Skills, Informality, and Development

Dibyendu Maiti
Arup Mitra

Skills, Informality, and Development

Dibyendu Maiti
Arup Mitra

Skills, Informality, and Development*

Dibyendu Maiti and Arup Mitra

ABSTRACT

This paper makes an attempt to estimate the index of informal sector employment which can be attributed to the supply-push phenomenon. Factors which explain the inter-state variations include the industrial-informal sector wage gap, revenue expenditure, and development expenditure incurred by the government. Increased development expenditure brings in a decline in distress-led informalization. With improved education, health, and infrastructure facilities the employability of an individual goes up, which, in turn, reduces the compulsion to get absorbed residually. However, expansion in government activities measured through increased revenue expenditure raises in-migration, which in turn raises the supply-push phenomenon. We also observed that with an increase in distress-led informalization inequality tends to rise. Adoption of labour intensive technology in the organized industrial sector is indeed crucial for pro-poor growth. The other policy implication is in terms of enhanced investment in the areas of education, health and other infrastructural facilities.

1. INTRODUCTION

Issues concerning the residual absorption of labour in the low productivity informal sector have already received a great deal of attention in the past. In the present context of globalization, while most countries are aiming at maximizing growth, the issue of well-being has become increasingly important. One of the crucial dimensions of well-being is access to productive employment opportunities. Thus the concept of pro-poor growth and various other questions relating informalization have acquired prominence in the development literature.

Growth that is currently taking place is accompanied by informalization, e.g. subcontracting in the production process and various other mechanisms that tend to leave labour with less bargaining power. On the whole, the informalization process is feared to involve substantial welfare losses and deterioration in terms of governance. There is also concern on industrialization issues and, accordingly, it has led policy makers and academicians to debate and design policies for providing a safeguard against global imbalances. It is often observed that producers engaged in small enterprises in the informal sector cater to local and regional demand. The argument which is usually put forward in this context is to enhance the educational level and technical skills, which in turn would promote graduation of labour to the formal sector. Keeping some of these issues in mind, this paper makes an attempt to estimate the supply-push component of the informal sector employment across the Indian states and identifies factors that determine this supply-push informalization. The paper, in particular, examines whether education and skill development promote participation in the formal sector. Finally, we investigate whether this type of informalization leads to a rise in inequality in the economy and deterioration in well-being.

In the developing world, around 60 to 70 per cent of the total manufacturing employment is located in the informal sector (Agenor 1996). An issue of concern in the present context is whether the informal sector workers are able to face the challenges of globalization. In a recent work, Kiso (2008), based on three consecutive surveys (1991, 1998, and 2006), of the same sample set of textile workers in Ahmedabad, observed that more than 50 percent workers were in the informal sector. Marjit et al. (2007) argued that liberal trade and investment policies may expand or contract output and employment in the informal sector. Several papers in the volume edited by Guha-Khasnobis and Kanbur (2006) analysed the state of informal enterprises in the developing world. Mitra (2004) focused on the use of informal networks, which in turn bind the informal sector workers to low income jobs. This process restricts their upward mobility, though at the entry level these networks play a crucial role in providing sources of livelihood.

Maiti and Marjit (2008) argue that with greater exposure to international trade, a competing export firm in the formal sector shifts much of its efforts towards marketing, leaving

production activities to the informal sector. In a study based on fieldwork, Maiti (2008) further showed that the small-scale rural industries are expanding and have survived in the post-reforms India in a subcontracting arrangement as a part of the production process of the relatively larger firms or traders. Goldar et al. (forthcoming), on the other hand, argue that economic reforms have been accompanied by growing consumerism and an increasing demand of consumers for quality products. This is obviously expected to have a significantly adverse effect on the demand for the unorganized/informal sector output.

In a study of Latin American countries, Goldberg and Pavnick (2003), suggest that reforms led to an increase in wage inequality and a moderate increase in income inequality in the late 1980s and early 1990s. Regardless of whether wage and income inequality were rising or not, trade reform was accompanied by reductions in poverty, mainly through reductions in the cost of the consumption bundle of the poor and reduction in unemployment. Policies relating to the provision of education, access to credit and insurance, flexible entry and exit of firms, and access to infrastructure and technical assistance, can help the poor to maximize the new economic opportunities offered by trade reforms.

The role of education has therefore appeared as one of the principal policy instruments for poverty alleviation. As the growth literature also suggests, improvements in the average education level accelerate growth through productivity-enhancement and knowledge spillover. A large body of research using individual level data on education and income provides robust evidence in favour of a substantial payoff attached to investment in education (Krueger and Lindahl 2001). One corollary of this argument seems to suggest that the provision of higher education would unambiguously promote growth, which will be accompanied by a shift in the work force structure away from the informal towards the formal sector. However, it may not be a smooth process because of the segmentation of the economy. Due to the structural bottlenecks, a large component of the work force cannot be absorbed in the formal sector and, rather, they are left in the low cost production sector to cater to the local market. The poor cannot easily access the external market without investing in education, establishing networks, and pursuing rigid registration procedures for formalization. Removal of rigid procedures, extension of subsidies, and educational facilities may enable the workers to graduate from the informal to the formal sector.

The paper is organized as follows. Section 2 provides the theoretical motivation. Section 3 presents an estimate of informal sector employment in non-agricultural activities and, based on stochastic function framework, an index of informal sector employment is worked out that can be attributed to the supply-push phenomenon. In section 3, based on the cross-sectional variations, the important determinants of this index are identified and, also, we assess the impact of supply-push informalization on inequality. Finally, in section 4 the major findings are summarized.

2. THEORETICAL MOTIVATION

We, here, develop a simple framework to see under what conditions education can promote participation in the formal sector. Suppose a producer in the informal sector, who is capital constrained, produces to cater to the local market. He manufactures certain goods to supply to the final producers, traders, or directly to the consumers in the local market. Suppose the cost of manufacturing the products is cq^2 , where the marginal cost is $2cq$. Here, c is a positive parameter of the marginal cost of production and q is the output produced by the firm. The price of the goods in the local market is unity and, thereby, an informal sector producer can attain one unit value for each product sold in the local market. But, he can top up this value if he can send his products to a market outside the local area. In order to do so, he requires exposure, technical and marketing skills, a proper management education, and training. The basic intuition is that if an individual gets this sort of education and training, he can successfully access the modern marketing network and, thus, sell to the outside market at higher prices. So, the level of education and training, denoted by e, matters for achieving a higher price of the product, that is, $\alpha(e)$; $\alpha'>0$, $\alpha''<0$ and $\alpha(0)=0$.

In other words, with a higher level of education and training, the exposure to sell the product at the national/international market would be greater.[1] But, such education is not costless. Moreover, an informal sector producer cannot sell products to an outside market without a proper registration and trade license. The legal system is such that he would not be allowed to cater to the outside market without proper registration, which requires formal procedures involving substantial time and fees. The investment on training and registration together are assumed, for the sake of simplicity, to be A in period one and after period one it becomes $A(1+r)e^2$, where r is denoted as the market rate of interest. Now the profit function of the firm can be expressed as:

$$\Pi(q,e) = p\alpha(e)q + (1 - p)q - cq^2 - A(1 + r)e^2 \qquad \ldots\ldots\ldots(1).$$

In the first stage, the firm takes the decision simultaneously as to whether it would produce in the formal or informal sector, and what would be the optimal level of education. At the second stage, the optimum level of production will be solved. This is done using the backward induction technique.

Differentiating (1) with respect to q and equating to 0 we get:

$$\frac{d\Pi}{dq} = [p\alpha(e)+(1-p)]-2cq = 0$$

$$or, q = \frac{[p\alpha(e)+(1-p)]}{2c}$$

---

1   Similar specification is also available in Maiti and Marjit (2008).

Substituting for output into Π we get:

$$\Pi(e) = [p\alpha(e) + (1-p)]\frac{[p\alpha(e) + (1-p)]}{2c} - \frac{[p\alpha(e) + (1-p)]^2}{4c} - A(1+r)e^2,$$

or, $\Pi(e) = \dfrac{[p\alpha(e) + (1-p)]^2}{2c} - A(1+r)e^2$ .... (2).

Differentiating the above expression with respect to e we get:

$$\frac{d\Pi(e)}{de} = \frac{2[p\alpha(e) + (1-p)]^2}{2c}.p\alpha' - 2A(1+r)e = 0 \qquad \text{......... (3).}$$

From the above profit function, the optimum level of education can be solved. For a critical value of e, that is, $e=e^*$, we can work out the $\pi = \pi^*$. This is demonstrated in Figure 1.
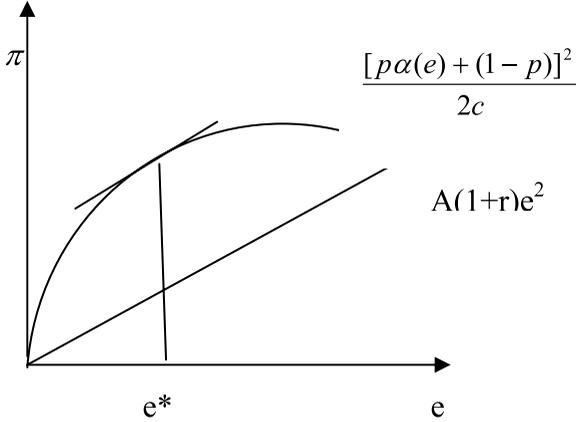
Figure 1: Optimum level of education

Now, if $e=0$, $\pi_0 = \dfrac{(1-p)^2}{2c} > 0$. In other words, the firm can earn a positive profit from the local market without having education and formal registration.

Comparing the profit levels, π^* and π_0, the firm will decide whether formalization is beneficial or not. If $\pi_0 > \pi^*$, the firm does not want to cater to the outside market and it remains in the informal sector. If $\pi_0 = \pi^*$, the owner of the firm remains indifferent between the level of education at 0 and e^*. But he prefers to opt for $e=0$ because there is no incentive to go for higher education.

Suppose the government takes some initiative to uplift the quality of education, that is, shift the $\alpha(e)$, and reduces the costs of formalization, or ensures better transport facility (that

is, to raise *p*) by raising development expenditure, the profit can be raised and the aspiration for education can be enhanced.

Similarly, educational subsidy, interest subsidy, loans to firms, reduction in cost of education, and formal registration (reducing *A*) will yield similar results. Therefore, we can infer that education may be a necessary, but not a sufficient condition for joining the formal sector[2]. Education combined with investment in public utilities will encourage formal sector participation.

EMPIRICAL ANALYSIS

In this section we examine some of the implications of the theoretical construct from the empirical standpoint. As regards the informal sector employment, the National Sample Survey Organization (NSSO) came up with estimates for non-agricultural activities, corresponding to the years 1999–2000 and 2004–05. In order to derive the absolute number of workers in the informal and the formal sectors we have adopted the following steps.

First, given the population figures from the censuses of 1991 and 2001 the average annual growth rates have been computed on the basis of which population for the year 1999–2000 and 2004–05 have been projected. Given the NSSO estimates of worker (principal plus subsidiary) to population ratio, the absolute number of workers for these two years has been derived. In the next step, the NSSO estimates, of per thousand distribution of workers across different activities, have been applied to derive the absolute number of workers in each of the activities. In the third step, NSSO's results of the survey on the informal sector workers in non-agricultural activities have been used to split the total workers in each activity into informal and formal components. The NSSO's estimate of the per thousand distribution of workers in the informal sector is applied to the absolute number of workers in each activity to derive the absolute number of workers in the informal sector, which has been then deducted from the total number of workers in each activity to deduce the formal sector workers[3].

The share of the informal sector in total non-agricultural employment has been extremely high in both rural and urban areas. Across states, considerable variations exist but the relative size in most of the cases is on the high side. At the all-India level, the informal sector constituted around 78 per cent of the work force in 1999–2000 (in the rural and urban areas combined), which then increased to 84.5 per cent in 2004–05 (see Tables 1 and 2).

2 See Mookherjee, Napel and Ray (2008).

3 For 1999–2000 NSSO provided the absolute number of workers in the informal sector directly. The proportions have been calculated by considering the NSSO estimate of population for the year 1999–2000. Since the NSSO's estimate of population is said to be grossly underestimated, these proportions are then applied to the absolute number of workers derived from the projected population of 1999–2000 on the basis of the decennial census figures. The adjusted set of absolute number of workers in the informal sector is then used for further analysis.

Table 1—Relative Size of the Informal Sector: 1999–2000 (per cent)

State	Manufacturing	Construction	Trade, Hotel	Transport	Finance	Service	Aggregate
Andhra Pradesh	73.41	76.52	91.89	67.90	58.76	47.87	71.15
Arunachal Pradesh	6.34	20.45	49.86	42.07	7.42	1.41	12.89
Assam	82.26	62.96	86.42	65.85	46.22	34.46	58.51
Bihar & Jharkhand	74.93	49.02	78.29	59.53	63.10	36.04	62.57
Goa	30.48	68.71	80.08	64.13	26.81	14.63	55.82
Gujarat	73.45	69.86	91.07	67.46	56.02	25.53	67.38
Haryana	63.84	71.93	82.48	66.13	39.93	25.30	62.83
Himachal Pradesh	66.93	59.79	85.41	70.25	34.21	11.50	52.13
Jammu and Kashmir	92.17	80.41	87.92	60.30	58.34	9.47	59.41
Karnataka	76.30	71.57	86.96	66.88	46.54	27.55	67.23
Kerala	82.60	85.08	79.72	76.05	54.03	34.63	72.38
Madhya Pradesh & Chhattisgarh	71.00	53.78	90.28	66.25	54.88	26.91	62.94
Maharashtra	67.46	63.76	88.91	57.85	48.64	25.83	61.87
Manipur	90.60	91.81	87.79	79.80	34.55	12.39	54.47
Meghalaya	74.94	67.67	83.04	69.63	14.40	5.60	42.00
Mizoram	96.20	71.80	92.71	87.69	40.73	5.30	44.35
Nagaland	75.95	51.45	85.24	65.51	47.64	4.36	23.93
Orissa	83.88	60.31	89.35	57.20	47.95	33.83	68.92
Punjab	75.79	78.03	85.60	76.50	50.21	33.47	69.78
Rajasthan	85.76	76.93	93.93	73.27	54.39	28.06	72.54
Sikkim	76.50	66.59	96.63	79.74	39.68	4.66	41.24
Tamil Nadu	81.47	69.75	91.09	63.66	49.69	32.08	71.60
Tripura	76.65	57.00	72.96	79.35	37.00	28.61	47.57
Uttar Pradesh & Uttaranchal	82.88	74.15	91.73	75.67	59.04	44.79	75.51
West Bengal	84.22	73.16	90.83	74.13	53.86	36.77	74.95
Andaman	68.70	49.21	77.68	40.20	67.35	13.90	45.75
Chandigarh	62.03	77.92	89.13	80.89	60.44	17.89	57.21
Dadra	65.31	30.00	101.80	94.59	132.37	29.83	66.33
Daman	44.75	84.40	98.46	68.50	45.66	44.45	62.22
Delhi	80.21	66.54	89.55	68.95	51.53	15.18	62.81
Lakshadweep	23.53	35.49	10.89	24.29	0.00	0.33	12.64
Pondicherry	68.43	69.55	91.87	83.99	67.99	26.21	68.55
All-India	77.91	69.70	88.78	67.37	53.45	33.07	68.46

Note: Aggregate is the combination of all the non-agricultural activities shown in the Table.

Source: Informal Sector in India, 1999–2000, Report No. 459(55/2.0/2), National Sample Survey Organisation, Ministry of Statistics and Programme Implementation, May 2001

Table 2—Relative Size of the Informal Sector: 2004-05 (per cent)

State	Manufacturing	Construction	Trade, Hotel	Transport	Finance	Service	Aggregate.
Andhra Pradesh	87.66	92.59	95.56	80.18	68.39	79.66	87.13
Arunachal Pradesh	43.78	4.61	47.78	64.44	18.20	29.48	30.49
Assam	84.63	72.98	88.58	74.26	55.91	53.61	73.05
Bihar	93.67	76.98	89.85	78.41	83.55	77.87	85.95
Chhattisgarh	80.16	78.96	92.91	69.51	95.39	59.50	78.08
Delhi	80.68	70.55	93.71	65.82	43.83	45.96	70.96
Goa	47.53	92.73	89.09	72.04	97.43	43.73	70.88
Gujarat	73.46	90.07	96.13	84.09	75.14	68.84	80.73
Haryana	65.54	61.35	92.12	84.41	76.65	65.77	73.73
Himachal Pradesh	59.41	45.59	92.28	56.22	76.54	55.18	60.01
Jammu and Kashmir	88.94	59.36	89.27	85.82	79.87	51.42	74.02
Jharkhand	70.18	69.96	88.43	68.29	75.59	68.83	73.88
Karnataka	87.22	85.98	95.98	83.36	52.37	68.39	83.76
Kerala	87.16	88.75	95.54	82.00	82.11	53.21	82.00
Madhya Pradesh	67.84	75.11	89.32	73.51	81.77	66.24	75.15
Maharashtra	77.14	80.16	94.51	70.24	72.29	66.10	78.49
Manipur	81.35	67.81	82.36	76.38	22.83	37.95	64.77
Meghalaya	81.35	83.12	83.08	65.77	100.00	14.31	50.56
Mizoram	87.13	56.26	80.71	77.97	63.38	34.66	55.38
Nagaland	84.28	39.99	75.70	44.23	19.98	30.94	51.99
Orissa	90.26	71.34	94.10	74.93	72.60	71.23	82.99
Punjab	88.39	86.60	95.00	78.07	93.48	56.01	82.81
Rajasthan	94.80	84.02	94.39	87.43	86.55	60.12	85.02
Sikkim	86.86	61.77	74.19	81.20	0.00	17.67	51.20
Tamil Nadu	89.40	91.11	96.88	72.32	58.42	69.94	84.92
Tripura	84.06	65.48	75.69	70.16	83.41	26.90	51.82
Uttaranchal	73.65	86.76	90.04	81.16	80.94	49.66	74.78
Uttar Pradesh	88.71	84.00	93.84	77.36	83.54	76.26	86.29
West Bengal	89.22	88.35	92.98	78.00	74.77	67.92	84.19
Andaman	74.44	62.11	86.41	69.31	53.70	12.07	51.61
Chandigarh	77.92	85.83	88.55	53.60	97.50	59.44	72.67
Dadra	63.98	87.84	86.93	10.00	100.00	50.54	64.22
Daman	18.33	17.35	58.90	93.73	90.83	70.31	50.32
Lakshadweep	83.36	73.39	53.81	37.73	55.20	42.09	59.52
Pondicherry	66.87	96.86	91.65	86.59	83.45	50.22	76.77
All-India	84.54	81.95	94.44	77.38	69.16	67.12	82.05

Note: Aggregate is the combination of all the non-agricultural activities shown in the Table.

Source: Informal Sector and Conditions of Employment in India, 2004–05, Report No. 519(61/10/7), National Sample Survey Organisation, Ministry of Statistics and Programme Implementation, April 2007.

Theoretically, the informal sector can grow due to the supply side factors and/or the demand side factors. In the present specification, we have taken informal sector employment to be a function of certain demand side factors approximated by the formal sector employment in various activities. Next, we pose the question—if the actual (observed) level of informal sector employment is much above the level that can be explained in terms of formal sector employment. We have analysed this in the stochastic frontier function framework. The distance of the actual informal sector employment from the level of informal sector employment, which can be explained in terms of formal sector employment, would represent the pressure of excess supplies. Higher the distance, the greater is the pressure of excess supplies of labour, leading to a residual absorption of labour in the low productivity activities in the informal sector.

By applying the statistical stochastic frontier function framework we can identify, based on the cross-sectional data, the extent to which different states are above the level that can be explained in terms of formal sector employment. The stochastic frontier model for informal sector employment is given by:

$$\inf_i = F(.)\exp(U_i + V_i).$$

The frontier level informal sector employment is defined to be:

$$\inf_i* = F(.)\exp(V_i).$$

The excess informal sector employment due to the supply side variable can be measured by the ratio of observed informal sector employment to the frontier level of employment.

$$E\inf_i = \inf_i / \inf_i^* = F(.)\exp(U_i + V_i)/F(.)\exp(V_i) = \exp(U_i)$$

As regards the estimation procedure, log transformation of informal sector employment is regressed on the log transformation of various components of the formal sector employment. Cross-sectional data used for frontier function estimation requires a priori assumption regarding the one-sided distribution of the error term taken to measure the effect of supply-push phenomenon. In this case we have assumed a half-normal distribution. The frontier equation is estimated by the Maximum Likelihood Estimation technique.

Data from both the survey years (1999–2000 and 200–-05) have been taken, implying that we have two observations per state. Based on the magnitude of the U_i, the maximum value (indexed as 100) is chosen to represent the case with a maximum supply-push effect. Mizoram (1999–2000) corresponds to the maximum effect of excess supplies of labour. After assigning a value of 100 to Mizoram (1999–2000) other states have been indexed accordingly (Table 3).

Table 3—Index of Supply-Push Informal Sector Employment

State	1999-2000	2004–05
Andhra Pradesh	53.55	94.43
Arunachal Pradesh	20.07	50.89
Assam	56.47	80.05
Bihar & Jharkhand	44.13	89.07
Goa	43.42	69.42
Gujarat	47.16	85.77
Haryana	48.8	77.95
Himachal Pradesh	47.12	51.94
Jammu and Kashmir	71.82	87.67
Karnataka	52.72	92.77
Kerala	70.2	86.41
Madhya Pradesh & Chhattisgarh	43.34	70.62
Maharashtra	34.67	67.89
Manipur	83.51	77.26
Meghalaya	61.35	
Mizoram	100	92.69
Nagaland	39.07	63.5
Orissa	59.95	93.25
Punjab	62.69	89.28
Rajasthan	69.43	99.68
Sikkim	67.09	83.76
Tamil Nadu	52.96	90.08
Tripura	73.4	68.09
Uttar Pradesh & Uttaranchal	65.51	90.65
West Bengal	62.49	88.11
Andaman	39.54	60.54
Chandigarh	73.77	79.07
Daman	75.58	82.79
Delhi	54.59	65.52
Lakshadweep	14.24	81.2
Pondicherry	87.14	94.02

Source: Authors' calculations.

4. IMPORTANT CORRELATES

The next question is: what determines this supply-push informal sector employment. An important determinant of labour productivity and wages in the organized industrial sector is technology. Most of the developing countries import technology from the western world since it has become cheaper to import after liberalization. UNIDO (2005) also insists that a wheel which has already been discovered in one part of the world need not be rediscovered again by the developing world. In spite of the fact that the adaptation cost of the imported technology is not negligible, import of technology is believed to be cost effective. However, imported technology is often capital intensive in nature since it is manufactured to suit the economic conditions of the developed countries. Being capital intensive in nature, imported technology leads to a sluggish labour absorption in the organized industrial sector with a substantive rise in labour productivity (Kato and Mitra 2008). As part of the labour productivity growth is transferred to the workers in terms of wage increase and this holds the possibility of widening the industrial-informal sector wage gap. With higher wage gaps, the informal sector workers may like to withdraw and strive hard to seek an employment in the organized industrial sector (Mitra, 1994). A similar result may also be observed if the informal-sector wage rate declines in response to an increase in supply given the formal sector wage rate (Mitra 2004). Some of the informal sector workers may like to withdraw from the labour market completely as the market wage may be substantially lower than their reservation wage. However, the possibility of observing a positive relationship between the wage gap and the informal sector employment is not ruled out because a rise in wage gap may lead to an increase in migration, which, in turn, can result in a residual absorption of labour. So it would be interesting to assess which of the two mechanisms dominates or whether they neutralize each other.

Among the other determinants of productive employment is skill formation. Since direct information on skill formation is not available, education may be taken as a proxy. With higher levels of education, the quality of labour is expected to improve which, in turn, would reduce the residual absorption of labour in the informal sector. However, what we have taken in the model is only the enrolment ratio and not the number of years of education. With a rise in developmental expenditure, the quality of human capital is expected to improve and this, in turn, would reduce the distress-led informalization. The other variable that we have considered in the model relates to revenue expenditure. With greater government activities the employment opportunities are likely to increase, which may induce migration and labour supplies. Supplies of labour, exceeding demand and/or

skill mismatch, can essentially lead to supply-push growth of the informal-sector. Since we have observations per state at two points of time one time dummy has been introduced.

Revenue expenditure and development expenditure are taken as a percentage of total net state domestic product (NSDP). On the other hand, wage gap is measured as the difference between the real wage rate pertaining to the organized industry (taken from the *Annual Survey of Industries* for respective years) and the wage rate of the hired workers in the unorganized manufacturing enterprises (taken from NSSO reports on unorganized manufacturing enterprises). The nominal wages are deflated by the consumer price index for industrial workers at 1993–94 prices. Enrolment ratio is defined as the proportion of students admitted to engineering and management studies (including all vocational institutes and ITIs) to the total number of students.

The regression results support most of the hypotheses (Table 4). Industrial-informal sector wage gap and developmental expenditure are seen to reduce the relative size of supply-push informal sector employment. The year dummy turns out to be significant with a positive coefficient, implying that the intercept corresponding to the second time point has been larger than the first. The relative size of the index, in fact, is higher in the year 2004–05 compared to 1999–2000 in most of the states (Table 3). Revenue expenditure takes a positive coefficient. The only variable which is not significant is the enrolment ratio. As already indicated above, this is in any case not a good proxy for skill formation.

In the next stage, we try to estimate the impact of supply-push informal sector employment on inequality and poverty. If the informalization process is demand induced, incomes in the informal sector are expected to rise which may reduce income/expenditure inequality. On the other hand, if informalization is supply-push, inequality is expected to increase. The empirical estimate of the second equation based on the two-stage-least-square technique shows a positive association between the index of supply push informal sector employment and the Gini index of expenditure inequality. With poverty, however, there is no relationship, implying that there could be many factors other than employment related ones, which would impinge on the well-being (Table 4).

Table 4: Regression Results

Explanatory Variables	INFINDEX	Gini Coefficient	Poverty ratio
WAGEGAP	-0.00034** (-2.33)		
DEVEXP	-2.75* (-1.91)		
REVEXP	2.05* (2.01)		
ENROL	0.16 (0.01)		
DUMMY	34.67* (7.87)		
Estimated INFINDEX		0.004* (6.59)	-0.053 (-0.41)
INTER	53.08** (3.94)	0.021 (0.44)	28.18* (2.99)
R^2	0.83	0.61	0.006
No. of Observations	30	30	30

Note: ** and * represent significance at 5 and 10 per cent levels respectively.

INFINDEX = Index of Informality, WAGEGAP= Formal and Informal wage difference, DEVEXP= Share of Development Expenditure as percentage of NSDP, REVEXP= Share of Revenue Expenditure as percentage of NSDP, ENROL = Percentage of students enrolled in management and technical education. INTER = Intercept and Dummy stands for year dummy.

Source: DEVEXP and REVEXP are based on information given in the Handbook of Statistics on Indian Economy, Reserve Bank of India (2000 and 2005). ENROL is based on information given in the Statistical Abstract, Central Statistical Organization, Government of India (2000 and 2005). The details relating to other variables are given in the text.

5. CONCLUSION

On the basis of NSSO data, this paper has worked out the absolute number of formal and informal sector workers across the Indian states. Using a statistical stochastic frontier function framework, we derived the index of informal sector employment which is attributed to the supply-push phenomenon. Factors that explain the inter-state variations in this index include industrial-informal sector wage gap, revenue expenditure and development expenditure incurred by the government. Although skill formation is thought to be an important determinant of the quality of employment, the enrolment ratio turned out to be insignificant, possibly because the enrolment ratio is not a good proxy for skill formation. However, these results also need to be interpreted in the backdrop of the rationalization provided in the theoretical construct which undermines the role of education under certain conditions. Enrolment will be effective for formal sector expansion only when developmental expenditure is substantial.

Increased development expenditure is seen to bring a decline in distress-led informalization. With improved education, health, and infrastructure facilities, the employability of an individual goes up which, in turn, reduces the residual type of employment. However, expansion in government activities, measured through increased revenue expenditure, raises in-migration, which in turn raises the supply-push phenomenon. We also observed that with an increase in distress-led informalization, inequality tends to rise although poverty does not show a clear-cut relationship with supply-push informalization. The wage gap between the organized industrial sector and the unorganized/informal sector reduces residual type employment as workers aspire to acquire an industrial job. Adoption of labour intensive technology in the organized industrial sector is, indeed, crucial for pro-poor growth. The other policy implication is in terms of enhanced investment in the areas of education, health and physical infrastructure.

REFERENCE

Agenor, P. (1996), 'The labour market and economic adjustment', *IMF Staff Papers* 32, 261–335.

Central Statistical Organization, (2000 and 2005), *Statistical Abstract*, Ministry of Statistics and Programme Implementation , Government of India.

Goldar, B.N., Arup Mitra and Anita Kumari (Forthcoming), 'Performance of Unorganised Manufacturing in the Post-Reform Period', in Keshab Das (ed.), *Micro and Small Enterprises in India: The Era of Reforms*, New Delhi: Routledge..

Goldberg, P., and N. Pavnik (2003), 'The response of the informal sector to trade liberalization', *Journal of Development Economics*, 72 (3), 463–96

Guha-Khasnobis, B. and R. Kanbur (2006), *Informal labor markets and development*, UK: McMillan-Palgrave.

Kato, Atsushi and Arup Mitra (2008), **'**Imported Technology and Employment: Evidence from Panel Data on Indian manufacturing Firms', in S.R.Hashim and N.S.Siddharthan (ed.) *High-tech Industries, Employment and Competitiveness***, Routledge.**

Kiso, J. (2008), 'Job Loss and Job Opportunities of Factory Workers in Ahmedabad Flexible Labour Rethink', in H. Sato and M. Murayama (eds) *Globalisation, Employment and Mobility – The South Asian Experience*, Japan: JDE-JETRO.

Krueger, A. B. and M. Lindahl (2001), 'Education for growth: why and for whom?', *Journal of Economic Literature*, 35: 1101–36.

Maiti, D. (2008), 'Organizational morphology of rural industries and its dynamics in liberalized India'. *Cambridge Journal of Economics* 32, no. 4: 577–91.

Maiti, D. and S. Marjit (2008), 'Trade liberalization, production organization and informal sector of the developing countries', *Journal of International Trade and Economic Development*, 17:3: 453–61.

Marjit, S. (2003), 'Economic reform and informal wage: general equilibrium analysis', *Journal of Development Economics*, 72 (1), 371–8.

Marjit S., S. Ghosh and A. Biswas A (2007), 'Informality, Corruption and Trade Reform', *European Journal of Political Economy*, 23:3: 777–89.

Mitra, Arup (1994), *Urbanisation, Slums, Informal Sector Employment and Poverty: An Exploratory Analysis*, Delhi: D.K. Publishers.

Mitra, Arup (2004), 'Informal Sector, Networks and Intra-city Variations in Economic Activities and Informal Sector', *Review of Regional and Urban development Studies*, Blackwell Publishing**,** 16:2.

Mookherjee, D., S. Napel and D. Ray (2008), 'Aspirations, Segregation and Occupational Choice', Boston University, Mimeo.

NSSO, Survey of Non-Agricultural Informal Sector; Government of India: Delhi; 1999-2000 (55th Round) and 2004-05 (61st Round)

Reserve Bank of India (2000 and 2005), *Handbook of Statistics on Indian Economy*, http://www.rbi.org.in/scripts/AnnualPublications.aspx?head=Handbook%20of%20Statistics%20on%20Indian%20Economy

UNIDO (2005), 'Productivity in developing countries: trends and policies', Vienna: United Nations Industrial Development Organisation.

RECENT WORKING PAPERS

Title	Author (s) Name	Paper No.
Import Penetration and Capacity Utilization in Indian Industries	Bishwanath Goldar V.S. Renganathan	E/293/2008
IT & ITES as an Engine of Growth: An Exploration into the Indian Experience	Seema Joshi	E/294/2009
Addressing Coastal Vulnerability at the Village Level: The Role of Socio-economic and Physical Factors	Saudamini Das	E/295/2009
Literacy and School Attendance in India	Suresh Sharma	E/296/2009
Impact of Trade on Employment Generation in Manufacturing in India	Bishwanath Goldar	E/297/2009
Impact of Trade on Employment in the Services Sector in India	Arup Mitra	E/298/2009
Evaluating Agricultural Policy in a Farming System Framework: A Case from North West India	Brajesh Jha	E/299/2009
The Impact of Economic Reforms on Indian Manufacturers: Evidence from a Small Sample Survey	Eckhard Siggel Pradeep Agrawal	E/300/2009
Informal Wage and Formal Sector Productivity: Theory and Evidences from India	Dibyendu Maiti Sugata Marjit	E/301/2009
Pattern of Agricultural Diversification in India	Brajesh Jha Nitesh Kumar Biswajit Mohanty	E/302/2009
Drivers of Agricultural Diversification in India, Haryana and the Greenbelt Farms of India	Brajesh Jha Amarnath Tripathi Biswajit Mohanty	E/303/2009
Regional Openness, Income Growth and Disparity Across Major Indian States during 1980-2004	Dibyendu Maiti Sugata Marjit	E/304/2010
Rethinking Agricultural Production Collectives: The Case for a Group Approach to Energize Agriculture and Empower Poor Farmers	Bina Agarwal	E/305/2010