STEG-PEDL Course on Private Enterprises, Productivity, and Economic Growth

Lecture 4: Formalization, taxation, and subsistence

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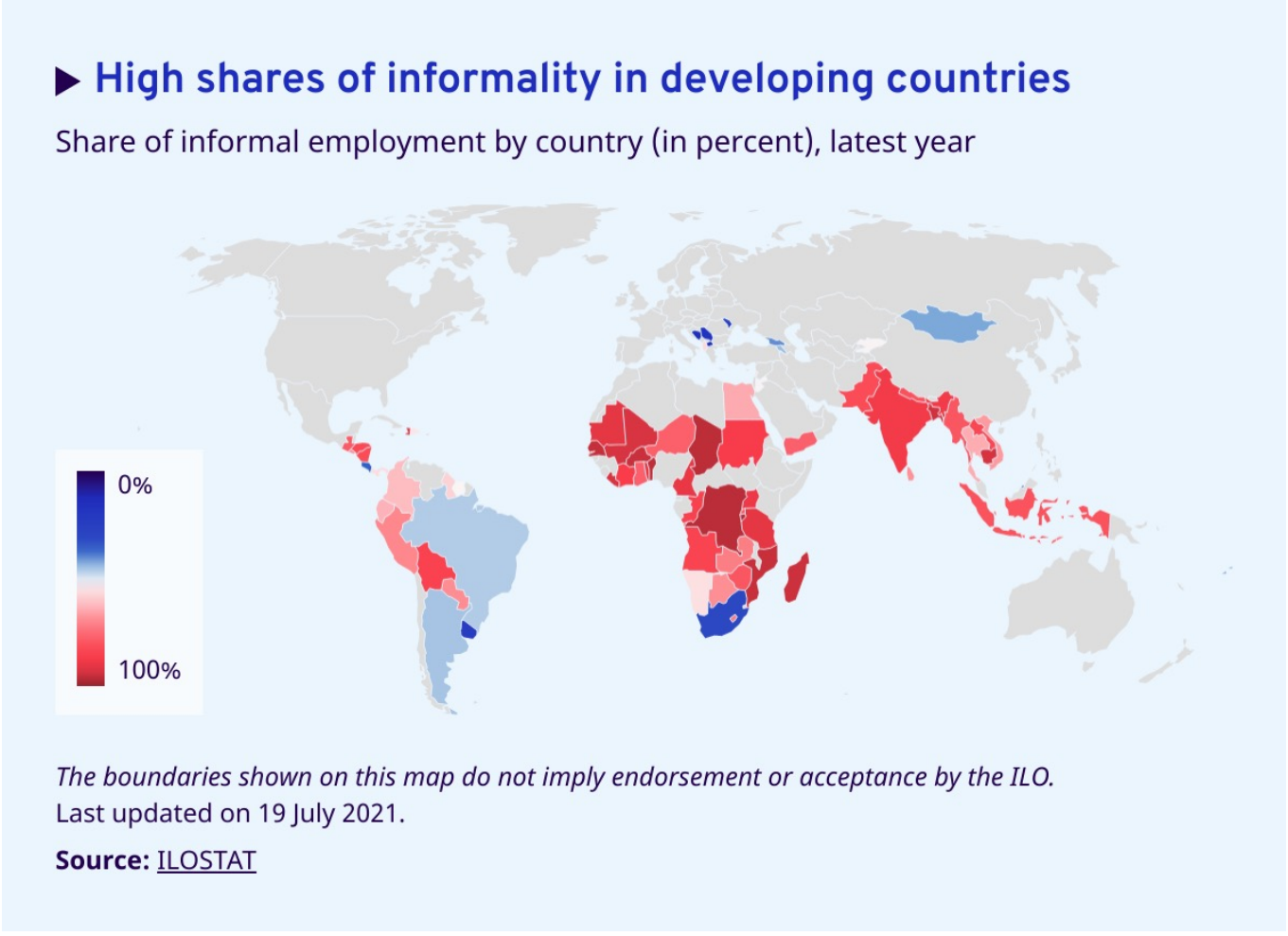
February 27, 2026

Why informality? It's pervasive

- 30-70% of economic activity
- 20-80% of labour force
- Equally large share of firms



Why informality? Anathema to development (Penny's lecture 1)

- Tax avoidance, hindering the provision of public goods.
- Misallocation of resources $\rightarrow$ it corresponds to a size-dependent distortion.
- Informal workers have no job stability, no unemployment insurance, nor employer provided social security.
- However, informality may provide *de facto* flexibility to firms and workers to cope with adverse shocks.
- **Key**: Countries are unlikely to simply "grow out of informality".

Definitions (1/2)

Informality can be an elusive concept. Much of the earlier literature focused on the discussion of informal sector's definition.

Definitions based on firm characteristics – size or productivity – are very problematic.

Dominant contemporary approach: "legalistic definition":

- Informal firms and workers are those that operate at the margin of the relevant laws and regulations.

Definitions (2/2)

For firms, it is important to distinguish two margins of informality:

1. The extensive margin: to register or not the business.
2. The intensive margin: whether registered firms hire informal workers.

$$\begin{aligned} \text{Informal firms} &= (1) \quad \approx 70\% \text{ of firms in Brazil} \\ \text{Informal workers} &= (1)+(2) \quad 30\text{-}80\% \text{ of workers in LAC} \end{aligned}$$

The intensive margin accounts for 40-44% of informal employment in Latin American countries!

Today's Lecture

1. Some Facts
2. Determinants: Firms
3. Determinants: Workers
4. Consequences of informality
5. Urbanization and Informality

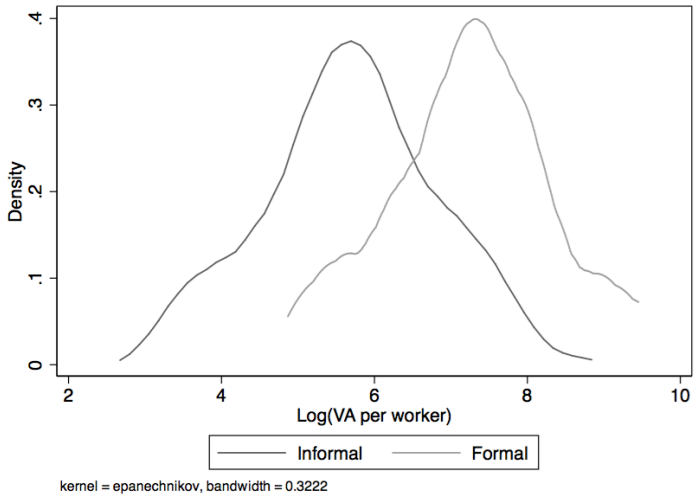
Outline

Lack of duality

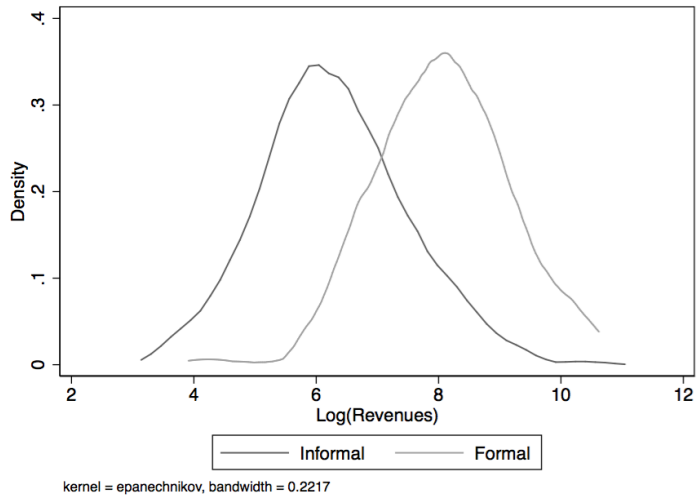
Vast evidence that informal firms are on average "worse": smaller, lower wages and profits, less educated owners and employees,...

Differences have been often interpreted as evidence of a dualistic view, but:

- ◇ Formal and informal firms coexist even within narrowly defined industries.
- ◇ There is a substantial overlap in formal and informal firms' productivity distributions, even within industries:



(a) Productivity: Log(VA/Worker)

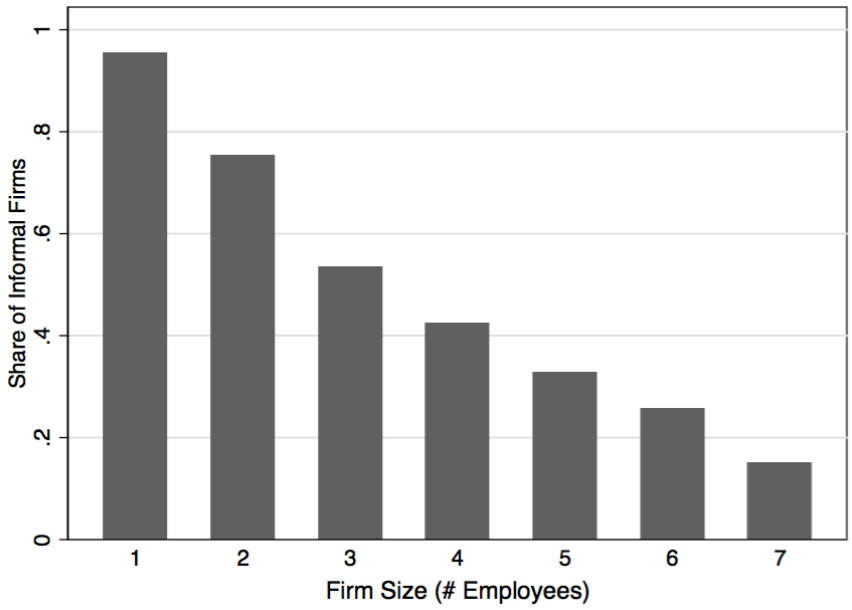


(b) Size: Log(Revenues)

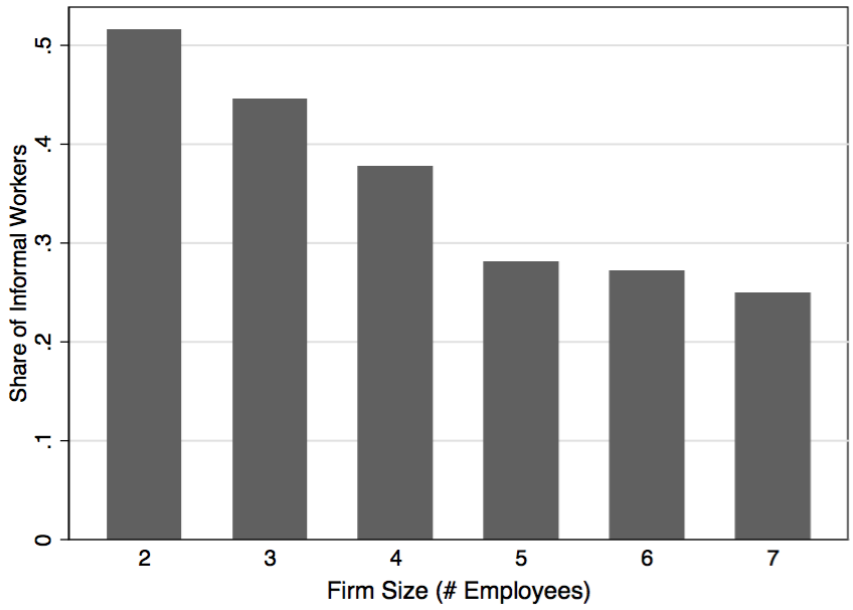
Source: Ulyssea (2018)

Margins of informality

Both margins of informality decline with firm size. Evidence from Brazil:



(a) Panel A: Extensive margin



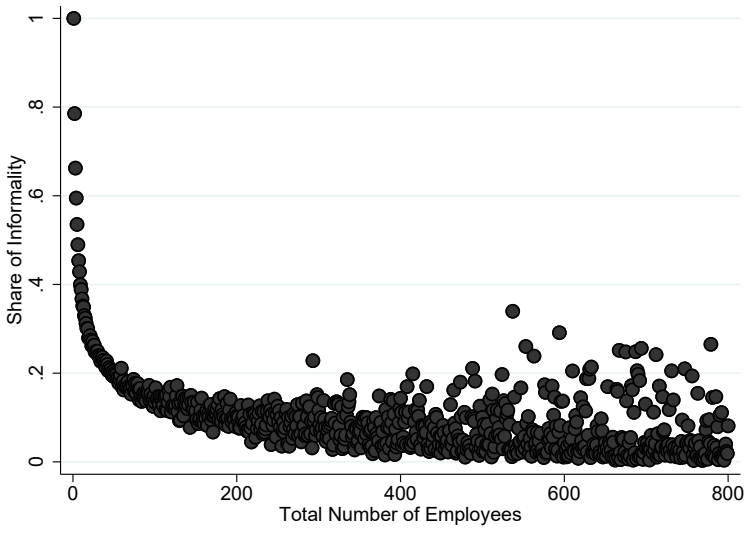
(b) Panel B: Intensive margin

Source: Ulyssea (2018)

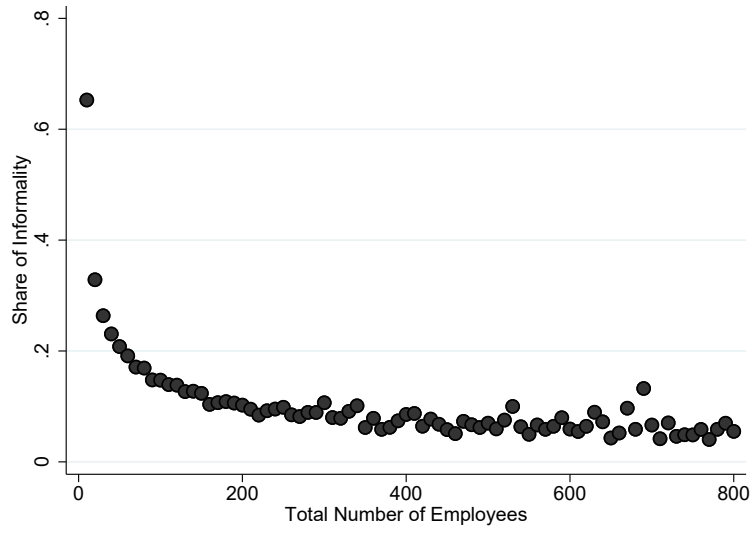
Margins of informality

Even better evidence on the intensive margin (also from Brazil):

(a) % Informal and Size



(b) % Informal and Size (bin width = 10)

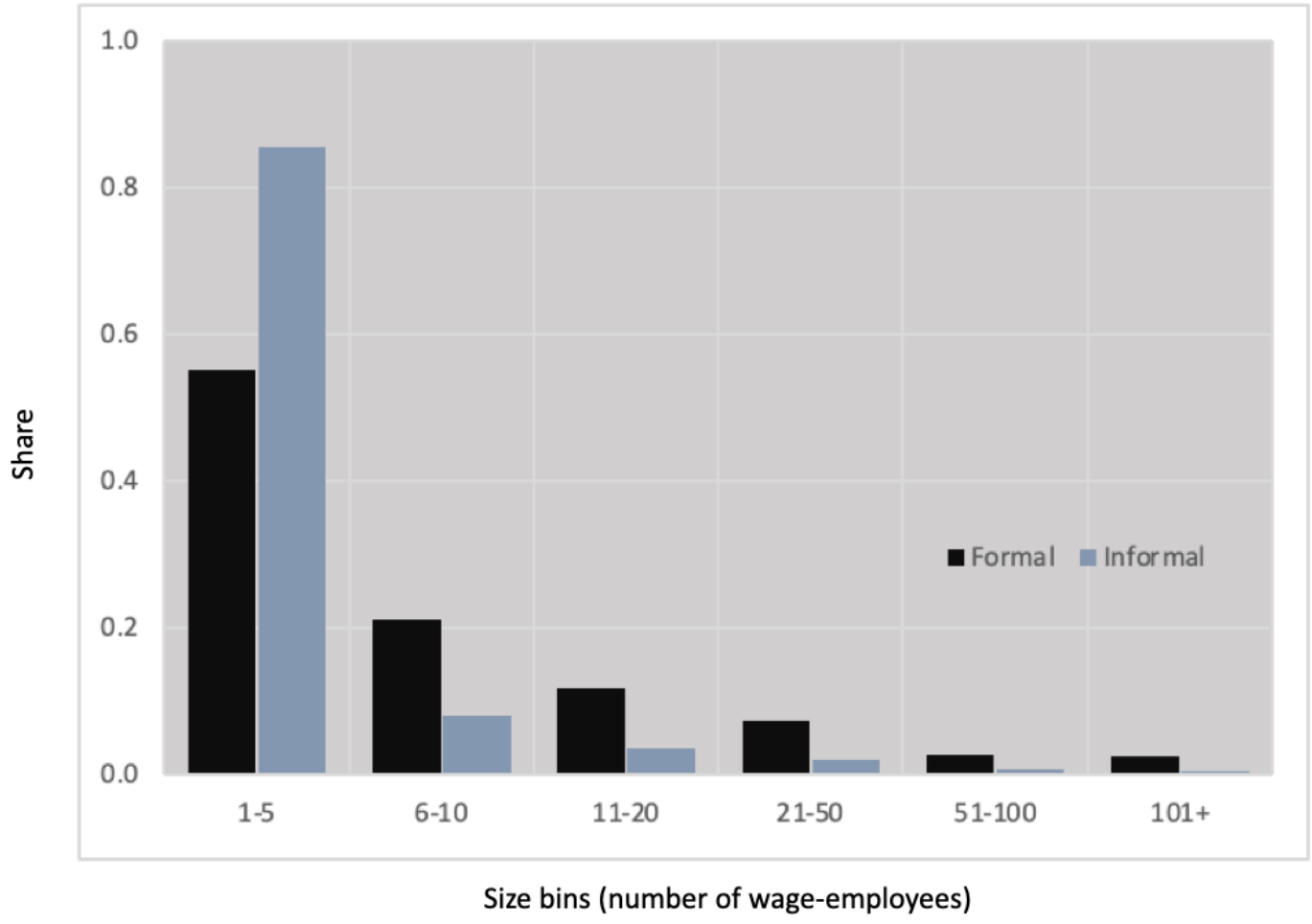


Notes. The figure plots the average share of informality by firm size of plants caught with infraction between 1997 and 2010. Some establishments are audited more than once in different years. The figure contains information only for the first time that a plant was caught with an infraction. Panel (a) displays the average share of informality for firms with different sizes. Panel (b) aggregates observations in bins and displays the average share of informality for each bin.

Source: Brotherhood, Da Mata, Guner, Kircher, and Santos (2023)

No missing middle in firm size distributions (but lots of skewness!)

See Hsieh and Olken (2014)! In **Mexico**:



Source: Eslava et al. (2025)

Outline

Simple framework (1/3)

For now, we will focus on the extensive margin only. Firms' profit functions:

$$\begin{aligned} \pi_f(\theta) &= (1-\tau_y)\underbrace{\theta F(k,\ell)}_{\equiv y(\theta)} - (1+\tau_w)w_f\ell - r_f k - \bar{c}_f \\ \pi_i(\theta) &= (1-p(y(\theta)))\,\theta F(k,\ell) - w_i\ell - r_i k \end{aligned}$$

where

- θ: firm's productivity
- τ_y, τ_w: revenue and payroll taxes
- $F(\cdot)$: production function, increasing and concave in ℓ and k
- $\bar{c}_f$: per-period fixed cost of operation that formal firms must pay
- $p(y(\theta))$: "cost of informality", increasing and convex in firm's output

Simple framework (2/3)

Infinite horizon, discount rate $= 1$, no uncertainty but firms face an exogenous death shock, δ_s, $s = i, f$.

Value functions:

$$V_f(\theta) = \frac{\theta F(k,\ell)}{\delta_f} - \left(\frac{w_f \ell + r_f k}{\delta_f}\right) - \underbrace{\left(\frac{\tau_y \theta F(k,\ell) + \tau_w w_f \ell + \bar{c}_f}{\delta_f}\right)}_{\text{Costs of remaining formal (A)}}$$

$$V_i(\theta) = \frac{\theta F(k,\ell)}{\delta_i} - \left(\frac{w_i \ell + r_i k}{\delta_i}\right) - \underbrace{\frac{p(y(\theta))\theta F(k,\ell)}{\delta_i}}_{\text{Costs of remaining informal (B)}}$$

Firms decide to formalise if

$$V_f(\theta) - c_f^e \geq V_i(\theta)$$

where c_f^e denotes entry costs.

Simple framework (3/3)

Policy makers can thus incentivise firms to formalise by:

(i) Reducing the costs of formality: costs of entering the formal sector (c_f^e) + costs of remaining formal (A).

(ii) Increasing the benefits of formality: e.g. increasing access to capital (a lower r_f).

(iii) Increasing the costs of informality (B): e.g. higher enforcement of the existing laws and regulations.

Empirical evidence (1/3)

Papers that seek to identify the causal effect of potential determinants of firms' formalisation estimate variations of the following:

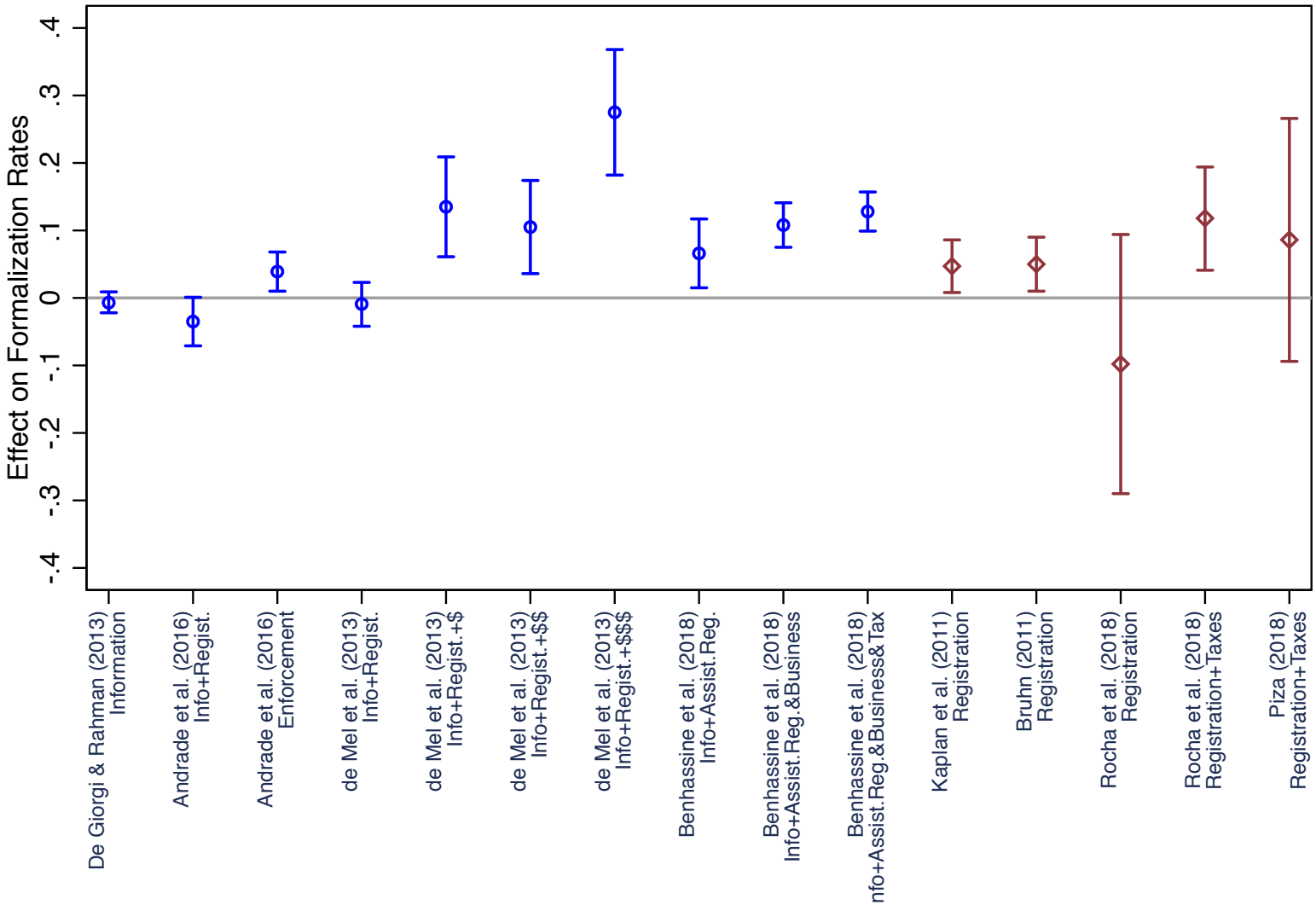
$$y_{it} = \alpha + \beta Treatment_{it} + \gamma X_{it} + \epsilon_i t$$

Unit of analysis (i): typically firm or entrepreneur, but can be a more aggregate unit, such as municipality, commuting zone or industry.

y_{it}: formality dummy or share of formal firms in a given municipality or industry.

$Treatment_{it}$: dummy that equals one if offered a formalisation treatment.

Empirical evidence (2/3)



Notes: Blue circles are results from experimental studies; maroon diamonds are results from natural experiments. ITT estimates are shown for the experimental papers.

Empirical evidence (3/3)

High registration costs are often emphasized as a major constraint to firm creation and formalization but results are quite limited.

Largest formalization effects come from interventions that reduce the ongoing costs of formality or increase its benefits.

- See, in particular, De Mel et al. (2013) and Rocha et al. (2018).

Few exceptions investigate the effects of higher enforcement:

- Andrade et al. (2014): randomly assigning municipal inspectors to firms leads to an increase of 21-27 p.p. on firms' registration.
- Samaniego and Bujanda (2024): inspections lead to 15% lower formal employment despite within-firm formalization.

Potential interpretation using the model in Ulyssea (2018)

Today we will discuss a simpler version of the model that has homogenous labour. Product and labor markets are competitive.

Firms are indexed by their productivity, θ.

The production function:

$$y(\theta, \ell) = \theta q(\ell), \; q'(\cdot) > 0, q''(\cdot) < 0$$

Informal firms profit function:

$$\Pi_i(\theta, w) = \max_{\ell} \{\theta q(\ell) - \tau_i(\ell) w\}$$

where $\tau_i', \tau_i'' > 0$.

Hiring costs for formal firms:

- Informal workers: $\tau_{fi}(\ell)\, w$, where $\tau'_{fi}, \tau''_{fi} > 0$.
- Formal workers: $(1+\tau_w)\, w\ell$.
- $\tilde{\ell}$ is s.t. $\tau'_{fi}(\tilde{\ell}) = (1+\tau_w)$. For $\ell > \tilde{\ell}$, hire only formal workers at the margin.

Profit function:

$$\Pi_f(\theta, w) = \max_{\ell} \{(1-\tau_y)\, \theta q(\ell) - C(\ell)\}$$

where

$$C(\ell) = \begin{cases} \tau_{fi}(\ell)\, w, & \ell \leq \tilde{\ell} \\ \tau_{fi}(\tilde{\ell}) w + (1+\tau_w)\, w\left(\ell - \tilde{\ell}\right), & \ell > \tilde{\ell} \end{cases}$$

Entry

- Mass of potential entrants of size M, observe $\nu \sim G$, i.i.d.
- If entry occurs: pay E_s, $s = i, f$ and draw θ from $F(\theta|\nu)$.
- θ remains constant after entry. Exit probability: κ_s, $s = i, f$.
- Value function: $V_s(\theta, w) = \max\left\{0, \frac{\pi_s(\theta,w)}{\kappa_s}\right\}$, $s = i, f$.
- Expected value of entry: $V_s^e(\nu, w) = \int V_s(\theta, w)\, dF(\theta|\nu)$, $s = i, f$.
- If entry is positive in both sectors:

$$\begin{aligned} V_i^e(\overline{\nu}_i, w) &= E_i \\ V_f^e(\overline{\nu}_f, w) &= V_i^e(\overline{\nu}_f, w) + (E_f - E_i) \end{aligned}$$

Data and Estimation

Data sources:

1. ECINF (*Pesquisa de Economia Informal Urbana*): Matched employer-employee data; representative for firms with up to 5 employees.

2. RAIS: Matched employer-employee admin. data from the Ministry of Labor; universe of formal firms and workers.

3. National Household survey (PNAD): repeated cross section, representative at the national level.

I estimate the model using a two-stage simulated method of moments.

Distribution of informal firms' types in the data

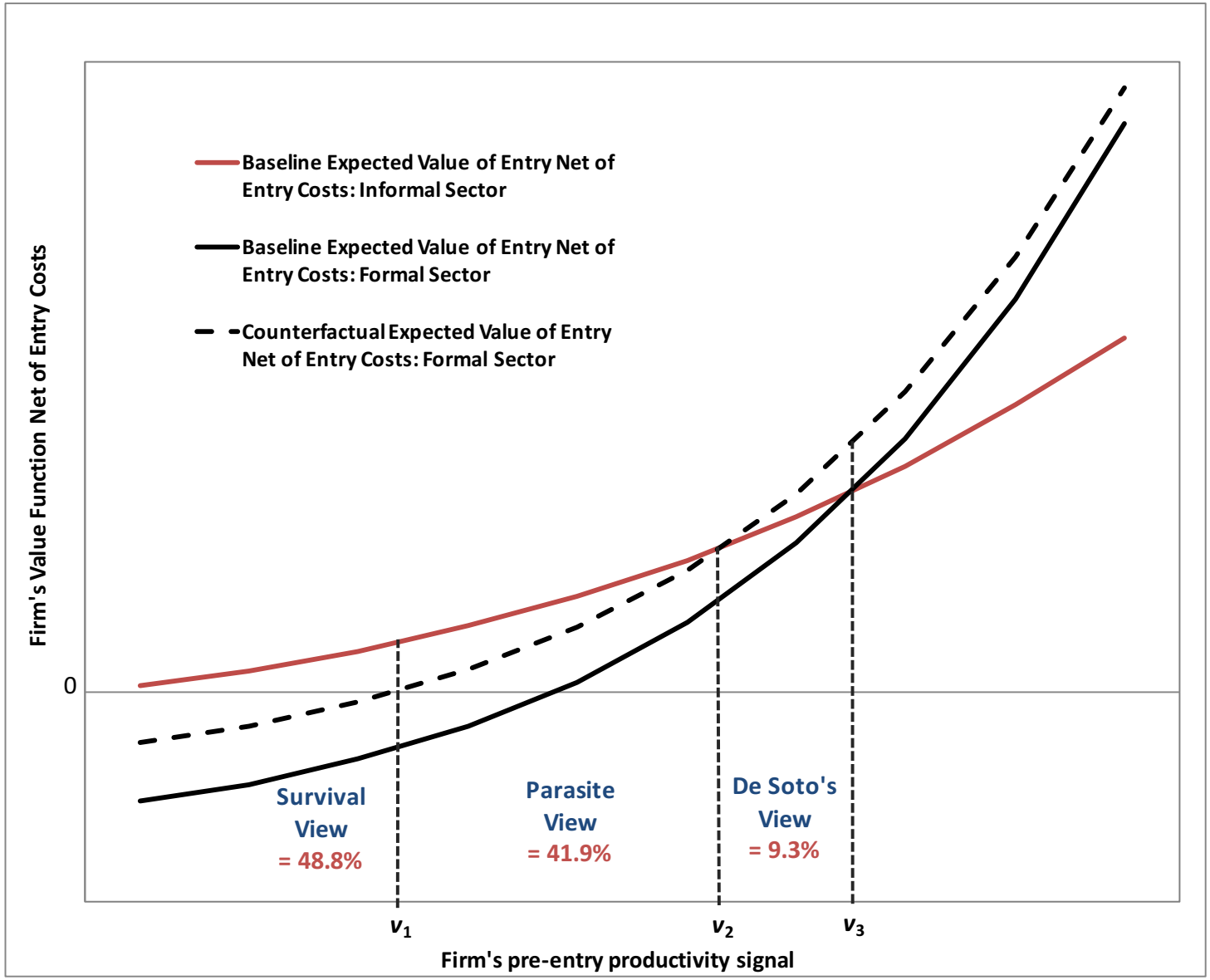


FIGURE 6. THE DISTRIBUTION OF INFORMAL FIRMS TYPES IN THE DATA

Trade and Informality

- Strong effects on both firm and labor informality, but with two opposing forces:
  i. The least productive (informal) firms exit → extensive margin
  ii. Formal firms cut costs by hiring informal workers → intensive margin

- Greater access to foreign markets can **reduce** firm informality

See McCaig and Pavcnik (2018), Paz (2014), Dix-Carneiro and Kovak (2019), Cruces et al. (2018), and Ponczek and Ulyssea (2022), Cisneros-Acevedo (2022)

Outline

The role of public policies

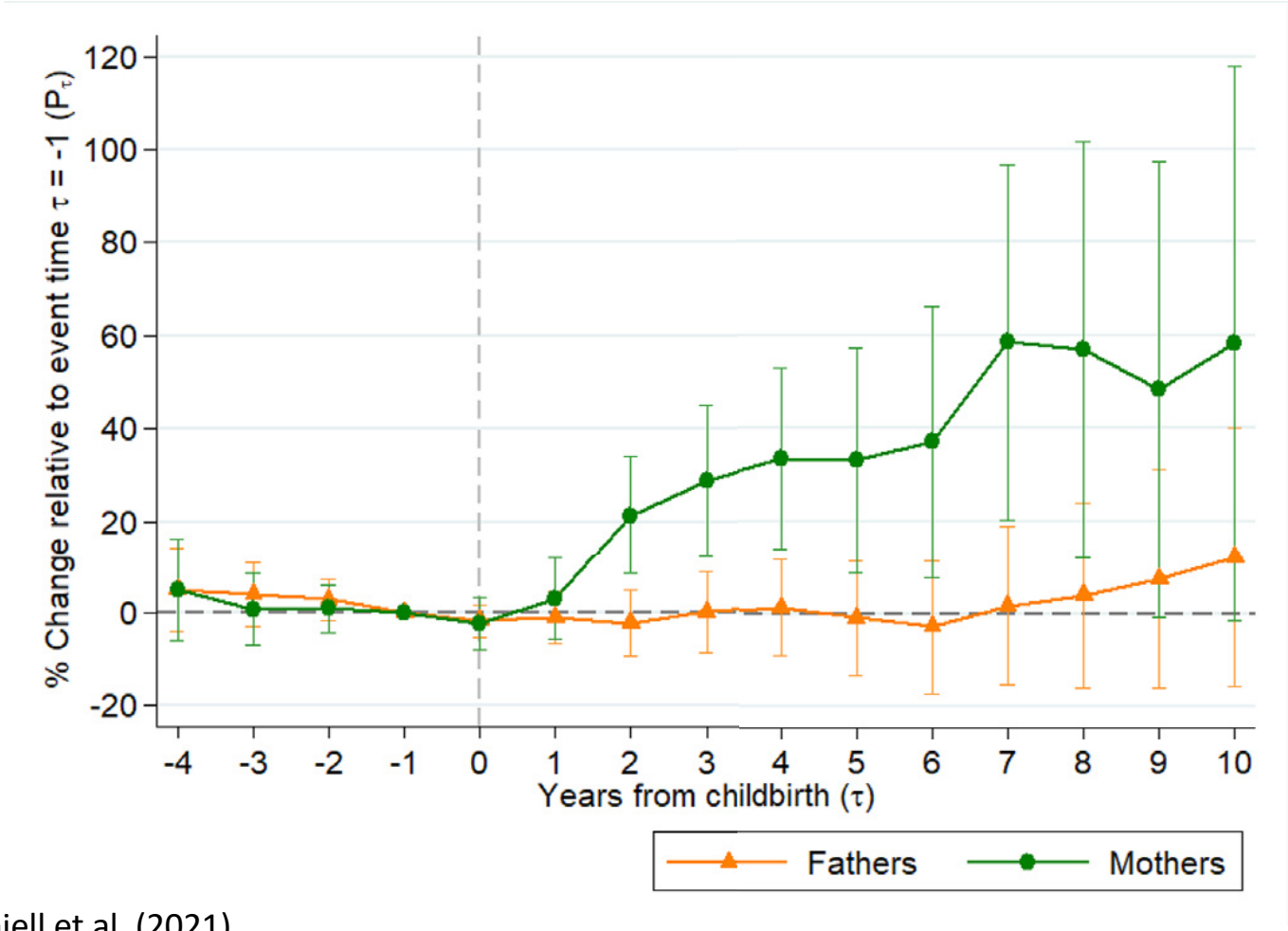
Concern: welfare programs could shift labor supply from the formal to the informal sector. True for both means-tested and universal programs.

Evidence:

- Universal health coverage (Mexico and Colombia) led to small increases in informal employment. Evidence that the value of these benefits is low.
- Cash transfer programs:
  - Evidence from Brazil, Argentina, and Uruguay indicates that both informality and non-employment increase (not much).
  - New: no effect on men but positive effect on women's formal labor supply (Leite Mariante, 2024).
  - Aggregate effects from Bolsa Família (PBF) led to an increase in local formal employment in Brazil (Gerard et al., 2023).
- ALMP: can improve first matches of young workers and improve mid-run outcomes

Informality and the motherhood penalty (1/2)

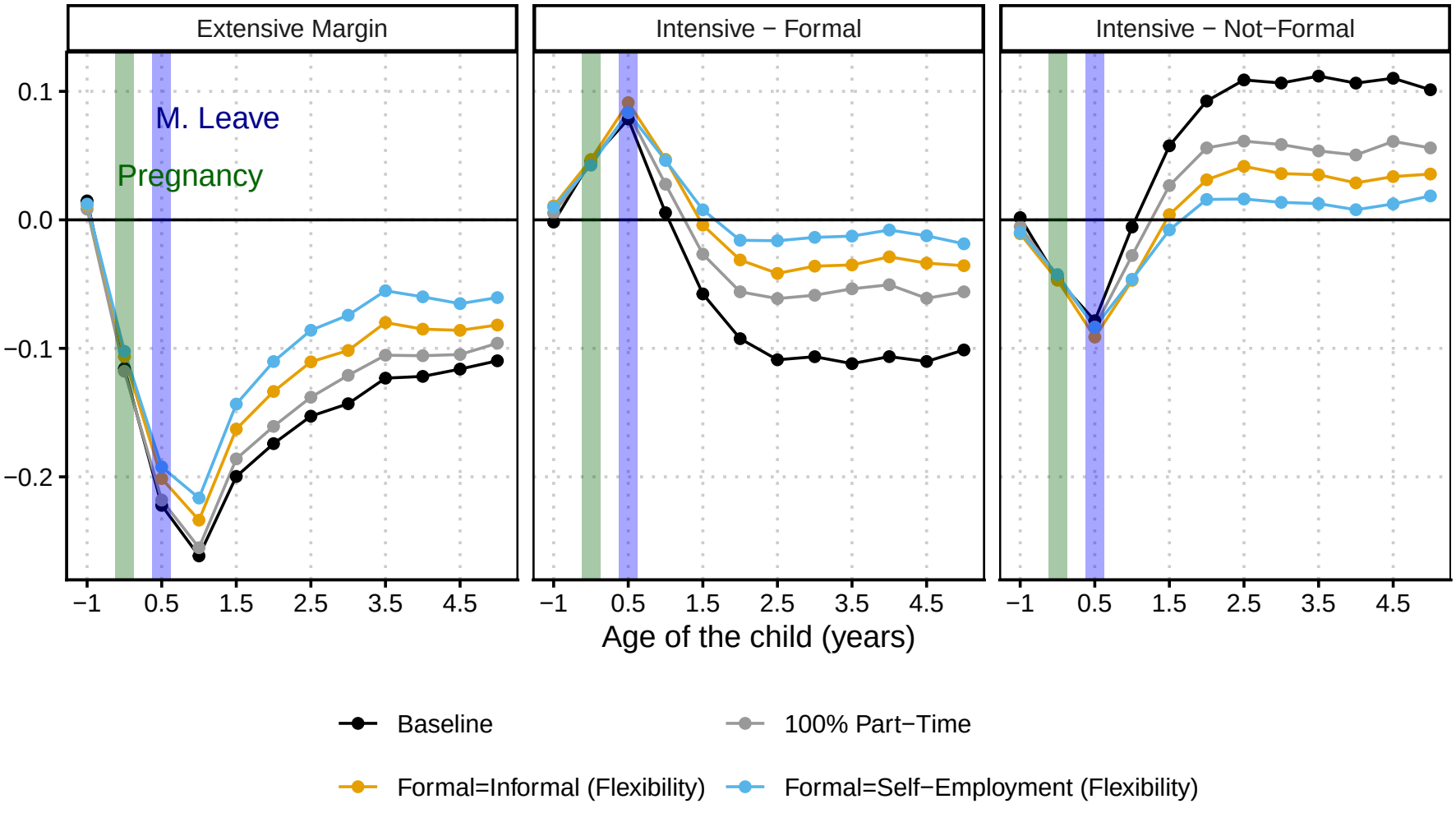
- Rigidity in labor regulations could also induce shifts to the informal sector. Evidence from Chile:



Source: Berniell et al. (2021)

Flexibility is key

Model counterfactuals from Andrade et al. (2026):



Outline

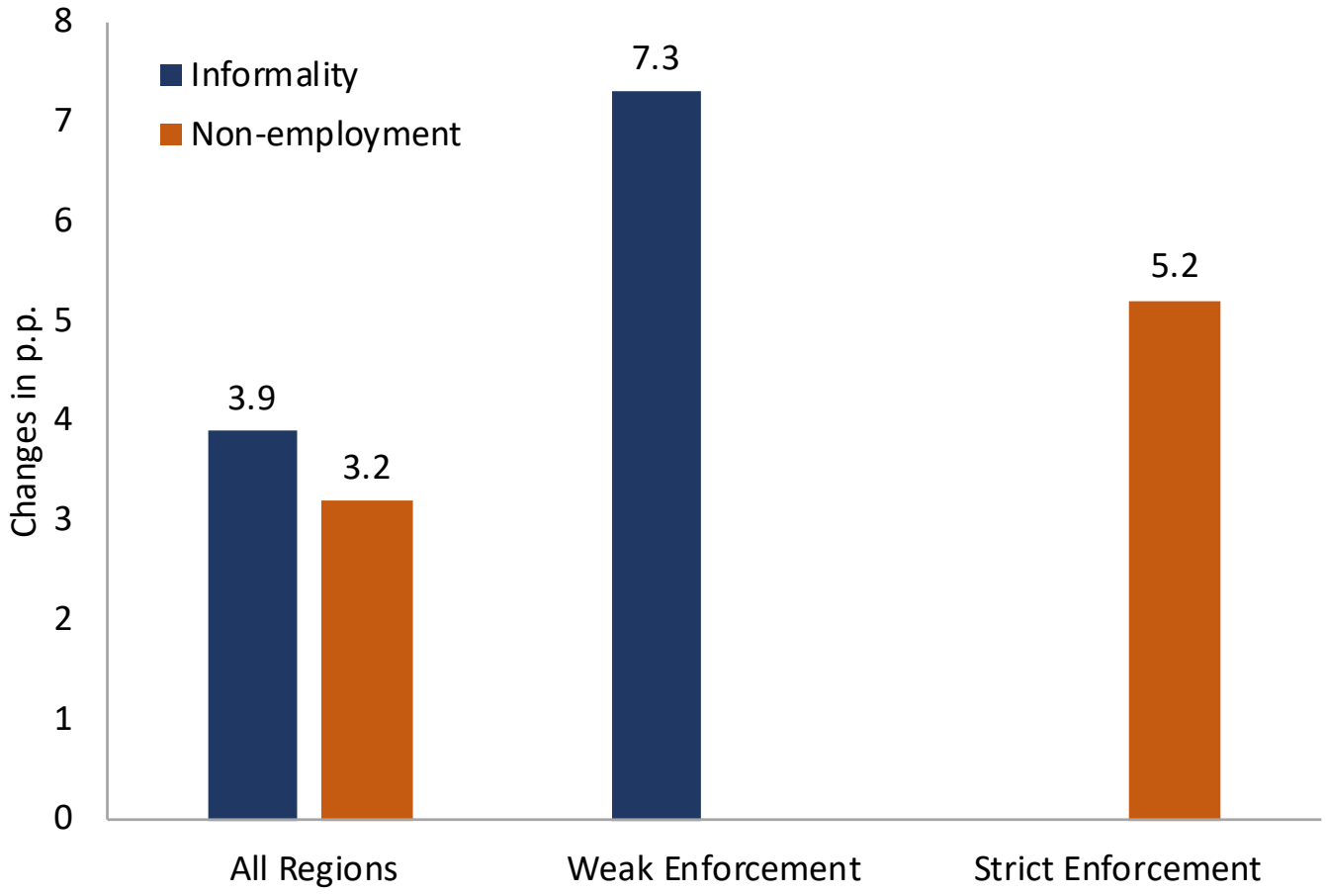
Firms

- The results in the literature indicate that formalization has no effects on different measures of firm performance (sales, profits, size,…)
- Consistently, firms that formalize do not seem to change any meaningful behavior (access to finance, formal banking, investments,…).
- Whenever there are positive average effects, these are driven by few firms experiencing substantial growth.
- This lack of effect is consistent with the argument that the perceived benefits of formalization are very low for most small-scale entrepreneurs.
- It might be the case that the positive effects of formality take long to appear. Even then, these results are not encouraging, as the costs kick in upon formalization.

E.g.: De Mel, McKenzie & Woodruff (2013)

Trade and Informality reloaded

Higher informality is not necessarily bad; it can help reducing employment losses. Example from Brazil (Ponczek and Ulyssea, 2022):



Trade and Informality reloaded

But what about GE effects on welfare (or real income)? Need a structural model!

Our results suggest that informality is a "employment buffer" but not a "welfare buffer" (Dix-Carneiro, Goldberg, Meghir & Ulyssea, 2026)

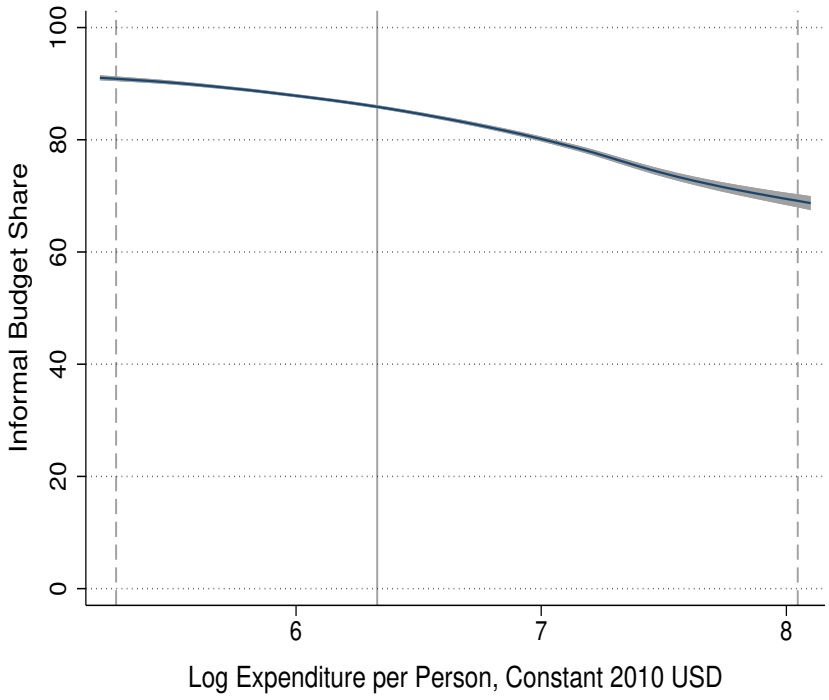
Taxation and redistribution

High informality levels change the redistributive properties of taxation.

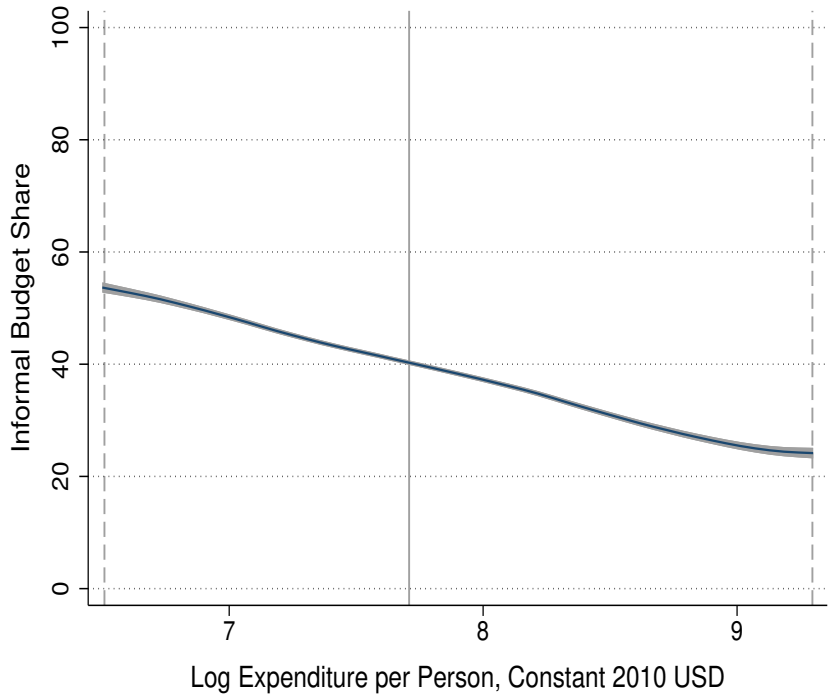
If the expenditure share of informal goods systematically varies with income, the presence of informal sectors will change the incidence of consumption taxes.

Informality Engel curves (Bachas et al, 2023):

(a) Rwanda

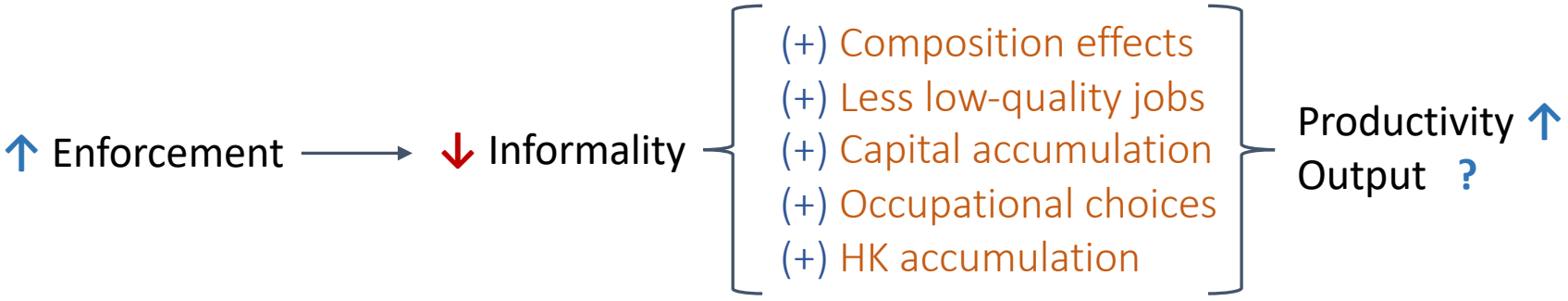


(b) Mexico



Aggregate productivity, output, and growth

The aggregate effects of reducing informality crucially depend on the policy instrument used to achieve it. I will focus on enforcement and entry costs.

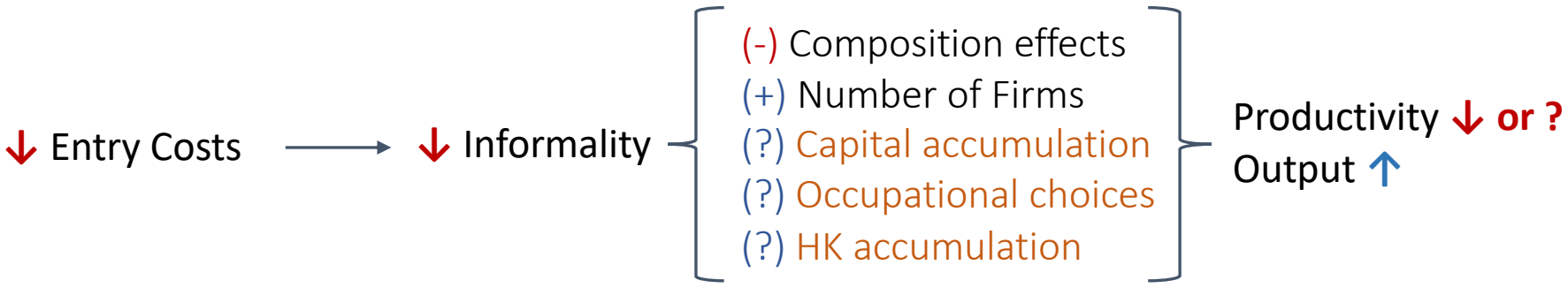


Greater enforcement can have adverse effects on welfare, and even output, due to higher unemployment/displacement effects. Mixed results in the literature.

Key dimension: how much employment reallocation there can be from low-productivity informal firms to more productive formal firms.

Open question: transition dynamics!

Aggregate productivity, output, and growth



Open questions:

- What is the role of other (formal sector) frictions in shaping these effects?
- Even without the positive composition effects, can we observe positive effects on occupational choices, K and HK accumulation?

Taxes: reductions in the tax burden have limited formalization effects

Outline

Urban population in developing countries has grown at staggering speed in the past 45 years:

- High income countries: 1.5 fold
- Upper- Lower-middle income: 3.4-3.9 fold
- Low-income: 5.5 fold

40-45% of the population already lives in cities (population of at least 50,000).

Urban population in developing countries is projected to grow by 64.7% until 2050 (UNCTAD, 2021).

$\Rightarrow$ Increasingly, the loci of development will be cities.

Intrinsically connected to rural-urban migration: major contributor of urban growth (Jedwab et al., 2017) + will increase with climate change (Rigaud et al., 2018).

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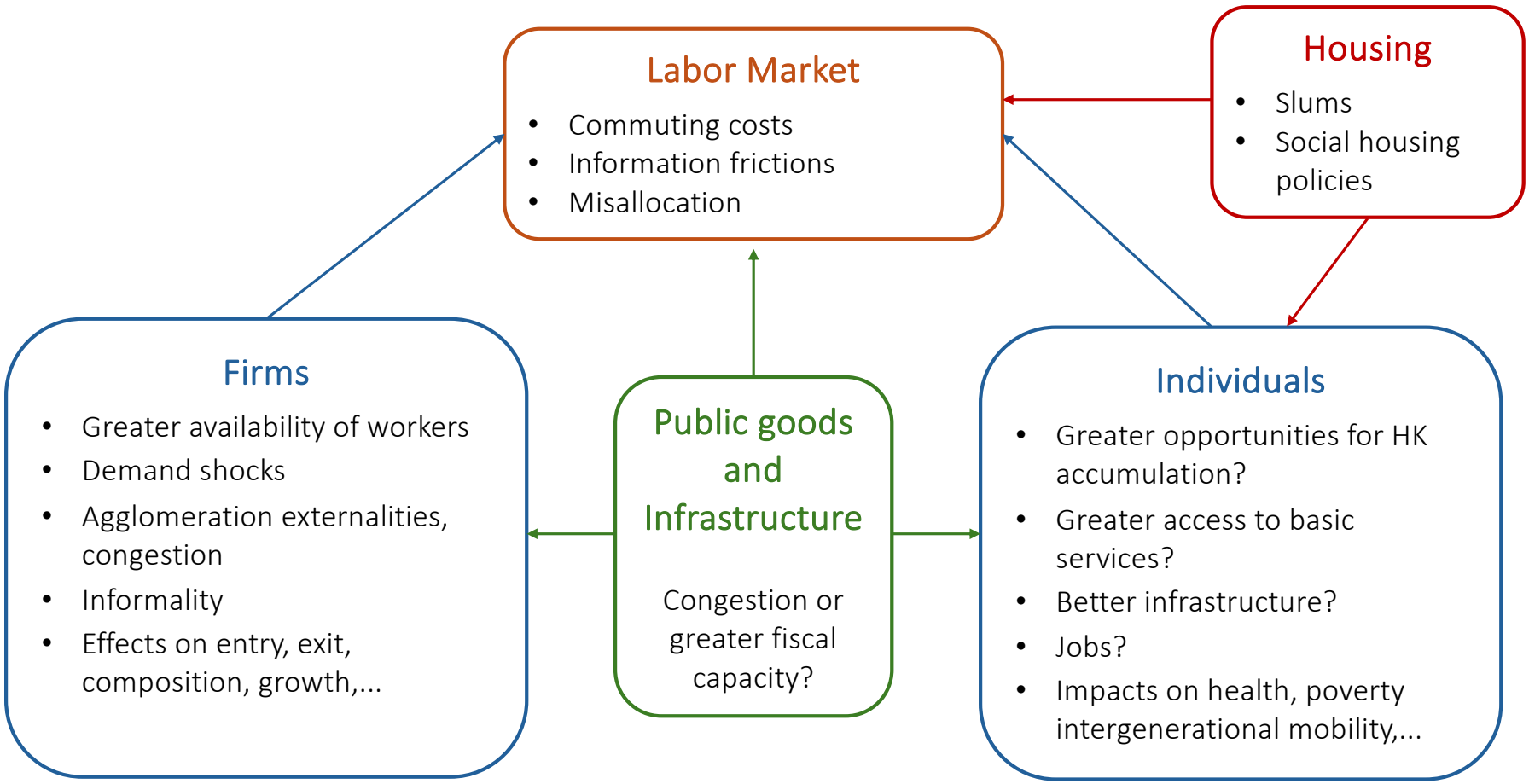
Key dimensions associated to urbanization (non-exhaustive)



Key question: Can developing country cities generate enough good jobs to accommodate this fast growing workforce?

Enough reasons for pessimism:

- Traditional "Harris-Todaro-Fields" view predicts that rural-urban migration leads to higher unemployment and informality in urban destinations.
- These predictions are supported by empirical evidence on the short-run effects of rural-urban migration, e.g.:
  - El Badaoui et al. (2017) in Thailand
  - Kleemans and Magruder (2018) in Indonesia
  - Corbi, Ferraz & Narita (2024) in Brazil
- Consistent with ample evidence on frictions facing firms and workers, low firm growth, high informality and unemployment.

Imbert and Ulyssea (2026):

- Shift-share IV design to identify the long-run causal effects of immigration at destination in Brazil.

- Over a decade, cities that receive more migrants experience:
  - (i) Formalization $\rightarrow$ shift from informal to formal jobs; no effects on non-employment; and small reduction in wages.
  - (ii) Formal firms: $\uparrow$ formal firms, $\uparrow$jobs, $\uparrow$entry and $\uparrow$exit.
  - (iii) Results are weaker in places with higher formal wage rigidity.
  - (iv) Short-run (y-o-y) specification: migration $\Rightarrow \uparrow$ informality.

- Develop and estimate a model of firm dynamics and informality:
  - (i) Transition dynamics with sluggish formal wage adjustment: $\uparrow$ informality in the short run following a migration shock.
  - (ii) Informality initially absorbs the growing labor force, and serves as "stepping-stone"; but reduces the dividends from immigration.

However...

Firm composition shifts towards:

- Retail, services and construction, and away from manufacturing (similar effects on jobs).
- Small firms $\rightarrow \uparrow\uparrow$ share of firms ≤ 5 employees.
- Mid-bottom of the productivity distribution; relative decline in the share of top-productivity firms.

Final Remarks

- There has been substantial progress in understanding the determinants of firms' choices regarding informality. Many interesting open questions:
  - (i) How much employment reallocation there can be from informal firms to more productive formal ones? How long (and painful) is this process?
  - (ii) Even if reducing informality is growth-inducing in the long-run, is it politically feasible to do it?
  - (iii) Can informality be a stepping-stone for entrepreneurs with high-growth potential but who might be constrained by other frictions?

- Gaps are arguably wider on workers' side:
  - (i) What are the determinants of workers' choice/allocation between formal and informal jobs over their life cycle?
  - (ii) How much do workers value the greater job security provided by formal employment relative to informal jobs?
  - (iii) Do informal jobs represent a stepping-stone for younger workers, or is there an "informality trap"?

- Interplay between structural transformation and urban informality still understudied!