Informality and the Interdependence of Fiscal and Monetary Policies

Carlos Urrutia

ITAM, Department of Economics

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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

Informality reduces tax revenues (leakage)
- Bad enforcement of rule of law
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

Motivation
Informality and Inflation

Informality associated to higher inflation
- How the economy responds to shocks?
- Transmission mechanism of monetary policy
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 shedding of formal jobs (to OLF)
## Informality and Labor Market Adjustment

### Business Cycle Properties

<table>
<thead>
<tr>
<th></th>
<th>Mexico</th>
<th></th>
<th>U.S.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$\chi$</td>
<td>$\sigma_{X}/\sigma_Y$</td>
<td>$\text{cor}_{X,Y}$</td>
<td>$\sigma_{X}/\sigma_Y$</td>
<td>$\text{cor}_{X,Y}$</td>
</tr>
<tr>
<td>GDP ($Y$)</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Employment rate (% of POP)</td>
<td>0.42</td>
<td>0.76</td>
<td>1.04</td>
<td>0.85</td>
</tr>
<tr>
<td>Informal employment (% of POP)</td>
<td>0.52</td>
<td>0.06</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Informality rate (% of employment)</td>
<td>0.53</td>
<td>-0.57</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Out of labor force (% of POP)</td>
<td>0.42</td>
<td>-0.46</td>
<td>0.56</td>
<td>-0.13</td>
</tr>
<tr>
<td>Unemployment rate (% of labor force)</td>
<td>3.74</td>
<td>-0.92</td>
<td>11.79</td>
<td>-0.95</td>
</tr>
</tbody>
</table>

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

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## Informality and Labor Market Adjustment

### Transitions and the Employment Rate: Job Creation/Destruction

![Graphs showing transitions and employment rates](image-url)
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.

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**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

$$\max E_{0 \to \infty}^{1-\beta} \left[ \log \left( C_t - \psi \Phi_t \left( \frac{L^f_t + L^s_t}{1 + \varphi} \right)^{1+\varphi} \right) - \frac{\zeta}{2} U^2_t \right],$$

s.t. \( C_t + l_t + B_{t+1} = w^f_t L^f_t + w^s_t L^s_t + r_t K_t + (1 + \varphi_{t-1}) B_t + \Pi_t - T_t \)

\( L^f_t = (1 - s) L^f_{t-1} + \rho_t U_t \)

\( L^f_t + L^s_t + U_t + O_t = \bar{I} \)

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

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
  $$M_t = \left\{ \left( M^f_t \right)^{\frac{\varepsilon-1}{\varepsilon}} + \left( M^s_t \right)^{\frac{\varepsilon-1}{\varepsilon}} \right\}^{\frac{\varepsilon}{\varepsilon-1}}$$

using only labor, through linear technologies with productivities equal to one and \( \chi \)
- Aggregate production function for the economy:

$$\frac{Y_t}{GDP} = \left[ A_t \left\{ \left( (1 - l^s_t) \right)^{\frac{\varepsilon-1}{\varepsilon}} + \left( \chi l^s_t \right)^{\frac{\varepsilon-1}{\varepsilon}} \right\}^{\frac{\varepsilon(1-\alpha)}{\varepsilon-1}} \right] (K_t)^{\alpha} (L_t)^{1-\alpha}$$
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 ($\tau$)
- Financial cost channel (working capital constraint)
- Utility value of a formal match:
  \[ J_t = \left[ p_t^f - \left( 1 + \kappa i_t^f + \tau \right) w_t^f \right] \lambda_t^C + (1 - s) \beta E_t J_{t+1} \]
  where \( i_t^f \approx i_t + \zeta_t \)
- 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 it 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
  \[ 1 + i_t = (1 + \nu_t) \left( \frac{P_t}{P_{t-1}} \right)^{\phi_I} \left( \frac{Y_t}{Y_{t-1}} \right)^{\phi_Y} \]

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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

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

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

### Impulse Response Functions: Cumulative Deviations after first year

<table>
<thead>
<tr>
<th>Cumulative Effect First Year (%)</th>
<th>Technology ((A_t, \downarrow))</th>
<th>Demand ((g_t, \uparrow))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Model</td>
<td>No Informality</td>
</tr>
<tr>
<td>Real output</td>
<td>-8.83</td>
<td>-8.59</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>1.00</td>
<td>0.89</td>
</tr>
<tr>
<td>Nominal interest rate</td>
<td>1.56</td>
<td>1.34</td>
</tr>
<tr>
<td>Total employment</td>
<td>-2.52</td>
<td>-2.16</td>
</tr>
<tr>
<td>Average real wage</td>
<td>-5.69</td>
<td>-6.34</td>
</tr>
<tr>
<td>Formal wage premium</td>
<td>-0.15</td>
<td>–</td>
</tr>
<tr>
<td>Nominal unit labor cost</td>
<td>3.42</td>
<td>2.39</td>
</tr>
<tr>
<td>Informality rate</td>
<td>-0.20</td>
<td>–</td>
</tr>
<tr>
<td>Measured TFP</td>
<td>-6.98</td>
<td>-7.05</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Cumulative Effect First Year (%)</th>
<th>Monetary ((\kappa_t \uparrow))</th>
<th>Full Model</th>
<th>No Informality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real output</td>
<td>-1.72</td>
<td>-1.27</td>
<td></td>
</tr>
<tr>
<td>Inflation rate</td>
<td>-1</td>
<td>-1.02</td>
<td></td>
</tr>
<tr>
<td>Sacrifice ratio</td>
<td>1.70</td>
<td>1.27</td>
<td></td>
</tr>
<tr>
<td>Nominal interest rate</td>
<td>0.09</td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td>Total employment</td>
<td>-3.03</td>
<td>-1.91</td>
<td></td>
</tr>
<tr>
<td>Average real wage</td>
<td>-4.23</td>
<td>-6.28</td>
<td></td>
</tr>
<tr>
<td>Nominal unit labor cost</td>
<td>-9.16</td>
<td>-11.7</td>
<td></td>
</tr>
<tr>
<td>Informality rate</td>
<td>-1.19</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>

Higher sacrifice ratio with informality... due to buffer effect on wages... in spite of financial cost channel
Governments in countries with larger informal sectors might depend more on seigniorage revenue
- Low tax base
- More unstable tax revenues
  \[\Rightarrow\] 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)
  \[\Rightarrow\] Higher inflation volatility

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
- Informality might change this trade-off, by making taxes more distorting

Need for better coordination between Fiscal and Monetary Policies
- Role of commitment