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Rural urban migration with heterogeneous firms, heterogonous laborer and the effect of wage subsidy

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Abstract. *Rural urban migration is an important aspect towards the process of urbanization and development and therefore has been a topic of interest and debate for many economists for several decades. As a result, there exists a vast and diverse literature empirical and theoretical on the causes, consequences and therefore policy considerations and implications of rural urban migration. In this paper a few of the empirical observations are incorporated in a general equilibrium model based on Harris Todaro (1970) and Melitz (2003) to make it more realistically relevant. Later the effect a usual policy of rural wage subsidy is observed in the new model.*

Keywords: rural urban migration, heterogeneous firms, informal sector, heterogeneous laborer, unemployment, rural wage subsidy.

JEL Classification: E24, J61, J64, L11, L15, O15, R23.

1. Introduction

It is a well known fact that rural urban migration is an important aspect towards the process of urbanization and development. Therefore it has been a topic of interest and debate for many economists for several decades though shifting in and out of prominence. So, there exists a vast and diverse literature on causes, consequences and therefore policy considerations and implications of rural urban migration. However the literature is more empirically than theoretically inclined though present in large numbers. In this paper a few recent findings have been studied and incorporated in a Harris Todaro (1970) and Melitz (2003) type general equilibrium framework and later the consequence of a usual wage subsidy has been observed in the new framework.

Some of the recent empirical research based on which the theory has been constructed are Naryan and Singh (2015) using data of 1300 household in Uttar Pradesh, India show that out migration is more from remote villages than from semi-urban areas also migrants are more educated than non migrants. Lusome and Bhagat (2006) and also Bhagat (2010) using Indian census data from 1971to 2001 show that rural urban migration increased substantially during this period and also cited employment as the main reason for migration among men but Bhagat (2010) further found that this migration rate was high in the highest monthly per capita expenditure/income category. Also among the rural urban migrants literacy rate was higher compared to the average rural literacy rate. Parida (2019) observed using 55^{th} and 64^{th} round NSSO data of India that rural urban migration increased during this period of economic growth, especially to large and medium sized cities. Also the share of migrant workers in the total urban work force was very high and in some large states even higher than national average. More percentage of migrants where employed as self employed or casual (informal) workers than regular salaried workers still the average wage earned by migrants was higher than. He further observed that decision to migrate increased with skill, also the wage earned in the urban area was statistically significantly dependent on the skill level. Imbert and Papp (2020) in Indian context show the presence of costs of migration such as travel costs, income risks, living costs and most importantly psychological cost. Hossain (2001) using 1997 Bangladeshi data show that most migrants were educated, but lesser educated also did migrate. Furthermore rate of migration increased with education. The prime reason for migration being employment, with more educated gravitating towards permanent employment, education etc., also the migrants moved mainly to large cities. Su, Tesfazion and Zhao (2017) find that Chinese migrants are more attracted to cities with high GDP, wage differential, population size, and employment growth rate. But they are deterred to move outside of the province because of the costs like institutional barriers, cultural barriers associated with it, similar to the border effect in case of international migration. With CGSS data Hu, Xu and Chen (2011) show that educated labourer are more likely to migrate permanently have stable jobs and earn high income. Using Chinese data Demurger, Gurgand, Shi and Ximing (2008) show that urban resident's earnings are much higher than migrants which might be because of disparities in educational opportunities. On similar lines Lu and Song (2006) for Tianjin China show that urban residents are more educated than migrants, more of them have permanent jobs with contracts while most of migrants work without proper contracts. Moreover the migrants earn roughly half of their rural counterparts they also receive very

little social protection. Using RUMiC 2009 data of China Xiao and Zhao (2018) find that increase in agricultural land holding increase the propensity of migration. Again, using Chinese data Zhang, Kevin and Song (2003) show that migration increased with urban economic growth, while migrants were attracted by the rural urban wage differential and discouraged by distance. Agesa (2001) using Kenyan data show that, expected wage differential between migrants and non migrants increases the probability of rural urban migration and so does obtaining higher human capital. Gimba and Kumshe (2011) find that if not all most migrants are literate with more people moving for better educational and employment opportunities, but this movement builds various stress in the urban area, in the case of Borno state. Using data from Thailand Amare, Hohfeld, Jitsuchon, Waibel (2012) find that migrants tend to be better educated than non migrants in an overall low level of education in the rural area, but they lack social protection. Lottum and Marks (2012) find that Indonesian internal migrants were typically drawn towards Jakarta due to its urban dominance despite of Governments expensive re direction methods. Andrienko and Guriev (2003) observe that internal migrants in Russia, with an overall low migration rates, migrate to destinations with better job opportunities and availability of public goods, also increase in income increases outmigration from poorer regions. Similarly in case of Ghana, communities with better facilities produce fewer migrants, also migrants tend to be more educated and are better off in urban areas than their non migrant counterparts according to Ackeh and Medvedev (2013). Also in case of Ghana's, Accra Awumbila, Owusu and Teye (2014) show that despite of living in harsh environment in the urban area migrants, most having education but at very low levels believed to be better off and they worked in informal sector as only a few were able to work as formal employees.

What can be observed from the above literature directly and indirectly is the fact that differences between origin and destination cause migration. Also, there exists heterogeneity among labourer individually as well as spatially which leads to, propensity towards, upward selectivity of individuals in the migration process. But even then urban residents remain better off than migrants also migration puts pressure in the urban area. In this paper the above observations have been incorporated in a general equilibrium Harris Todaro (1970) and Melitz (2003) type framework to make it more realistically relevant. Even though Beladi and Oladi (2012) integrated these two seminal works in their model however they did not include an informal sector, urban unemployment and the presence of heterogeneous labourer to capture the above empirical considerations which has been in this framework. Later a usual policy of rural wage subsidy is employed to observe if the pressure of urban unemployment decrease. Even though due to reduction in cost of production labourer employed in the rural sector does increase but due to increase in informal wage and in formal fixed reservation wage leads to decrease in demand of labourer in urban area. So the net effect on urban unemployment remains indeterminate as both expected benefit and cost of migration rises. Thus whether reduction in unemployment is achieved or not, the provision of rural wage subsidy does leads to increase in the efficiency level of the economy by making more competitive firms to operate on one hand the but raising the inequality on the other.

The rest of the paper is arranged as follows in section 2 of the model is set in section 3, the working of the model is observed in section 4, the policy and its implications have been observed finally in section 5 conclusion and future research has been discussed.

2. The model

There is a closed developing economy separated into a developed urban sector and a traditional rural sector. The reason to separate the economy into two sectors is to incorporate duality by assuming the coexistence of development and underdevelopment simultaneously, a salient feature in most of the developing economies. The urban sector is further divided into two subsectors formal and informal. In the formal sector quality differentiated manufactured goods (X) are produced, and in the informal sector a homogeneous good (Y) is produced, again a homogeneous but essential good (Z) is produced in the rural sector. All the usual neo classical assumptions hold unless otherwise specified.

2.1. Consumers

There are two distinct representative consumers, whose preferences are represented by the following utility functions,

$$U_1 = X^a Z^{1-a}, 0 \leq a \leq 1 \tag{1}$$

$$U_2 = Y^b Z^{1-b}, 0 \leq b \leq 1 \tag{2}$$

U_1 represents the preferences of the consumers with money income $M_1 \geq \overline{w}$, where $\overline{w}$ is the sticky urban formal minimum wage, while U_2 represents the preferences of consumers with income M_2 strictly less than the formal minimum wage. The separation of utility functions implies inferiority of the informal good over the varieties produced in the formal sector, and presence of the good Z in both the utility functions imply essentiality of the homogeneous rural good. Now X is the aggregate of quality differentiated varieties produced in the formal sector. It is represented by the usual CES Dixit Stiglitz (1977) type utility function but with quality adjustment, since there is love for variety more varieties imply higher utility and furthermore inclusion of quality implies that utility improves with increase in quality of the variety as well,

$$X = \left[\int_0^\infty \{q(\lambda)x(\lambda)\}^\rho d\lambda\right]^{\frac{1}{\rho}} \tag{3}$$

λ is the index of variety, $\lambda \in (0, \infty)$, $x(\lambda)$ is the quantity consumed of λ^{th} variety, and $q(\lambda)$ is the quality of $x(\lambda)$, $\sigma = \frac{1}{1-\rho} > 1$ is the constant elasticity of substitution between any two goods. The aggregate of varieties X also has an aggregate price associated with it,

$$P_X = \left[\int_0^\infty p(\lambda)^{1-\sigma} d\lambda\right]^{\frac{1}{1-\sigma}} \tag{4}$$

here, $p(\lambda)$ is the quality adjusted price of λ^{th} variety.

Now, maximizing the utility functions, the demand for X, Y and Z are respectively obtained,

$$X = \frac{aM_1}{P_X} \tag{5}$$

$$Y = \frac{bM_2}{p_Y} \tag{6}$$

M_1,M_2, a and b has previously been defined, p_Y is the price of inferior informal good Y,

$$Z = \frac{(1-a)M_1+(1-b)M_2}{p_Z} \tag{7}$$

and p_Z is the price of the rural essential good.

Finally, the demand for a single variety λ is

$$x(\lambda) = q(\lambda)^{\sigma-1}X\left(\frac{p(\lambda)}{P_X}\right)^{-\sigma} \tag{8}$$

and it can be seen from the above equation increase in quality has a positive effect on quantity demanded.

2.2. Producers

2.2.1. Urban formal producer

In the urban formal sector, there is a continuum of firms, each producing a single separate quality differentiated variety, aggregate of which is given by X. The firms are arranged according to technology and each level of technology is matched with a skill level requirement. Firms possessing higher technology levels require superior skill level for production while lower technology firms require lower skill levels, it is further assumed that increasing number of labourer would not replace skill level requirement. Now, the firms are indexed according to skill level s and therefore labourer required by s^{th} firm is given by,

$$l(s) = \frac{x(s)}{s} \tag{9}$$

where, $x(s)$ is the quantity supplied by the s^{th} firm, it can be observed from the above equation that to produce the same quantity of the good, number of labourer required decreases as the skill level increases. Also high skill level implies higher quality of the good produced,

$$q = q(s), q'(s) > 0 \tag{10}$$

and for mathematical simplicity quality is given by,

$$q(s) = s \tag{11}$$

Now the wage rate paid to the labourer is assumed to be,

$$w(s) = \overline{w} + f\{q(s), MP_{l(s)}\} = \overline{w} + f(s), f'(s) > 0 \tag{12}$$

where, $\overline{w} = \overline{w}(p_Z, w_Y)$ (13)

is the trade union determined sticky minimum wage, but is upward adjusting with the price of essential good, p_Z and non unionized informal wage rate w_Y (from Chaudhuri (2002)). The firms above the break even firm have higher technology require higher skill level and therefore have more productivity (from equation (9) marginal product of labourer with skill s is $\frac{dx(s)}{dl(s)} = s$) also produce superior quality (given by s from equation(13)) so pay higher wages increasing with the skill level apart from the necessary minimum wage.

Again the market for the varieties has monopolistic competition which implies the price charged by s[th] firm is given by,

$$p(s) = \frac{w(s)}{\rho s} \tag{14}$$

and it is quality adjusted, as the skill level increases the quality increases and by equation (12) so does wages which in turn increases the price level.

Now the profit of the break even firm is,

$$\pi(s) = p(s)x(s) - \overline{w}(p_Z, w_Y)l(s) - F = 0 \tag{15}$$

F>0 is the fixed cost, homogeneous to all the firms. Solving equation (15) the cut off skill level s^*can be obtained and,

$$s^* = \left[\frac{\left(\overline{w}(p_Z, w_Y)\right)^{\sigma-1} F}{X {P_X}^{\sigma} \left\{\rho^{\sigma}\left(\frac{1}{1-\sigma}\right)\right\}}\right]^{\frac{1}{2(\sigma-1)}} \tag{16}$$

The presence of a cut off implies that only firms s^* and above are able to produce and the rest exit the market. Also it can be observed that the cut off technology is directly related to the cost while inversely with the revenue.

2.2.2. Urban informal producer

In the urban area there is another sector, the informal sector, which produces a final homogeneous but inferior good Y using homogeneous labourer, who also creates the demand for the good, so it is not dependent on the formal sector for its survival. Furthermore this sector is not completely migrant dependant as urban labourers also do participate. The production technology is represented by the following function,

$$l_Y = \alpha Y \tag{17}$$

here, l_Y is the labourer required to produce Y amount of output, and α is the labourer output ratio. The market for Y is perfectly competitive, so profit maximisation implies,

$$\alpha w_Y = p_Y \tag{18}$$

w_Y is the informal wage rate and since it does not have any minimum floor value is the source of informality of the Y producing sector.

2.2.3. Rural producer

In the rural sector another homogeneous but essential good Z is produced, the production function is given by,

$$Z = g(l_Z, land) \tag{19}$$

where, identical labourer l_Z and land are the factors of production. Both the factors are equally important for production i.e. $Z = g(0, land) = g(l_Z, 0) = 0$ and complementary in its use. But the amount of land is exogenously fixed to some amount $\overline{land}$, and so, $g'_{l_Z} > 0, g''_{l_Z} < 0$ for $l_Z \leq \overline{land}$ i.e., the production function behaves as a usual neo classical production function but $g'_{l_Z} = 0$ for $l_Z > \overline{land}$.

The market for good Z also has perfect competition which implies,

$$p_Z Z'_{l_Z} = w_Z - S \tag{20}$$

p_Z is the price of good Z and is a policy variable and so is S which is a rural wage subsidy given per unit of employment. Now a rational producer would not hire labourer any more labourer than the limited land available. But in this model it has been assumed that there exists a surplus labourer which is a reasonable assumption as one of the prime features of developing economies is the presence of surplus of labourer over land (Gebeyehu (2014) using Ethiopian data, Dubey, Palmer-Jones and Sen (2004) with Indian data, Kwan (2009) using Chinese data, Ullah (2004) with Bangladeshi data etc. show the presence of surplus labourer over land), which implies that if all the labourer in the rural area are employed in the production of Z for the sake of kinship or any other reason which actually is the case then according to this model given the policy variable price, marginal product of labourer and therefore the wages will be equal to zero which is also expected. This acts as a push factor for migration as it would not be a stable equilibrium condition if along with it the benefit from moving to the urban area is greater.

2.3. Labourer

The workforce or consumer population in the economy as a whole is given by,

$$L = L_U + L_R \tag{21}$$

where, L_U is the total labourer in the urban area and L_R in the rural area, a priori migration.

2.3.1. Rural labourer

As noted above the total labourer in the rural area before migration is given by L_R and,

$$L_R = \int_{\theta=0}^{\theta_R} l(\theta) d\theta \tag{22}$$

is distributed according to individual's capability to obtain human capital, θ, with minimum capability level being 0 and maximum θ_R in rural area, and $l(\theta)$ is the total labourer having capability θ. Now the capability level may depend on several factors such as individual's innate ability, parental wealth, their education, their investment on their children, government policies and expenditure on infrastructure etc., and since capability

depends on such diverse factors, differing for every individual therefore is the cause of heterogeneity among the labourers hence the cause for selectivity in obtaining skill levels.

Now it has already been assumed that there exists surplus labourer over land in the rural area, which implies that if L_R is entirely employed in the rural production then the marginal product of labourer and therefore the wage received will equal zero. Also there exists no other employment opportunities in the rural area i.e. non land related activities. These aspects acts as push leverage while higher expected wage in urban area acts as a pull factor. The labourers who are able to obtain at least the minimum skill level and above are the ones able to migrate for employment in the urban formal sector, while the unskilled ones migrate for informal sector as long as the expected earnings from migrating in either of the sector is greater than their respective costs. All the labourers are not able to migrate for formal sector because of the differences in their capability levels and therefore opportunity cost of obtaining skill apart from a fixed cost of migration which is a homogeneous cost of migrating to the urban area and does not depend on the sector for which the labourer is migrating. So, there exists a cut off capability level given by θ_R^* required not only to obtain the minimum skill level s^* but also be able to cover the cost of migration and it can be obtained by putting the following equation equal to zero,

$$p_{s^*}\overline{w}(w_Y, p_Z) + p_I w_Y + p_U 0 - w_z e(\theta) - F_M = 0 \tag{23}$$

The above equation when solved provides cut off capability level for which the expected benefit from obtaining the skill level s^* is equal to the cost. Here, $p_{s^*} = \frac{l(s^*)}{l^{ss}(s^*)}$, is the individuals probability of getting employed in the firm requiring s^* level of skill in the formal sector and earning minimum wage, where, $l(s^*)$ is the demand for labourer having skill s^* while $l^{ss}(s^*) = l(\theta_R^*) + l(\theta_U^*)$ is the total supply. Therefore $(1 - p_{s^*})$ must be the probability of not getting employed in the cut off firm which in turn implies either getting employed in the urban informal sector, its probability being $p_I = \frac{l_Y}{l_Y^{ss}}$, where l_Y is the total demand and $l_Y^{ss} = L - \int_{s^*}^{s_U} l(s)ds - l_Z$ is the total supply of labourer for informal employment and earning informal wage or being urban unemployed and earn nothing with probability p_U (also it is known that $p_{s^*} + (1 - p_{s^*}) = p + p_I + p_U = 1$). Presence of probability implies income uncertainty also a type of cost. Furthermore it has also been assumed that 1 unit of labourer implies 1 unit of labour. While $e(\theta) = \frac{s^*}{\theta}$ is the effort function which represents the effort put forward to obtain the skill level s^* instead of labour to obtain rural wage, so the opportunity cost of effort is the rural wage foregone. As evident from $e(\theta)$ the effort level decreases with capability level, while increasing with the skill level. $F_M > 0$ is the exogenous fixed cost of migration that consists of several types of costs together such as travel costs, living costs, network building cost, information and search cost, psychological cost etc. The presence of migration cost is not an unknown phenomenon as can be observed from several empirical literatures. Imbert and Papp (2020) using Indian data show that seasonal migrants prefer to earn less because of costs associated with migration, such as travel costs, income risks, cost of living in city and most importantly non monetary costs associated with migration such as harsh living and working conditions in the city. Using Chinese data Su, Tesfazion and Zhao (2017) show that moving beyond

home province has a strong deterrent effect on migration. Also using Chinese data Wang and Fu (2019) find that reducing legal restriction imposed by Hokou system and other migration costs increased migration. Andrienko and Guriev (2003) show for Russia that migration is constrained by lack of liquidity and outmigration increases with increase in income on similar lines using Brazilian data Golghar (2012) explain that poor migrants do not have many options and they are partially trapped in origin. Brauw, Mueller and Lee (2014) try to find the reasons for low migration in Sub- Saharan Africa despite presence of gains, due to Governmental policies, income risks, travel costs, and even though network decreases the information costs but communication system is poor, psychological cost of moving to unfamiliar location, opportunity cost of migrants departure etc. Also Bryan and Morten (2018) observe existence of cost as an impediment to internal migration and that labour productivity increased with reduction in these costs in case of Indonesia.

Solving equation (23) for θ the minimum capability level θ_R^* is obtained and,

$$\theta_R^* = \frac{w_Z s^*}{p_{s^*}\bar{w}(w_Y, p_Z) + p_I w_Y - F_M} \tag{24}$$

its value is low if the expected benefit is higher and high if costs are higher. Similarly one to one relationship can be established between every capability level and skill level by putting different levels of capability and therefore obtaining the respective skill level,

$$p_s w(s) + p_I w_Y - w_Z \frac{s}{\theta} - F_M = 0 \tag{25}$$

Finally the maximum skill level given by s_R that can be achieved in the rural area can be obtained by solving the following equation for s,

$$p_s w(s) + p_I w_Y - w_Z \frac{s}{\theta_R} - F_M = 0 \tag{26}$$

So, total skilled migrants from rural area are $\int_{\theta_R^*}^{\theta_R} l(\theta) d\theta$. Now it is known that in the urban area there is another sector, the informal sector which requires no skill. Rural unskilled labourer will also tend to move to this sector and the migration will occur till equilibrium is reached which transpires when the expected benefit from equals the rural wage w_Z and the fixed cost of migration $F_M > 0$ i.e. the cost. So for the migration to halt the following condition must hold,

$$p_I w_Y = w_Z + F_M \tag{27}$$

2.3.2. Urban labourer

Again total number of urban labourer prior to migration is given by L_U from (21) and,

$$L_U = \int_{\theta=0}^{\theta_U} l(\theta) d\theta \tag{28}$$

so, the urban labourers are also distributed according to their capability levels akin to the rural labourer, the minimum capabilities are identical in both the areas however the maximum capability differs, with $\theta_U > \theta_R$ i.e. it is assumed that urban maximum capability level is higher than rural maximum. This is a reasonable assumption to show spatial difference between the labourers capability led by urban primacy. Again it is also

assumed that $l(\theta: \theta = 0) > l(\theta: \theta = \theta_R) > l(\theta: \theta = \theta_U)$ which implies that as the capability level increases the total number of labourer having the capability decreases i.e. there are more people with low capability level than with high capability. Now since urban labourers are also heterogeneous in terms of capability levels it implies again there is selectivity in terms of obtaining skill. So the cut off capability level required by the urban labourer to obtain the cut off skill s^* is given by θ_U^* and is obtained by solving the following equation for s,

$$p_{s^*}\overline{w}(w_Y, p_Z) + p_I w_Y + p_U 0 - (p_I w_Y + p_U 0)e(\theta) = 0 \tag{29}$$

Unlike the rural area there are only two costs of obtaining s^* in the urban area; the cost of uncertainty and the opportunity cost. Again, similar to the rural labourer, $p_{s^*} = \frac{l(s^*)}{l^{ss}(s^*)}$ is the probability of getting employed in the breakeven firm for the urban labourer as well, if not employed then the labourer will either get employed in the informal sector with probability $p_I = \frac{l_Y}{l_Y^{ss}}$ or remain unemployed the probability of which being p_U. But the opportunity cost of obtaining skill in the urban area is the expected informal wage i.e. $p_I w_Y$. $e(\theta) = \frac{s^*}{\theta}$ is again the effort function to obtain skill level s^*. Therefore solving (29) for θ_U^*,

$$\theta_U^* = \frac{p_I w_Y s^*}{p_{s^*}\overline{w}(w_Y, p_Z) + p_I w_Y} \tag{30}$$

The minimum capability level required by the urban labourer to obtain the skill s^* is also negatively associated with expected benefit and positively with cost. It is known that s_R is the maximum skill level obtained by the rural labourer given the maximum capability level θ_R, now the capability level required by the urban labourer to obtain the same amount of skill is given by θ_{UR} and can be obtained from solving the following equation for θ,

$$p_{s_R} w(s_R) + p_I w_Y - p_I w_Y \frac{s_R}{\theta} = 0. \tag{31}$$

Again, since it was assumed that $l(\theta_U) < l(\theta_R) < l(0)$ i.e. as the capability level increase the total number of labourer having the capability decreases and it has already been observed that there exists a one to one relationship between capability and skill level also it is known that the as technology in the urban formal sector increases the skill level required also increases but the number of labourer required decreases. This can imply that after the skill level s_R there is no competition from the rural migrants hence there is no uncertainty regarding unemployment, so every urban labourer who obtains any skill greater than s_R are completely employed in the firms requiring those skill levels. These occurrences entails that the rural labourer bring over crowdedness in urban area and hence urban unemployment in equilibrium. Since $\theta_U$is exogenously given the highest skill level that can be achieved by the urban labourer or s_U and therefore the technology operable in the economy can be endogenously determined from the following equation,

$$w(s) - p_I w_Y \frac{s}{\theta_U} = 0. \tag{32}$$

3. Working of the model

Now since the model has been set up the endogenous variables in the model has to be determined given the exogenous and policy variables. Also $M_1 = \overline{w}(w_Y, p_Z) + \int_{s^*}^{s_U} f(s)ds = \int_{s^*}^{s_U} w(s)ds$ and $M_2 = w_Y + w_Z$. There are 16 unknown variables X, Y, Z, P_X, $\overline{w}$, $q(s), x(s)$, $l(s)$, $p(s)$,w(s), p_Y, w_Y, l_Y, w_Z, l_Z, s^*, s_U which can be solved from 16 equations (4), (5), (6), (7), (8), (9), (11), (12), (13), (14), (16), (17), (18), (19), (20), (27), (32). Once these variables are obtained it can be used to calculate θ_R^* and θ_U^* from equations (24) and (30). Finally since L is known, $\int_{s^*}^{s_U} l(s)ds$ is the total labourer employed in the formal sector, l_Y in the informal sector and l_Z in the rural sector, therefore $L - \int_{s^*}^{s_U} l(s)ds - l_Y - l_Z$ gives the total unemployed labourer in the urban area in equilibrium. Also since there is a single sector in the economy with each firm having a single technology requiring a single skill level and producing a single variety solving for maximum skill level also determines the total number of firms $\int_{s^*}^{s_U} ds$ and therefore the total number of varieties produced in the closed economy.

4. Policy effects of rural wage subsidy

It has already been observed, that migration increases stress in the urban employment opportunities. So, one of the policies that Government can adopt in order to reduce this pressure is to give wage subsidy to the rural producer. In this paper the effect of this rural wage subsidy has been observed.

Proposition: if an additional wage subsidy is given to the rural producer then rural demand for labourer increases, informal real wage decreases, also informal labourer employed decreases, formal minimum wage increases and employment falls, but net employment may remain indefinite.

Proof: If an additional wage subsidy is provided to the rural producer i.e. S is increased in equation (20). Then even though w_Z does not change and assuming land is not overcrowded, from equation (20) in new equilibrium since R.H.S reduces i.e. the rural cost of production due to increase in subsidy L.H.S must decrease and since p_Z is a policy variable, labourer demanded must increase for the marginal product of labourer to decrease. As l_Z increases from equation (19) supply of Z also increases. Thus to match the increase in supply of Z, demand must also increase as demand equals supply and for demand to increase equation (7)'s R.H.S must increase and for this to happen there can be four possibilities either M_1, M_2, both to increase or p_Z to decrease, but it is a policy variable as already stated earlier. But in any on the former three situations w_Y has to increase and from equation (18) p_Y also increases and since α is a positive constant, increase in p_Y must be greater than w_Y. So from equation (6) demand for Y decreases and therefore from (17) to reduce its supply labourer employed l_Y must be reduced. Since w_Y increases, from (13) $\overline{w}$ i.e. the sticky minimum wage also increases being an upward adjusting function of w_Y and therefore s^* also increases which can be observed from (16). Since the minimum cut off skill required increases so does the minimum capability level required in both rural and

urban area increases which can be obtained from (24) and (30). Now since in new equilibrium $\overline{w}$ is higher so will be the maximum skill level obtained s_U given the maximum capability level θ_U. Thus higher technology firms operate in the new equilibrium. But $\int_{s^*}^{s_U} l(s)ds$ decreases as both s^* and s_U (from 32) increase since it has been assumed that more the skill level required lesser the number of labourer employed. Therefore in terms of change in the level of unemployment there are two opposing forces on one hand there is an increase in rural employment and in other decrease in both informal and formal urban employment. So net variation in unemployment remains indeterminate as if former is less than later then unemployment increases, and if decrease is lesser, then unemployment is lesser. But whatever be the case with unemployment one thing is common since s^* increases lesser labourer make their way into formal employment hence more have to consume the inferior good. That is the effect of increasing employment opportunity in rural area to reduce urban stress by decreasing the rural cost of production does improve the overall technology of the economy and also removes the less efficient firms but increases inequality while may not be changing the net employment scenario at all.

5. Conclusion

The literature on rural urban migration is extremely vast and diverse as the experience of every other country is different. Capturing every cause and consequence of rural urban migration and providing policies to curb costs and increase its benefit through a single workhorse model is difficult if not impossible. In this paper some of the empirical findings have been observed and incorporated in a general equilibrium Harris Todaro (1970) rural urban migration and Melitz (2003) heterogeneous firm type model. The model has been extended to include an informal sector producing an inferior good, heterogeneous labourer leading to selectivity apart from heterogeneous firms and observed that migration did lead to stress in the urban area. Later a usual policy of rural wage subsidy is employed to observe if the pressure decreases. Even though due to reduction in cost of production labourer employed in the rural sector does increase but due to increase in informal wage and in formal fixed reservation wage leads to decrease in demand for labourer in urban area. So the net effect on urban unemployment remains indeterminate as both expected benefit and cost of migration rises. Thus whether reduction in unemployment is achieved or not, the provision of rural wage subsidy does leads to increase in the efficiency level of the economy by making more competitive firms to operate on one hand the but raising the inequality on the other.

For further research the current model can be extended further and incorporate other outcomes obtained from the rural urban migration research. Moreover different policies such as price subsidies and relaxations, other wage subsidies, employment guarantee schemes used by several developing economies can be applied in the present model and its outcomes observed. The model can also be used to include movement of goods and people internationally.

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