

Informality and the Interdependence of Fiscal and Monetary Policies

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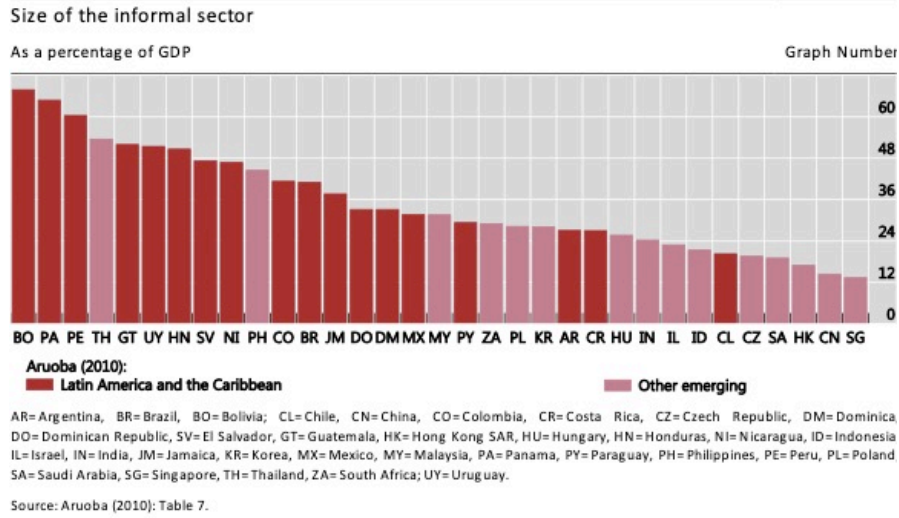
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Motivation

- EMEs have improved macroeconomic stability
 - Fiscal discipline
 - Inflation convergence, but not complete
 - Central bank institutionality
- Yet, structural traits are still different from advanced economies
 - Economic structure, reliance on commodities or external financing
 - Financial stability has always been a priority for CBs
- Informality is a key defining element in most EMEs
 - Economic and social relevance, seen as a drag to development
 - Low productivity of informal workers, lack of protection
 - Implications for fiscal revenues, adjustment of labor markets and monetary policy

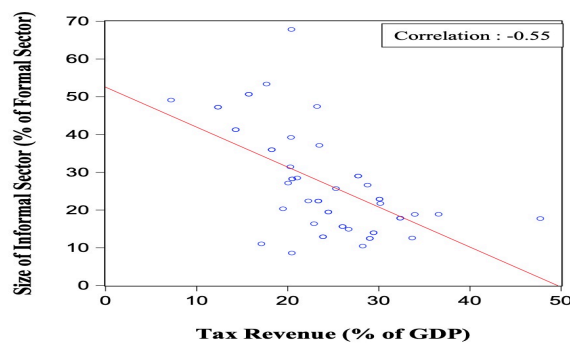
Motivation

Size of the Informal Sector in Emerging Economies



Motivation

Informality and Fiscal Revenues



Informality reduces tax revenues (leakage)

- Bad enforcement of rule of law
- Aruoba (2010). “Informal Sector, Government Policy and Institutions”

Motivation

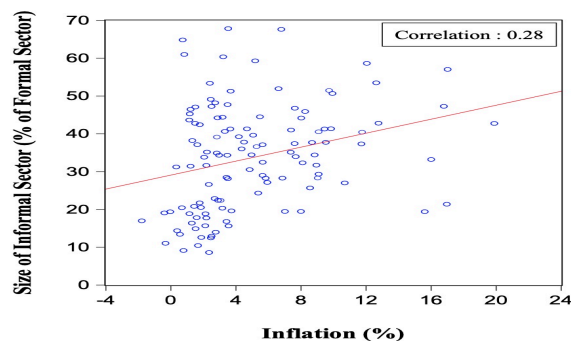
Informality and Labor Markets

Informality dampens employment fluctuations

- Buffer effect of informality
 - or escape valve from rigid formal sector
- Role of participation margin, formal job creation
- Leyva and Urrutia (2020). “Informality, Labor Regulation, and the Business Cycle ”, *Journal of International Economics*.

Motivation

Informality and Inflation



Informality associated to higher inflation

- How the economy responds to shocks?
- Transmission mechanism of monetary policy
- Alberola and Urrutia (2020). “Does Informality facilitate Inflation Stability?”, *Journal of Development Economics*.

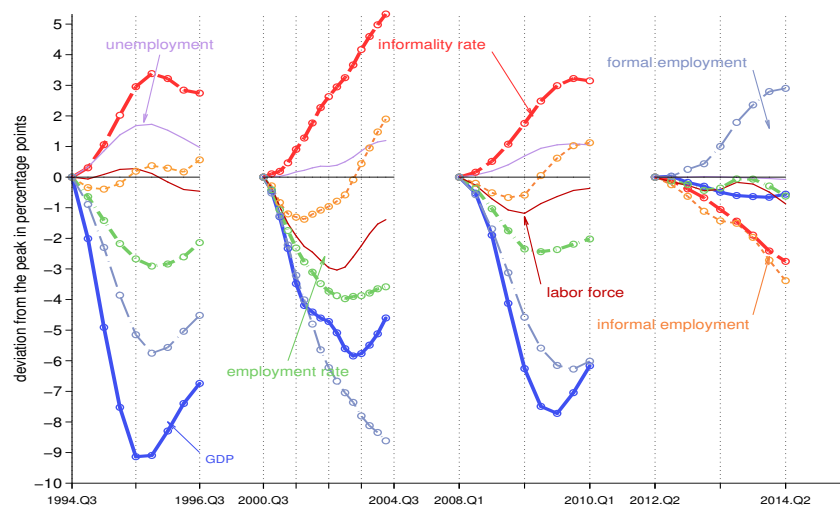
Outline

- Informality and Labor Market Adjustment
 - Leyva and Urrutia (*JIE*, 2020)
- Informality and Inflation Dynamics
 - Alberola and Urrutia (*JDE*, 2020)
- Relation between Fiscal and Monetary Policies
 - ... with a Large Informal Sector

Informality and Labor Market Adjustment

Informality as a Buffer?

Recessions characterized by shredding of formal jobs (to OLF)



Informality and Labor Market Adjustment

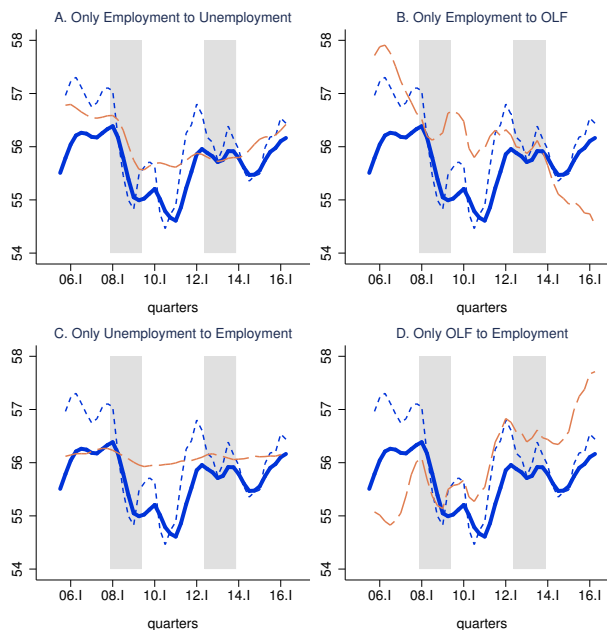
Business Cycle Properties

X	Mexico		U.S.	
	σ_X/σ_Y	$cor_{X,Y}$	σ_X/σ_Y	$cor_{X,Y}$
GDP (Y)	1.00	1.00	1.00	1.00
Employment rate (% of POP)	0.42	0.76	1.04	0.85
Informal employment (% of POP)	0.52	0.06	-	-
Informality rate (% of employment)	0.53	-0.57	-	-
Out of labor force (% of POP)	0.42	-0.46	0.56	-0.13
Unemployment rate (% of labor force)	3.74	-0.92	11.79	-0.95

The informality rate is **countercyclical**
 ... but informal employment is **acyclical**

Informality and Labor Market Adjustment

Transitions and the Employment Rate: Job Creation/Destruction



Informality and Labor Market Adjustment

Empirical Findings

- As in previous studies, our data confirms that the *informality rate* (as a fraction of total employment) is countercyclical
- However, this does **not** imply substitution of formal by informal workers in recessions
- In recessions, the *employment rate* decreases because of adjustments in the participation rate
 - ... job creation from OLF to formal employment slows-down
 - ... increasing mechanically the informality rate

Informality and Inflation Dynamics

A Simple DSGE Model

- Standard sticky price model with monetary sector in a closed economy
- Monetary regime: Inflation targeting implemented via a Taylor rule
- Household savings channeled to firms through financial intermediaries
- Different shocks affecting the economy every period
 - Demand (government expenditures)
 - Supply (technology)
 - Financial (lending spread)
- The main departure is the production sector and the work of the labor market \Leftarrow Introducing informality

Informality and Inflation Dynamics

Model: Labor Supply by Households

Representative household problem

$$\max E_{0,t=0}^{\infty} \beta^t \left[\log \left(C_t - \psi \Phi_t \frac{(L_t^f + L_t^s)^{1+\varphi}}{1+\varphi} \right) - \frac{\zeta}{2} U_t^2 \right],$$

$$\text{s.to.} \quad C_t + I_t + B_{t+1} = w_t^f L_t^f + w_t^s L_t^s + r_t K_t + (1 + \rho_{t-1}) B_t + \Pi_t - T_t$$

$$L_t^f = (1 - s) L_{t-1}^f + p_t U_t$$

$$L_t^f + L_t^s + U_t + O_t = \bar{L}$$

$$\Phi_t = C_t^\omega \Phi_{t-1}^{1-\omega}$$

Informality and Inflation Dynamics

Model: Production

Final good technology:

$$Y_t = A_t (K_t)^\alpha (M_t)^{1-\alpha}$$

A_t : aggregate technology shock

- Intermediate good is a composite of inputs produced in the formal and informal sector

$$M_t = \left\{ (M_t^f)^{\frac{\epsilon-1}{\epsilon}} + (M_t^s)^{\frac{\epsilon-1}{\epsilon}} \right\}^{\frac{\epsilon}{\epsilon-1}}$$

using only labor, through linear technologies with productivities equal to one and χ

- Aggregate production function for the economy:

$$\underbrace{Y_t}_{GDP} = \left[A_t \underbrace{\left\{ ((1 - I_t^s))^{\frac{\epsilon-1}{\epsilon}} + (\chi I_t^s)^{\frac{\epsilon-1}{\epsilon}} \right\}^{\frac{\epsilon(1-\alpha)}{\epsilon-1}}}_{TFP} \right] (K_t)^\alpha (L_t)^{1-\alpha}$$

Informality and Inflation Dynamics

Model: Formal vs Informal Sectors

- Formal firms post vacancies, subject to matching frictions (Mortensen & Pissarides (1994))
- Formal firms face payroll taxes (τ)
- Financial cost channel (working capital constraint)
- Utility value of a formal match:

$$J_t = \left[p_t^f - (1 + \kappa i_t^l + \tau) w_t^f \right] \lambda_t^C + (1 - s) \beta E_t J_{t+1}$$

where $i_t^l \approx i_t + \zeta_t$

- In contrast, informal firms pay no taxes, face no search frictions in hiring and are assumed to be excluded from credit markets
... but productivity is lower $\chi < 1$

Informality and Inflation Dynamics

Model: Additional Elements

- Formal wages determined through Nash-bargaining; zero profit condition for vacancy posting
- Nominal rigidities á la Calvo at the retail level for the final composite good
- Government balances its budget each period via lump sum taxes

$$g_t Y_t = \tau w_t^f L_t^f + T_t$$

- Monetary policy conducted according to a Taylor rule

$$1 + i_t = (1 + \iota) \left(\frac{P_t}{P_{t-1}} \right)^{\phi_\pi} \left(\frac{Y_t}{Y_t^n} \right)^{\phi_y} \nu_t$$

Informality and Inflation Dynamics

The presence of informality affects inflation dynamics through two mechanisms:

- ① It increases the flexibility of labor supply (vis a vis a more rigid formal sector)
 - Allowing employment to react more quickly to shocks affecting labor demand
... and providing a *buffer* for wages pressures feeding inflation
 - This mechanism has been highlighted by Castillo and Montoro (2010)
- ② It reduces the sensitivity of unit labor costs to changes in interest rates

$$ulc_t = \frac{P_t \left[w_t + \left(\kappa l_t^i + \tau \right) w_t^f (1 - l_t^s) \right]}{Y_t / L_t}$$

- Dampening the incidence of the working capital channel in the formal sector
- Key asymmetry: informal sector does not use credit

Informality and Inflation Dynamics

Impulse Response Functions: Cumulative Deviations after first year

Cumulative Effect First Year (%)	Technology ($A_t \downarrow$)		Demand ($g_t \uparrow$)	
	Full Model	No Infor- mality	Full Model	No Infor- mality
Real output	-8.83	-8.59	1.04	0.62
Inflation rate	1.00	0.89	1.00	1.15
Nominal interest rate	1.56	1.34	1.71	1.9
Total employment	-2.52	-2.16	2.15	1.01
Average real wage	-5.69	-6.34	1.89	2.36
Formal wage premium	-0.15	–	0.26	–
Nominal unit labor cost	3.42	2.39	6.14	7.06
Informality rate	-0.20	–	1.35	–
Measured TFP	-6.98	-7.05	-0.32	0.00

Informality and Inflation Dynamics

Implications for Monetary Policy

These experiments assess the effectiveness of Taylor rule in dampening inflation volatility under different shocks

- Facing shocks of similar sizes, the economy with informality achieves
 - Lower inflation volatility under demand and/or financial shocks
 - Higher inflation volatility under technology shocks
- Results depend on relative weights of the two channels:
 - The buffer effect of informality (labor market channel)
 - The sensitivity of unit costs and job creation in the formal sector to interest rates (financial channel)
- We also analyze the transmission of monetary shocks to the Taylor rule

Informality and Inflation Dynamics

Impulse Response Functions: Cumulative Deviations after first year

Cumulative Effect First Year (%)	Monetary ($\nu_t \uparrow$)	
	Full Model	No Infor- mality
Real output	-1.72	-1.27
Inflation rate	-1	-1.02
Sacrifice ratio	1.70	1.27
Nominal interest rate	0.09	0.16
Total employment	-3.03	-1.91
Average real wage	-4.23	-6.28
Nominal unit labor cost	-9.16	-11.7
Informality rate	-1.19	–

Higher sacrifice ratio with informality

... due to buffer effect on wages

... in spite of financial cost channel

Relation between Fiscal and Monetary Policies

... with a Large Informal Sector

- Governments in countries with larger informal sectors might depend more on seigniorage revenue
 - Low tax base
 - More unstable tax revenues
 - => Higher long run inflation
- Monetary policy might be less effective to stabilize inflation in the short run with a large informal sector
 - Flexibility of informal employment makes output to react quickly (large sacrifice ratios)
 - => Higher inflation volatility

Relation between Fiscal and Monetary Policies

... with a Large Informal Sector

- Different shocks typically require different mixes of fiscal and monetary responses
 - The mix might be affected by the presence of the informal sector
 - Funding of government spending matters
 - Informality impedes the credit channel of monetary policy
- Optimal policy mix (Ramsey approach) tends to favor price stability to tax smoothing
 - Benigno and Woodford (2003), Schmitt-Grohe and Uribe (2004)
 - Informality might change this trade-off, by making taxes more distorting
 - Nicolini (1998), Koreshkova (2006): no effect of informality on labor market flexibility
- Need for better coordination between Fiscal and Monetary Policies
 - Role of commitment