# Wage employment, unemployment and self-employment across countries

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# The distribution of employment status across countries

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1. **documents** relationships between self-employment, unemployment and income per capita
2. develops a **model** for labor markets with a lot of self-employment
3. **quantitatively studies determinants** of self-employment and unemployment.

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   1.1 Higher self-employment in poorer countries.
   A lot of this is low-productivity own-account work.
   1.2 Higher unemployment relative to wage employment ("*UN* ratio") in poorer countries.
   1.3 Higher self-employment where *UN* ratio is high.
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3. **quantitatively studies determinants** of self-employment and unemployment.
   Labor market frictions

   3.1 can account for a very large fraction of the variation in not only unemployment but also self-employment across countries, and

   3.2 affect aggregate output via the quality of own-account workers.

# Self-employment, unemployment and income per capita: Evidence from 150 censuses

- IPUMS International provides harmonized census data for 60+ countries
- covers 1960-2011
- Censuses typically about 10 years apart
- allows computing unemployment, employment and self-employment by urban/rural, education, age...
- sample used: urban, age over 16, country population $> 1M$
- ⇒ main sample: 137 censuses from 55 countries
- comparability code (3 tiers)

# The classification of employment status

EMPSTAT:

— Inactive

— Unemployed

— Employed

CLASSWK:

- Self-employed
  - Own-account worker
  - Employer
- Wage/salary worker (employee)
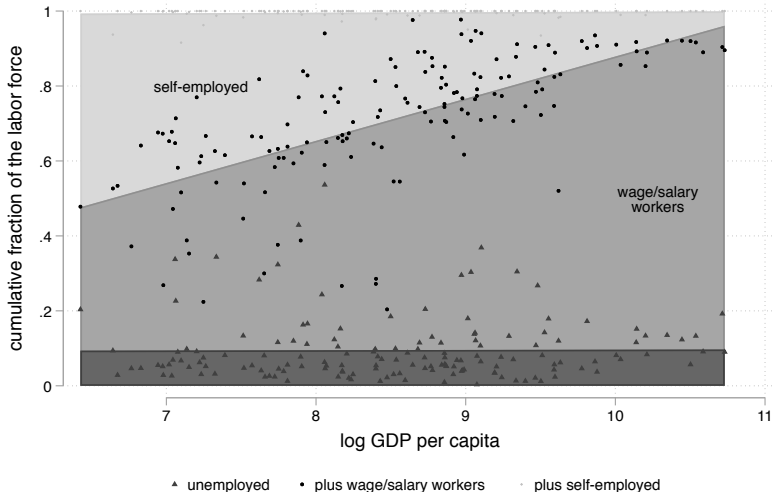- Unpaid
- Other

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        ○ Unpaid

        ○ Other

## Labor force composition and GDP per capita



Data: IPUMS International, 196 observations, 64 countries, urban areas, 1960-2011. PWT.

non-urban

## Labor force composition and GDP per capita

|  | self-employment rate | fraction own-account workers | fraction employers | fraction wage/salary workers |
|---|---|---|---|---|
| $\ln(Y/L)$ | -0.132*** | -0.143*** | 0.012*** | 0.138*** |
|  | (0.017) | (0.020) | (0.003) | (0.017) |
| $R^2$ | 0.507 | 0.512 | 0.236 | 0.543 |
| observations | 150 | 140 | 140 | 150 |
| countries | 58 | 53 | 53 | 58 |

Notes: Data on urban areas. Standard errors in parentheses. Between effects regressions. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

# The distribution of employment status across countries

Every time GDP per capita doubles,

— the self-employment rate declines by 9 percentage points,

— the wage employment rate increases by 9 percentage points.

Robust:

— similar for entire country

— for only top tier data

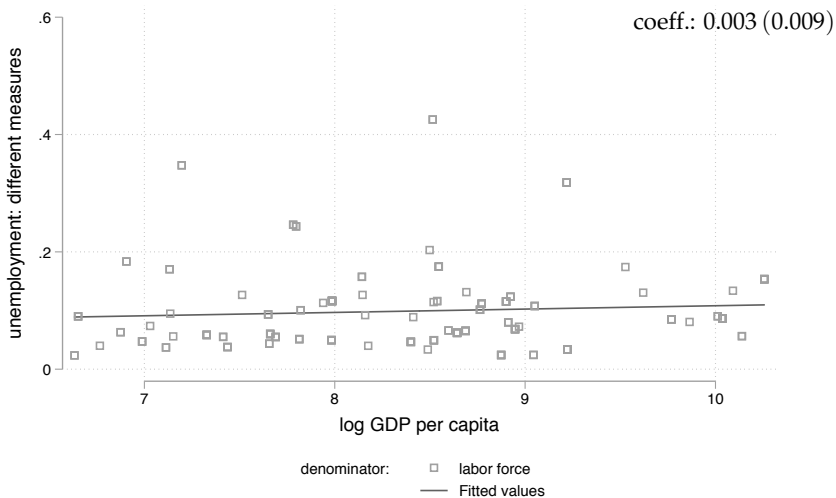## The distribution of employment status across countries

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# Unemployment and GDP per capita



coeff.: 0.003 (0.009)

y-axis: unemployment: different measures

x-axis: log GDP per capita

denominator: □ labor force
—— Fitted values

## Measuring unemployment

$$u = \frac{U}{L} = \frac{U}{U + N + SE}$$

Data:

– $U/L$ similar across countries.

– Rich countries: high $N$, low $SE$

– Poor countries: high $SE$, low $N$

⇒ *unemployment/employment (UN) ratio* $\dfrac{U}{U + N}$ high in poor countries.
  Measures incidence of failed search.

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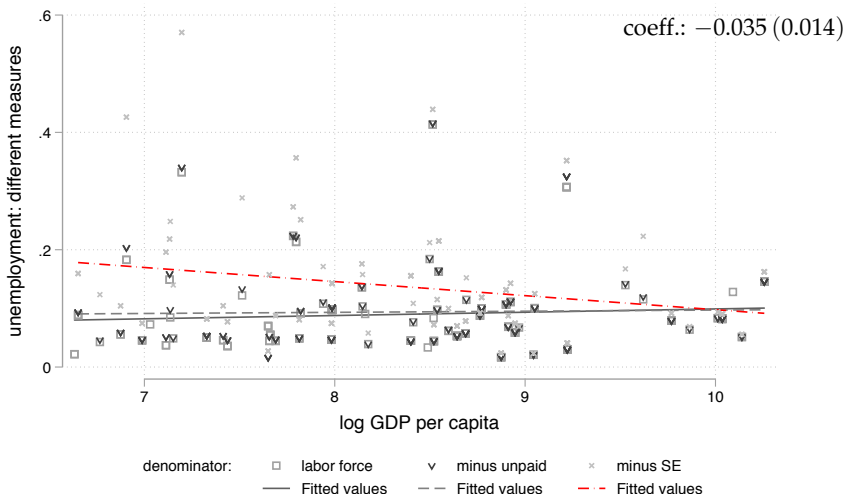
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# The *UN* ratio and GDP per capita



Notes: Data for urban areas.

## The distribution of employment status across countries

Every time GDP per capita doubles,

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— within age groups

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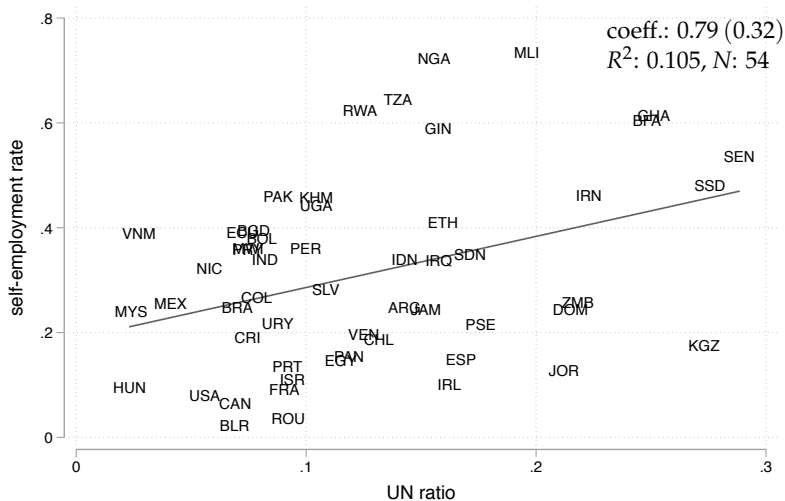


Data: IPUMS International, data for urban areas, 135 observations, 54 countries, 1960-2011, bottom 90% of *UN*. PWT.

▸ Appendix

# Self-employment and unemployment, controlling for income

| dependent variable: | self-employment rate | fraction own-account workers | fraction employers |
|---|---|---|---|
| *UN* ratio | 0.702** | 0.802** | 0.058 |
| | (0.285) | (0.312) | (0.051) |
| log GDP per capita | -0.122*** | -0.136*** | 0.012*** |
| | (0.018) | (0.020) | (0.003) |
| $R^2$ | 0.556 | 0.575 | 0.229 |
| observations | 136 | 126 | 126 |
| countries | 54 | 48 | 48 |

Notes: Standard errors in parentheses. Between effects regressions. Bottom 90% of *UN*. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

# The distribution of employment status across countries

Every time GDP per capita doubles,

1. the self-employment rate declines by 9 percentage points,
2. the wage employment rate increases by 9 percentage points,
3. the *UN* ratio decreases by 2.5 percentage points.

4. Self-employment rate rises by 0.5 percentage points as $U/(U+N)$ rises by 1 percentage point (at fixed GDP per capita).

Robustness:

  &minus; similar estimate for only top tier data

  &minus; 1.-3. also hold for entire country, 4. only significant in urban data

  &rArr; the SE-*UN* relationship is an urban phenomenon

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# Model

## Main model ingredients

— Builds upon Diamond-Mortensen-Pissarides.

— 4 states: employed, unemployed, self-employed, employer.

— The unemployed choose whether to
  ○ search for a job, or
  ○ start a firm, at a cost.
  ⇒ endogenous firm entry rate.

— Firms differ in productivity $z$.

— $z$ is revealed after entry. Once known, two options:
  ○ Become an employer, post vacancies to hire workers: $y = zn^{\gamma}$.
  ○ Become an own-account worker: $y = \zeta z$.
  ⇒ endogenous own-account/employer split.

## Equilibrium

Equilibrium $\theta, w$ pinned down by occupational choice and wage bargaining.

- **OC curve:**
  Value of search = value of entry: downward-sloping in $\theta, w$-space.
- **wage curve:** upward-sloping in $\theta, w$-space.

# Quantitative Results

## Quantitative exercises

1. Calibrate the model to eight countries spanning the distribution of income
2. Which factors drive cross-country differences?
3. The effect of labor market frictions

## Calibration strategy: targets

| parameter | | target |
|---|---|---|
| $k_v$ | vacancy posting cost | unemployment outflow rate |
| $A$ | matching fct. prodty | normalization |
| $\zeta$ | match destruction rate | unemployment rate |
| $k_f$ | entry cost | self-employment rate |
| $\zeta$ | rel. SE productivity | fraction own-account |
| $\lambda_f$ | firm exit rate | firm exit rate |
| $\sigma_z$ | productivity variance | share employment large firms |
| $\delta$ | probability casual work | rate of casual employment |
| $\eta$ | worker bargaining power | labor income share |
| $b$ | $u$ flow value | $b/w = 0.4$ |

# Calibration: target countries

| | $u$ (%) | $u$ outflow rate (%) | own-account workers (%) |
|---|---|---|---|
| Ethiopia | 23.7 | 4.4 | 28.8 |
| Indonesia | 5.8 | 9.1 | 31.1 |
| Mexico | 4.2 | 39.8 | 22.1 |
| Italy | 15.2 | 6.2 | 15.7 |
| France | 13.0 | 8.6 | 4.0 |
| Germany | 10.7 | 6.2 | 4.6 |
| Canada | 6.9 | 25.6 | 6.9 |
| US | 5.1 | 44.0 | 4.9 |
| average | 10.6 | 18.0 | 14.9 |

## Calibrated parameters: some highlights

|  | Ethiopia | USA | average |
|---|---|---|---|
| *Model moments:* | | | |
| Unemployment outflow rate | 0.044 | 0.453 | 0.180 |
| Unemployment rate | 0.237 | 0.051 | 0.106 |
| Self-employment rate | 0.348 | 0.098 | 0.193 |
| Fraction own-account workers | 0.288 | 0.050 | 0.149 |
| Share of employment firms with $n > 10$ | 0.089 | 0.848 | 0.740 |
| *Parameter values:* | | | |
| Vacancy posting cost $k_v$ | 69 | 12 | 45.4 |
| Job destruction rate $\xi$ (%) | 3.2 | 1.36 | 1.43 |
| Firm entry cost $k_f$ | 13.54 | 56 | 7.5 |
| Relative own-account productivity $\zeta$ | 0.519 | 0.657 | 0.605 |
| Productivity dispersion $\sigma_z$ | 0.0224 | 0.164 | 0.32 |

## What accounts for model fit?

Calibration: choose value for 8 parameters per country to match 8 targets.

### Which parameters matter for capturing cross-country variation?

Approach:

— Benchmark: calibration outcomes for each country using parameters from *average country calibration*.

— Then allow 1, 2 or 3 parameters to be country-specific, to achieve best calibration fit in each country.

— Measure
  ○ decline in the calibration loss function (total across countries)
  ○ decline in sum of squared deviation between model outcomes and data for $u, UN, SE$

# Labor market frictions central for explaining variation

|  | Overall fit | unemployment outflow rate | $u$ | UN ratio | SE rate |
|---|---|---|---|---|---|
| *One country-specific parameter:* | | | | | |
| $k_f$ | 0.173 | 0.099 | -0.075 | 0.143 | 0.701 |
| $k_v$ | 0.438 | 0.715 | 0.306 | 0.370 | 0.105 |
| $\eta$ | 0.118 | 0.209 | 0.213 | 0.117 | -0.141 |
| $b$ | 0.124 | 0.167 | 0.003 | -0.013 | 0.224 |
| $\xi$ | 0.190 | 0.021 | 0.284 | 0.413 | 0.883 |
| $\zeta$ | 0.138 | -0.017 | -0.113 | 0.003 | 0.915 |
| *Two country-specific parameters:* | | | | | |
| $k_v$, $\xi$ | 0.708 | 0.939 | 0.191 | 0.336 | 0.808 |
| *Three country-specific parameters:* | | | | | |
| $k_v$, $b$, $\xi$ | 0.915 | 0.987 | 0.984 | 0.988 | 0.890 |

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# Can the model account for the
# self-employment/unemployment relationship?



data coeff.: 0.79
model coeff.:
  0.88 (2 par.s)
  0.37 (3 par.s)
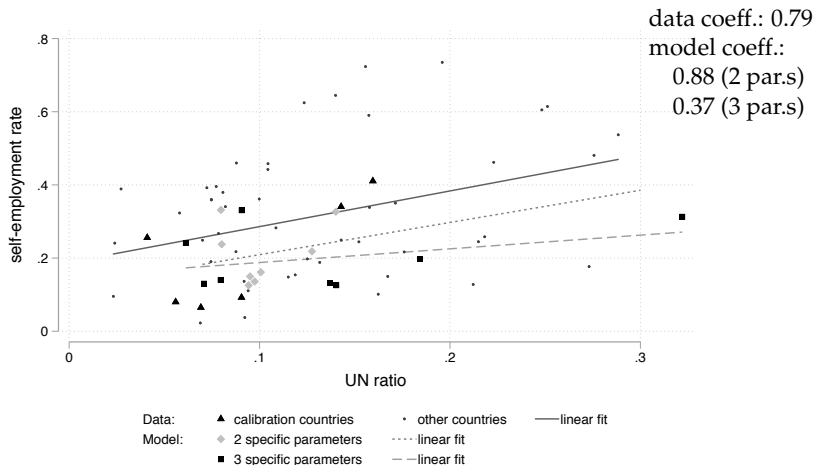
Parameters from the average economy calibration, except $k_v$ and $\xi$ (2 parameters),
plus $b$ (3 parameters)

# Summary of decomposition

1. Variation in labor market parameters ($k_v, \xi, b$) across countries is key for
   - overall fit
   - variation in unemployment
   - variation in self-employment
   - joint variation in unemployment and self-employment.
2. Other parameters ($k_f, \zeta$) fit variation in self-employment, but have counterfactual implications for unemployment.
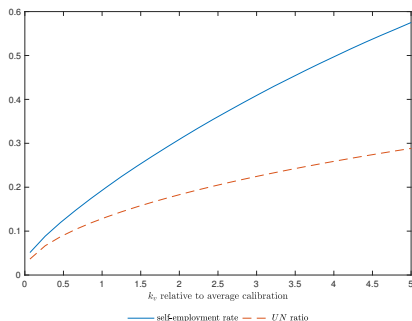
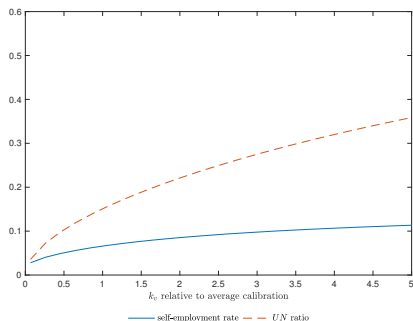## The effect of labor market frictions

Illustrate their effect on

—  labor market outcomes

—  output

for different settings.

# The effect of varying labor market frictions on unemployment and self-employment



(a) Low $k_f$ (from average country calibration): $k_v$ mostly affects SE



(b) High $k_f$ (from US calibration): $k_v$ mostly affects $UN$

Self-employment is an important margin for "escaping" frictions.

# The effect of labor market frictions on output

Experiment: reduce $k_v$ by half.

| | calibration to | | | |
| --- | --- | --- | --- | --- |
| % change in | average economy | avg economy, high $k_f$ | Ethiopia | US |
| output: | | | | |
|    aggregate output | 4.0 | 5.2 | 6.1 | 1.4 |
| counterfactual output: | | | | |
|    only $u$ changes | 2.9 | 5.1 | 0.6 | 1.7 |
|    only SE rate changes | 1.2 | 0.0 | 5.2 | -0.4 |

– High $k_f$: labor market frictions mostly affect output via $u$.
– Low $k_f$: $k_v$ affects output via occupational choice and the quality of entrepreneurs.

## Conclusion

1. Poor countries feature high unemployment and high self-employment.
2. An **extended DMP model** can serve to model poor country labor markets with high $u$ and SE.
3. The model suggests that **cross-country differences in labor market frictions** are the source not only for differences in unemployment, but also in self-employment.
4. **Labor market frictions**
   ○ strongly increase self-employment, and
   ○ can reduce output by encouraging low-productivity own-account work.

# Challenges and future directions

   — Worker and match heterogeneity

$\Rightarrow$ requires a decent-sized urban panel

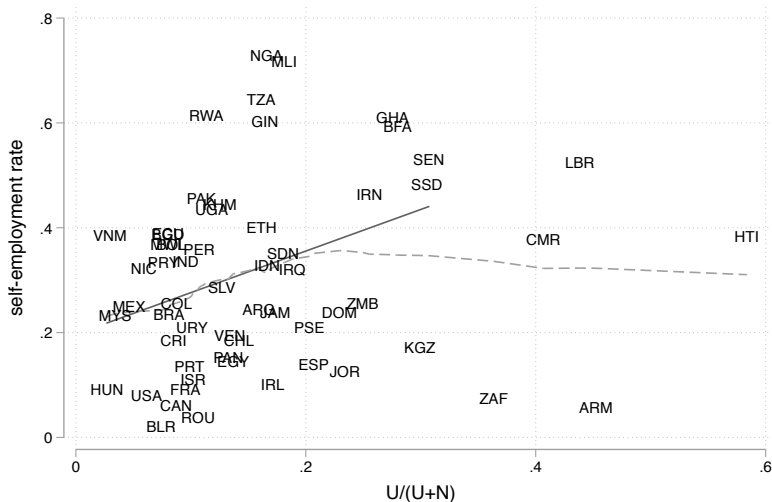   — Entry investment choice, frictions at entry

   — Life cycle

# Appendix

# Labor force composition and GDP per capita – countrywide



Data: IPUMS International, 214 observations, 68 countries, 1960-2011. PWT.

▸ back
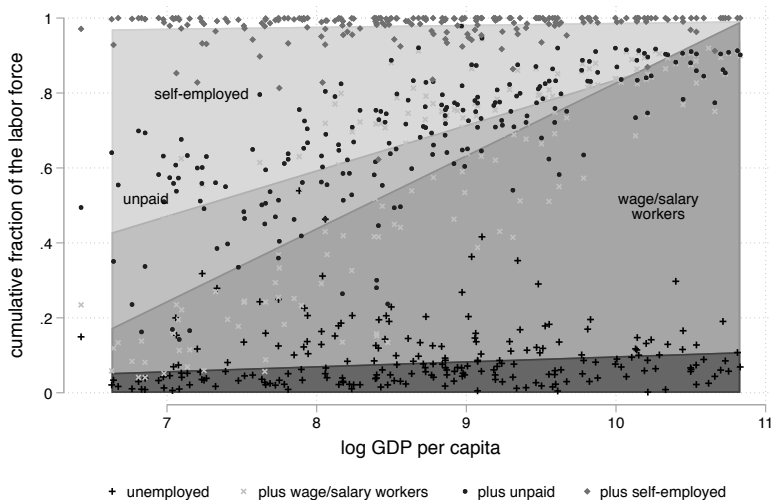
## Labor force composition and GDP per capita – urban, incl. unpaid
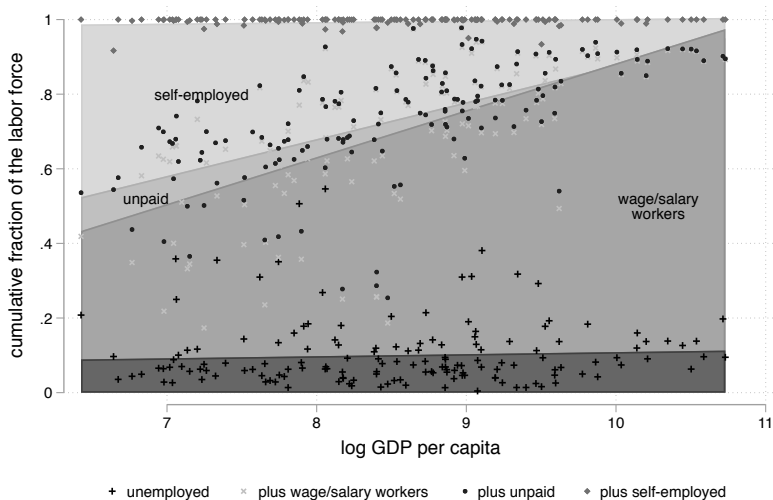
# Self-employment and unemployment



Data: IPUMS International, 59 countries, 1960-2011. PWT.

## Are self-employment and unemployment mutually exclusive?

- UEUS data: average weekly hours worked are 50 for SE, 1.3 for the unemployed.
- Donovan et al. (2018): SE→N transition rate flat in GDP per capita.
- Abebe et al. (2016) survey: Rare for job seekers to engage in self-employment.
- Franklin (2014): Job search is time consuming and costly. Often requires physical travel to read job ads and drop off applications.

- How is job search financed? With casual work. Readily available; does not require capital.
  Censuses capture casual work as a separate category.