Working and Saving Informally

The Link between Labor Market Informality and Financial Exclusion

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Introduction

Motivation

Developing countries are characterized by high informal employment and by low saving rates.

- High Informal employment:
  - In the Latin America and the Caribbean region (LAC), about half of labor force is informal.
  - Informality:
    - may introduce some useful flexibility
    - but lowers workers' protections, increases employment risks, hinders productivity growth.

  [World Bank, 2013; Perry et al., 2007; La Porta and Shleifer, 2014]

- Low Saving rate:
  - In LAC, savings are 17% of GDP compared to 30% in High-Income regions.
  - Low savings:
    - make individuals more vulnerable to shocks
    - but they are not simply due to many individuals "too poor to save".

  [Cavallo et al., 2016; Karlan and Morduch, 2010; Dupas and Robinson 2013; Bond et al. 2015.]

This Paper: Why

If both high levels of informality and low levels of saving are problems in themselves, this paper studies how they feed each other to generate even worse outcomes.

- Informality increases the need for precautionary savings because of higher employment risk;
- but the informality status also cause financial exclusion and sub-optimal saving levels;
- which in turn may induce workers to accept informal jobs with higher frequency because they cannot finance an effective labor market search.

This Paper: How

Since the deep linkages prevents from studying each problem in isolation, we develop a model that integrates all the crucial elements giving rise to both phenomena:

- Agents search on- and off-the-job for both formal and informal work;
- save through both formal financial institutions and informal ones.
- But informal workers face higher costs of accessing formal financial institutions (financial exclusion.)

To provide a quantitative assessment and evaluate policy interventions, we estimate the model on Colombia:

- It belongs to a region where both issues are particularly acute (Colombia is the fourth economy in LAC).
- It collects good quality data on both savings and labor market behavior (rare among developing countries).

Preview of Preliminary Results

1. The link labor market informality and financial exclusion is confirmed:
   - Our estimates confirm that informal workers face higher cost to access formal financial institutions.
   - Our equilibrium-based counterfactual show that granting full financial access to informal workers would increase savings by 3% a month and formal assets by 21%. It would also decrease inequality in assets and consumption.
2. Specific policy experiments for Colombia:
   - The recent fiscal reform that lowered the payroll contribution for formal workers may be responsible for increasing saving by 10% a year.
3. Methodological contributions:
   - First paper to successfully estimate a search model of the labor market with savings and borrowing where two assets are allowed.
     [Rendon (2006); Lentz (2009); Lise (2013); Garcia-Perez and Rendon (2020); Abrahams (2022]
   - First paper to successfully estimate a search model of the labor market with both informality and savings.
     [Bobba et al. 2022, 2021; Megir et al. 2015; Bosch and Esteban-Pretel (2012)]; Charlot et al. 2013; Albrecht et al 2009]

Model and Estimation

Workers' optimization problem

The model environment can be summarized in the following optimization problem:

$$\max_{c,\phi} E_0 \int_0^{\infty} e^{-(\rho+\theta)t} \left[\frac{c^{\delta}}{\delta} + \epsilon f \right]$$

subject to

$$da = \begin{cases} \left[(r_1\phi + r_2(1-\phi))(1+\nu l_{a^-})a + b - c - \frac{\psi^u}{2}\phi^2 \right] dt & \text{u} \\ \left[(r_1\phi + r_2(1-\phi))(1+\nu l_{a^-})a + w(f)(1-\tau f) - c - \frac{\psi^e(f)}{2}\phi^2 \right] dt & \text{f=1,0} \end{cases}$$

$$a \geq \underline{a}$$

$$dr_2 = \kappa(\bar{r}_2 - r_2)dt + \sigma dz \qquad r_2 \sim \mathcal{N}\left(\bar{r}_2, \frac{\sigma^2}{2\kappa}\right)$$

$$di = \begin{cases} dq_{\lambda_1^u} \mathbf{l}_1 w(1) + dq_{\lambda_0^u} \mathbf{l}_0 w(0) - b & u \\ dq_{\eta_1} b + dq_{\lambda_1^e} \mathbf{l}_1 w'(1) + dq_{\lambda_0^e} \mathbf{l}_0 w'(0) - w(1) & f = 1 \\ dq_{\eta_0} b + dq_{\lambda_1^e} \mathbf{l}_1 w'(1) + dq_{\lambda_0^e} \mathbf{l}_0 w'(0) - w(0) & f = 0 \end{cases}$$

where $w(f)$ are draws form $F(w|f)$ and f are a draws from a Bernoulli distribution with $p(f)$.

Equilibrium

Definition
Given the primitive parameters $\{\rho, \theta, \lambda^u, \lambda^e(1), \lambda^e(0), \eta(1), \eta(0), \psi^u, \psi^e(1), \psi^e(0), b\}$, the instantaneous utility function $u(c)$, the distributions of wage offers $F(w|1)$, $F(w|0)$, $p(1)$ the *steady state equilibrium* is a set of values $U(a, r_2)$ and $W(a, r_2, w, f)$ that satisfy the value functions equations, together with the invariant distributions of individuals across labor market states and the invariant distributions of total assets $\Lambda(a)$.

Note:

- Endogenous:
  - Hazard rates.
  - Accepted wages distributions.
  - Distribution over labor market states.
  - Assets distribution.
- Exogenous
  - Wage offers distributions.
  - Poisson rates (mobility parameters, effective discount rate).
  - Utility function and institutional parameters.

Data Description

Gran Encuesta Integrada de Hogares (GEIH): Monthly household survey focused on labor market outcomes

- Individual characteristics (gender, age, years of schooling).
- Labor market states (non-employment, formal and informal employment).
- On going durations in unemployment and employment states (in months).
- Labor income and weekly hours worked.

Encuesta Longitudinal Colombiana (ELCA): Longitudinal survey that follows $\approx$ 10000 households every three years (2010, 2013, and 2016).

- Savings behavior (average monthly savings, formal savings and informal savings.

Sample: male, between 25 and 55 years old, living in urban areas, with only secondary education completed ("unskilled")

Descriptive statistics on labor market outcomes

Descriptive Statistics on Labor Market Outcomes

	Formal Emp.	Informal Emp.	Unemp.
Labor Market States			
Proportion	0.395	0.527	0.077
Wages (hundred of US$ per month)			
Mean	3.284	2.429	–
Standard Deviation	1.395	1.126	–
Ratio of Average Wages	1.352	1.000	–
Ongoing Duration (months)			
Mean	67.535	89.507	4.034
Standard Deviation	78.689	100.191	6.858
Sample			
Number Obs.	31709	42307	6195

Descriptive statistics on saving behavior

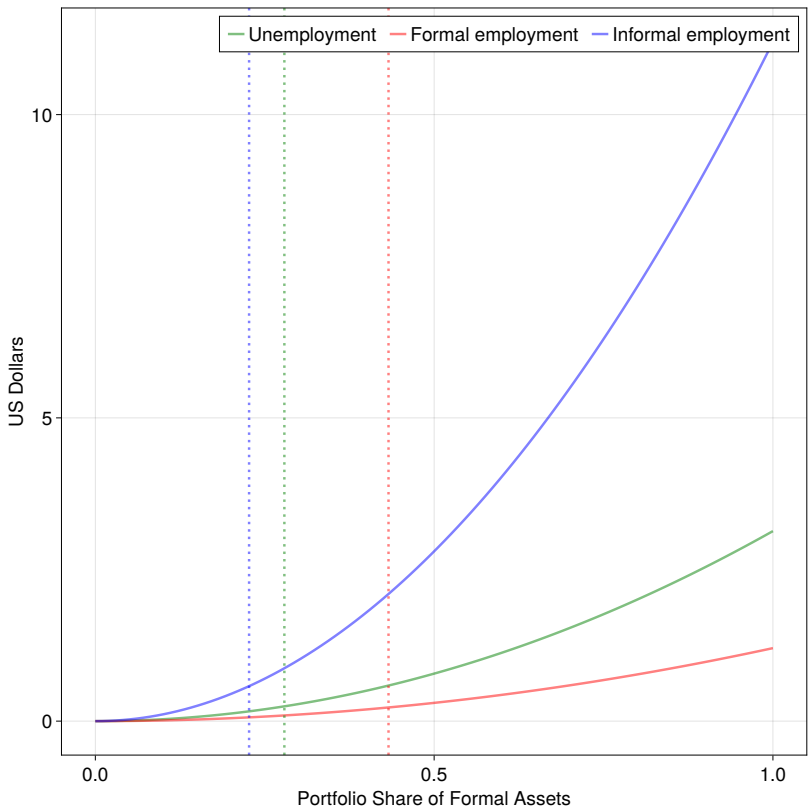
Descriptive Statistics on Saving Behavior

	Formal Emp.	Informal Emp.	Unemp.
Proportion of Individuals who save			
At all	0.271	0.211	0.036
Mainly in formal institutions	0.493	0.185	0.333
Savings amount among savers (hundred of US$)			
Mean	0.601	0.508	0.443
Standard Deviation	0.721	0.748	0.480
Saving rate among savers (savings/labor income)			
Mean	0.133	0.151	-
Standard Deviation	0.123	0.122	-
Sample Size			
Number Obs.	517	589	83

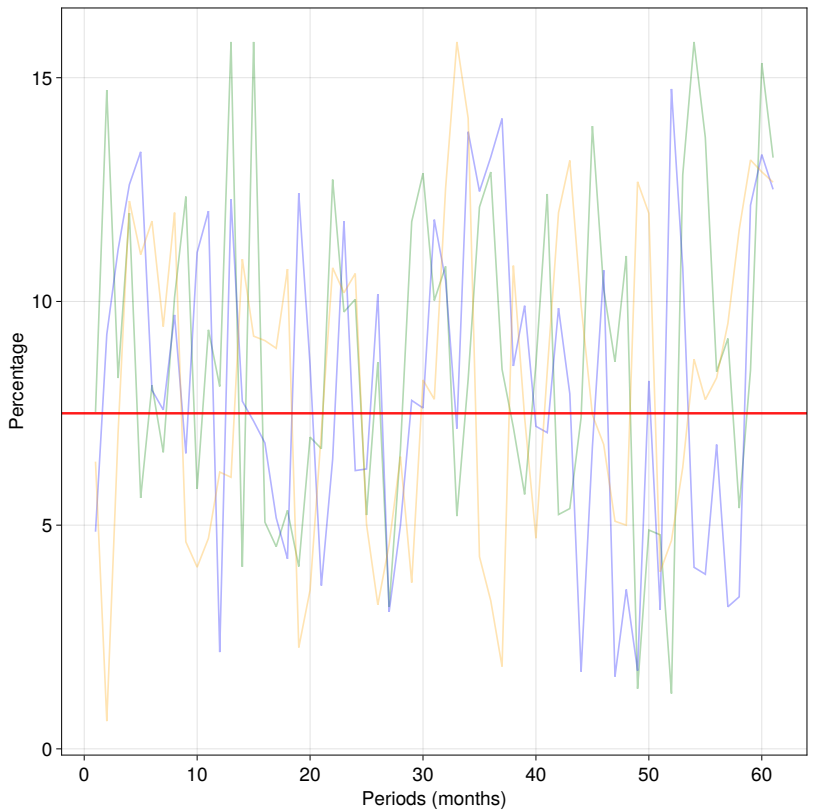
Estimation and identification

- We estimate the model using the Method of Simulated Moments (MSM).
- Identification (main points):
  - Interest rate in the informal financial system: We assume the 99% interval $[0, 0.075 \times 2.1]$, therefore $\mathcal{N}\left(0.079, \frac{\sigma^2}{2\kappa} = 0.0009\right)$ (Eeckhout and Munshi, 2010)
  - Labor market dynamics: durations + steady state distributions (Flinn and Heckman ,1982).
  - Wages distributions and unemployment income: Log-normality assumption + observed wages (Flinn and Heckman, 1982).
  - Portfolio costs: Observed savings + the behavior of individual in choosing financial assets to accumulate wealth.
- Estimation takeaways:
  - Informal workers face significantly higher portfolio costs of formal financial assets (9 times).
  - Formality state is not a permanent state. Job security in formality is reflected in higher on the job arrival rates.
  - Informal assets have considerable risk in their rate of return.

Estimation and identification



(a) Portfolo Cost Function



(b) Assets Returns

Counterfactual experiments

Definitions

We perform two sets of counterfactual experiments:

1. **Financial inclusion**: Equal portfolio costs $\psi^e(0) = \psi^e(1) = 0.024$.
2. **Lower labor market informality**: Proportion of informal job offers drops from the baseline 54% to 33% (almost 40% reduction).
3. **Payroll tax policy** Increase of the payroll to from 16% to 29.5% (level set prior to the 2012 reform).

We evaluate the impact on labor market and financial outcomes and on wealth and consumption inequality taking into account the endogenous adjustment in individual's optimal behaviors.

Results

Counterfactual Experiments - Labor Market and Financial Outcomes

	Benchmark	$\psi^e(0) = \psi^e(1)$		$1 - p(1) = 0.325$		$\tau = 0.295$	
	Value	Value	Ratio	Value	Ratio	Value	Ratio
Labor market states (proportion)							
$e(1)$	0.394	0.393	0.996	0.610	1.548	0.342	0.867
$e(0)$	0.566	0.565	0.997	0.349	0.617	0.615	1.086
u	0.039	0.043	1.077	0.040	1.024	0.043	1.097
Wages (hundred of US$ per month)							
$E[w\|e(1)]$	3.759	3.753	0.999	3.813	1.014	3.772	1.004
$E[w\|e(0)]$	2.854	2.871	1.006	2.926	1.025	2.861	1.003
Savings (hundred of US$ per month)							
$E[s\|s > 0]$	0.189	0.195	1.030	0.206	1.087	0.170	0.900
$E[s\|s > 0, e(1)]$	0.221	0.225	1.019	0.224	1.015	0.176	0.797
$E[s\|s > 0, e(0)]$	0.172	0.177	1.030	0.179	1.042	0.170	0.990

NOTE: Benchmark's values are: $\psi^e(0) = 0.224$; $\psi^e(1) = 0.024$; $p(0) = 0.545$; $\tau = 0.160$.

Results

Counterfactual Experiments - Labor Market and Financial Outcomes

	Benchmark	$\psi^e(0) = \psi^e(1)$		$1 - p(1) = 0.325$		$\tau = 0.295$	
	Value	Value	Ratio	Value	Ratio	Value	Ratio
Total Assets (hundred of US$)							
$E[a]$	6.149	6.365	1.035	6.746	1.097	5.519	0.898
$E[a\|e(1)]$	7.362	7.412	1.007	7.564	1.027	5.768	0.783
$E[a\|e(0)]$	5.495	5.862	1.067	5.719	1.041	5.557	1.011
Formal Assets (hundred of US$)							
$E[\phi a]$	2.241	2.705	1.207	2.617	1.168	1.921	0.857
$E[\phi a\|e(1)]$	3.264	3.223	0.987	3.226	0.988	2.404	0.736
$E[\phi a\|e(0)]$	1.598	2.461	1.540	1.718	1.075	1.704	1.066
Portfolio (proportion of total assets which is formal)							
$E[\phi]$	0.310	0.415	1.338	0.353	1.138	0.297	0.957
$E[\phi\|e(1)]$	0.433	0.430	0.994	0.423	0.978	0.401	0.926
$E[\phi\|e(0)]$	0.227	0.415	1.831	0.241	1.064	0.239	1.054

NOTE: Benchmark's values are: $\psi^e(0) = 0.224$; $\psi^e(1) = 0.024$; $p(0) = 0.545$; $\tau = 0.160$.

Counterfactual Experiments - Inequality

General Entropy Indexes	Benchmark Value	$\psi^e(0) = \psi^e(1)$		$p(0) = 0.325$		$\tau = 0.295$	
		Value	Ratio	Value	Ratio	Value	Ratio
Total Assets							
$GE(0)$	0.277	0.240	0.869	0.254	0.919	0.277	1.001
$GE(1)$	0.224	0.196	0.878	0.201	0.900	0.223	0.997
$GE(2)$	0.247	0.216	0.872	0.218	0.881	0.241	0.975
Formal Assets							
$GE(0)$	0.794	0.359	0.453	0.614	0.774	0.799	1.007
$GE(1)$	0.434	0.232	0.533	0.331	0.762	0.451	1.039
$GE(2)$	1.625	1.135	0.699	1.344	0.827	1.678	1.033
Consumption							
$GE(0)$	0.128	0.126	0.986	0.126	0.989	0.128	1.002
$GE(1)$	0.110	0.107	0.971	0.105	0.958	0.109	0.990
$GE(2)$	0.113	0.108	0.957	0.106	0.938	0.110	0.977

NOTE: $GE(0)$ is the mean log deviation, $GE(1)$ is the Theil index, and $GE(2)$ is half the coefficient of the variation. Benchmark's values are: $\psi^e(0) = 0.224$; $\psi^e(1) = 0.024$; $p(0) = 0.545$; $\tau = 0.160$.

Concluding remarks

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- We develop and estimate a model able to replicate the crucial features of developing countries economies:
  1. High level of labor market informality
  2. Low level of savings
  3. High proportion of assets held in informal institutions
- Our claim that working informally is linked to saving informally is confirmed:
  - Informal workers face partial financial exclusion from formal financial institutions
  - If full financial access were guaranteed to them:
    - Savings would increase 3% a month and formal assets 21%
    - Asset inequality would decrease 13% and consumption inequality 4%
- Colombia-specific policies:
  - A recent reform reducing formal payroll contribution had the potential to increase savings by 10% a month.

Concluding remarks

- We also provide two methodological contributions in the labor market search literature:
  1. We add saving and borrowing to search models with informality.
     [Bobba et al. 2022, 2021; Megir et al. 2015; Bosch and Esteban-Pretel (2012)]; Charlot et al. 2013; Albrecht et al 2009]
  2. We allow for two assets in search models with saving.
     [Rendon (2006); Lentz (2009); Lise (2013); Danforth (1979); Acemoglu and Shimer (1999); Krusell et al. (2010); Bils et al. (2011)]

Thank You!!