

The Tax Elasticity of Formal Work in African Countries

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Background

- ▶ The informal sector in developing countries is large, and it is not getting smaller
 - ▶ was on average 58% in Latin America in 2005-10, whereas it was much larger in Sub-Saharan Africa (approx. 66%)
 - ▶ Charmes (2012): the informal sector size in Africa the same than it was in the 1980s
- ▶ African countries have been able to increase their tax take, but revenues still not sufficient to finance necessary developmental spending
 - ▶ personal income tax has a very small role
- ▶ A dilemma: A further increase in (income) tax rates can limit the growth of private-sector, formal, jobs

The research question

- ▶ The paper asks the question:
 - ▶ What happens to the share of formal work when (income) taxes on formal work are raised
- ▶ What could happen:
 - ▶ via tax incidence, labour costs increased, labour demand reduced, fewer formal-sector jobs
 - ▶ people can choose to become informal self-employed instead
- ▶ Our goal: estimate the size of the response; elasticity of formal work

Related literature

- ▶ Earlier quasi-experimental evidence on the impacts of expanding social security financed by payroll taxes on formal work in the Latin American context, including Kugler and Kugler (2009), Bergolo and Cruces (2014) and Garganta and Gasparini (2015)
- ▶ Studies focussing on programmes and incentives for firms to formalize; e.g. De Mel et al. (2013) and Benhassine et al. (2018); we concentrate on the employee side
- ▶ Papers explaining the wage premium in the formal sector, such as Falco et al. (2011), Günther and Launov (2012) and Nordman et al. (2016)

The contribution of this paper

- ▶ Evidence on formality elasticity is not available, to our knowledge, for African countries outside of South Africa
- ▶ Our paper: combines repeated cross sections data and transparent identification strategy to examine the size of formality elasticity
 - ▶ Four countries (Ghana, Uganda, Rwanda, Tanzania)
- ▶ Another objective of the study is to provide new descriptive information about the workers in formal vs informal sector in Africa

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A (simplified) conceptual framework

- ▶ Net income in the state of formal work is given by $x_f = y_f - t(y_f) + b(y_f)$
- ▶ And in the state of informal work $x_n = y_n + b(y_n)$
- ▶ Individual decides to work for the formal sector if searches for a job in the formal sector if

$$x_f - x_n \geq d$$

- ▶ where
 - ▶ d cost of working for the formal sector (can be negative)
- ▶ When $x_f - x_n$ is reduced because of an increase in a tax, formal sector share declines

Comments on the conceptual framework

- ▶ Working for the informal sector can be voluntary or involuntary
- ▶ Traditional view on formality: segmented labour markets; informal work only exists because of lack of formal sector jobs
- ▶ Modern evidence (cited above) suggests
 - ▶ heterogeneity in informal sector work: some choose to work for the informal sector voluntarily, can earn there more or benefit from more flexible conditions (women with children)
 - ▶ => simultaneous existence of voluntary and involuntary informality

Voluntary versus involuntary informality?

	Madagascar	Malawi	Uganda	Zambia
Choice	73.5	49.6	44.7	39.3
Non-choice	26.5	50.4	55.3	60.7

Table: Self employed by choice or because of lack of formal sector job. Source: McKay et al. (2018)

Estimation (by country)

$$P(\text{formal})_{i,c,t} = \alpha + \beta \times [x_f - x_s]_{i,c,t} + \epsilon_{it},$$

- ▶ from which β can be used to calculate the formality elasticity:
 - ▶ proportional change of the share of formal work with respect to the proportional change in the difference in the net pay between formal and informal sector
- ▶ Challenges in the estimation
 - ▶ individual only observed in one state
 - ▶ the RHS endogenous: net pay depends on taxes, which depend on whether the person works for the formal sector or not
 - ▶ if demand side is restrictive, the net pay difference does not matter: concentrate on workers strictly above the minimum wage

Estimation ctd

- ▶ The solution: Follow (Blundell et al., 1998) and partition the data into groups based on personal characteristics
 - ▶ => pseudo panel based on age, gender, education
- ▶ Estimate at group mean level (with group size as weights)

$$\overline{P(formal)}_{g,c,t} = \alpha + \beta \times \overline{(x_f - x_s)}_{g,c,t} + \alpha_g + \mu_t + \eta_{it}$$

- ▶ Angrist and Pischke (2009) show that this is equivalent to estimating

$$P(formal)_{i,c,t} = \alpha + \beta \times [x_f - x_s]_{i,c,t} + \alpha_g + \mu_t + \eta_{it},$$

- ▶ by two-stage least squares (2SLS) while using group*time interactions as excluded instruments for $(x_f - x_s)$.
- ▶ Identifying assumption: Once group permanent effects and common time effects are controlled for, group*time effects affect formality only via changes in net pay

Estimation: Pooled model

- ▶ Pool information from different countries around the same time
- ▶ Benefit: increases sample size and precision

$$\overline{P(\text{formal})}_{g,c,t} = \alpha + \beta \times \overline{(x_f - x_s)}_{g,c,t} + \alpha_g + \theta_c + \mu_t + \eta_{it}$$

- ▶ Identification: across groups in different countries at the same time, while country-specific permanent effects and linear trends are accounted for

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Data

- ▶ Country selection: crucial to have individual income data and information about formality

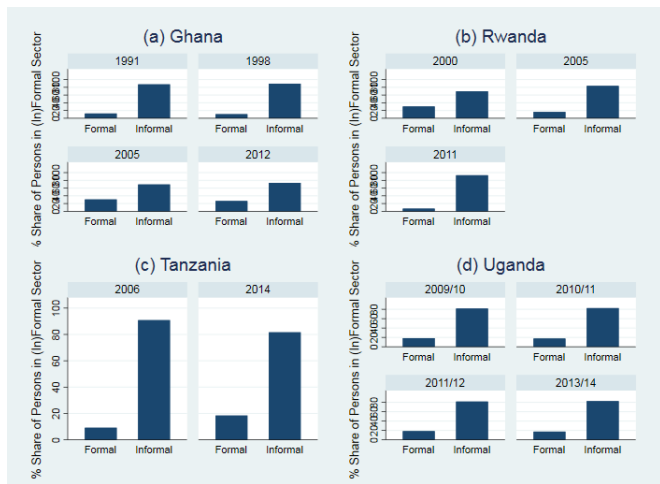
	Year-groups				
	1	2	3	4	5
Countries	1991	1998-2001	2005-2006	2009-2011	2012-2014
Ghana	GLSS3 (1991)	GLSS4 (1998)	GLSS5 (2006)		GLSS6 (2012)
Rwanda		EICV1 (00/01)	EICV2 (05/06)	EICV3 (10/11)	
Tanzania			ILFS (2006)		ILFS (2014)
Uganda				NPL (09/10)	
				NPL (10/11)	NPL (11/12)
				NPL (11/12)	NPL (13/14)

Table: Survey waves in the estimation sample

Some sample choices

- ▶ Formality mainly determined on the basis of having access to social security (entitled to pension, unemployment or health insurance)
 - ▶ complemented with self-reported status
- ▶ Age 15-60 (three groups)
- ▶ Education: primary education or less; junior secondary education; senior secondary or more
- ▶ Public sector workers and agricultural self-employed excluded
- ▶ Net income calculated using the tax code in a country for formal sector workers if only gross income reported

Formal sector share

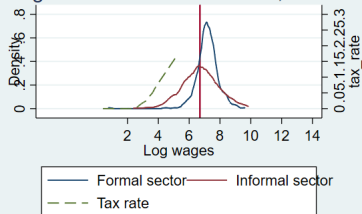


Source: Authors' own estimations based on survey data from GLSS 3-6, EICV 1-3, IFLS 2006-2014 and NPL 2009/2010 – 2013/2014.

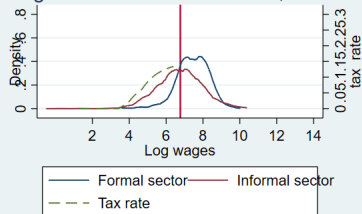
Figure: Share of Formal Workers by Country.

Earnings distributions: Ghana

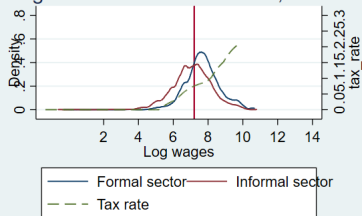
Wage distribution in Ghana all, GLSS3



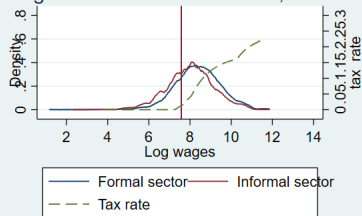
Wage distribution in Ghana all, GLSS4



Wage distribution in Ghana all, GLSS5



Wage distribution in Ghana all, GLSS6



Summary on sum stats

- ▶ For all countries, men, household heads and middle aged individuals (25-44 years) more likely to be formal workers
- ▶ The share of individuals working in the formal sector rises with education.
- ▶ Professionals and technicians and associate professionals are occupations most likely to be formal whereas clerks and sales and shop workers are most likely informal
- ▶ Formal workers typically earn more, but there are cases where the opposite is true
 - ▶ similar situations observed in other countries (Bargain and Kwenda, 2011; Matos and Portela Souza, 2016)

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Results: Pooled model

	No controls	All fixed effects	Above min wage	Above 1st tax br	With trends	Excl. self-empl
	(1)	(2)	(3)	(4)	(5)	(6)
Elasticity	0.408*	0.038	0.341**	0.633***	0.116	-0.207*
Std. Err.	(0.242)	(0.123)	(0.171)	(0.227)	(0.161)	(0.108)
Group N	155	148	141	118	118	110

Table: Pooled estimation results.

Results: by country

		No controls	All interactions	Above min wage	Above 1st tax br	Excl. self-empl
		(1)	(2)	(3)	(4)	(5)
a) Ghana	Elasticity	0.159*	-0.0116	-0.00489	-0.0320	0.0108
	Std. Err.	(0.0805)	(0.0527)	(0.0685)	(0.0792)	(0.0975)
	Group N	57	57	54	43	35
b) Rwanda	Elasticity	-0.0402	0.0357	0.0158	-0.0856	-0.0257
	Std. Err.	(0.0445)	(0.0372)	(0.0504)	(0.0846)	(0.0509)
	Group N	36	36	36	35	30
c) Tanzania	Elasticity	0.124	-0.0154	-0.105	0.119	0.186
	Std. Err.	(0.0772)	(0.0859)	(0.104)	(0.146)	(0.113)
	Group N	33	33	31	29	25
d) Uganda	Elasticity	0.196***	0.0154	-0.0288	0.0403	-0.0288
	Std. Err.	(0.0637)	(0.0539)	(0.0404)	(0.118)	(0.0404)
	Group N	32	32	26	12	0.745*

Table: Individual country estimation results.

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- ▶ In our understanding the first paper to explore whether formal sector income taxes lead to a lower formal sector size in Sub-Saharan African countries
- ▶ There does not seem to be a tradeoff between taxes and formal-sector share:
 - ▶ Some mixed results in pooled regressions; but no robust significant impact
- ▶ Caveats:
 - ▶ Earnings data not perfect
 - ▶ Limited number of cells in country-level analysis
 - ▶ Individuals may not have reacted because tax changes not salient (bracket creep, mostly)
 - ▶ Results hold for current tax levels, not necessarily for much greater tax burden

References I

- Angrist, J. and J.-S. Pischke (2009). *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press.
- Bargain, O. and P. Kwenda (2011). Earnings structures, informal employment, and self-employment: New evidence from Brazil, Mexico, and South Africa. *Review of Income and Wealth* 57, S100–S122.
- Benhassine, N., D. McKenzie, V. Poulouen, and M. Santini (2018). Does inducing informal firms to formalize make sense? experimental evidence from Benin. *Journal of Public Economics* 157, 1 – 14.
- Bergolo, M. and G. Cruces (2014). The anatomy of behavioral responses to social assistance when informal employment is high. Discussion Paper 8198, IZA.
- Blundell, R., A. Duncan, and C. Meghir (1998). Estimating labor supply responses using tax reforms. *Econometrica* 66(4), 827–861.
- Charmes, J. (2012). The informal economy worldwide: Trends and characteristics. *Margin: The Journal of Applied Economic Research* 6(2), 103–132.

References II

- De Mel, S., D. McKenzie, and C. Woodruff (2013). The demand for, and consequences of, formalization among informal firms in Sri Lanka. *American Economic Journal: Applied Economics* 5(2), 122–50.
- Falco, P., A. Kerr, N. Rankin, J. Sandefur, and F. Teal (2011). The returns to formality and informality in urban Africa. *Labour Economics* 18, S23 – S31. Labour markets in developing countries.
- Garganta, S. and L. Gasparini (2015). The impact of a social program on labor informality: The case of AUH in Argentina. *Journal of Development Economics* 115, 99 – 110.
- Günther, I. and A. Launov (2012). Informal employment in developing countries: Opportunity or last resort? *Journal of Development Economics* 97(1), 88 – 98.
- Kugler, A. and M. Kugler (2009). Labor market effects of payroll taxes in developing countries: Evidence from Colombia. *Economic Development and Cultural Change* 57(2), 335–358.

References III

- Matos, V. and A. Portela Souza (2016). Mudanças dos diferenciais de salários formal e informal: redução da segmentação ou do salário hedônico? In d. F. Holanda Barbosa Filo, G. Ulyssea, and F. Veloso (Eds.), *Causas e Consequências da Informalidade No Brasil*, Chapter 2. Elsevier.
- McKay, A., A. Newell, and C. Rienzo (2018). Job satisfaction among young workers in Eastern and Southern Africa: a comparative analysis. Technical report, University of Sussex. mimeo.
- Nordman, C. J., F. Rakotomanana, and F. Roubaud (2016). Informal versus formal: A panel data analysis of earnings gaps in madagascar. *World Development* 86, 1 – 17.