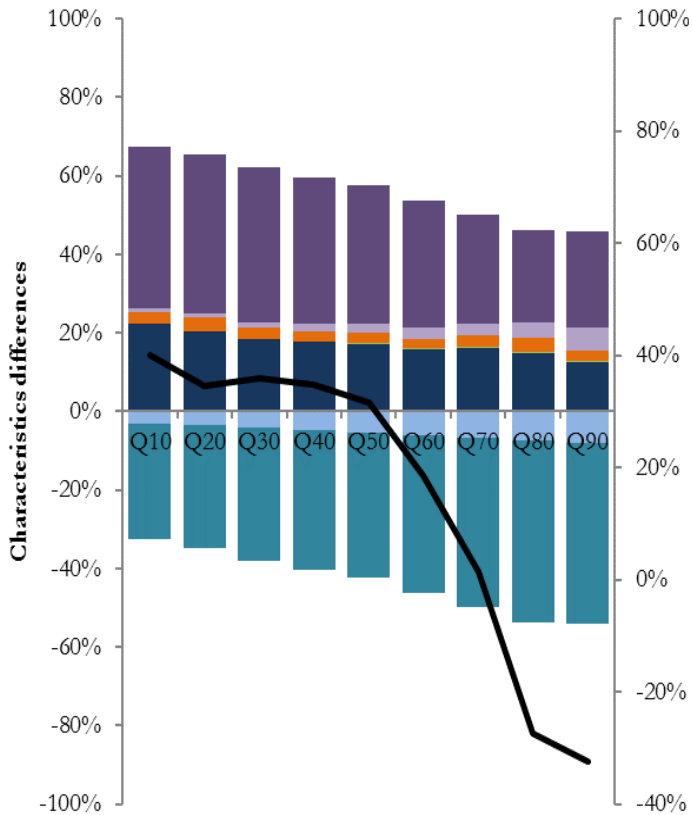


People aged 45 to 64

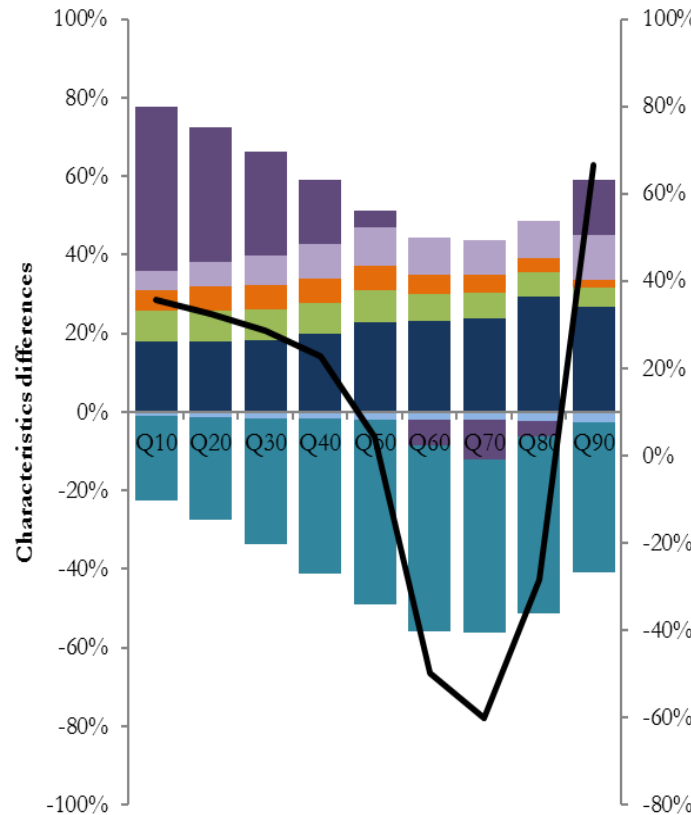


DEC. EXPLAINED COMPONENT – FORMAL

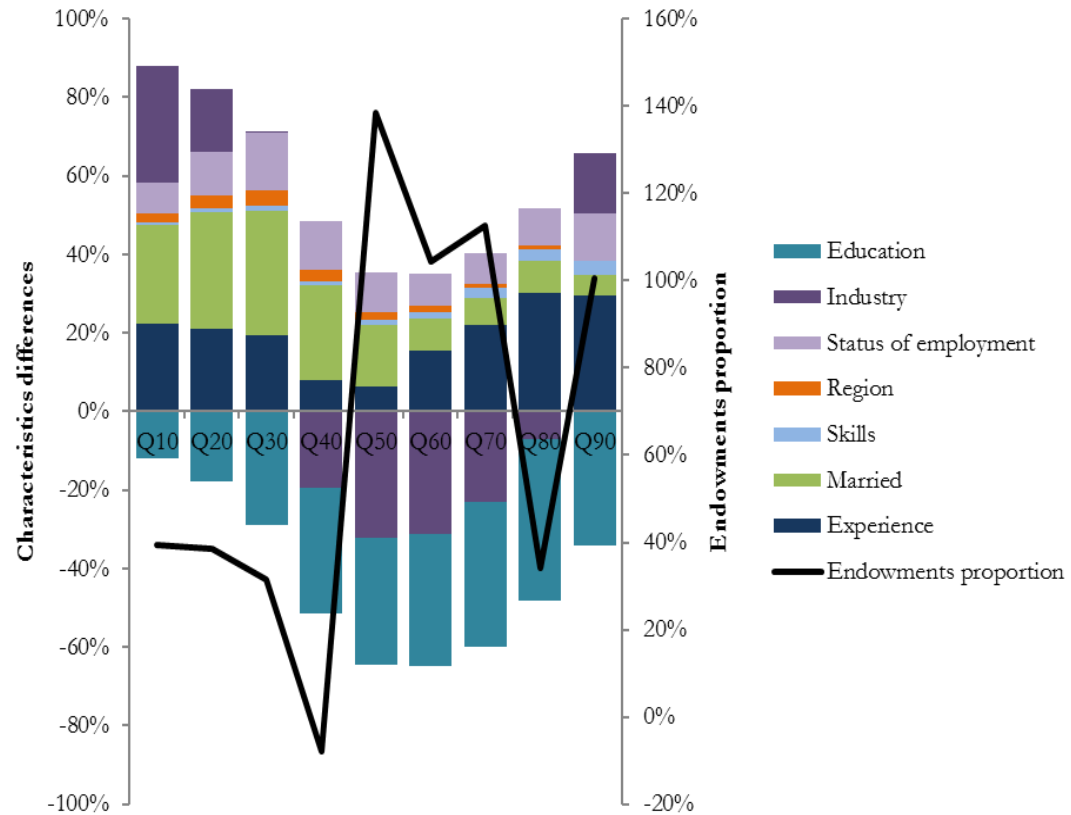
People aged 15 to 29



People aged 30 to 44



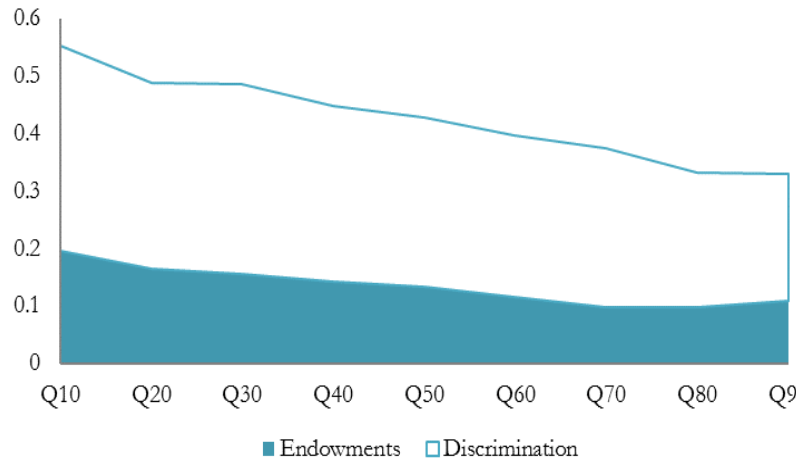
People aged 45 to 64



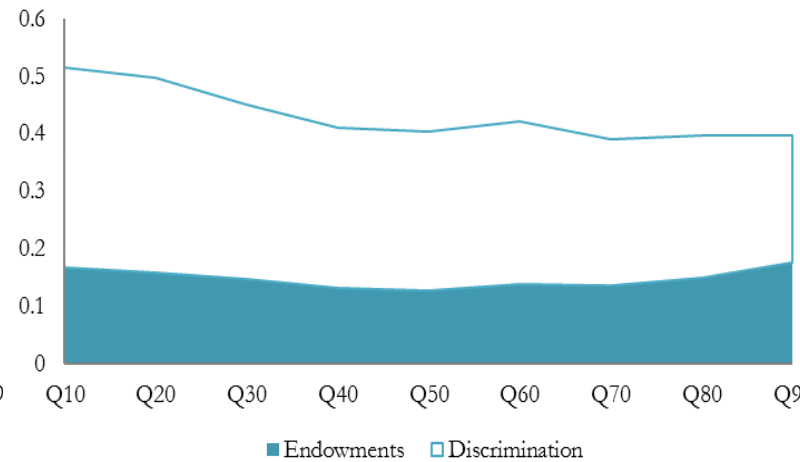
- Education
- Industry
- Status of employment
- Region
- Skills
- Married
- Experience
- Endowments proportion

AGE COHORT ANALYSIS - INFORMAL

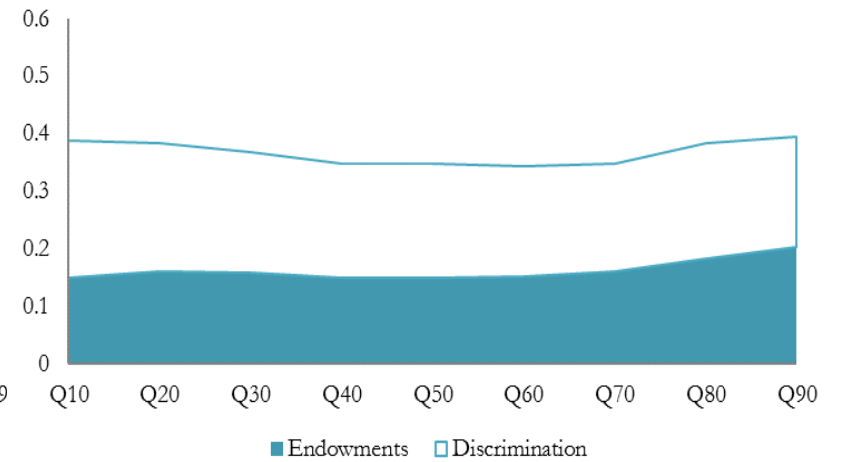
People aged 15 to 29



People aged 30 to 44

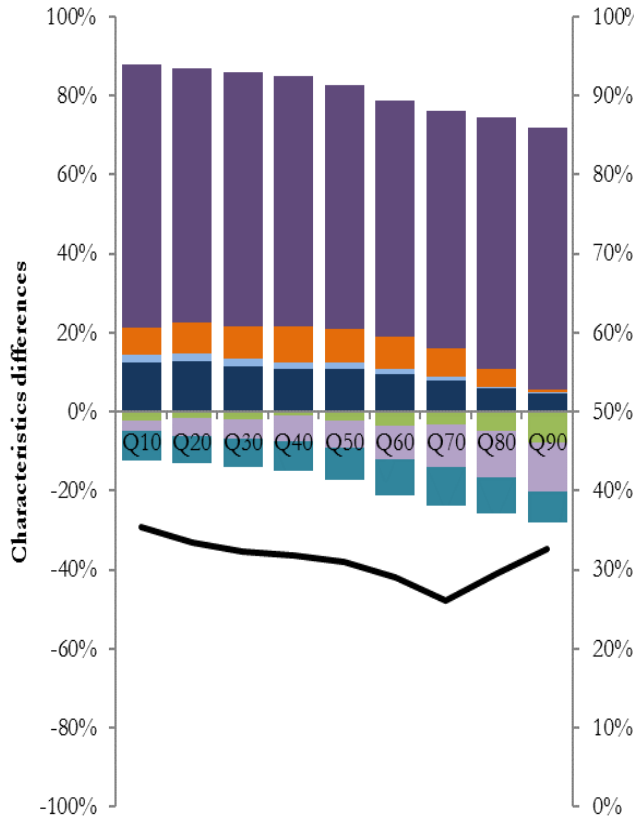


People aged 45 to 64

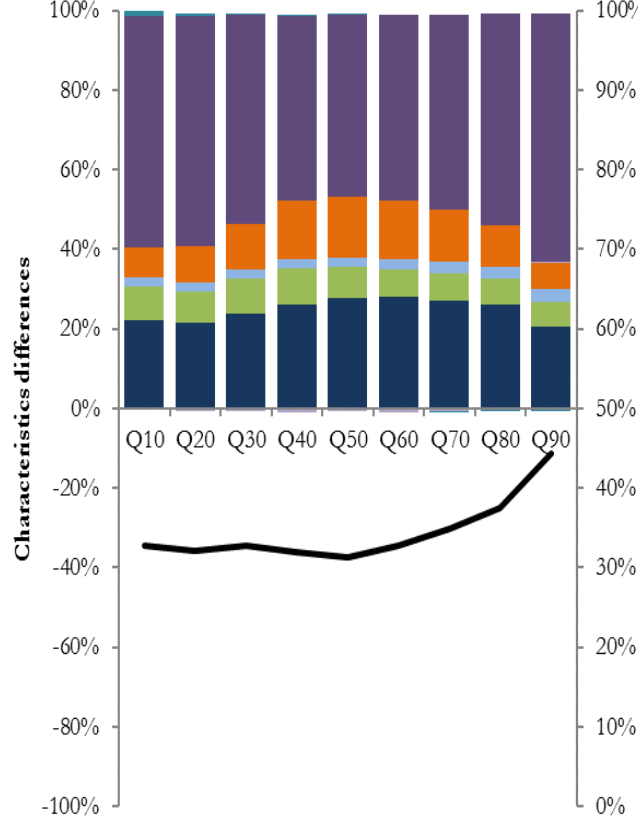


DEC. EXPLAINED COMPONENT – INFORMAL

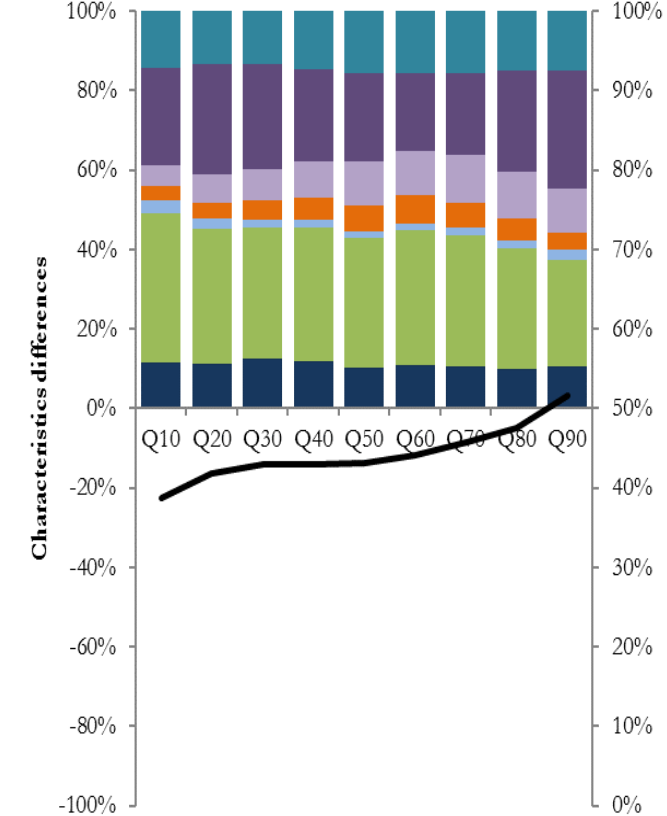
People aged 15 to 29



People aged 30 to 44



People aged 45 to 64



- Education
- Industry
- Status of employment
- Region
- Skills
- Married
- Experience
- Endowments proportion

ROBUSTNESS TESTS

- ❖ Changing non-discriminatory coefficients
- ❖ Industrial segregation
- ❖ Selection bias due to participation in the labour market

$$W_{i,g} = X'_{i,g}\beta_g + \lambda_{i,g}\theta_g + \varepsilon_{i,g} \quad \lambda_i = \frac{\phi(\gamma Z_i)}{1 - \Phi(\gamma Z_i)}$$

Exclusion restriction: household composition (being head of the household, household size, elderly people in the household, potential babysitters at home, and number of children in the household by age ranges), total number of children and age

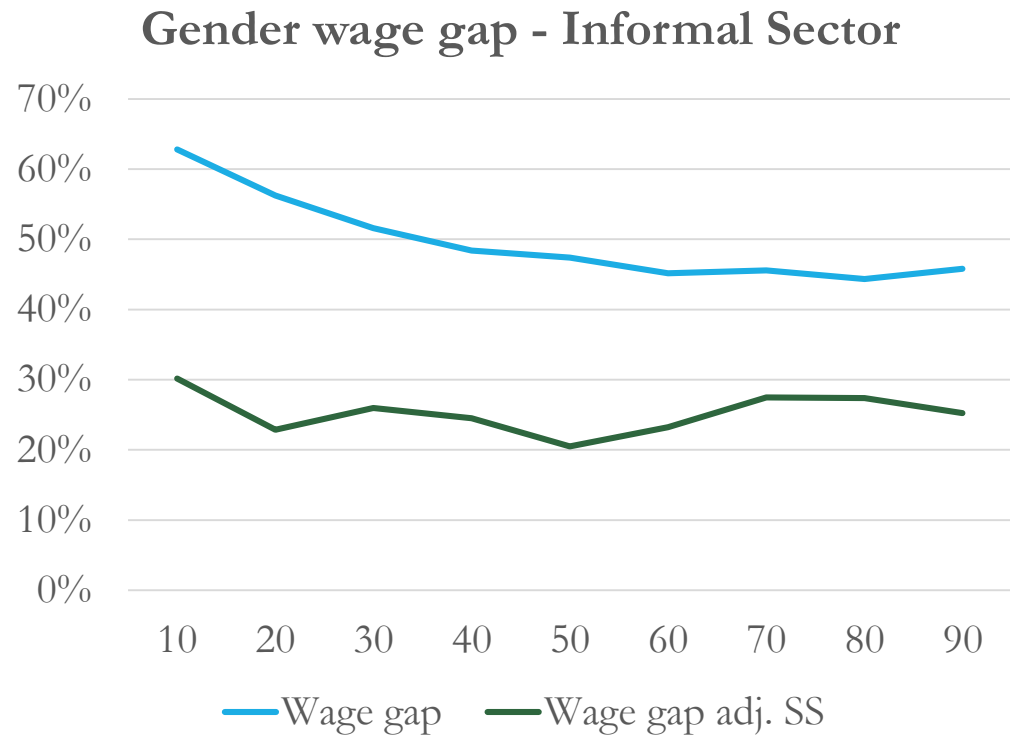
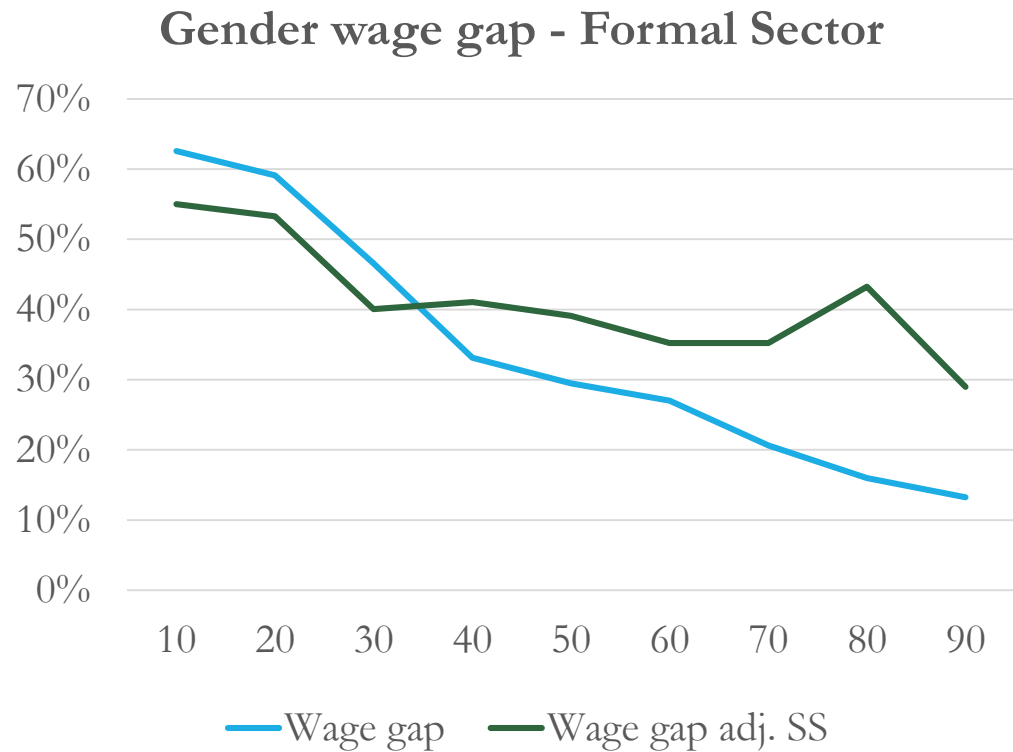
$$R = E(W_m) - E(W_f) = [\overline{X_m} - \overline{X_f}]' \hat{\beta}_m + \overline{X_f}' [\hat{\beta}_m - \hat{\beta}_f] + (\widehat{\theta_m} \overline{\lambda_m} - \widehat{\theta_f} \overline{\lambda_f})$$

$$R + (\widehat{\theta_f} \overline{\lambda_f} - \widehat{\theta_m} \overline{\lambda_m}) = [\overline{X_m} - \overline{X_f}]' \hat{\beta}_m + \overline{X_f}' [\hat{\beta}_m - \hat{\beta}_f]$$

ROBUSTNESS TEST (AT THE MEAN)

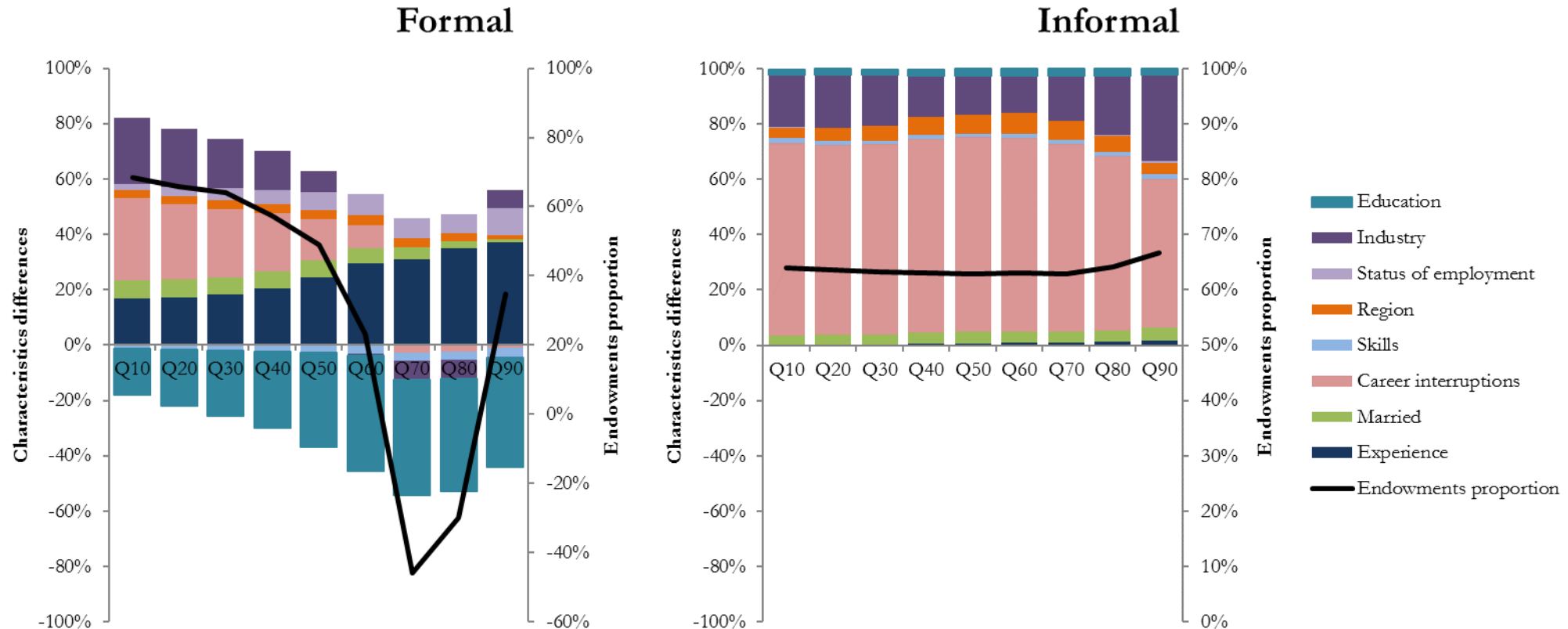
	OLS		OLS Excluding Industry		Heckman	
	Formal	Informal	Formal	Informal	Formal	Informal
Raw difference	0.2660***	0.4049***	0.2660***	0.4049***	0.5541***	0.2618***
	30.5%	49.9%	30.5%	49.9%	74.0%	29.9%
Total Explained	0.0846***	0.1251***	0.0403***	0.0512***	0.0571***	0.0576***
	32%	31%	15%	13%	10%	22%
Total Unexplained	0.1815***	0.2798***	0.2257***	0.3537***	0.4970***	0.2042***
	68%	69%	85%	87%	90%	78%
Observations	161,040	171,678	161,040	171,678	161,040	171,678

INCLUDING THE INVERSE MILLS' RATIO TO THE RIF



Assumption: The selection into employment is uniform along the wage distribution. Treats symmetrically the contribution of observables and selection in the decomposition.

HOW DOES FERTILITY DECISIONS AFFECT THE RESULTS?



CONCLUSIONS

- ❖ We find strong evidence of sticky floors in the formal sector and not in the informal sector
 - ❖ By age: sticky floors for older women in the formal and younger women in the informal
- ❖ Relative to the total gap, explained proportions are constant along the distribution
- ❖ Explained components
 - ❖ Formal: experience explained differences in wages while education reduces the gap
 - ❖ Informal: Industrial segregation plays an important role
 - ❖ Career interruptions accounts for an important part of the gap particularly in the informal sector
- ❖ People in different age groups and sector face different levels of discrimination and endowment effects
- ❖ Selection into the labour market affect mainly women in the formal sector and at the top end of the wage distribution.



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