

A Contemporary Perspective on the Informal Labour Market: Theory, Policy and the Indian Experience

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This article looks at the substantial literature that has emerged in recent times on the impact of globalisation, reform and deregulation on the informal labour market, in terms of theory and accompanying empirical evidence. Growth of real informal wage and productivity across all states in India since the early 1990s is an interesting starting point. While it is not a foregone conclusion that a liberal economic environment necessarily benefits such sectors, market-friendly policies can improve the real income of informal workers and thus can have a substantial effect on urban poverty. Some supportive evidence to this effect has led to analytical models that investigate these issues closely. The analysis here shows that deregulated economies may benefit the informal workers, by raising both wages and employment under certain conditions that depend on inter-sectoral capital mobility. In the process, agriculture and formal manufacturing may suffer. Labour and commodity market reform may have different and contradictory impact on informal labour. Organisational changes in production in a more open economy increase the degree of specialisation, help informal entrepreneurs, and promote exports. Lower tariffs and lower interest rates have opposite impacts on the informal segment of import competitive industries.

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The informal economy has emerged as one of the most dynamic and active segments in the developing world. Unfortunately, at the same time, it remains one of the least treated subjects in mainstream economic theory and development economics. No text on international trade or development economics offers a separate chapter on the informal sector in spite of the fact that much of the workforce in poorer countries is in this segment.

1 Introduction

In India, the informal sector provides livelihood to more than 90% of the population. If Arthur Lewis had re-written a more contemporary version of his classic article (1954) on growth with unlimited supplies of labour, he would have definitely brought this phenomenon to the core of development analysis. It should be noted that Harris and Todaro (1970) failed to recognise the fact that open unemployment among the poor and relatively unskilled in anticipation of uncertain future formal employment is not a viable proposition in the face of dire survival needs. In fact, choosing to remain unemployed especially in the absence of social assistance programmes may be construed as inconsistent with the socio-economic conditions of the very poor workers who migrate to escape starvation in the rural sector. Fields (1975), using a closer approach to Lewis' basic model, however, included a third option for the migrants in terms of the urban informal sector, albeit the choice to remain unemployed was still an open possibility. More modern treatments of the problem have been able to accommodate both open unemployment and informal employment in the conventional Harris-Todaro framework guaranteeing the fact that informal wage does not fall below the rural wage, in fact, the urban informal wage is held equal to the rural wage owing to perfect intersectoral mobility of labour (Marjit and Beladi 2008).

As has been shown in some of the contemporary studies that we take up for detailed discussion shortly, markets and competition both play dominant roles in determining wages in the informal sector. In the presence of a huge pool of unskilled labour, agriculture, a large component of the informal sector, might naturally exhibit "full employment" particularly with the large number of agricultural labourers sharing the minimum possible wage either in kind or cash and suffering from the usual economic maladies of poor countries, including food insecurity and malnutrition. A huge drop in the land-man ratio may not cause open unemployment, but will devastate the per capita income for agricultural workers. It may be argued that the problem for

the very poor and the unskilled was never lack of jobs, but the wage rate or the price at which poor workers were likely to find such employment.

It should be clearly noted that studies that deal with minimum wage, open unemployment, wage negotiations, employment subsidies, and etc, essentially cover a small percentage of the labour force in poor countries. This leaves out the majority for which the wage level and not the employment status is a more tenable criterion for measuring the conditions of living and therefore the issues of wage determination and movements should have received more attention than it ever did. For a distribution of employment highly skewed in favour of the informal sector, any set of policy parameters decided in the formal or organised segment, generally witnesses a palpable and significant spillover into the informal sector in terms of returns to capital and labour. The studies that are discussed here mainly fill this gap in the existing literature by treating the informal sector in a general equilibrium framework.

The approach has therefore been geared to address the widespread reluctance to pursue general equilibrium analyses for understanding some of the idiosyncratic features embedded in the interactions between the formal and the informal sectors. To the best of our knowledge, none of the prior theoretical and empirical studies on the informal sector discussed the general equilibrium effects of intersectoral mobility of capital and labour or of labour productivity in both and its relationship with wages. The lack of attempts might have been caused by the fact that sometimes such movements are very slow and often invisible, particularly due to constrictions created by state regulations, social constraints, or risks and uncertainties. At other times, such movements may be quite rapid and, in effect, substantiate the theory that resources in the long run do have a tendency to move from low to high return sectors. In most previous cases, the view was restricted to one single industry, or one production unit, or even one particular location. Analysis of the general conditions based on partial evidence is naturally exposed to the risk of biased relationship between economic changes and the health of a particular sector. The case of the informal sector in India has not been an exception in this regard. In some of the later studies it is pointed out that if capital is treated as a "black box" one may also obtain biased outcomes regarding wage-employment movements laden with misspecification problems.

Thus, one recurrent theme that we shall discuss deals with how the informal wage responds to unemployment among the formal or organised/unionised segment of individual industry types. It has been shown theoretically (Marjit 2003; Marjit and Kar 2004; Marjit, Kar and Acharyya 2007; Marjit, Kar and Beladi 2007; Marjit and Kar 2008 a, b; Marjit Kar and Maity 2008, etc)¹ that informal wage can move up or down depending on the assumption on capital mobility between formal and informal activities. These studies use simple general equilibrium expositions to answer a critical question – how do exogenous policy changes in the formal sector affect the wage and employment conditions in the informal sector? In the entire post-1990s decade and up to very recent times, employment in the manufacturing sector and wages in the organised sector did not show much improvement,

and neither did its capital stock. The productivity growth has also been quite limited. Compared to this, data on the wage-employment and productivity within the informal sector as available from the National Sample Survey Organisation (NSSO) for most of the states and union territories in India tell a completely different story. It has been empirically verified that, labour productivity, fixed assets, per unit value added and real wages in the informal sector, all have improved in comparison with the typical organised sector in India. Without capital accumulation in this sector, the observed upward wage movement or productivity growth would not have been possible.

In the development discourse, whatever be its ideological or rhetorical origin, "informal" is a derogatory term. Workers in this sector are sometimes coined as marginalised, underprivileged, dying to be formalised, located at the receiving end of liberal policies, suffering from undesired pitfalls of free market mechanisms, etc. Without denying the fact that the conditions of work in these sectors can be quite deplorable and raising them to acceptable standards is the need of the hour, one could still highlight the point that this sector, like many others, may easily get the benefit of a more open and liberal economic environment. This point has been noted in various recent works, such as, Harris-White and Sinha (2007) in the context of India. It is important to realise that the informal sector can be far more dynamic than the organised sector provided they have the right opportunities to flourish. Contrary to the general wisdom, the informal sector is not synonymous with an entity that necessarily stagnates in a low level equilibrium trap, in fact both informal manufacturing units and self-employed units accumulate fixed assets, invest and prosper and they may do so even at a time when their formal counterparts are often mired in complex regulations and not successful in protecting their self-interests in transition. No doubt, outcomes facing informal units are more likely to be mixed than uniform, but there are situations when markets deliver clear benefits to workers engaged in this sector. It is however, contingent not only on the degree of capital mobility as the pre-deployed capital needs to be reallocated from non-viable sectors to those offering higher returns, but also on institutional capabilities to reformulate existing regulations.

A number of issues that necessitate discussion at an early stage have to do with the emergence, sustenance and characterisation of the informal economy. What causes the informal sector to emerge and grow? Is it all economics or a refined political strategy? What are the focal points of analyses that relate informal labour to the broader issue of development? Is formalising the informal the right solution? These will be discussed in the second section of our paper. We will also try to highlight some work done in the interface of economics and politics, including those on the association of informality with property rights, social welfare and the general issue of governance.

The third section discusses trade reform and the role of capital mobility on informal wage and employment. The fourth section discusses productivity growth in the skilled sector and its resultant impact on informal wage related issues and the Indian evidence. The last section concludes.

2 The Origin and Sustainance: A Political Perspective

Definition of informal activities can be both varied and quite specific. The populist interpretation seems to be in terms of activities that are illegal, or at least extra-legal often amounting to criminal activities, highlighting tax evasion and/or undocumented production-employment relations. In a broader context unregistered firms escaping tax payments, labour regulations, environmental strictures or indulging deliberately in unrecorded activities, would be treated as the informal sector. For our purpose we shall concentrate on such activities that are extra legal, i.e., in violation of some officially specified codes of conduct but are not criminal activities. In this set of activities we shall isolate the case of the labour market where in one of the segments, labour regulations, officially recognised collective bargaining process, taxes or for that matter any institutional obligations are largely ignored; while the other is a unionised high wage sector. The issue of factor mobility between the formal and the competitive low wage informal sector constitute the core of our general equilibrium analysis. For analytical simplicity and to avoid unnecessary complications we shall use the terms informal and unorganised interchangeably.

However, before we land into the analytical domain of models dealing with informal labour, we must offer a discussion on why and how the informal sector has emerged and whether it is a deterrent to the process of development. Is it partly a conscious choice of the state or is it something that is imposed on the state? The borderline between legal and extra legal can be an endogenous political choice in a democracy, a thesis which has again been somewhat neglected in discussions on politics and economics of development.

A couple of texts that set the stage for such discussions are by Hernando De Soto (2000) and Avinash Dixit (2004), although they are written from two different perspectives. De Soto's book, *Mystery of Capital* talks about the lack of property rights and legal contracts in the informal segment that locks in huge amount of capital, blocking development all around. The policy of guaranteeing property rights, enforcement of legal contracts, etc., is expected to release capital for investment and growth. Dixit, on the other hand, talks about lawlessness of economics that necessitates appropriately designed contracts needed for conducting business. Dixit's book is a technical manuscript representing the intricacies of contractual arrangements. De Soto's is a more casual empirical work with persuasive anecdotes. Nevertheless, both in a sense admit the problems of informality in economic activities. While De Soto talks about legalising the extra-legal, Dixit provides a workable structure within the domain of the extra-legal. Both of these approaches indirectly hold the state and the regulatory structures responsible for the emergence of informal arrangements and formalising the informal seems to be the first best choice that is somehow not implemented by the state.

Contrary to these, two recent studies by Marjit, Mukherjee and Kolmar (2006) and Dasgupta and Marjit (2006) provide political rationale to the part of the state to perpetuate informal arrangements. The first one argues that given high incidence of poverty and absence of a social welfare system, a democratic state uses

the informal sector as a buffer for the poor people. The extra legal occupations work as substitutes for social security and emerge as an innovative and effective re-distributive strategy. The degree of enforcement of property rights itself becomes a strategic political variable. The existence of an unorganised sector helps the organised firms to take advantage of liberal economic policies and in a way use a disadvantage to gain competitive advantages, locally and globally. This is amply demonstrated in Marjit and Maiti (2006) and Maiti and Marjit (2008). Dasgupta and Marjit (2006) use a framework with unionised labour and informal workers and show that the state will have reasons to undermine the strength of trade unions and stealthily promote the culture of informal sector, again to push forward liberal policies. Essentially, these papers look at the possible reasons as to why the State may be reluctant in clearly defining the boundaries of legal institutions and consequently chose an optimal degree of enforcement.

In a related paper Sarkar (2006) writes on the economic policies of the left-ruled state government in West Bengal and argues that the ruling coalition has encouraged formation of the informal sector as if on a clientele mode, such that they are always in a position to control the economic lives of the poor. This is also in line with the general tenet of the argument that the informal sector becomes a necessary element of state sponsored political strategy, especially when the institutions themselves are endogenously designed and their limits are manipulated to obtain highest political returns. It may perhaps be best viewed as the well-known dilemma of rules versus discretion as exemplified in the macroeconomic theory in a different context (Barro and Gordon 1983). Institutional commitment specifies certain rules of the game relatively sticky and unmanipulable. On the other hand, the state sometimes needs flexibility to foster adopted policies and at times to steer political self-interest. Informal sector provides a great opportunity to practise discretion. Great many concerns behind formalising the informal often miss out this simple motivation of a democracy.

Marcoullier and Young (1995) is an elegant piece which is related to the political issues discussed above. It talks about the predatory state that uses informal arrangements to extract revenues.

In this context it will be interesting to look at the following research question, which seems to address serious contemporary concerns regarding the organisation of production in the informal sector in India. One could extend the line of argument developed by Sarkar (2006) and Marjit, Mukherjee and Kolmar (2006) and analyse how the state actually renders a fairly organised form of political supervision and control of the unorganised sector in India. There seems to be a tremendous "organised" intervention if one takes the case of left-ruled West Bengal. The parallel informal economy employs people, leads to politically recognised and guarded activities, and generates revenues that are redistributed to strengthen political patronage. If markets and policies promote relatively unfettered growth of small private investments, the poor people's dependence on politics and politicians will be far less and that undoubtedly poses a threat to the political power structure. Full-blown market capitalism, if it does deliver, will go against such entrenched vested interest. Yet, politicians need

markets, to the extent it absorbs the poor and helps them to have an economically meaningful existence.

The fear of massive social unrest and revolution powerful enough to shatter the very foundation of political power in a democracy seems to have been an important concern behind such huge patronage of the informal sector acting as a pure substitute for the front-door development efforts on the part of the governments. It is this kind of love-hate relationship that makes the informal sector a strategic conduit of development. This issue remains a wide and open research question.

3 Informal Sector in General Equilibrium

It is perhaps doubly important to recognise that even under such pre-existing conditions as discussed thus far, wage and employment situations in the informal sector across the country have been fairly sensitive to exogenous shocks in international trade and per se to the waves of globalisation. In the existing literature, welfare implications of trade reforms, with the informal sector as an important part of the economy, have recently come up for much discussion (Marjit and Kar 2007; Marjit et al 2007; Chaudhuri and Banerjee 2007; Chaudhuri 2003; Marjit 2003; Chaudhuri and Mukhopadhyay 2002; Chen 2000; Kar and Marjit 2001, etc). A primary reason as argued earlier, is that, leaving out the informal sector fails to capture the actual impact of such policy reforms since on an average 70% of the labour force in the less developed countries (LDCs) work under arrangements outside the purview of what is typically known as the formal/organised sector. Data from the south-east Asian, East European, African, and Latin American countries show varying rates of urban informal sector employment within the range of 15% to 20% in Turkey and Slovakia to 80% in Zambia, or even more, to about 83% in Myanmar. Moreover, considering the state of agricultural and rural activities in these countries, it is quite apparent that the total shares of the informal sector in these countries are quite high (ILO 1999). This is also corroborated by some of the other studies (for example, Turnham 1993), which provide evidence that in low-income countries like Nigeria, Bangladesh, Ivory Coast, India, and elsewhere, the share of the urban informal sector is at least as high as 51%. Alternatively, seen from the point of view of the “minimum wage” earners, only 11% of Tunisia’s labour force, for example, is subject to minimum wage; in Mexico and Morocco, a substantive number earns less than the minimum wage; in Taiwan, the minimum wage received by many is less than half of the average wage and, etc (Agenor and Montiel 1996).

There are conjectural suggestions that the level of informalisation in a country increases as the economic reforms are initiated. A more general concern that follows is that such expansion will reduce informal wage with retrenched workers crowding in from the formal sector. Some of the above mentioned studies show that despite contraction of the previously protected and often state-run formal sector as a consequence of trade liberalisation, and consequent relocation of relatively unskilled and older workers into the informal segment, informal wage can still rise if capital also relocates into the informal sector.

Although generally, the informal sector activity pertains to non-traded items in the economy, from street vendors to domestic

help, in many countries they produce intermediate goods, processed exportable and import substitutes with subcontracts from the formal sector. In such cases, the formal sector often adds the capital content (like, the brand name) only. In many other cases, informal industries that produce garments, leather goods, small tools and machinery are known to export directly – often by passing the formal regulations and procedures mainly through adjacent border trade.² Apart from that, in all the developing countries, agriculture, poultry and fisheries are predominantly outside the formal sphere and consumer non-durables such as vegetables, fish and meat are procured from informal producers, processed and traded. Analysing the impact of industrial and trade reform on these activities and on the workers employed therein should offer a wider view in favour of appropriate policy formulations. It is to be noted that given the considerably large share of employment in these sectors even small positive gains in the real wage, can increase the economic attainments of millions in most developing and transition countries.

As briefly referred to earlier, let us re-emphasise the fact that mobility and more specifically the degree of mobility of capital is one of the most instrumental factors behind tracing the connection between either prosperity or ruin in the formal sector to the implications it might have for the informal counterpart. In this connection, it is imperative to discuss the precise mechanism that captures the issue of capital mobility, typically since there is neither a measure nor statistical evidence on how capital takes flight from dwindling industries and relocates into the prospering ones. Marjit (2003) and later Marjit and Kar (2007), Marjit, Kar and Beladi (2007) explore this issue in greater detail. Of these, Marjit (2003) shows that even if a part of the informal sector is vertically linked with the formal sector and the formal sector contracts due to trade liberalisation, informal wage can still increase. In the other paper capital mobility plays a major role in a two sector formal-informal framework. Capital immobility reduces informal wage when informal employment expands, whereas allowing for freer capital mobility leads to exactly opposite outcomes.

While there are several other mechanisms that can generate such positive economic impact for the existing group, here the argument behind invoking the issue of capital mobility comes from the observation that several developing countries have been experimenting with policies on trade reform for quite some time, wherein the critical feature has been the contraction of the formal protected industries, either, via, import liberalisation or through state initiatives in withdrawing support from loss-making public enterprises. This implies that a large amount of capital and labour that were earlier part of these industries would now have to relocate to a more profitable venture. In most of these countries, the vacuum left by the vanishing large-scale public industries have been filled not by similar manufacturing units, but by predominantly service-oriented industrial structure which faces less stringent labour laws and industrial regulations. And, moreover, the new opportunities that have emerged in the so-called sunshine industries are incapable of accommodating the retrenched capital and labour, a larger share of which has hence been devoted to less formal applications. There may be several explanations for this transition, which include the fact that workers in typical import-competing

public or private enterprises would not find an easy access to the more formal service industries, which recruit high-skilled professionals with advanced technical expertise that these older industries rarely employed. We present a formal model below, which captures the exact mechanism whereby capital mobility affects the informal wage subject to downsizing of the formal sector.

Assume a two-sector small open economy. X is produced in the formal manufacturing sector and Y is the informal manufacturing sector. Both X and Y use labour and capital. Wage in the formal segment is fixed through bargaining. Initially, X is protected either through a tariff or by a state subsidy, which artificially increases the price of X . Trade reform or withdrawal of subsidy implies a decline in the tariff/subsidy rate, denoted by t . Workers, who do not find jobs in the formal sector flock in sector Y where they receive the market determined wage rate. We call this the informal wage. There is no open unemployment in this model. People must find jobs to survive, and wage in the informal sector adjusts fully to accommodate workers moving into the sector. Markets are competitive and technology exhibits CRS and diminishing marginal productivity.

The model is similar in spirit to Agenor and Montiel (1996), Carruth and Oswald (1981), Marjit and Beladi (2002) and Marjit (2003). Capital and land are fully employed.

The symbols we use are given as follows:
 \bar{w} : Formal unionised wage; w : Informal (flexible) wage
 r_i : Return to capital in sector i , $i=X, Y$; X : Output of formal sector;
 Y : Output of informal sector; (P_X, P_Y) : Exogenous commodity prices
 \bar{L} : Supply of labour; \bar{K} : Total supply of capital
 K_i : Supply of capital in sector i ; (a_{LX}, a_{LY}) : Per unit labour use in X and Y .

(a_{KX}, a_{KY}) : Per unit capital use in X and Y ; t : Import tariff.
 $\hat{\ }^{\wedge}$ represents percentage changes for particular variables and symbols used bear the same implications as in Jones (1965).

Competitive price equations that describe the system are given by,

$$\bar{w}a_{LX} + r_X a_{KX} = P_X(1+t) \quad \dots(1)$$

$$wa_{LY} + r_Y a_{KY} = P_Y \quad \dots(2)$$

Commodity prices are given from the rest of the world. Let us suppose Y is exported and X is imported.

Full employment conditions imply:

$$a_{LX}X + a_{LY}Y = \bar{L} \quad \dots(3)$$

$$K_X + K_Y = \bar{K} \quad \dots(4)$$

$$a_{KX}X = K_X \quad \dots(5)$$

$$a_{KY}Y = K_Y \quad \dots(6)$$

Let \hat{w} be so determined that,

$$\hat{w} = \alpha \hat{P}_X + \beta \hat{P}_Y, 0 < \alpha, \beta < 1 \quad \dots(7)$$

Finally, the capital mobility condition:

$$\frac{K_X}{K_Y} = \phi \left(\frac{r_X}{r_Y} \right), \phi > 0 \quad \dots(8)$$

Equation (8) suggests the following. At any point of time \bar{K} is allocated between X and Y . But such allocation depends on return differential. Hence there is imperfect mobility of capital. If $\left(\frac{r_X}{r_Y} \right)$,

increases, $\frac{K_X}{K_Y}$ will also increase. $\frac{K_X}{K_Y}$ describes the relative supply of capital in sector X . The usual way to model this is to assume sector-specific capital for X and Y without any mobility with $\phi=0$. Perfect mobility will always imply $r_Y = r_X$ and there is no relevance for a separate sectoral supply function of capital. Relative supply adjusts to demand in each sector and this is the standard Heckscher-Ohlin structure. We shall demonstrate that our comparative static depends on the curvature of $\phi=0$.

Given $(P_X + t, P_Y)$, \bar{w} , L , and K , we have $w, r_X, r_Y, X, Y, K_X, K_Y$ to solve from (1)-(6) and (8). The determination of general equilibrium proceeds as follows. From (1) we can determine r_X . Now using (4) and (8) we get (8)'

$$\frac{\bar{K} - K_Y}{K_Y} = \phi \left(\frac{r_X}{r_Y} \right) \quad \dots(8)'$$

As r_Y increases, given r_X and $\phi' > 0$, K_Y must rise. This defines the relationship MM in figure (1). Now using (5), (6) and (3),

$$\frac{a_{LX}}{a_{KX}} (\bar{K} - K_Y) + \frac{a_{LY}}{a_{KY}} K_Y = \bar{L} \quad \dots(9)$$

Since r_X is given by CRS, $\frac{a_{LX}}{a_{KX}}$ is given. Now as r_Y increases, from (2), $\frac{r_Y}{w}$ must rise and $\frac{a_{LY}}{a_{KY}}$ must rise as well. Hence in equation (9) the LHS unambiguously increases. To bring back the balance K_Y must fall substantially. As long as $\frac{a_{LY}}{a_{KY}} > \frac{a_{LX}}{a_{KX}}$, LHS must decrease with a decline in K_Y . Such an assumption implies that the informal sector is labour-intensive; an assumption by virtue of being realistic is kept all through the paper. Therefore as r_Y rises, K_Y must fall. This defines FF in Figure 1 (p 65). Once (r_Y, K_Y) are determined from Figure 1, the rest of the variables can be determined easily.

The key comparative static exercise we are interested in is a decline in 't'. Figure (1) helps us to trace out the consequences of both. A decline in t reduces r_X , given \bar{w} and P_X . Given r_Y , a drop in r_X increases K_Y , as $\phi' > 0$. This will mean a rightward shift of MM to MM' .

At the same time given r_Y and K_Y , a drop in r_X reduces $\frac{a_{LX}}{a_{KX}}$ and therefore LHS in (9) declines. The balance is restored through an increase in K_Y at a given r_Y . FF shifts to the right as well. The way Figure 2 (p 65) is drawn suggests that Y must expand. But r_Y may remain unchanged and can in fact go either way. Note that if MM shifts quite a bit relative to FF , r_Y will decline and w will increase. The mobility effect has to be significant for a positive effect on the informal wage. A drop in $\frac{a_{LX}}{a_{KX}}$ releases labour to Y sector, which implies that FF shifts up requiring more K_Y to accommodate displaced labour. Additional capital that comes to Y because r_X is lower must outweigh the required amount needed to absorb displaced labour at a given r_Y , hence at a given w to induce an increase in w . With zero mobility MM is vertical and remain unchanged. Hence, r_Y must increase and w must decrease through a shift in FF . With perfect mobility MM is horizontal at $r_Y = r_X$ and as r_X drops, MM shifts down. Notwithstanding the shift in FF , r_Y must adjust to the new level of r_X and w must increase. Figure 3 (p 65) describes the effects of such adjustments.

The above two cases explicitly demonstrate the partial and general equilibrium results that can be derived from this model. In Figure 2, the vertical line MM represents perfect immobility of capital between the formal and the informal segments. Under the circumstances, formal job losses and crowding in of workers into the informal sector leads to wage cuts in the latter. The situation

undergoes a complete reversal if capital is perfectly mobile and is represented by a horizontal line *MM* (Figures 2 and 3). Retrenchments from the formal sector and additional job creation in the informal could even lead to a wage gain for the informal workers, thus establishing the general equilibrium implications of our model. Finally, the precise condition for $\frac{dw}{dt} > 0$ is given by: $\hat{w} > 0$, iff, $\varepsilon > \sigma_X K_X f\left(\frac{\lambda_{LX}}{\lambda_{KX}}\right)$... (10)^{3,4}

Figure 1

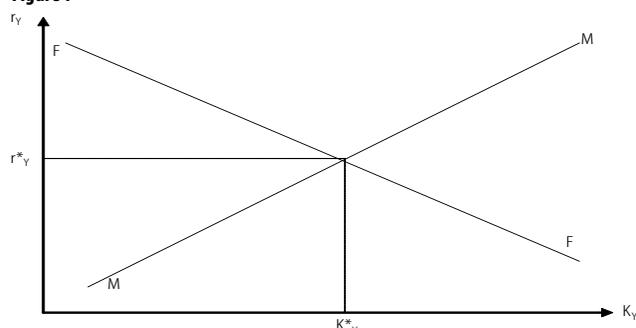


Figure 2

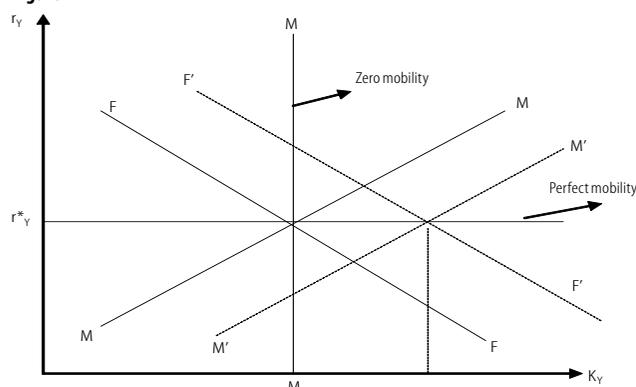
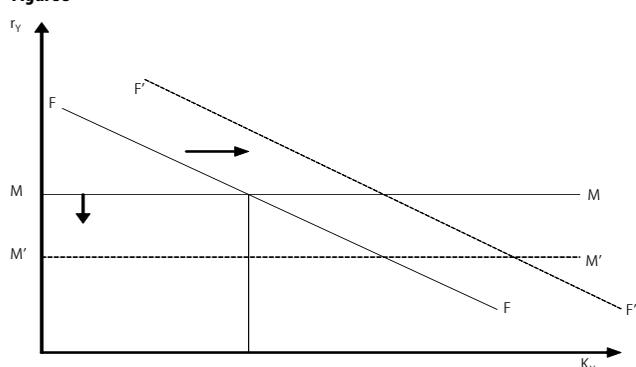


Figure 3



3.1 Empirical Evidence for India: Capital Mobility and Informal Wage

It is best to admit that relating informal wage and trade liberalisation via intersectoral capital mobility is a more difficult job empirically, than theoretically. The empirical structure is highly dependent on the availability and reliability of data on the informal sector. For India, however, there exist the surveys of informal units by the nssso – usually five-yearly samples drawn from almost all states and union territories in the more recent years. The survey covers the average yearly wage, employment, major

occupational categories by broad industry types, gender, fixed assets and value added of the informal units classified as non-directory manufacturing enterprises (NDMES) and own account enterprises (OAEs), both rural and urban in either case. Given this, our next concern is which variables to use that capture the impact of capital accumulation on wages, best. To this end we take up only urban NDMES given their strong inter-linkages with the urban formal sector for five consecutive rounds, 1984-85, 1989-90, 1994-95, 1999-2000 and 2000-01, for 17 states in the first period as per availability that extends to all states and union territories for the subsequent rounds. We intend to show that the period of gradual trade liberalisation in India, i.e., the post-1991 decade which led to closures of many formal and traditional industries releasing unskilled labour in large numbers, coincides significantly with annual (real) growths in (i) urban informal wage (*iw*), (ii) urban informal fixed assets (as a proxy for capital formation, *FA*) and (iii) urban informal value added (*VA*). We estimate the impact of the latter two variables on real informal wage (deflated by 1989-90 consumer price index of India).

The logic behind such modelling emanates from the observation that trade liberalisation drives capital and labour into the informal sector and yet the wage rises across states, steeply for some and moderately for the rest leading to an average annual

Table 1: Descriptive Statistics for the Variables (Year-wise)

Year	Variables	Mean	SD	Skewness	Kurtosis	Minimum	Maximum	Observations
1989-90	IW	(-15.08	3.45	0.97	3.16	(-18.96	(-6.75	17
	FA	4.71	9.29	0.54	3.18	(-10.75	26.92	17
	VA	(-7.90	7.12	1.20	4.20	(-19.04	10.00	17
1994-95	IW	20.72	10.97	0.22	3.03	(-0.43	47.97	30
	FA	3.23	12.93	1.36	5.99	(-19.28	47.98	30
	VA	5.89	13.31	1.98	7.94	(-12.24	56.44	30
1999-2000	IW	1.29	7.65	1.26	4.76	(-9.07	25.49	30
	FA	58.50	50.32	1.35	4.16	(-13.24	208.01	30
	VA	42.05	32.67	1.47	4.93	3.48	140.38	30
2000-2001	IW	44.18	28.51	(-0.52	3.30	(-37.11	90.74	30
	FA	(-10.52	35.77	0.87	4.19	(-69.15	99.74	30
	VA	(-40.18	25.04	0.82	4.42	(-94.69	26.49	30
All years	IW	16.16	26.84	0.81	3.20	(-37.11	90.74	107
	FA	15.10	43.33	1.69	7.54	(-69.15	208.01	107
	VA	0.92	38.68	0.59	4.54	(-94.69	140.38	107

Description of variables:

IW = Annual growth rate of real informal wage.

FA = Annual growth rate of real fixed assets.

VA = Annual growth rate of real value added.

Table 2: Regression Results for Individual Time-Points Corrected for Heteroscedasticity (Generalised Least Squares, Dependent variable: Annual Growth Rate of IW)

Year	Exp Variables	Coeff	t-ratio	R ²	Adj R ²	AIC	LL
1989-90	Constant	(-) 11.35	(-) 6.70473*	0.48	0.36	5.01	(-) 39.10
	FA	0.102	2.588*				
	VA	0.233	5.098*				
1994-95	Constant	15.89	8.846*	0.23	0.14	7.59	(-) 109.98
	FA	0.278	2.190*				
	VA	0.183	1.744**				
1999-2000	Constant	(-) 3.76	(-) 1.622	0.16	0.06	6.961	(-) 100.42
	FA	0.014	0.4587				
	VA	0.083	2.041**				
2000-2001	Constant	69.56	5.691*	0.30	0.23	9.41	(-) 137.09
	FA	0.152	0.8636				
	VA	0.607	2.239*				

* denotes significance at 5% level and ** denotes significance at 10% level.

Adj R² = adjusted R², AIC = Akaike Information Criterion, LL = Log-likelihood.

Table 3: Unbalanced Panel Regression on Real IW

Dependent Variable: Real Informal Wage (1989-2005); Independent Variable: Real Fixed Assets and Real GVA

Exp Variables	Coeff	t	R ₂	sigma_u	sigma_e	F(25, 102) test that all u _i =0
Fixed Effect (within) Regression						
Constant	70.148	5.360*	0.501	23.925	44.744	1.29
FA	0.025	5.710*				
GVA	0.044	4.180*				
Exp variables	Coeff	z	R ₂	sigma_u	sigma_e	Wald chi2(2)
Random-effects GLS regression						
Constant	69.009	6.430*	0.512	7.670	44.744	129.23
FA	0.020	5.730*				
GVA	0.054	5.970*				
Exp variables	Coeff	Difference	chi2(2)	Prob>chi2		
	FE	RE				
Hausman Test						
FA	0.025	0.020	0.006	5.75	0.0565	
GVA	0.044	0.054	-0.010			

* denotes significance at 5% level (Hausman test supports acceptance of fixed effects).

Table 4: Share of Workers in Unorganised Manufacturing Sector by States
(% of total state level manufacturing workers)

	Without DME			With DME		
	1989-90	1994-95	2000-01	1989-90	1994-95	2000-01
Andhra Pradesh	79.77	71.90	79.15	82.07	74.14	81.20
Assam	72.71	85.66	83.66	75.21	86.00	84.36
Bihar	87.52	90.05	92.67	88.20	90.58	92.95
Gujarat	64.90	65.55	63.41	75.19	76.05	72.88
Haryana	65.37	53.59	60.12	69.77	60.21	65.90
Himachal Pradesh	87.88	76.67	81.84	88.73	78.31	83.87
Karnataka	81.86	79.20	81.44	85.61	84.03	84.98
Kerala	82.00	63.87	75.86	86.33	69.83	80.28
Madhya Pradesh	80.44	79.83	87.23	82.30	81.13	88.28
Maharashtra	68.16	62.96	71.94	74.10	72.00	78.43
Orissa	95.04	95.36	95.57	95.20	95.45	95.69
Punjab	61.17	55.97	66.47	65.83	62.55	72.80
Rajasthan	85.49	80.12	85.37	86.76	81.20	86.72
Tamil Nadu	77.68	69.45	73.89	81.83	75.79	78.82
Uttar Pradesh	87.37	89.71	91.31	89.18	91.03	92.89
West Bengal	90.74	87.02	91.87	91.41	88.28	92.79
Delhi	72.56	74.00	85.80	85.11	85.74	91.81
All India	82.40	66.91	83.52	84.83	70.91	85.80

Source: ASI and NSSO (respective years), DME: Directory Manufacturing Enterprises.

Table 5: Share of Gross Value Added and Workers in the Informal Sector by Industry

	Share of workers in Informal Sector (%)					Share of GVA in Informal Sector (%)				
	1978-79	1984-85	1989-90	1994-95	2000-01	1978-79	1984-85	1989-90	1994-95	2000-01
Food, beverages and tobacco	72.23	87.02	85.29	82.32	82.73	41.76	52.18	41.99	33.67	43.09
Textiles	77.98	89.56	83.96	81.50	77.72	33.93	53.48	37.81	28.33	46.35
Wood	94.75	97.01	97.60	97.01	95.28	44.37	71.76	51.36	66.99	93.57
Paper	71.97	68.60	84.55	69.26	80.29	65.34	69.85	66.37	50.14	22.67
Leather	64.54	81.63	80.93	85.09	71.27	70.12	68.72	70.75	51.05	40.50
Chemical	56.93	54.80	38.85	18.37	35.07	8.67	10.92	4.78	4.44	2.95
Rubber plastics and petroleum	76.64	83.58	92.35	89.53	46.87	3.96	5.65	11.45	4.28	10.38
Nonmetal	25.53	25.67	20.56	21.59	85.12	33.68	33.42	31.23	28.56	31.82
Basic metals	55.96	60.91	66.22	67.20	15.82	3.66	5.14	4.51	2.30	3.24
Metal products	49.99	59.56	75.96	74.31	81.24	45.38	58.47	49.57	45.32	41.61
Machinery and equipment	25.66	33.58	52.89	49.78	83.53	8.07	10.34	12.66	9.93	25.51
Transport	65.69	71.51	81.75	82.85	23.49	17.61	31.33	32.61	29.67	6.35
All	71.25	82.81	81.46	78.37	78.42	27.07	37.33	29.87	21.71	28.07

Source: ASI and NSSO; Note: Re-estimated according to NIC definition 1998.

real wage growth of 10% somewhat contrary to conventional wisdom (see Appendix II, Figure 1 (p 70), and also for abbreviations for provinces and union territories). What could possibly explain

the post-reform average rise in the wage if more unskilled labour formerly part of the organised sector flows into the informal counterpart due to contraction of the formal industries and consequent unemployment? It is observed that a rise in FA, an equivalent to capital formation, affects the informal wage positively as does a rise in the value added for each such unit. We run individual cross sections for each year and then pool the data for all the available years to run a pseudo-panel regression on the same set of variables to capture the overall impact on real informal wage (Figures 2 and 3 provide the annual growth rates of real FA and real VA, respectively). Appendix II offers detailed descriptive statistics for the variables under consideration and we have checked that there does not exist substantial problem of multi-collinearity among the variables. It should be noted that there are many other important variables that are potential candidates in the exercise, such as wages by gender, specific occupational types, literacy rates and so on, which are excluded here mainly to provide an aggregative explanation of the driving relationship, the growth of the informal wage in a period dominated by industrial trade liberalisation.

The state-wise and year-wise movements of the two explanatory variables, informal value added (real VA) and informal fixed assets (real FA) are reported in Tables 8 and 9, respectively (Appendix II). During 1989-90 and 1994-95 immediately after the reforms took effect in India, informal fixed asset shows high growth rate in most of the states while some report negative growth (BH, HP, LA, ME, etc). Between 1994-95 and 1999-2000 informal fixed assets grew positively (10% to 150%) for 29 out of 30 locations in India, with the exception of Manipur (MA). The pattern, however, seems dampened for many states during 1999-2000 and 2000-01. The real value added (VA) also registered a negative trend for all states except Gujarat and West Bengal during 1984-85 and 1989-90. It underwent a turnaround in the post-reform period, when most states and union territories showed significant increase in the value added. Finally between 1999-2000 and 2000-01 it reports negative growth rates in most states.

The dependent variable in our model, the growth rate of real informal wage (IW) shows a negative growth for all the states between 1984-85 and 1989-90. The trend shifted substantially in favour of informal workers in the period immediately following the introduction of economic reforms in India. All the states including, GJ, MH, OR (22%), TN, RJ (32%), AP (38%) showed significant positive annual growth in informal wages. Between 1994-95 and 1999-2000, 29 out of 30 locations, except WB (-2%) show moderate positive annual growth of informal wage and the post-reform average annual growth in informal wage is recorded at between 15-20% with

a variance of 26% between states.

Therefore, using a simple empirical model

$$w_t = \alpha_t + \beta_1 (FA)_t + \beta_2 (VA)_t + \epsilon_t \dots(11)$$

Table 6: Unorganised Manufacturing by Types of Enterprises

Year	Share of Enterprises in (%)			Absolute Number of Enterprises			Total
	OAME	NDME	DME	OAME	NDME	DME	
1978-79	95.68	4.32		7,187,173	324,197		75,11,370
1984-85	86.77	10.67	2.56	1,53,56,726	18,89,176	4,52,509	17,6,98,411
1989-90	86.93	9.56	3.72	1,27,09,320	1,3,98,056	5,43,409	1,46,20,785
1994-95	84.59	10.40	5.01	1,07,10,987	13,16,757	6,34,004	1,26,61,748
2000-01	86.19	10.05	3.76	1,46,70,000	17,10,000	6,40,000	1,70,20,000

Source: NSS report (various rounds).

Table 7: Workers in Unorganised Manufacturing by Types of Enterprises

Year	Share of Enterprises (in %)			Absolute Number of Employed			Total
	OAME	NDME	DME	OAME	NDME	DME	
1978-79	77.78	22.22		12,984,221	37,09,557		1,66,93,778
1984-85	74.15	12.62	13.23	2,54,18,255	43,27,124	45,35,870	3,42,81,249
1989-90	69.38	13.40	17.22	2,27,89,981	44,02,547	56,56,635	3,28,49,163
1994-95	68.11	13.69	18.19	2,05,12,449	41,24,179	54,78,046	3,01,14,674
2000-01	67.58	14.99	17.42	2,50,60,000	55,60,000	64,60,000	3,70,80,000

Source: NSS report (various rounds).

where, a is constant, w is real informal wage, t is year, ϵ the error term and rest as defined, we offer results from a generalised least square regression (Table 2, p 65), after correcting for presence of heteroscedasticity in the error terms. Between 1984-85 and 1989-90 (denoted as 1989-90 in Table 2), all the elements significantly explain changes in the informal real wage. Notably, the intercept term is negative. Admittedly, the explanatory power of the regression (Adjusted R -squares) analysis declines over time.

Subsequently, we offer a pooled (a pseudo panel) regression for these variables:

$$w_{it} = \alpha + \beta X_{it} + \epsilon_{it} \quad \dots(12)$$

where, w_{it} = real informal wage pooled for i states and t periods, $i = 1..N$, the number of states, β is the coefficient vector for the explanatory variables (X), $t = 1..T$ the time periods and follows $N(0, \sigma^2)$. The findings are reported in Table 3 (p 66). The panel regression tests for whether the fixed effects (FE) or the random effects (RE) model is consistent with the data, given that the FE/RE is the natural choice over classical regression (CR) model since

Table 8: Real GVA Per Worker by States (Rs)

State	Formal			Informal without DME			Informal with DME		
	1989-90	1994-95	2000-01	1989-90	1994-95	2000-01	1989-90	1994-95	2000-01
Andhra Pradesh	55,859	93,600	99,091	4,288	5,334	7,273	4,394	5,841	8,154
Assam	1,21,584	1,02,492	1,18,578	6,462	5,649	9,960	7,532	5,912	11,194
Bihar	1,54,334	1,74,546	2,21,411	7,425	5,843	8,136	7,813	5,976	8,637
Gujarat	1,17,194	2,29,594	2,83,751	19,301	12,906	16,638	15,132	15,544	19,125
Haryana	1,09,689	1,50,910	2,23,213	8,374	15,522	15,858	14,170	20,137	18,314
Himachal Pradesh	1,15,405	1,88,139	3,54,982	12,191	7,159	11,362	13,403	7,682	14,487
Karnataka	1,20,800	1,73,724	1,94,272	5,330	6,596	8,816	5,646	7,067	9,840
Kerala	1,06,577	78,337	1,08,657	5,740	7,969	11,124	6,511	8,595	12,983
Madhya Pradesh	1,47,232	2,17,470	2,77,599	5,271	6,373	6,420	5,985	9,264	7,271
Maharashtra	1,85,831	2,68,129	3,15,094	9,277	11,941	13,557	15,004	16,451	17,494
Orissa	1,70,424	1,58,313	2,12,283	2,273	2,325	3,482	2,556	2,467	3,758
Punjab	1,13,433	1,16,937	1,29,110	12,319	14,850	16,994	14,172	16,885	20,432
Rajasthan	1,03,813	1,96,273	2,51,614	6,882	10,339	12,536	8,152	11,115	13,940
Tamil Nadu	1,06,940	1,35,241	1,49,697	5,029	8,118	9,263	6,516	11,038	11,958
Uttar Pradesh	1,16,773	1,92,203	2,14,509	5,491	6,485	7,498	6,340	7,588	8,860
West Bengal	67,296	98,239	1,06,662	4,890	5,491	7,078	5,511	6,285	8,542
Delhi	1,05,609	2,22,398	1,91,485	23,237	18,695	26,960	11,544	20,412	29,247
All India	1,17,200	84,775	1,98,646	3,948	6,951	8,927	5,394	8,792	11,075

Source: ASI and NSSO (respective years).

the value of the Lagrange Multiplier is very large. Further, between FE and RE the results from the Hausman Test suggest that FE is the appropriate model to use. Consequently, we use the methodology of Least Squares Dummy Variables after correcting for heteroscedasticity. According to this model, however, the real FA is not significant, although, with a positive impact on real rw. Real va on the other hand is positive and highly significant (at 1% level) in explaining the increase in real rw. The panel regression is consistent with the cross section results, in that, the real va continues to be significant in explaining the real informal wage while the FA is not, although the general direction is positive as expected.

4 Labour Productivity and Informal Wage

This section offers the empirical relationship between labour productivity growth in the informal sector and the informal wages, another area that we have already explored theoretically (Marjit and Kar 2008a, b). Intrinsic differences in labour productivity are difficult to measure since much depends on the complementary factors. If capital is sticky and not flowing freely into the informal segment, then the informal labour productivity might remain low. Below we offer some features that are expected in this relationship.

- (1) Productivity of informal workers is directly related to the market-determined informal wage and the labour supply curve may not be infinitely elastic.
- (2) Capital should play some role in determining the level of labour productivity. Very strong trade unions/high effective hiring cost in the organised sector may have mixed effects on informal wage depending on capital mobility (Marjit and Maiti 2006).
- (3) More productive formal sector workers again should impart mixed effects on informal wage and productivity (Marjit and Kar 2007b)
- (4) Even if informal workers do have similar productivities and work at lower wages, firms may still prefer working with formal labour (Marjit, Biswas and Ghosh 2007; Marjit and Maiti 2007).

(5) Wage growth in the informal sector may increase labour productivity in the formal sector.

A few of these assertions are verified with Indian data. In particular, we look at the relationship between wage and productivity in formal/informal sector, nature of productivity growth in these segments and the role of capital (also see Marjit and Maiti 2007).

The Data

As an extension of the previous study, we now include all the categories, namely, own account manufacturing enterprise (OAME), non-directory manufacturing enterprise (NDME) and directory manufacturing enterprises (DME). The OAME does not hire any labour while NDME and DME are those which hire up to five workers and more than five workers, respectively, on fairly

Table 9: Real Fixed Assets Per Enterprise by States (Rs)

State	Formal (Capital Formation)			Informal without DME			Informal with DME		
	1989-90	1994-95	2000-01	1989-90	1994-95	2000-01	1989-90	1994-95	2000-01
Andhra Pradesh	67,37,426	1,36,28,606	1,28,28,948	7,153	10,070	19,073	na	10,433	23,621
Assam	87,47,398	1,16,04,739	2,64,28,740	9,545	8,181	11,392	na	8,141	12,960
Bihar	2,73,43,846	3,66,55,000	3,93,36,617	14,161	10,407	15,611	na	9,899	16,739
Gujarat	1,24,55,562	2,10,40,161	3,49,61,584	33,955	39,400	61,114	na	64,018	88,207
Haryana	1,42,11,286	1,71,71,870	2,14,77,713	25,923	38,572	85,142	na	9,300	116,138
Himachal Pradesh	4,95,15,313	5,44,27,435	4,59,03,881	35,812	16,491	34,512	na	10,045	50,454
Karnataka	1,00,05,869	1,47,85,496	2,56,67,300	9,440	13,488	21,929	na	20,321	31,917
Kerala	95,37,991	91,41,109	96,12,778	10,462	15,874	32,901	na	8,267	48,350
Madhya Pradesh	3,54,44,595	4,67,91,189	3,14,38,982	11,032	14,502	19,586	na	13,624	23,913
Maharashtra	1,73,39,473	2,21,67,655	2,49,06,624	21,228	39,463	53,213	na	78,891	85,447
Orissa	5,09,68,757	6,34,02,305	4,70,72,000	4,405	3,842	7,381	na	4,634	8,340
Punjab	1,16,99,694	1,51,47,740	81,31,834	32,877	13,820	71,867	na	16,978	1,13,637
Rajasthan	187,81,142	2,25,39,896	1,82,77,211	20,362	13,952	39,015	na	12,587	46,254
Tamil Nadu	97,10,269	1,34,25,883	1,24,15,718	10,421	8,747	33,725	na	18,449	53,222
Uttar Pradesh	1,70,19,438	2,77,18,705	2,41,35,866	13,433	9,083	24,308	na	11,217	33,410
West Bengal	1,94,64,024	3,49,23,640	1,93,55,927	5,833	6,782	12,120	na	6,223	16,717
Delhi	23,83,993	80,63,169	43,23,406	95,998	93,271	2,41,282	na	1,99,058	317,632
All India	1,41,26,454	2,04,74,363	2,07,39,871	12,839	13,392	28,260	na	28,921	40,759

Source: ASI and NSSO (respective years).

Table 10: Real Fixed Assets Per Worker by States (Rs)

State	Formal (Capital Formation)			Informal without DME			Informal with DME		
	1989-90	1994-95	2000-01	1989-90	1994-95	2000-01	1989-90	1994-95	2000-01
Andhra Pradesh	1,54,316	2,54,548	2,35,606	4,089	5,243	10,281	na	5,970	11,501
Assam	1,36,693	1,73,320	410,118	5,648	4,117	6,631	na	4,207	7,234
Bihar	3,35,559	4,99,934	6,50,584	8,588	5,792	8,409	na	5,765	8,711
Gujarat	2,43,629	4,43,014	8,89,661	15,867	20,156	31,311	na	19,859	32,146
Haryana	2,44,875	2,76,643	4,39,167	14,449	20,403	47,884	na	23,929	53,407
Himachal Pradesh	3,97,096	4,95,145	7,81,297	21,898	11,947	24,676	na	12,016	31,980
Karnataka	1,86,539	2,60,346	5,00,914	5,622	7,611	13,696	na	8,345	16,247
Kerala	1,52,507	1,32,450	1,77,392	6,236	8,572	19,292	na	9,606	22,985
Madhya Pradesh	4,28,826	6,09,608	5,49,945	6,469	7,544	10,809	na	8,173	12,185
Maharashtra	3,00,772	4,17,278	5,64,624	10,982	18,932	29,033	na	28,445	35,614
Orissa	5,90,072	7,61,587	7,90,651	1,916	1,751	3,372	na	2,073	3,729
Punjab	2,27,945	2,95,733	2,08,539	18,341	7,764	41,778	na	9,223	51,973
Rajasthan	2,92,077	5,03,268	5,32,182	11,076	7,862	23,225	na	8,521	25,159
Tamil Nadu	1,78,805	2,73,528	2,76,399	5,403	4,509	18,619	na	6,906	23,618
Uttar Pradesh	2,65,324	4,81,226	5,82,058	7,130	4,318	12,499	na	4,587	14,334
West Bengal	1,81,678	3,35,965	2,58,653	2,912	3,227	6,353	na	3,820	7,894
Delhi	80,089	2,46,953	1,84,040	32,763	35,139	87,316	na	35,996	79,392
All India	2,40,626	1,85,054	4,41,981	6,828	6,739	15,043	na	16,592	18,964

Source: ASI and NSSO (respective years).

regular basis. Till date NSSO has published five reports on unorganised manufacturing from 1978-89 to 2000-01, but first three reports do not cover all information as the more recent ones.

Table 4 (p 66) shows that 85.8% of total industrial workers in India and more than 90% in some states in the year 2000-01, are employed in the informal sector. Informal shares are not only high in agro-allied industries like wood, food, beverage and tobacco, paper, leather etc, but also captures as high as 80% in non-agro industries like metal products, machinery and equipment, etc. In some industries, such as basic metal works, transport and rubber and petroleum industries, etc, the share is pretty low (Table 5, p 66). The share of informal employment also varies significantly across the states, ranging from 72.80% in Punjab to 92.95% in Bihar in 2000-01 (Table 6, p 67). Of these,

almost 86% enterprises are OAMES for the year 2000-01, and mainly in the nature of cottage industries, employing two-thirds of the workforce, while the presence of DMES is still negligible (Tables 8 and 9). Moreover, the informal sector contributes 25.5% to total industrial value addition in 2000-01 and it is on the rise in the post-reform period, albeit interstate variation is rather high – from 13.7% in Haryana to 50.9% in West Bengal.

Wage and Productivity

To find out the relationship between wage and productivity, we have run both correlation and panel regressions. While the correlation coefficient between formal wage and formal labour productivity is declining from 1989-90 to 2000-01, the correlation coefficients between informal wage and informal productivity as well as between informal wage and formal productivity are rising steadily. The regression results also tell a similar story. The regression coefficient of formal wage on formal labour productivity is not statistically significant, but that of informal wage on formal labour productivity is positive and highly significant (Table 12, p 69). These results suggest that in a typical developing country the productivity augmenting efforts in formal sector will be limited by the existence of a large informal sector thriving at lower wage rates. The expansion of informal wage must push the R&D efforts in the formal sector and eventually it should also improve the labour productivity in the formal sector.

Finally, looking at the stagnant or declining real formal wage and rising informal wage, it should be interesting to see the trend of wage gap between formal and informal sectors during the post-reform period in India. We estimate the beta-coefficient of trend factor using the standard formula, and we observe a converging trend

between the sectors. Using,

$$\frac{1}{T} \ln (w_{it}/w_{i0}) = \alpha - (e^{-\beta} - 1) \ln w_{i0} + \gamma X_{it} + u_{it} \quad \dots(13)$$

we obtain results under both fixed effects and random effects models, respectively:

$$\frac{1}{T} \ln (w_{it}/w_{i0}) = 0.07 - 0.14 \ln w_{i0} + 0.001X_{it}, R^2 = 0.48, \rho = 0.80 \quad \dots(14)$$

$$\frac{1}{T} \ln (w_{it}/w_{i0}) = 0.04 - 0.13 \ln w_{i0} + 0.001X_{it}, R^2 = 0.58, \rho = 0.56, \text{Hausman} = 0.13 \quad \dots(15)$$

The Hausman statistic suggests that the random effect model is not rejected. The rate of convergence in the wage gap is 3.10% per annum.

What we observe in this section is still an incomplete picture, typically because it is rather impossible to account for several

Table 11: TFPG of Formal and Informal Sector in India by States during 1990-2001

Firm	Formal Sector			Informal Sector		
	EFFCH	TECHCH	TFPCH	EFFCH	TECHCH	TFPCH
Andhra Pradesh	6.3	6.9	13.6	-2.0	-1.2	-3.2
Assam	-31.8	5.8	-27.9	10.8	1.5	12.4
Bihar	-10.2	26.8	13.8	8.4	0.1	8.5
Gujarat	6.1	27.1	34.9	0.0	-15.5	-15.5
Haryana	10.8	14.3	26.6	30.5	-10.9	16.2
Himachal Pradesh	26.9	31	66.3	14.1	-14.5	-2.5
Karnataka	-11.2	12.7	0.1	5.0	0.9	6.0
Kerala	-14.6	7.4	-8.3	11.4	1.3	12.9
Madhya Pradesh	6.3	30.6	38.7	-30.4	0.7	-29.9
Maharashtra	0	21.1	21.1	12.5	-10.0	1.3
Orissa	-19.2	37.9	11.3	-1.3	-5.4	-6.7
Punjab	-4.6	14.1	8.8	21.4	-5.0	15.3
Rajasthan	20.6	23.4	48.7	32.7	-2.1	29.9
Tamil Nadu	-5.4	8.2	2.3	3.4	2.5	6.0
Uttar Pradesh	-0.1	24.7	24.6	6.5	1.6	8.2
West Bengal	2.3	9.2	11.8	-13.9	-4.6	-17.9
Delhi	0	0.1	0.1	0.0	-3.9	-3.9
All India	-2.1	17.3	14.8	5.3	-4.0	1.2

EFFCH= change in Labour Efficiency. TECHCH= Technical change in sector *i* and TFPCH= Total Factor Productivity Change in sector *i*, *i*=Formal, Informal. Finally, TFPCH=EFFCH*TECHCH.

Table 12: Determinants of Formal Wage, Informal Wage and Formal Productivity

	$\ln w_f$		$\ln w_i$		$\ln apl_f$	
	Fixed Effects	Random Effects	Fixed Effects	Random Effects	Fixed Effects	Random Effects
Const	9.98**	9.54**	6.19**	6.04**	6.38**	8.42**
$\ln apl_f$	0.02	0.05				
$\ln apl_i$			0.32**	0.34**		
$\ln w_i$					0.62*	0.39*
R ²	0.19	0.19	0.27	0.27	0.07	0.08
P	0.89	0.86	0.84	0.78	0.67	0.55
Hausman		-28.23		-1.14		0.08

w_f : formal wage; w_i : informal wage; apl_f : formal average labour productivity; apl_i : informal average labour productivity.

problems that the sector encounters, without which we believe the total factor productivity growth (TFPG) would have been significantly higher than that reported. The total factor productivity in the informal sector is constrained by the technological change because of lack of capital accumulation. In fact, NSSO reports that more than 50% of unorganised enterprises face capital shortage in 2000-01 and this is the most severe problem. Other common problems are marketing of goods, non-availability of electricity, power-cuts, non-availability of raw materials, etc. Among the other problems, competition from larger units, non-recovery of service charges/business credits, regional problems, lack of infrastructure, etc, are reported as main constraints for the informal entrepreneurs.

4 Conclusions

The present study offers an aggregative view of the informal sector in India. The paper is a turnaround from other prior attempts at quantifying and theorising the activities of the informal sector in dual economy labour markets. By linking the unorganised sector to the organised sector through aspects of capital mobility and labour productivity, we are able to estimate and theorise in more formal ways the effects of reform on the wage and employment status of the workers in the informal sector.

The results, as we have discussed are quite revealing. We establish via rigorous general equilibrium models that trade liberalisation in the formal sector can, in fact contrary to conventional wisdom, raise both employment and wages in the informal sector if capital is easily mobile between the two sectors. Even if capital is sticky, as we explored in subsequent studies, downsizing of the capital intensive import competing sector may lead to increased output in the labour-intensive informal segment and rise in informal wage. The issue of capital mobility thus takes an important role in shaping the magnitude and directionality of informal wage subject to exogenous policy changes in the organised sectors of an economy.

Furthermore, the role of labour productivity in both formal and informal sectors can also impart strong influences on the employment and wages in the informal sector. Labour productivity improvement in the unskilled labour-intensive segments of the formal sector can improve informal wage even in the short run under free mobility of capital, and with formalisation of informal labour. These features, as argued, have not surfaced until a set of recent papers opened up the scope and dimensions of research in this context. The empirical investigations reported here may thus be deemed as scratching the surface of an iceberg, although delving deeper may not be easy due to serious deficits in the data sources. Nevertheless, the results discussed provide some credible attempts at capturing mobility and productivity aspects of the wage-employment dynamics in the informal sector. The highlights of the section include empirical support for the theoretical conjectures that informal real wage in India has experienced a rising trend, despite the fact that, in the post-reform era fierce import competition pushed many erstwhile protected industries out of business and released significant amounts of capital and labour into unorganised manufacturing and service sectors. We have simultaneously established that the labour productivity growth in the informal sector, an outcome of more efficient utilisation of the limited resources in the sector, is also responsible for higher wage realisation. While, paucity of space does not presently allow us to report more specific microeconomic features on the formal-informal relations that we studied with the aid of primary surveys in different urban locations in West Bengal, Maharashtra and Gujarat, we can broadly claim that viewing the case of informal sector in partial equilibrium by neglecting roles played by other factors, such as capital and land, is likely to produce inconsistent estimates of the internal dynamics of the sector. This synthesis of various dimensions of the informal sector is therefore an imperative step towards situating the subject in a wider context.

NOTES

- 1 For evidence on other countries, see Goldberg and Pavnik (2003), for example.
- 2 Earlier, De Soto (2000) pointed out that a heavy burden of taxes, bribes and inflexible bureaucratic regulations in the formal sector drives many producers into the informal sector.
- 3 See Appendix I for detailed algebraic proof.
- 4 Condition (10) offers a directly testable hypothesis. However, it requires matching data on product specific capital stock in both formal and informal sectors, and the return such capital fetches in each sector. *Annual Survey of Industries* in India offers data on formal commodities until 1997 only, and reliable data on the return to capital in the informal sector is unavailable. Thus, we set aside this direct exercise for future work effort and use a proxy measure instead.

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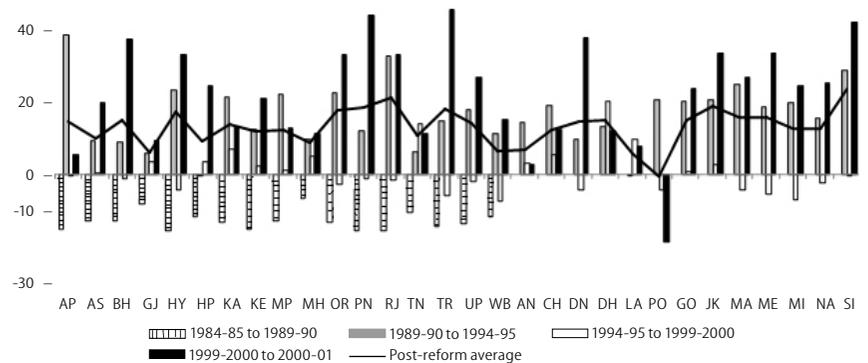
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Appendix II

Figure 1: Annual Growth Rate of Real Informal Wage (in %)



Source: NSS Reports, various rounds and own calculations
 List of Abbreviations for States and Union Territories in India
 AP – Andhra Pradesh, AS – Assam, BH – Bihar, GJ – Gujarat, HY – Haryana, HP – Himachal Pradesh, KA – Karnataka, KE – Kerala, MP – Madhya Pradesh, MH – Maharashtra, OR – Orissa, PN – Punjab, RJ – Rajasthan, TN – Tamil Nadu, TR – Tripura, UP – Uttar Pradesh, WB – West Bengal, AN – Andaman and Nicobar Islands, Ch – Chandigarh, DN – Dadra and Nagar Haveli, DH – Delhi, LA – Lakshadweep, PO – Pondicherry, GO – Goa, JK – Jammu and Kashmir, MA – Manipur, ME – Meghalaya, MI – Mizoram, NA – Nagaland, SI – Sikkim.

Appendix I

Proof of condition (10)

$$\bar{w}_{a_{LX}} + r_X a_{KX} = P_X(1 + t)$$

$$\bar{w}_{a_{LY}} + r_Y a_{KY} = P_Y$$

$$\frac{K_X}{K_Y} = \phi \left(\frac{r_X}{r_Y} \right), \phi > 0$$

$$\frac{\bar{K} - K_Y}{K_Y} = \phi \left(\frac{r_X}{r_Y} \right)$$

$$\text{From (A.1), } \hat{r}_X \theta_{KX} = \hat{P}_X - \theta_{LX} \hat{w}$$

$$= \hat{P}_X(1 - \theta_{LX}\alpha)$$

Where $\hat{w} = \alpha \hat{P}_X + \beta \hat{P}_Y = \alpha \hat{P}_X$, since $\hat{P}_Y = 0$.

$$\text{From (A.2), } \hat{w} \theta_{LY} + \hat{r}_Y \theta_{KY} = 0. \text{ This implies, } \hat{w} = -\frac{\theta_{KY}}{\theta_{LY}} \hat{r}_Y. \quad \dots(A.5)$$

Now using equations (3) to (6),

$$a_{LX}X + a_{LY}Y = \bar{L}$$

$$\text{Reformulating, } \frac{a_{LX}}{a_{KX}} (\bar{K} - K_Y) + \frac{a_{LY}}{a_{KY}} K_Y = \bar{L}$$

$$\text{Again, } \lambda_{LX} \hat{X} + \lambda_{LY} \hat{Y} + \lambda_{LX} \hat{a}_{LX} + \lambda_{LY} \hat{a}_{LY} = 0$$

$$\text{And } \lambda_{LX} \hat{K}_X + \lambda_{LY} \hat{K}_Y + \lambda_{LX} (\hat{a}_{LX} - \hat{a}_{KX}) + \lambda_{LY} (\hat{a}_{LY} - \hat{a}_{KY}) = 0 \quad \dots(A.6)$$

But, as $K_X = \bar{K} - K_Y$

$$\hat{K}_X = -\hat{K}_Y / \phi, \text{ where } \phi = (K_X/K_Y).$$

Substituting these information in (A.6),

$$-\frac{1}{\phi} \lambda_{LX} \hat{K}_Y + \lambda_{LY} \hat{K}_Y + \lambda_{LX} \sigma_X \hat{P}_X - \lambda_{LY} \sigma_Y (\hat{w} - \hat{r}_Y) = 0 \quad \dots(A.7)$$

Rearranging, and using (A.4), and $\theta_{LY} (\hat{w} - \hat{r}_Y) = -\hat{r}_Y$

$$(\lambda_{LY} - \frac{1}{\phi} \lambda_{LX}) \hat{K}_Y + \lambda_{LX} \sigma_X \hat{P}_X \left(\frac{1 - \theta_{LX} \alpha}{\theta_{KX}} \right) + \lambda_{LY} \sigma_Y \frac{\hat{r}_Y}{\theta_{LY}} = 0.$$

$$\text{Thus, } (\lambda_{LY} - \frac{1}{\phi} \lambda_{LX}) \hat{K}_Y + \sigma_Y \frac{\lambda_{LY}}{\theta_{LY}} \hat{r}_Y = -\lambda_{LX} \sigma_X \hat{P}_X \left(\frac{1 - \theta_{LX} \alpha}{\theta_{KX}} \right) \quad \dots(A.8)$$

Now, taking 'ln' on (A.3),

$$\ln(\bar{K} - K_Y) - \ln K_Y = \ln \phi \left(\frac{r_X}{r_Y} \right). \text{ Taking percentage changes,}$$

$$\hat{K}_X - \hat{K}_Y = \frac{1}{\phi} d\phi = \frac{1}{\phi} \frac{\delta \phi}{\delta \left(\frac{r_X}{r_Y} \right)} \frac{r_Y dr_X - r_X dr_Y}{r_Y^2} = \frac{\phi' r_X}{\phi r_Y} (r_X - \hat{r}_Y). \text{ Using (A.4),}$$

$$\text{or, } \hat{K}_X - \hat{K}_Y + \frac{\phi' r_X}{\phi r_Y} \hat{r}_Y = \frac{\phi' r_X}{\phi r_Y} [\hat{P}_X (1 - \theta_{LX} \alpha) / \theta_{KX}]$$

We define, $\epsilon = \frac{\delta \phi}{\delta (r_X/r_Y)} \frac{r_X/r_Y}{\phi}$, as the elasticity of capital mobility between sectors X and Y.

$$\text{Thus, } -\hat{K}_Y [1 + \frac{1}{\phi}] + \epsilon \hat{r}_Y = \epsilon \hat{P}_X (1 - \theta_{LX} \alpha)$$

$$\text{Therefore, } \hat{r}_Y + \hat{K}_Y \frac{1}{\epsilon} [1 + \frac{1}{\phi}] + \hat{P}_X (1 - \theta_{LX} \alpha) \quad \dots(A.9)$$

Rearranging equations (A.6) and (A.7),

$$\text{Define, } \mu = (\lambda_{LY} - \frac{1}{\phi} \lambda_{LX}) = \left(\frac{\lambda_{LY}}{\lambda_{KY}} - \frac{\lambda_{LX}}{\lambda_{KX}} \right) K_X = \frac{\lambda_{LX}}{\lambda_{KX}} \frac{K_X}{\left(\frac{\lambda_{LY}}{\lambda_{KY}} - \frac{\lambda_{LX}}{\lambda_{KX}} \right)} \quad \dots(A.10)$$

$$\sigma_Y \frac{\lambda_{LY}}{\theta_{LY}} \hat{r}_Y + \mu \hat{K}_Y = -\lambda_{LX} \sigma_X \hat{P}_X \left(\frac{1 - \theta_{LX} \alpha}{\theta_{KX}} \right) \quad \dots(A.11)$$

and

$$\hat{r}_Y - \frac{\phi + 1}{\phi \epsilon} \hat{K}_Y = \hat{P}_X (1 - \theta_{LX} \alpha) \quad \dots(A.12)$$

Using Cramer's rule to solve for \hat{r}_Y ,

$$D = \begin{vmatrix} (\sigma_Y \frac{\lambda_{LY}}{\theta_{LY}} + \frac{\lambda_{LZ} \theta_{KY}}{\theta_{TZ} \theta_{LY}} \sigma_Z) & \mu \\ 1 & -\frac{\phi + 1}{\phi \epsilon} \end{vmatrix} = \begin{vmatrix} \sigma_Y \frac{\lambda_{LY}}{\theta_{LY}} (\phi + 1) \\ -\frac{\phi \epsilon}{\phi \epsilon} - \mu \end{vmatrix} < 0$$

$$\text{Therefore, } \hat{r}_Y = \frac{1}{D} \left[\frac{\lambda_{LX} \sigma_X \alpha (\phi + 1)}{\phi \epsilon} - \mu \right] \hat{P}_X (1 - \theta_{LX} \alpha) \quad \dots(A.13)$$

Now, suppose $\hat{P}_X < 0$, then $\hat{r}_Y > 0$ iff, $\frac{\lambda_{LX} \sigma_X (\phi + 1)}{\phi \epsilon} > \mu$

Finally, using (A.5)

$$\hat{w} > 0, \text{ iff, } \frac{\lambda_{LX} \sigma_X (\phi + 1)}{\phi} > \mu \epsilon \quad \dots(A.14)$$

$$\text{or, } \epsilon > \frac{\lambda_{LX} \sigma_X (\phi + 1)}{\phi \mu}$$

$$\text{or, } \epsilon > \frac{\lambda_{LX} \sigma_X \phi + 1}{\mu} = \frac{\lambda_{LX} \sigma_X}{\mu} \frac{1 + \frac{K_X}{K_Y}}{\frac{K_X}{K_Y}} = \frac{\lambda_{LX} \sigma_X}{\mu} \frac{\bar{K}}{K_Y} \frac{K_Y}{K_X} = \frac{\lambda_{LX} \sigma_X}{\lambda_{KX} \mu}$$

$$\text{Using (A.8), } \hat{w} > 0, \text{ iff, } \epsilon > \sigma_X K_X f \left(\frac{\lambda_{LX}}{\lambda_{KX}} \right)$$

The above derivation provides the proof of condition (10).

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