Kinship Taxation as a Constraint to Microenterprise Growth: Experimental Evidence from Kenya

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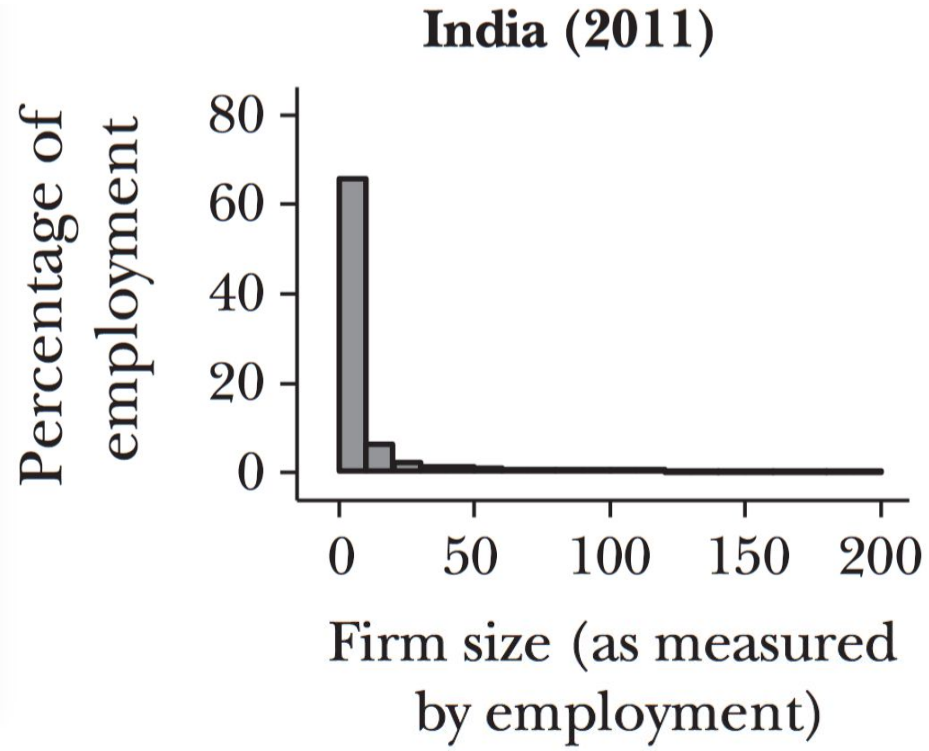
Microenterprises common at low levels of development

- Large share of labor force in small informal firms
  - Hsieh and Olken (2014)



- Many have high marginal product of capital
  - De Mel, McKenzie and Woodruff (2008)

Constraints to microenterprise growth

- Credit constraints
  - Policies to alleviate these have had mixed success
  - Microcredit loans have low returns
- Kinship taxation
  - Pressure from relatives and friends to share income
  - Form of weak property rights

Research question:

- To what extent does kinship taxation constrain growth of microenterprises?

Kinship taxation: Pressure from relatives and friends to share income

"I sell second-hand clothes without anyone knowing, far from home.

My previous business, a street-side restaurant, failed due to my in-laws using me for money, yet I wanted to expand it."

- 40 year old woman, Nairobi slum

Three contributions

1. Describe kinship taxation
   - Lab experiment to elicit marginal kinship tax rates

2. Quantify economic cost of distortion from kinship taxation
   - Structural model to get counterfactual

3. Evidence on interaction with credit constraints
   - Complementarity of credit constraints and kinship taxation

Literatures on kinship taxation, credit constraints, and firm misallocation

1. Kinship taxation as constraint on productive activity
   - Lewis (1955), Platteau (2000), Hoff & Sen (2005)
   - Baland, Guirkinger & Mali (2011), di Falco and Bulte (2011), Hadnes, Vollan & Kosfeld (2013), Jakiela & Ozier (2015) Boltz et al. (2015)
2. Credit constraints and property rights
   - de Mel, McKenzie & Woodruff (2008), Karlan & Zinman (2009), Banerjee & Duflo (2014), Fafchamps, McKenzie, Quinn & Woodruff (2014)
   - Johnson, McMillan & Woodruff (2002), Besley & Ghatak (2010)
3. Firm level misallocation and aggregate TFP
   - Restuccia & Rogerson (2008), Hsieh & Klenow (2009), Hopenhayn (2014)

Outline

Outline

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Simple model of distortions from kinship taxation

Model provides:

1. Precise term for marginal kinship tax rate
2. Relation between tax rates and other firm-level distortions
3. Sufficient statistic to measure tax rate in the lab
   - Willingness-to-pay to hide income

Model of utility maximizing entrepreneur

$$\max_{c,d,k,l} \; u(c,d),$$

s.t.

$$c + d = Af(k,l) - wl - rk$$

- c Consumption
- d Net transfers
- A Ability (TFP)
- k Capital stock
- l Labor use
- w Wage rate
- r Interest rate

Add kinship taxation and credit constraints

1. Kinship taxation
   - Minimum net transfer required
2. Credit constraints
   - Upper limit on capital stock
3. Entrepreneur-specific distortions
   - Output wedge τ_i^y reduces scale of firm
   - Capital-labor wedge τ_i^k reduces capital use relative to labor

$$\max_{c,d,k,l} \; u(c, d),$$

s.t.

$$\begin{aligned} c + d &= (1 - \tau_i^y) A_i f(k, l) - wl - (1 + \tau_i^k) rk, \\ d &\geq T_i(y), \\ \mu : \quad k &\leq \bar{k}_i, \end{aligned}$$

where $y = A_i f(k, l)$.

How kinship taxation distorts productive decisions

- If neither constraint binds, $d > T_i(y)$ and $k < \bar{k}_i$,

$$(1 - \tau_i^y) A_i f_l = w,$$
$$(1 - \tau_i^y) A_i f_k = (1 + \tau_i^k) r.$$

- If both constraints bind, $d = T_i(y)$ and $k = \bar{k}_i$,

$$\left[1 - \tau_i^y - \frac{\partial T_i}{\partial y}\left(1 - \frac{u_d}{u_c}\right)\right] A_i f_l = w,$$
$$\left[1 - \tau_i^y - \frac{\partial T_i}{\partial y}\left(1 - \frac{u_d}{u_c}\right)\right] A_i f_k = (1 + \tau_i^k) r + \frac{\mu_i}{u_c}.$$

For ease of notation, $\tilde{\tau}_i^k \equiv \tau_i^k + \frac{\mu_i}{u_c r}$

Kinship tax rate $\neq$ transfer rate

Marginal distortion from kinship taxation is $\frac{\partial T_i}{\partial y}\left(1-\frac{u_d}{u_c}\right)$

1. Marginal transfer rate $\frac{\partial T_i}{\partial y}$
2. Attenuated by ratio of marginal utility of transfers to consumption u_d/u_c

For ease of notation, $t_i \equiv \frac{\partial T_i}{\partial y}\left(1-\frac{u_d}{u_c}\right)$

Kinship tax is analogous to output wedge

FOCs:

$$[1 - \tau_i^y - t_i] A_i f_l = w \tag{1}$$

$$[1 - \tau_i^y - t_i] A_i f_k = (1 + \tilde{\tau}_i^k) r \tag{2}$$

$\Rightarrow$ Kinship taxation reduces optimal firm scale

- Firm data can be used to back out τ wedges, as in Hsieh and Klenow (2009)
  1. $1 + \tau_i^y + t_i$
  2. $1 + \tilde{\tau}_i^k$

How to elicit kinship tax rate

- Need a measure of $t_i = \frac{\partial T_i}{\partial y}\left(1 - \frac{u_d}{u_c}\right)$ to estimate extent of kinship tax distortions
- Rather than measure $\frac{\partial T_i}{\partial y}$ and $\frac{u_d}{u_c}$, use sufficient statistic:
  - Willingness-to-pay to hide income

Willingness-to-pay to hide income as measure of kinship tax rate

Allow the entrepreneur to hide income ε by paying fraction p

$$\max_{c,d,k,l} \; u(c,d),$$

s.t.

$$\begin{aligned} c + d &= (1-\tau^y) A_i f(k,l) - wl - (1+\tau_i^k) rk - p\varepsilon, \\ d &\geq T_i(y-\varepsilon), \\ k &\leq \bar{k}_i. \end{aligned}$$

- Willing to pay to hide income ε at any price $p \leq \bar{p}_i$ such that:

$$\bar{p}_i = \frac{\partial T_i}{\partial y}\left(1 - \frac{u_d}{u_c}\right)$$

Empirics: Data required to estimate cost of kinship tax

To estimate distortion from marginal kinship tax rates, for each entrepreneur:

Firm level data Back out A_i, $\tilde{\tau}_i^k$ and $\tau_i^y + t_i$

Lab experiment Get direct measure of t_i

Then reallocate inputs across firms, after removing t_i distortion

Outline

Lab experiment: Elicit willingness-to-pay to hide income

- Elicit willingness-to-pay to hide income from social network
  - Similar experiments in Jakiela & Ozier (2015) and Boltz, Marazyan & Villar (2015)

Would you prefer:

1. I give you \$5, and announce that I gave you this money
2. I give you \$4, and tell no one

- If choose #2, interpret as $t_i \geq 20\%$

Converting choices into willingness-to-pay

If the prize were either...	Person A	Person B	Person C	Person D
1) \$5 announced or \$5.00 secret	Secret	Secret	Secret	Secret
2) \$5 announced or \$4.50 secret	Announced	Secret	Secret	Secret
3) \$5 announced or \$4.00 secret	Announced	Secret	Secret	Secret
4) \$5 announced or \$3.50 secret	Announced	Secret	Secret	Announced
5) \$5 announced or \$3.00 secret	Announced	Secret	Secret	Secret
6) \$5 announced or \$2.50 secret	Announced	Announced	Secret	Announced
7) \$5 announced or \$2.00 secret	Announced	Announced	Secret	Announced
8) \$5 announced or \$1.50 secret	Announced	Announced	Secret	Secret
Imputed WTP to hide income	0%	40%	70%	20%

Design of lab experiment

Each participant interviewed 1-on-1

- Effort framing: cleaning beans to induce effort framing
- Deniability: chosen decision implemented in lottery

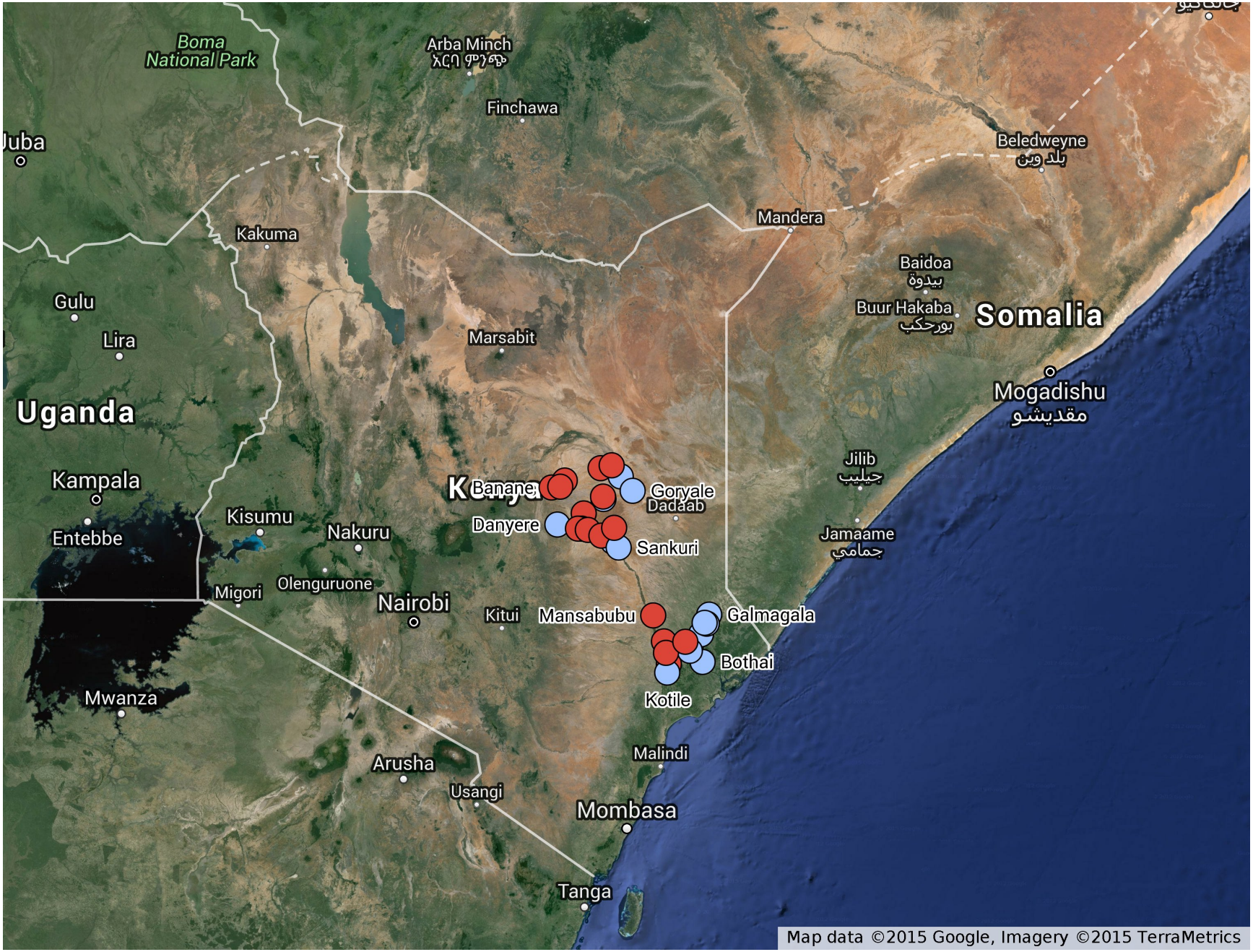
Participants recruited from cash transfer RCT

- 17 villages across Garissa County, Kenya
- Population is Somali, Islamic, agro-pastoralist
- Participants recruited from separate cash transfer RCT
  - Allows me to observe random income shock
- Participants earned avg. of \$1.60 in lab
  - 64% of daily household income

Descriptive statistics

Balance across participant/non-participant

Location of sample villages



Outline

Prima facie evidence of inefficiency

Choosing to pay to hide reduces group's income

- Of 1805 participants, 423 (23%) chose to pay to hide
- For them, average t_i is \$2.59/\$5.00, or 52%

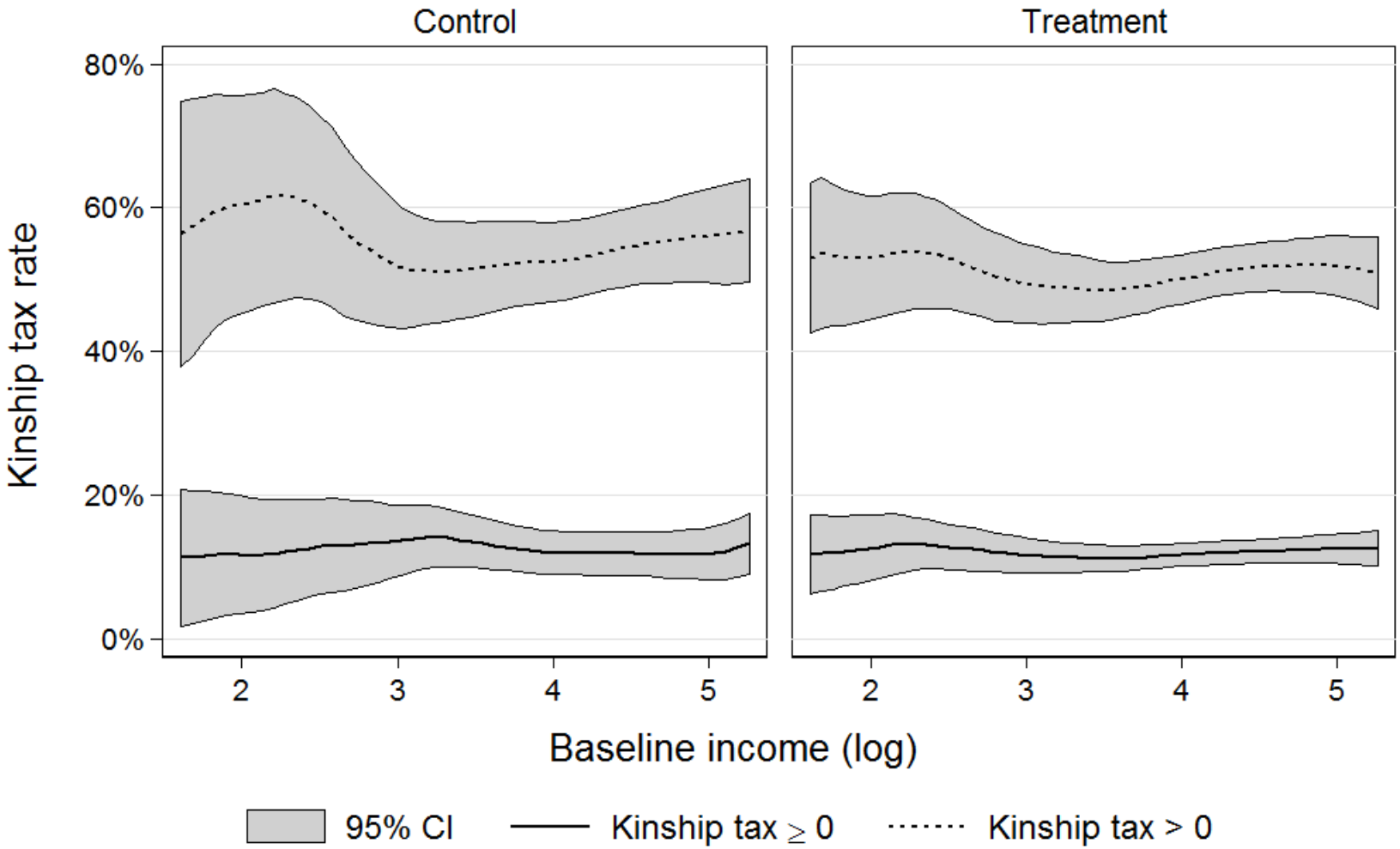
Table of WTP frequency

Tax rate higher for men, educated, and entrepreneurs

Dependent variable:	(1) Kin Tax > 0	(2) Kin Tax > 0	(3) Kin Tax > 0	(4) Kin Tax > 0	(5) Kin Tax > 0
Female	-0.104***	-0.0493**	-0.0985***	-0.0943***	-0.0658**
	(0.0235)	(0.0249)	(0.0227)	(0.0229)	(0.0268)
Age	-0.00129*				-0.000744
	(0.000723)				(0.000803)
Education (yrs)		0.0218**			0.0198**
		(0.00867)			(0.00865)
Islamic educ (yrs)		0.0222***			0.0200**
		(0.00857)			(0.00872)
Raven's score (SD)		0.0157			0.0128
		(0.0103)			(0.0104)
Microentreprise owner			0.0877***		0.0702***
			(0.0259)		(0.0263)
Living with spouse				0.0102	0.00835
				(0.0243)	(0.0263)
Number of siblings				0.00764***	0.00644**
				(0.00254)	(0.00259)
Mean of dep var	0.234	0.233	0.234	0.234	0.233
Observations	1805	1726	1805	1805	1726

Probit | Non-missing | Entrepreneurs

Marginal tax rates do not change with income



Regression table

Confirm that choices reflect preferences

Evidence that choices are not mistakes

1. Stated reason for hiding
   - "I don't want to share with others that is why I prefer \$1.50 not announced"
2. Hiding from friends & family, not strangers
3. Complexity of experiment does not drive results
4. Random order of questions
5. More educated hide more
6. Few inconsistent choices

Details

Outline

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Firm data from entrepreneurs

- 20% of sample are entrepreneurs

Microenterprise survey from de Mel, McKenzie and Woodruff (2008)

Capital Equipment + Structure + Inventory

Labor Owners + Wage workers + Unpaid workers

Output Value added

- 326 firms with non-zero, non-missing data on capital, labor, and output
  - Attenuate effect of outliers (winsorize at 1%)

Firm descriptive statistics | Variable definitions

Back out productivity and wedges

1. Using production function, back out each entrepreneur's wedges and productivity
   - $\{y_i, k_i, l_i\} \Rightarrow \{A_i, \tau_i^y + t_i, \tilde{\tau}_i^k\}$
2. Reallocate capital and labor across entrepreneurs after removing t_i as measured in the lab

Production Function

- Production function
  - Cobb-Douglas
  - Lucas span-of-control, to pin down firm size (DRS)

$$y = A(k^{\alpha} l^{1-\alpha})^{\sigma}$$

Each entrepreneur solves:

$$[1 - \tau_i^y - t_i] A_i f_l = w$$
$$[1 - \tau_i^y - t_i] A_i f_k = (1 + \tilde{\tau}_i^k) r$$

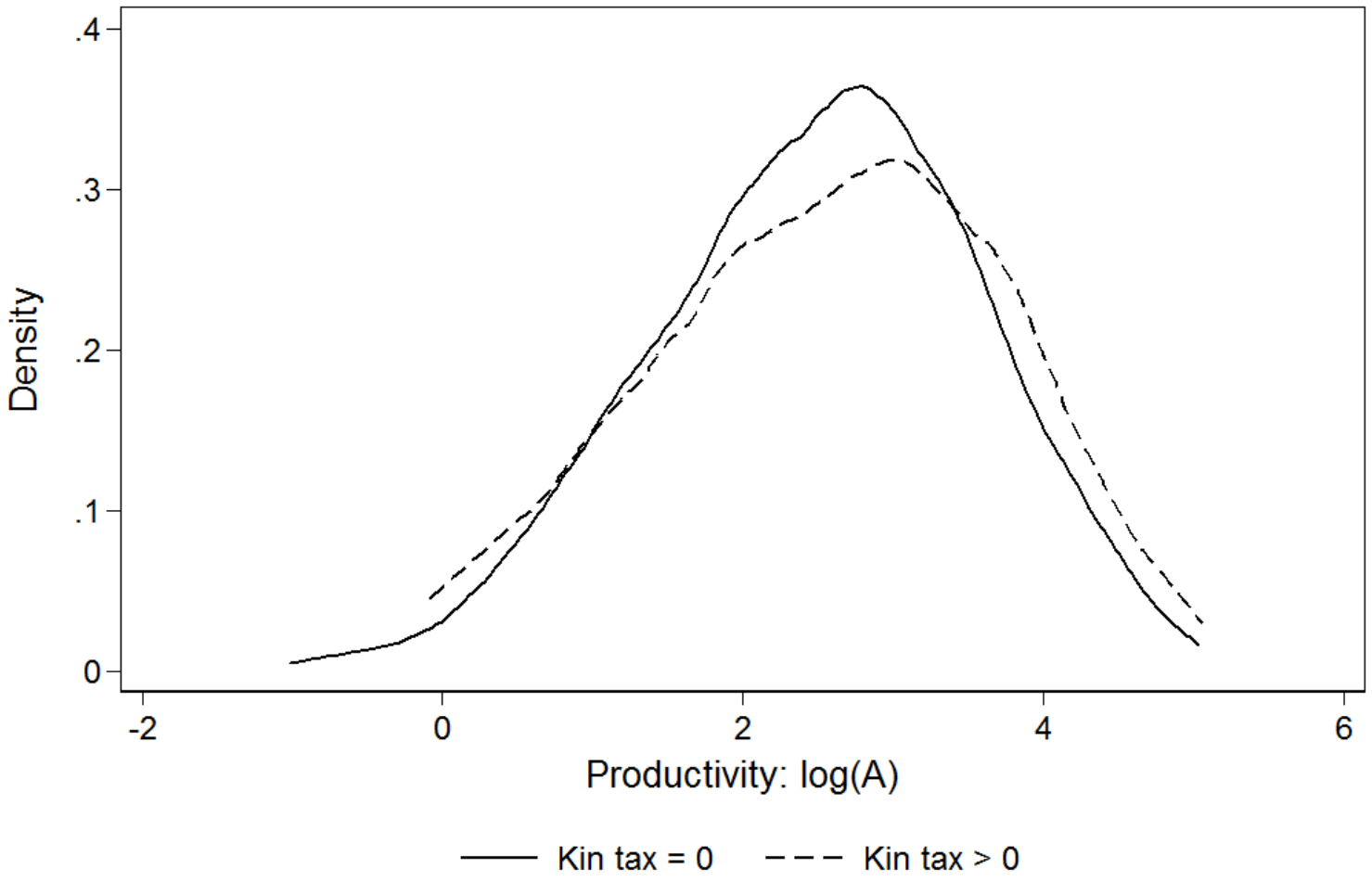
- $w = 30$
- $r = 0.02$

Out-of-sample Parameters

- Estimate production function
  - Estimating production function problematic, given distortions
  - Without panel no credible production function estimation
    - Olley & Pakes (1996), Levinsohn & Petrin (2003)
  - No undistorted benchmark as in Hsieh & Klenow (2009)
- Use capital share $\alpha = 0.3$
  - Higher estimates of capital share probably mismeasurement (Gollin 2002)
  - Naive OLS estimation: 0.25-0.35
- Use span parameter $\sigma = 0.7$
  - Midrigan & Xu (2014), Basu & Fernald (1997) & Atkeson & Kehoe (2007) use 0.85. Buera et al. (2011) use 0.79.
  - Conservative benchmark: estimates of gains from reallocation increase with σ.

Back out each entrepreneur's productivity

- $A_i = y_i(l_i^{\alpha} k_i^{1-\alpha})^{-\sigma}$



Estimates of productivity comparable to other settings

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Microenterprises		Agriculture		Manufacturing Plants		
	Squires (2015)	DMW (2008)	Shenoy (2015)	R&S (2015)	Hsieh & Klenow (2009)		
Setting	Kenya	Sri Lanka	Thailand	Malawi	India '94	China '05	US '97
SD	1.09	1.05		1.19	0.67	0.63	0.49
75/25	1.55	1.37	1.81	1.15	0.81	0.82	0.53
90/10	2.85	2.72	3.09	2.38	1.60	1.59	1.19

The first column is my own data. DMW (2008) is my own calculation, using data from de Mel, McKenzie & Woodruff (2008). R&S is Restuccia & Santaeulalia-Llopis. Data from Hsieh & Klenow (2009) are reported for 1994 for India, 2005 for China, and 1997 for the US. SD is the standard deviation of log productivity; 75-25 is the log difference between the 75 and 25 percentile and 90-10 the 90 to 10 percentile difference in productivity. My measure of productivity is equivalent to TFPQ in Hsieh & Klenow (2009), and those results are what I present in this table.

- Dispersion is similar to larger panel of microenterprises in Sri Lanka
- High relative to formal manufacturing firms, but low relative to Thai farmers

Back out wedges from data

FOCs pin down wedges, given observed k, l:

$$(1 - \tau_i^y - t_i) A_i f_l = w$$
$$(1 - \tau_i^y - t_i) A_i f_k = (1 + \tilde{\tau}_i^k) r$$

- k-wedge distorts relative use of capital and labor

$$1 + \tilde{\tau}_i^k = \frac{\alpha}{1 - \alpha} \frac{wl}{rk}$$

- y-wedge distorts the scale of the firm

$$1 - \tau_i^y - t_i = \frac{wl}{(1 - \alpha)\sigma A_i} (k^\alpha l^{1-\alpha})^{-\sigma}$$

Reallocation procedure

Counterfactuals:

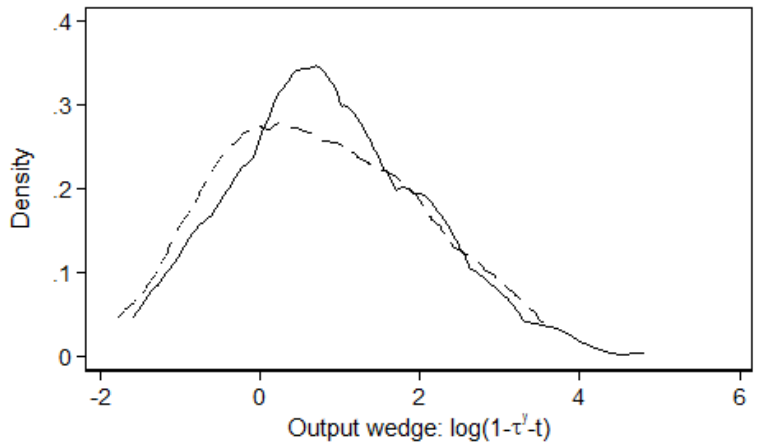
- Change $\{\tau_i^y, \tilde{\tau}_i^k, t_i\}$ and solve for input choices
- To discipline analysis, keep total capital and labor fixed
  - w and r adjust fully

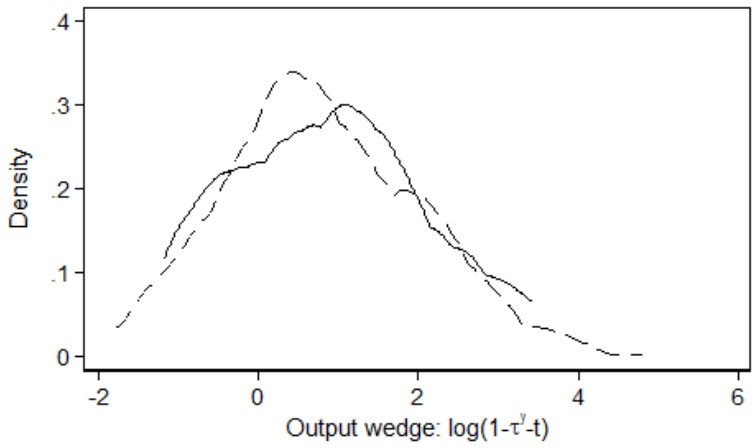
$$k_i \propto \left(\frac{(1 - \tau_i^y - t_i) A_i}{(1 + \tilde{\tau}_i^k)^{1-\alpha\sigma}} \right)^{\frac{1}{1-\sigma}}$$

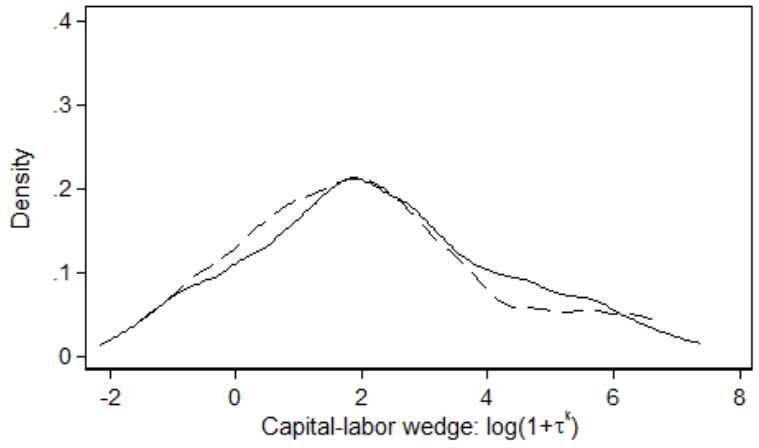
$$l_i \propto \left(\frac{(1 - \tau_i^y - t_i) A_i}{(1 + \tilde{\tau}_i^k)^{(1-\alpha)\sigma}} \right)^{\frac{1}{1-\sigma}}$$

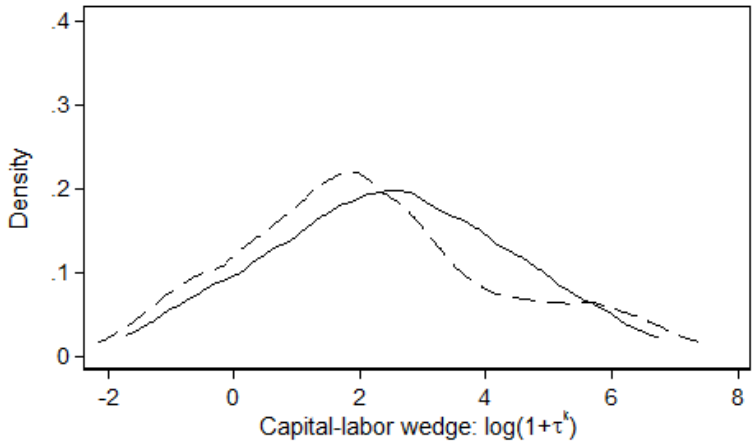
Outline

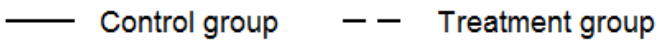
Distribution of wedges











Removing capital-labor wedges has small effect on treatment group

Table: Change in output from reallocation, removing k/l wedges

	(1) Change in output $\tau_i^k = 0$
Panel A: Entire sample	
Change in agg TFP ($\Delta Y/Y$)	0.078
Panel B: Split sample by RCT assignment	
Control	0.202
Treatment	0.045
N	326

Removing capital-labor wedges has no differential effect on those facing kin tax

Table: Change in output from reallocation, removing k/l wedges

	(1) Change in output $\tau_i^k = 0$
Panel A: Entire sample	
Change in agg TFP ($\Delta Y/Y$)	0.078
Panel B: Split sample by kin tax	
Kinship constraint does not bind ($t_i = 0$)	0.065
Kinship constraint binds ($t_i > 0$)	0.102
N	326

Removing all output wedges disproportionately benefits those facing kin tax

Table: Change in output from reallocation, removing output wedges

	(1) Change in output $\tau_i^y + t_i = 0$
Panel A: Entire sample	
Change in agg TFP ($\Delta Y/Y$)	0.694
Panel B: Split sample by kin tax	
Kinship constraint does not bind ($t_i = 0$)	0.478
Kinship constraint binds ($t_i > 0$)	1.112
N	326

Outline

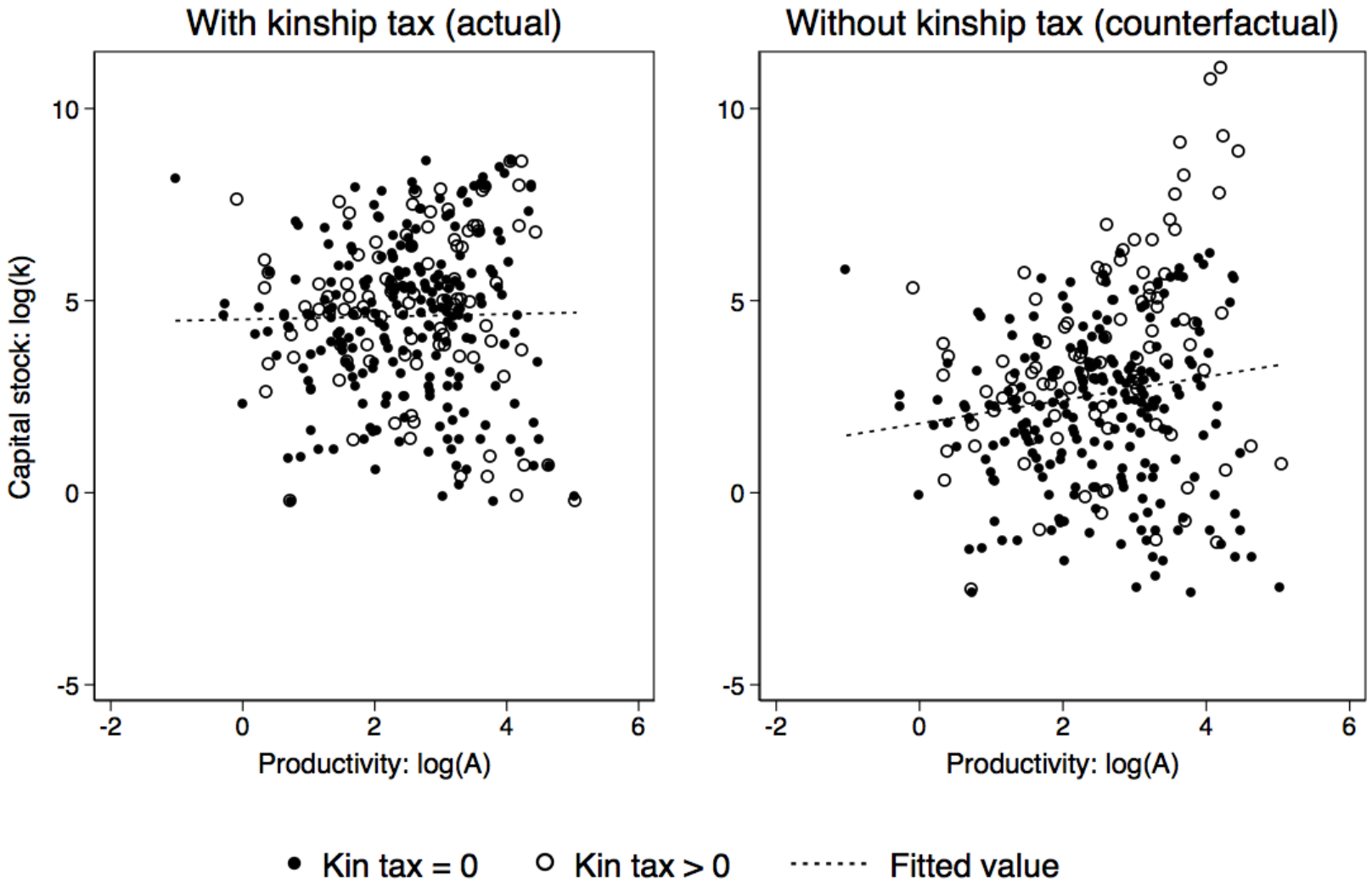
Removing kinship tax distortion increases output

Table: Change in output from reallocation, removing kinship tax distortion

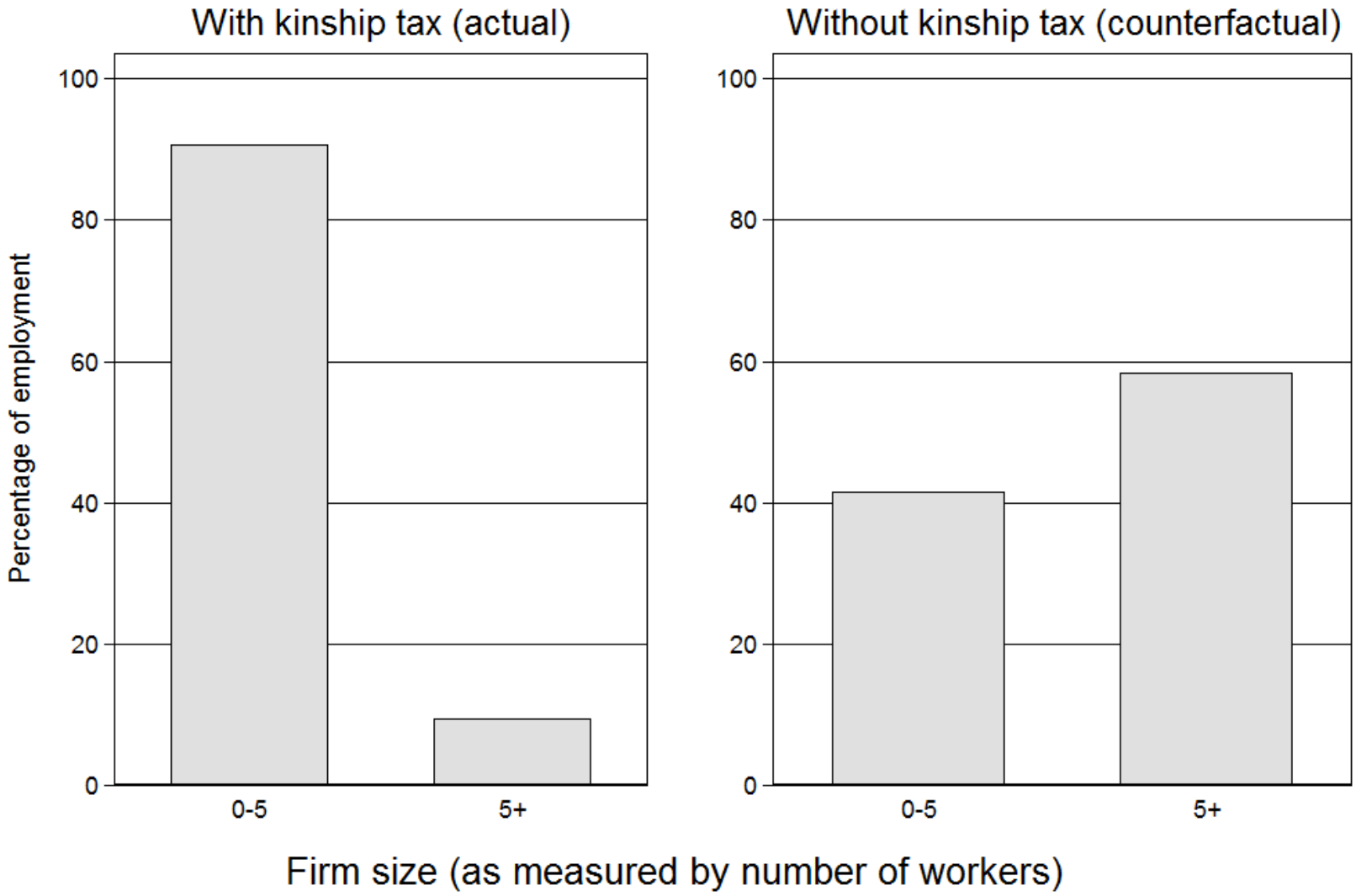
	(1) Change in output $t_i = 0$
Panel A: Entire sample	
Change in agg TFP ($\Delta Y/Y$)	0.265
Panel B: Split sample by kin tax	
Kinship constraint does not bind ($t_i = 0$)	-0.650
Kinship constraint binds ($t_i > 0$)	2.038
N	326

Robustness

Capital concentrated in larger firms



Labor concentrated in larger firms



Outline