

Informality, Corruption and Trade Reform

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December 2004

ABSTRACT

Stringent regulations coupled with corruption generate and sustain extra legal or informal transactions in the developing countries. Does trade related reform discourage informal activities and corruption? This paper attempts to analyze such a phenomenon. An import competing firm allocates production between a high wage formal and a low wage informal segment. Illegal use of labour in the informal sector is characterized by a probability of punishment which depends on the size of the informal output. In such a structure, as tariff comes down, total employment contracts but the informal sector expands. However, lowering of interest rate, possibly through the liberalization of capital account, tends to reduce the size of the informal segment. Hence, trade reforms may have conflicting impact on informality and corruption.

Key words: Trade Liberalization, Informal sector, Corruption

JEL Classification No: F 11, H 2,

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I Introduction

Liberal open economic policies have been taking firm root in the entire developing world. Be it Latin America, Asia or Africa, tariffs are being reduced, foreign investment is being encouraged and interventionist strategies are slowly taking a backseat. Naturally volumes are being contributed towards justifying or criticizing market-based reformist policies. A key feature of the developing world is that most of its work force is absorbed in the informal sectors, sectors which are usually not registered, non-tax paying and most likely to ignore labour laws or unionized wage negotiations. Agenor (1987) gives a detailed list of the relevant work on several developing countries which repeatedly assert the significance of informal labour market. Informal activities are carried out beyond the boundaries of legal institutions. Relatively high- wage, secured labor contracts in the formal labor markets coexist with flexible wage casual contracts in the informal market. Typically, labor reforms, incorporating contractual flexibilities, are opposed by the trade unions and are difficult to negotiate in countries with massive poverty and unemployment. However, trade related reforms, often dictated by the negotiations at the WTO, are implemented relatively faster. This paper tries to find out consequences of such reforms on the extent of informal activities when the labor market is characterized by high wage formal and low wage informal contracts. Extra legal informal arrangements are sustained through corruption and bribery. We look at the impact of reforms in this sphere as well. Let us now briefly go through with the related literature.

Kar and Marjit (2001) and Marjit (2003) have tried to analyse the impact of trade reforms on informal wage in terms of general equilibrium models. These models build on the assumption of a dual labour market with fixed as well as flexible wage contracts and labour mobility. In a way this is also related to Bulow and Summers (1986), Carruth and Oswald (1981), Saint-Paul (1996), Agenor and Montiel (1996) etc. Usually economic reform tends to expand size of the informal sector through a cut back in employment in the formal sector when formal and informal are producing *different* goods and a tariff protects the formal sector. Apparently, if one focuses on a typical import competing sector, which has both formal and informal segments, the impact of a reform is less clear. For example, a negative output effect of a tariff cut should be felt by both segments and one does not know a priori how the composition will change.

Another important departure from the exiting literature is in raising the issue of governance. This relates our paper to economics of corruption and the informal sector. Interested readers may look at Gupta and Chaudhuri (1997), Kolmar and Marjit (2000), Dessey and Pallage (2003) and Choi and Thum (2004) among others. Use of informal workers is illegal in our set up since this involves violation of labour laws. We argue that if the producer is monitored and apprehended for operating an 'informal' segment, he faces a penalty such as losing the license to produce the import competing product, thus losing the tariff protection. However, he can get away by paying a bribe to the apprehending agent. It is reasonable to argue that the opportunity costs of such actions are increasing in benefits from protection. We develop an explicit Nash-bargaining structure to determine the equilibrium bribe. This outcome is internalized by the firm while deciding the allocation of production or employment between the formal and informal sector.

Our focus is on reforms related to the external sector i.e., a decline in the tariff rate and deregulation of capital account, considering the case where cost of capital or borrowing is reduced. This is also a worldwide phenomenon and real interest rate has drastically come down in the developing world. For example, in India, one redeeming factor of reform is a substantial or partly phenomenal increase in foreign exchange reserve and a sharp decline in the interest rate all around.

With these in hand we proceed towards the formal analysis. Section II sketches the basic model and the impact of a decline in tariff. The third discusses the consequences of a declining interest rate. The last one concludes.

II. The Model

We start our model in a simplified way where initially there is no capital requirement.

Labour is the only input of production.

L_1 : labour requirement in the formal sector,

L_2 : labour requirement in the informal sector,

w_1 : wage rate in the formal sector,

w_2 : wage rate in the informal sector,

t : rate of tariff.

The formal-informal distinction is captured through the assumption that $w_1 > w_2$. Such wage determination is beyond the control of the particular firm. There is no difference in productivity of labour between segments. Therefore, it is quite likely that the entire production should shift to the informal sector. However, this can not be done

because ‘informal’ production is ‘illegal’ since it violates labour laws and calls for positive actions from the state. We explicitly model such a process as follows.

For the producer, the probability of being apprehended while producing in the informal sector will depend upon the size of the informal sector. In our model, the probability of getting caught is shown by $[1 - p(L_2)]$ with $p', p'' < 0$. In equilibrium p will depend on t , the extent of tariff. If the producer gets caught, he has to pay either bribe or the punishment cost. He will have to pay bribe to the monitoring officer who has a salary, donated in our model by ‘ s ’, independent of his monitoring capabilities.

Let us analyse the collusive form of game between the bribing producer and the corrupt monitoring officer. Assume that, $\Pi(t)$ be the level of profit by the tariff protected producer, which is a function of the tariff rate ‘ t ’; ‘ b ’ is the amount of bribe and F is the punishment cost. We assume that the punishment cost is quite severe which drives the profit level of the producer down to $\Pi(0)$, the reservation pay-off if the producer has to fall back on an alternative occupation. We try to determine the optimal level of bribing through the ‘Nash Bargaining’ approach. The net profit of the dishonest producer with tariff protection, would be $[\Pi(t) - b]$. But if he does not pay bribe, his net profit falls to $[\Pi(0) - F]$. On the other hand, if the monitoring officer takes bribe his total income would be $(s + b)$, otherwise it will remain at ‘ s ’. Thus, the simplest conventional way to treat this is to maximize the following simple expression with respect to b .

$$\text{Max}_{\{b\}} [\{(\Pi(t) - b) - (\Pi(0) - F)\} [s + b - s] \dots\dots\dots (1).$$

From the first order condition, we get, $b = [\{\Pi(t) - \Pi(0) + F\} / 2]$, which we denote as $b(t)$ with $b'(t) > 0$. The second order condition is also satisfied.

We now form the objective function for the producer. The production function is:
 $q = f(L_1 + L_2)$, with $f' > 0$ and $f'' < 0$. Assuming that the domestic price of the commodity is normalised to one, the objective function can be written as:

$$\Omega = p(L_2)[(1+t)f(L_1 + L_2) - (w_1L_1 + w_2L_2)] + [1 - p(L_2)][(1+t)f(L_1 + L_2) - (w_1L_1 + w_2L_2) - b(t)]$$

Rewriting the above equation, we get,

$$\Omega = (1+t)f(L_1 + L_2) - (w_1L_1 + w_2L_2) - [1 - p(L_2)]b(t) \dots\dots\dots (2).$$

The producer will try to rationally allocate the total production into two different sectors to maximise his total profit. Thus, we differentiate equation (1) with respect to L_1 and L_2 .

First order conditions give,

$$(1+t) \frac{\partial f}{\partial L_1} = w_1 \dots\dots\dots (2) \text{ and } (1+t) \frac{\partial f}{\partial L_2} = w_2 - p'(L_2)b(t) \dots\dots\dots (3).$$

It is easy to check that (See Appendix- I for details)

$$\left(\frac{dL_1}{dt}\right) = -\frac{f'}{f''(1+t)} + \frac{p'b'}{p'' \cdot b(t)} > 0 \dots\dots\dots (4)$$

$$\left(\frac{dL_2}{dt}\right) = \frac{p' \cdot b'}{-p'' \cdot b(t)} < 0 \dots\dots\dots (5).$$

The signs of (4) & (5) depend upon the facts that $p', p'' < 0$, $f' > 0$, $f'' < 0$ and $b' > 0$.

Combining equations (4) and (5), we get,

$$\frac{dL_1}{dt} + \frac{dL_2}{dt} = \frac{-f'}{f''(1+t)} > 0 \dots\dots\dots (6).$$

Equation (6) suggests that if the tariff protection falls, then the total production and hence, total labour requirements, $(L_1 + L_2)$ will fall. This is general convention. But what is more striking is that, following equations (4) and (5), though $(L_1 + L_2)$ is falling, L_2 ,

i.e., the labour requirement in the informal sector will rise and L_1 , the labour requirement in the formal sector will fall.

Figure (1) clearly expresses the above phenomena. Here, on the horizontal axis, we measure the total labour recruitments as well as the labour requirements in each of the sectors. On the vertical axis, we measure the formal and informal wage rates, i.e., the marginal costs (MC) of production. Since, the wage rate in the formal sector is high and fixed, the wage line is parallel to the horizontal axis and starts at $w = w_1$. On the other hand, the informal wage rate starts from a lower level and has a positive slope as the wage rate in this sector increases with recruitment of more informal labour as $p' < 0$. The demand for labour is shown by the downward slopping Value of Marginal Product for labour (VMP_L) curve. Total labor that will be hired by the producer, have been shown by the intersection point of the formal wage line and the VMP_L curve. Next we examine how a producer allocates his total labour requirements into two sectors. From figure (1), it can be clearly understood that, the demand for informal labour will be up to the point where the rising informal wage (or the informal MC) line meets the formal wage (or the formal MC) line. The rest will be hired from the formal sector.

We proceed further to examine graphically, the effects of a fall in the tariff protection on L_1 and L_2 . We know that lowering the tariff duty will cause a fall in the local price of that commodity and hence the VMP_L will fall. It has been shown by a leftward shift of the VMP_L curve in figure (1). Given the unchanged formal wage rate, it will cause a fall in overall labour requirements and hence the total production of that commodity will fall. But the MC of the informal sector has been given by $w_2 - p'(L_2)b(t)$. Since 't' is falling, the second part of the informal MC will also fall, as $b' > 0$, and the new informal MC curve will be flatter. A flatter informal MC curve will intersect the

formal MC line at the right side of the initial intersection point. This rightward shift of the meeting points of the two MCs vividly demonstrates that due to a fall in the tariff protection, the labour requirement and hence production in the informal sector will rise and the labour requirement and subsequent production in the formal sector will fall more than the rise in labour requirement in the informal sector.

Proposition 1: If the tariff protection (t) falls, then the total labour requirement in the production ($L_1 + L_2$) falls but labour requirement in the informal sector (L_2) will rise at the cost of formal labour (L_1).

Proof: See the Appendix-I

The intuition behind the result is that as t goes down, equilibrium amount of bribe also goes down. Therefore, effective marginal cost facing the informal segment also goes down. Hence, there is a change in composition of production in favour of the informal sector. Declining tariff and the bribe indicate the good effect of reformatory policy. However, this also increases the extent of extra legal activity i.e. the size of the informal output. Needless to say, this is the natural outcome when labor market reform is kept on hold while trade reforms are prioritized.

III. The Effects of a Decline in the Rate of Interest on the Informal Sector

In this section we look at yet another consequence of reform, i.e., lowering of interest rates. We introduce a notion of ‘working capital’ in the basic model. The notion of working capital has become quite significant in the recent discussions on firm level investment with imperfect credit market. Interested readers may have a look at Fazzari and Peterson (1993). The firm under consideration needs to pay workers at the beginning

of the period and then repays the principal and interest at the end of the production period. This is the standard idea of working capital or credit which affects the profitability of firms in a big way. To prove our point we need not distinguish between formal and informal interest rates. So we keep them the same at r . The objective function for the producer would be:

$$\Psi = (1+t)f(L_1 + L_2) - \{w_1(1+r)L_1 + w_2(1+r)L_2\} - [1 - p(L_2)]b(t) \dots\dots\dots (7).$$

Maximising (10) with respect to L_1 and L_2 , we get,

$$(1+t) \frac{\partial f}{\partial L_1} = w_1(1+r) \dots\dots\dots (8) \text{ and } (1+t) \frac{\partial f}{\partial L_2} = w_2(1+r) - p'(L_2)b(t) \dots\dots\dots (9).$$

The above equations (8 & 9) represent the FOCs, SOC's are also satisfied.

It is obvious that as r goes down, total employment of labour will expand. But we now show that L_1 will expand and L_2 will go down. It is instructive to look at figure 2. Since $w_1 > w_2$, a drop in r will mean $AA' > BB'$. Thus MC in the formal sector declines more than the MC in the informal sector. $L_1 + L_2$ expand, but L_1 goes down to L'_1 as the point of intersection between two MCs shifts from C to C' .

Proposition 2: If market interest rate (r) falls given unchanged tariff protection (t), total labour recruitment (L_1+L_2) will rise along with an increase in the formal employment (L_1) and a fall in informal employment (L_2).

Proof: See Appendix-II.

Per worker investment is more in the formal sector as they have to be paid a higher wage. As r goes down relative cost of hiring formal workers goes down and therefore the formal sector expands. Our earlier assumption suggests that the bribe depends on t because in case the entrepreneur has to close down his business, he will lose

the protection induced incentive. However, as r goes down overall profit of the firm goes up and now the auditor may ask for more bribe, thus discouraging informality further. Since this reinforces the result of a decline in r , we have not derived it explicitly. The possibility is there that although the size of the informal sector contracts, total bribe may actually go up. Our main intention here is to focus on the size of the informal sector.

What we have shown so far that a drop in t will increase L_2 and a drop in r will reduce L_2 . Therefore, if one is looking at two kinds of reforms, one should expect offsetting effects on the size of the informal segment.

IV. Conclusion

We have used a fairly simple model to argue convincingly that decline in tariff and interest rates, the two cornerstones of reformatory policies, have offsetting effects on the size of informal production within an import-competing sector. To start with our firm takes the advantage of the wage differential between the formal and the informal sector. To do that it needs to pay a bribe to the monitoring official. A decline in tariff reduces the cost due to bribery, reallocates production to the informal segment, making it easier for the firm to take the advantage of cheaper work force. But a drop in the rate of interest, mainly through the deregulated movement of foreign capital, cuts the cost of working capital. Credit cost of financing formal employment is relatively high due to higher wage. As credit becomes cheaper, proportion of formal hiring goes up. Thus capital market reform does reduce the size of the informal output unlike the case of a decrease in t .

Some extensions of the present work are being planned.

First, one could look at few other policies and discuss the governance issue further by bringing in the role of labour unions explicitly. This will endogenise the process of wage

formation. Second, fiscal issues, in case formal-informal division has revenue implications, could be discussed as well. It is clear that labor market reform, which tends to reduce the relative cost of formal hiring will lead to a cut back in the size of the informal sector. But a simultaneous decline in t will offset such an outcome to some extent

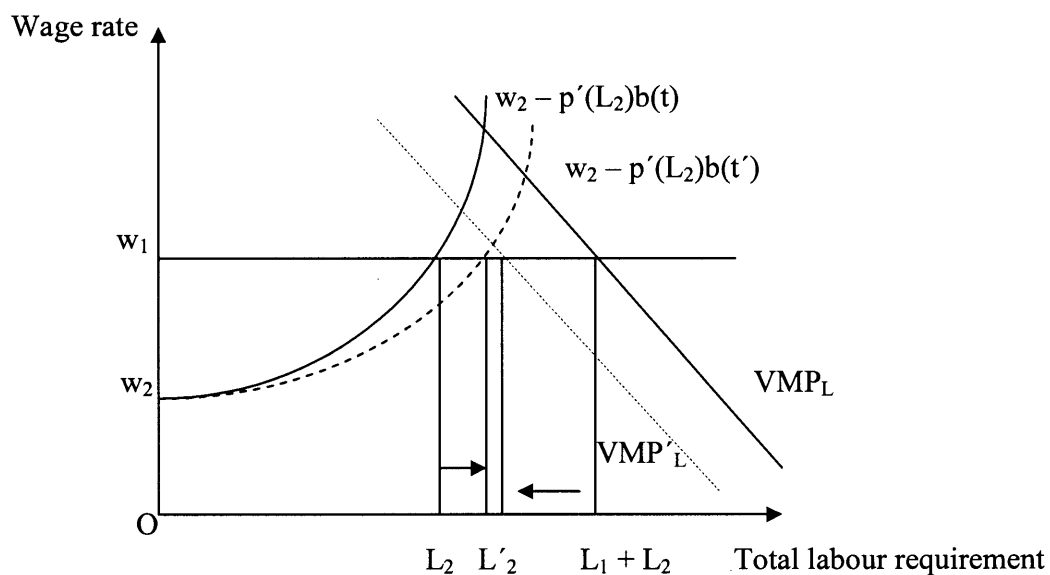


Figure (1): Effect of a fall in tariff protection ($t > t'$) on different labour sectors.

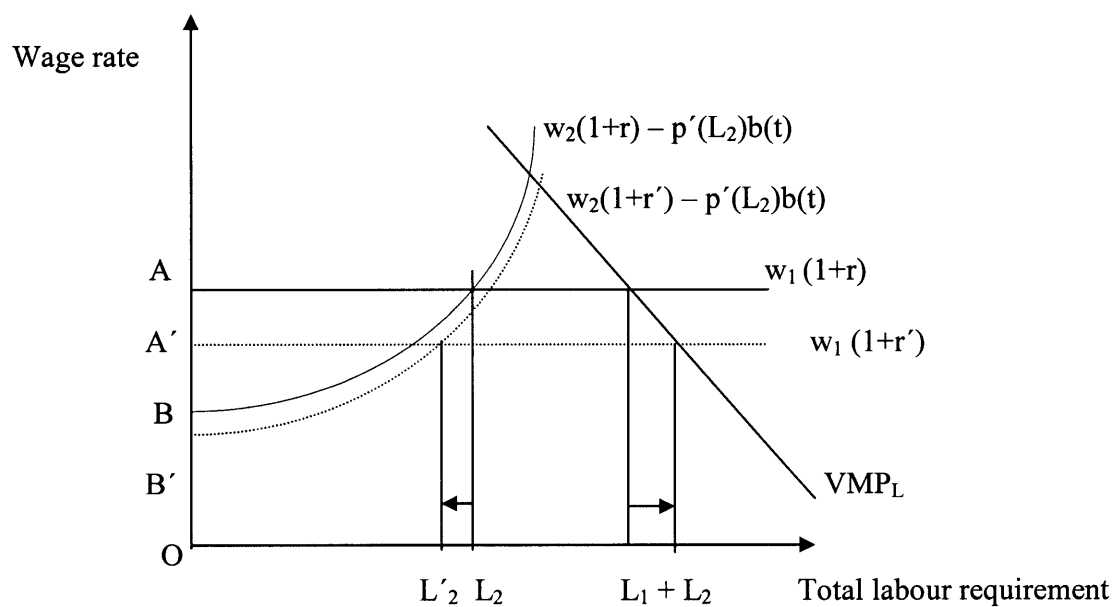


Figure (2): Effect of a fall in interest rate ($r > r'$) on different labour sectors

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Appendix - I

Differentiating further the two FOCs (equations 2 & 3), we obtain,

$$(1+t) f'' \frac{dL_1}{dt} + (1+t) f'' \frac{dL_2}{dt} = -f' \quad \dots\dots\dots(A1)$$

$$(1+t) f'' \frac{dL_1}{dt} + [(1+t) f'' + p'' \cdot b(t)] \frac{dL_2}{dt} = -f' - p' b' \quad \dots\dots\dots (A2).$$

Rearranging equations (A1) & (A2) in a vector-matrix form, we get,

$$\begin{bmatrix} (1+t)f'' & (1+t)f'' \\ (1+t)f'' & (1+t)f'' + p'' \cdot b(t) \end{bmatrix} \begin{bmatrix} \frac{dL_1}{dt} \\ \frac{dL_2}{dt} \end{bmatrix} = \begin{bmatrix} -f' \\ -f' - p'b' \end{bmatrix} \quad \dots\dots\dots (A3),$$

where the determinant, $\Delta = (1+t)f'' \cdot p'' \cdot b(t) > 0$.

From (A3), we can solve for $(\frac{dL_1}{dt})$ and $(\frac{dL_2}{dt})$.

$$\begin{aligned} \frac{dL_1}{dt} &= \frac{\begin{vmatrix} -f' & (1+t)f'' \\ -f' - p'b' & (1+t)f'' + p'' \cdot b(t) \end{vmatrix}}{\Delta} \\ &= \frac{-f p'' b(t) + p' b' (1+t) f''}{(1+t) f'' \cdot p'' \cdot b(t)} \\ &= -\frac{f'}{f''(1+t)} + \frac{p' b'}{p'' \cdot b(t)} > 0 \quad \dots\dots\dots (A4) \text{ (Equation 4 in the paper).} \end{aligned}$$

$$\begin{aligned} \frac{dL_2}{dt} &= \frac{\begin{vmatrix} (1+t)f'' & -f' \\ (1+t)f'' & -f' - p'b' \end{vmatrix}}{\Delta} \\ &= \frac{-(1+t) f'' \cdot p' \cdot b'}{(1+t) f'' \cdot p'' \cdot b(t)} \end{aligned}$$

$$= \frac{p' \cdot b'}{-p'' \cdot b(t)} < 0 \dots\dots\dots (A5) \text{ (Equation 5 in the paper).}$$

Appendix – II

From equation (8) and (9),

$$w_1(1+r) = w_2(1+r) - p'(L_2)b(t)$$

$$\text{or, } w_1 = w_2 - \frac{p'(L_2)b(t)}{(1+r)}.$$

$$\text{It implies that } -p'' \frac{dL_2}{dr} \frac{b(t)}{(1+r)} + \frac{p'}{(1+r)^2} b(t) = 0.$$

$$\text{Since, } p' < 0, p'' < 0, \frac{dL_2}{dr} > 0,$$

therefore, as r goes down L_2 will also go down.

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