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Abstract

This paper provides a simple demonstration of an empirical observation pointed out by the existing literature that the presence of informality in the production sector of an economy moderates the impact of economic shocks affecting it. We show that in the presence of informality, adverse demand shocks have a lower impact on aggregate output and adverse supply shocks have a lower impact on prices as well as output. Both would imply that countries without having substantial informal sector, largely more affluent nations, would be exposed more to higher prices following such shocks. This is consistent with contemporary evidence of stagflation in developed countries. Being the residual sector, the informal sector inevitably moves in the opposite direction to the formal sector during a bad shock episode, cushioning its aggregate effect. We then show that the argument goes through if the firms have to finance their working capital requirements by borrowing from the market.

JEL-Codes: E230, E260, E630.

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1. Introduction

Many theoretical studies have demonstrated that the presence of an informal economy generates a buffer effect or serves as a shock absorber that diminishes the pressure of a demand shock (Castillo and Montoro (2010), Alberola and Urrutia (2019), Lambert et al (2020)). Empirical studies like, for instance, Deaton (2021) have supported these theoretical conjectures for the Covid 19 pandemic. According to Deaton (2021) the pandemic reduced per capita incomes by more in higher-income countries than lower income countries and as a result country by country international income inequality decreased during the pandemic.

The objective of this paper is to give a simple explanation of the phenomenon that makes these results possible. We argue that by its very essence the informal sector is a place where all those who are forsaken by the formal sector find refuge. It is therefore a sector that is a perfect substitute of the formal sector – expanding when the former contracts and vice versa. Since the sector is productive and contributes to the GDP of a country its function is to moderate the effects of shocks to the formal sector. This happens both for positive and negative shocks hitting an economy. Thus the presence of the sector reduces the pace of progress and decelerates the rate of decline of GDP after a negative shock hits the country.

The main intuition of the paper is that underdeveloped countries have a productive fall back option for workers during times of stress. This makes them more resilient to negative shocks than those who do not have this option. In these (developed) countries workers that are released by the formal sector during recession are plunged into unproductive open unemployment increasing the impact on their aggregate GDP. By natural extension the intuition takes us to the conclusion that the extent of the cushioning effect will decline as the productivity of alternative employment declines due to overcrowding in the informal sector. Thus the

magnitude of the cushioning effect declines with the magnitude of the shock. This is exactly where our model takes us to.

The rest of the paper is arranged as follows: section 2 presents the basic model through which the argument can be made, section 3 extends the model to include market borrowing by firms, section 4 discusses some possible extensions of the model and section 5 concludes the paper.

2. The Model

We start from a standard aggregate demand AD function:

$$Y_D = Y_D(r, P) \tag{1}$$

For this paper we will assume r to be the target rate of the central bank in line with the new classical and new Keynesian micro foundations. The main intervention is in the realm of aggregate supply. Let Y_s denote the aggregate supply, part of which comes from the formal sector, Y_{FS} , and the other from the informal sector Y_{IS} . We assume that both these sectors produce final goods. Y_{FS} hires L_F workers at a minimum wage \bar{w} . Y_{IS} hires L_I at a labour market clearing wage rate w where $w < \bar{w}$. If w is higher than \bar{w} , then it is a case of labor scarcity, i.e. at \bar{w} there is excess demand for labor which is assumed away. Workers opt for a job in the informal sector if they do not find one in the formal sector at a lower marketing clearing wage (see Carruth and Oswald (1981), Agenor and Montiel (1995), Marjit (2003, JD), Marjit and Kar (2011) etc.). This implies:

$$L_F + L_I = L \tag{2}$$

Also we have the sectoral profit maximization conditions:

$$Y'_{FS}(L_F) = \frac{\bar{w}}{P} \tag{3}$$

$$Y'_{FI}(L - L_F) = \frac{W}{P} \quad (4)$$

Where W is the flexible informal wage that ensures full employment. Given (\bar{w}, p) , equation (3) determines L_F^* and equation (4) determines w^* , the informal wage. We do not explicitly bring in capital in this section. Capital is assumed to move freely between the two sectors.

Therefore, the aggregate supply is given by

$$Y_S = Y_{FS}(L_F^*) + Y_{FI}(L - L_F^*) \quad (5)$$

Where:

$$L_F^* = L_F^* \left(\frac{\bar{W}}{P} \right) \quad (6)$$

Equating equation (1) and (5) we get the goods market clearing condition:

$$Y_d = Y_S \quad (7)$$

The slope of the aggregate supply curve can be determined by differentiating (5) with respect to P .

$$\frac{dY_S}{dP} = \frac{\delta Y_{FS}}{\delta L_F^*} \cdot \frac{dL_F^*}{dP} + \frac{\delta Y_{IS}}{\delta L_I^*} \cdot \frac{dL_I^*}{dP} = \frac{\bar{W} - W}{p} \cdot \frac{dL_F^*}{dP} \quad (8)$$

Since $\frac{dL_F^*}{dp} = -\frac{\bar{w}}{p^2} \frac{1}{Y_{FS}} > 0$, our result shows that if we do not have an informal

sector, other things being the same, Y_S will respond more to a given change in price. The simple idea is that where p increases more workers are hired in the formal sector at a given \bar{w} . If we have an informal sector, workers come from the informal sector and Y_S declines.

Y_S has two opposing effects since $\bar{w} > w$, $\frac{dY_S}{dp} > 0$, but less than without the informal sector.

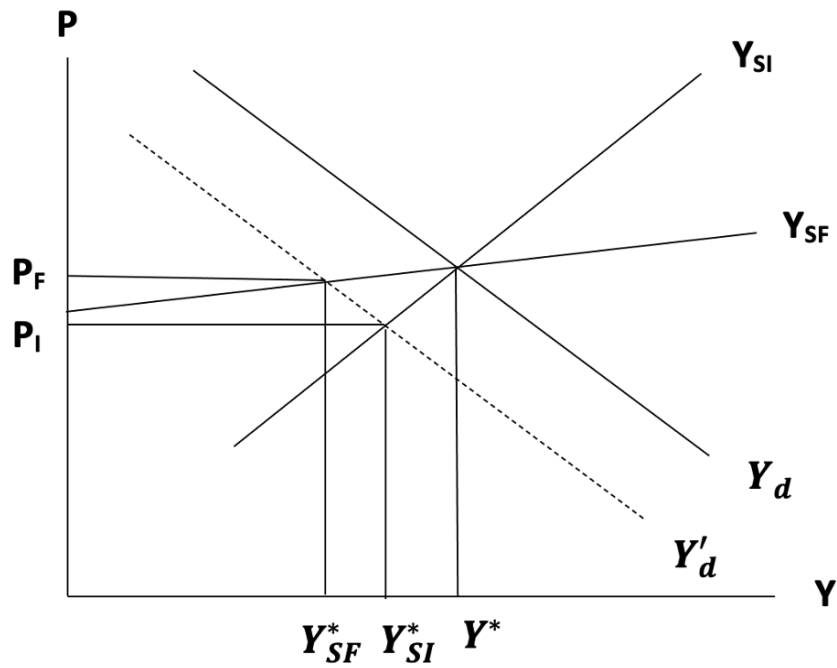


Figure 1: Adverse Demand Shock

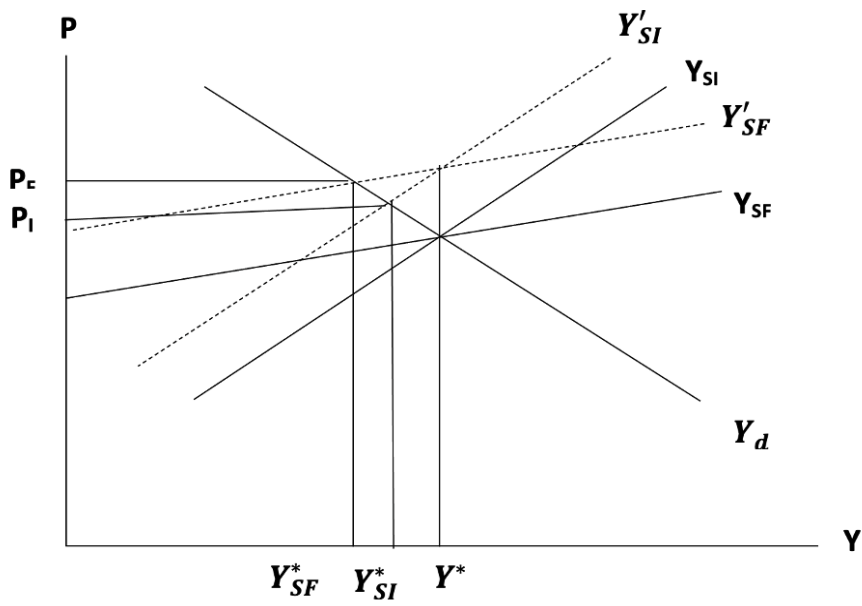


Figure 2: Adverse Supply Shock

This is demonstrated graphically in figures 1 and 2. In both figures Y_{SI} is the supply curve with the informal sector and Y_{SF} is the supply curve without the informal sector. As noted above, for a given price change the output change is more without the informal sector and hence, Y_{SF} is flatter than Y_{SI} . If recession is caused by a negative demand shock (demand curve moves from Y_d to Y'_d) as in figure 1, output falls to Y_{SF}^* without the informal sector but to Y_{SI}^* with the informal sector. On the other hand, for an equivalent amount of negative supply shock AB in figure 2, the economy faces a more severe stagflation (it shrinks more and prices rise more) if the informal sector is not there.

3. The Role of Finance

It can easily be shown that the same result holds when finance is explicitly introduced in the model. In what follows we will follow Marjit and Bhattacharyya (2022) in introducing the financial sector through the wage fund theory of Mill and others. Equation (8) below suggests that production requires time and at first at the beginning of the period L_F number of workers are hired at the fixed nominal wage \bar{W} by borrowing from banks and financiers and after production is realized, principal is paid back with interest. Thus for the formal sector:

$$\bar{W}L_F(1+r) = PY_{SF}(L_F) \quad (9)$$

A little manipulation yields:

$$\frac{Y_{SF}(L_F)}{L_F} = \varphi_{SF}(L_F) = \frac{\bar{W}(1+r)}{P} \quad (10)$$

This determines $L_F(r, P)$.

Therefore now (6) becomes:

$$L_F = L_F \left(\frac{\bar{W}(1+r)}{P} \right) \quad (11)$$

Similarly for the informal sector:

$$\frac{Y_{SI}(L-L_F)}{L-L_F} = \varphi_{SF}(L-L_F) = \frac{W(1+\mu r)}{P} \quad (12)$$

$$\text{This determines: } W = W(\mu r, P) \quad (13)$$

Note that once L_F is determined, so is L_I . Thus the flexible wage in the informal sector is determined via the level of employment in the informal sector rather than the other way round.

It is now easy to check that the difference in slopes of the formal and informal sector supply curves is preserved as in Figures 1 and 2.

Aggregate supply is given by:

$$Y_S = Y_{SF} \left[L_F \left(\frac{\bar{W}(1+r)}{P} \right) \right] + Y_{SI} [L - L_F]$$

Which implies:

$$\frac{dY_S}{dP} = \frac{\delta Y_{SF}}{\delta L_F} \cdot L'_F \cdot \left(-\frac{\bar{W}(1+r)}{P^2} \right) - \frac{\delta Y_{SI}}{\delta L_I}$$

$$\text{With } \frac{\delta Y_{SF}}{\delta L_F} > 0, L'_F = \frac{dL_F}{d\left(\frac{\bar{W}(1+r)}{P}\right)} = \frac{1}{Y''_{FS}} < 0 \text{ and } \frac{\delta Y_{SI}}{\delta L_I} > 0.$$

Note that as pointed out earlier, at equilibrium since L_F is already determined, so L_I is determined as a residual. Thus an increase in P would increase Y_{SF} but will reduce Y_{SI} . Fewer workers in the informal sector will push up informal wage. Then change in Y due to change in P without the informal sector is higher as in previous case.

4. Discussion

First, note that the difference in the two situations depends negatively on the wage gap, the cushioning effect of the informal sector reduces as the magnitude of the price shock increases.

In other words, the cushioning effect is more effective for smaller shocks than for larger shocks. The result thus supports the finding of Deaton (2021) that between-country income inequality has increased when global inequality is measured by weighting each country by its population largely because of India's poor performance during 2020. India had the highest amount of total cases after USA and the third highest number of deaths after USA and Brazil. The magnitude of the pandemic shock for India was so thus so severe that even with a large informal sector (employing about 83 percent of India's population), the decline was substantial.

It can easily be seen that the basic argument goes through if the formal wage is decided by some other process rather than through the exogenous minimum wage. For instance if the formal wage is determined by a competitive mechanism then, during recession the formal wage rate will decline and formal employment will rise and informal employment will fall rising its wage. In the net, the wage gap in equation (7) will reduce reducing the extent of the magnitude of the cushioning effect of the informal sector. There will be no qualitative change in the results. A similar argument will hold if instead to competitive forces a bargaining between the produces and workers determine the wage rate. If stronger bargaining power of the trade unions is reflected by downwardly sticky wages then the extent of cushioning will be directly proportional to the extent of stickiness in the wages.

A third possible extension of the model will be to allow for intermediate good producing informal sector. If the informal sector only produces informal goods that are used by a final good producing formal sector then the informal sector becomes perfectly complementary to the formal sector. It is trivial to verify that under such circumstances the argument will completely break down. Thus the effectiveness of the informal sector in absorbing shocks is indirectly proportional to the size of the intermediate good producing informal sector. Since at least a part of the informal sector in most developing countries produce intermediate goods for the formal sector this phenomenon may be difficult to verify from the data. What this paper

suggests is the proportion of final producing informal sector has a negative relationship to the amplitude of fluctuation of GDP over business cycles in developing countries – rather than simply the hypothesis that the amplitude of fluctuation of GDP in developing countries is lower than that of developed countries.

5. Conclusion

The macroeconomic implications of the presence of an informal sector is not well understood. In this paper we have attempted to shed some light on one aspect of this potentially vast area: the effect of the informal sector in mitigating external shocks. Our conclusion is that the presence of this sector downtrends the effects of these shocks. This it does by offering workers an option of productive employment during layoffs due to negative shocks and reducing the marginal contribution of additional employment during upturns as they were already productively employed in the informal sector. The main challenge that remains unaddressed in this paper is to determine the magnitude of this cushioning effect during particular shock episodes. For example if there is substantial skill differential between the formal and informal sector there may be an asymmetry of this effect during positive and negative shocks. Down skilling to access the informal sector during negative shocks may be easier than up skilling to access the formal sector during positive shocks. Also the symmetry between supply and demand shocks is doubtful. It can be conjectured that informality will be more effective for supply shocks to the formal sector, like the Covid – 19 episode studied by Deaton’s work cited above. However if the shock is generated by a decline in spending like the Great Depression then the presence of informality may not be effective. There is evidence that the marginal workers of the economy like the blue collar workers, low skilled workers and older male workers – a large part of whom consists of the informal economy in developing countries –

were more severely affected by the Great Depression¹. These are some of the areas where future research in this field can be directed.

¹ For example, a Congressional Research Service report on “The Labor Market During the Great Depression and the Current Recession” (<https://www.everycrsreport.com/reports/R40655.html>) found that the Great Depression had a “greater impact of economic downturns on male blue-collar workers in the goods-producing sector (e.g., construction and manufacturing), lower-skilled workers, and older workers”.

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