The University of Nottingham

research paper series

Theory and Methods

Research Paper 2013/07

Liberalization and 'Jobless Growth' in a Developing Economy
Some Extended Results

by

Soumyatanu Mukherjee

GEP

The Author:

Soumyatanu Mukherjee is a Research Fellow in University of Nottingham (UK), School of Economics. He is affiliated to the research groups CREDIT and GEP.

Acknowledgements:

This research is funded by an Economic and Social Research Council (ESRC), University of Nottingham Doctoral Training Centre (DTC) studentship (reference number ES/J500100/1). I am grateful to my supervisors, Professor Oliver Morrissey and Dr Markus Eberhardt and my internal assessor, Prof Daniel Seidmann for their valuable suggestions and comments. The usual disclaimer applies.

Liberalization and ‘Jobless Growth’ in a Developing Economy – Some Extended Results

by

Soumyatanu Mukherjee

Abstract:

This paper, in terms of a three-sector mobile capital version of Harris-Todaro type general equilibrium model of rural-urban migration with agricultural dualism and a non-traded intermediate input, tries to theoretically explain why a developing country may experience a ‘jobless growth’ during liberalised regime as suggested by empirical evidences. I have considered impacts of trade liberalization (captured by a tariff-reform in the protected import-competing sector) and liberalization of labour laws (captured by a reduction in the bargaining strength of the labour unions). These findings are particularly interesting for their contradiction to the predictions of standard Harris-Todaro model.

JEL Classifications: F11; F16; J21; O24

Keywords: Trade Liberalization; Labour Market Reform; Agricultural Dualism; Jobless Growth; Non-traded Intermediate Input; Urban Unemployment.

Outline:

Non-Technical Summary

It has been mentioned that if countries adopt an outward-oriented policy that aims to reduce all barriers to free trade, all the problems of developing countries will gradually be cured, including that of increasing urban unemployment. However empirical evidences suggest that many of the developing countries are facing significant adjustment costs in implementing policies of economic reform. It has been observed that developing countries (non-OECD) are increasingly reluctant to implement tariff reform as a possible strategy. One most strong argument in favour of not pursuing this policy is a tariff reduction would be counterproductive from the point of view of domestic welfare and it would immediately lead to an increase in unemployment since displaced workers cannot readily be absorbed in other sectors of the economy.

However in the context of the agriculture-dominated, 'labour-surplus' developing economies, the phenomenon of development in the presence of agricultural dualism (connoting the coexistence of an ‘advanced agrarian sector’ with a ‘pre-capitalist backward agriculture’) has received prominence. The presence of non-tradable, the prices of which are determined domestically by demand–supply forces, is another important feature of a developing economy. This paper has specifically incorporated these two features within a three-sector general equilibrium model of rural-urban migration with existence of urban unemployment. I have been able to show that a tariff-cut or a government policy of labour market reform in the formal manufacturing sector may be conducive to economy’s national income, without not necessarily intensifying urban unemployment.

1. Introduction

There are observed cases where 'jobless growth' is associated with economic liberalisation for developing countries like India, generating scepticism regarding the allocation of the benefits of growth during liberalised regime. This should tempt us to analyse the impact of economic reform on welfare and open unemployment in a developing economy in terms of general equilibrium framework.

However the simple two-sector mobile capital version of Harris-Todaro (Harris and Todaro, 1970) model (a' la Corden and Findlay, 1975) may not appropriately describe the complex nature of a low income developing economy, since presence of agricultural dualism and non-traded goods remain the two important features of such an economy. The non-traded goods may be either intermediate inputs or final commodities. Chaudhuri (2007) incorporated agricultural dualism using made an attempt to analyse why the developing countries are luring for foreign capital using a non-traded final commodity while Mukherjee (2012) used non-traded intermediate input to examine consequences of a liberalized investment policy (foreign capital inflow) on welfare and the level of urban unemployment in terms of a three sector mobile capital version of Harris–Todaro (hereafter HT) model. But one should keep in mind that economic reforms, in the context of a typical less developed country, involve not only a liberalised investment policy but also removal of protectionist policy and structural reforms like deregulating the labour market. The purpose of this paper is to build a theoretical model to yield predictions about the possibility of 'jobless growth' in a developing economy with labour market imperfection, where this developing country is adopting the policy of trade liberalization captured by a reduction in protection in the domestic import-competing sector and a policy of labour market reform, captured by government intervention to curb the bargaining power of the labour union in the organized sector in terms of a three-sector mobile capital version of HT model with agricultural dualism in the rural economy where advanced agricultural sector produces a non-traded intermediate input[1] using capital along with labour and land for the agro-based urban industry. This approach, to capture theoretically the impacts of trade liberalization and labour market reform in a set-up with agricultural dualism and non-traded intermediary where the intermediate input is produced with both land and capital along with labour is, to the best of my knowledge, quite a novel extension of Mukherjee (2012).

2. The Model:

Consider a small open economy, broadly divided into an urban manufacturing sector and a rural sector, which is sub-divided into 'backward' agricultural sector (sector 1) and 'advanced' agricultural sector (sector 2). Sector 1 uses labour and land as inputs, and is assumed to be the export sector of the economy. Sector 2 produces a commercial agricultural crop as an intermediate input for the urban manufacturing sector using land, labour and

[1] Although some papers (such as Marjit and Beladi, 1996, Yabuuchi and Beladi, 2001) assume existence of traded intermediary, assuming the intermediate sector to be non-traded seems more realistic in this context. For details see Mukherjee, 2012. Among other papers assumed existence of non-traded intermediate inputs, most notable is Yabuuchi et al. (2005)

capital. Finally, the urban manufacturing one (sector 3) may be an agro-based industry that uses labour, capital and the intermediate input. Sector 3 is the import-competing sector of the economy and is protected by an import tariff[2]. The per-unit requirement of the intermediate input is assumed to be technologically fixed in urban sector[3]. Workers in urban sector earn an institutionally given wage, W^{*}[4], while the wage rate in the other two sectors, W, is market determined. So labour is perfectly mobile between backward and advanced agricultural sector, but imperfectly mobile between urban manufacturing and the rest of the economy. Production functions exhibit constant returns to scale with diminishing marginal productivity to each factor. The two wages are related by the Harris-Todaro condition of migration equilibrium with $W<W^{*}$. Agricultural commodity is chosen as numeraire, so its price is set equal to unity.

The following notations are used:

W= competitive rural wage rate for labour (L);

W^*= institutionally given wage rate in urban sector;

R= rate of return to land (N);

r= rental rate return to capital (K);

a_{ji}= amount of the j^th^ factor used to produce 1 unit of the i^th^ good $\begin{cases} j = L, K, N \\ i = 1,2,3 \end{cases}$;

X_i = output of sector i;

L_U = urban unemployment level;

P_2 = domestic price of non-traded input;

P_3 = international price of good 3;

t = ad-valorem rate of tariff;

θ_{ji} = cost share of factor j in the production of good i;

λ_{ji} = share of sector i in the total employment of factor j.

∧ = proportional change.

The three zero-profit conditions are given by

---

[2] We assume ad-valorem equivalence of any quantitative or other restrictions on imports, such as quotas.

[3] It rules out the possibility of substitution between the non-traded input and other factors of production in urban sector.

[4] This is a simplifying assumption. Assuming each urban sector firm has a separate labour union, the unionized wage function can be derived as a solution to a Nash bargaining game between the representative firm and the representative union. This function has been derived in Chaudhuri and Mukhopadhyay (2010), pp. 33-35.

$$Wa_{L1} + Ra_{N1} = 1 \quad (1)$$

$$Wa_{L2} + Ra_{N2} + ra_{K2} = P_2 \quad (2)$$

$$W^* a_{L3} + ra_{K3} + P_2 a_{23} = (1+t)P_3 = P_3^* \quad (3)$$

Factor Market Equilibrium conditions are given by

$$a_{L1}X_1 + a_{L2}X_2 + a_{L3}X_3 + L_U = L \quad (4.1)$$

By Harris-Todaro Migration Equilibrium condition,

$$\left({W^* a_{L3} X_3} \Big/ {(a_{L3}X_3 + L_U)} \right) = W \quad (4.2)$$

Inserting $(a_{L3}X_3 + L_U) = \left({W^* a_{L3} X_3} \big/ {W} \right)$ in Equation (4.1) we get

$$\left(\frac{W^*}{W}\right) a_{L3}X_3 + a_{L2}X_2 + a_{L1}X_1 = L \quad (4.3)$$

$$a_{K2}X_2 + a_{K3}X_3 = K \quad (5)$$

$$a_{N1}X_1 + a_{N2}X_2 = N \quad (6)$$

The demand for non-traded input must equal its supply. So:

$$X_2^D = X_2 = a_{23}X_3 \quad (7)$$

The economy's social welfare is measured by strictly quasi-concave social welfare function:

$$V = V(D_1, D_3) \quad (8)$$

Where

D_1 =Domestic consumption of agricultural commodity 1 by the society

D_3 =Domestic consumption of the final manufacturing product by the society

(We implicitly assume that the non-tradable produced by advanced agricultural sector are not used for consumption purpose).

National Income at domestic prices:

$$Y = D_1 + P_3^* D_3 = WL + RN + rK_D - tP_3(D_3 - X_3) \quad (9)$$

It is not a decomposable system. The working of our general equilibrium model is as follows:

Given W^*, P_3, t; W, R and r are determined from our price-system given by Equations (1)–(3) as functions of P_2. Once factor prices are determined, factor coefficients are also determined as functions of P_2. Then from Equations (4.3) – (6) X_1, X_2 and X_3 are determined as functions of P_2. Finally P_2 is obtained from Equation (7).

Following Mukherjee (2012), I also assume that sector 2 is relatively more labour-intensive compared to sector 1 in physical and value terms.

A. Comparative Statics– Reduction in Protection in Import-competing Sector:

Taking total differentiation of Equations (1) – (3), using 'envelope conditions' and Cramer's rule we get

$$\widehat{W} = -\frac{\theta_{N1}}{|\theta|}\left[(\theta_{K3} + \theta_{23}\theta_{K2})\widehat{P_2} - \theta_{K2}T\hat{t}\right] \tag{10}$$

$$\hat{R} = \frac{\theta_{L1}}{|\theta|}\left[(\theta_{K3} + \theta_{23}\theta_{K2})\widehat{P_2} - \theta_{K2}T\hat{t}\right] \tag{11}$$

$$\hat{r} = \frac{(\theta_{L1}\theta_{N2} - \theta_{N1}\theta_{N2})}{|\theta|}\left(T\hat{t} - \theta_{23}\widehat{P_2}\right) \tag{12}$$

Where

$$|\theta| = \theta_{K3}(\theta_{L1}\theta_{N2} - \theta_{N1}\theta_{L2})$$

and,

$$T = (t/(1+t)) > 0;$$

Now totally differentiating Equations (4.2) – (7), using (10) – (12) and solving we get:

$$\widehat{X_2} = \frac{1}{|\lambda|}\left[\left(\lambda_{N1}\lambda_{K3}C_1 + \lambda_{L1}\lambda_{K3}C_2 + \tilde{\lambda}_{L3}\lambda_{N1}C_3\right)\hat{P}_2 - \left(\lambda_{L1}\lambda_{K3}C_4 + \lambda_{N1}\lambda_{K3}C_5 + \lambda_{N1}\widetilde{\lambda_{L3}}C_6\right)\hat{t}\right] \tag{13}$$

$$\widehat{X_3} = \frac{1}{|\lambda|}\Big[\left(\lambda_{L1}\lambda_{N2}C_3 - \lambda_{L1}\lambda_{K2}C_2 - \lambda_{L2}\lambda_{N1}C_3 - \lambda_{N1}\lambda_{K2}C_1\right)\hat{P}_2 - (\lambda_{L1}\lambda_{N2}C_6 - \lambda_{L1}\lambda_{K2}C_4 - \lambda_{L2}\lambda_{N1}C_6 - \lambda_{K2}\lambda_{N1}C_5)\hat{t}\Big] \tag{14}$$

Where all of the $C_1, C_2, C_3, C_4, C_5 < 0$[5]. Under the condition $\tilde{\lambda}_{L3}$ is negligible[6], $C_6 < 0$. Since output of sector 2 is relatively more labor-intensive compared to land vis-à-vis sector 1, we

[5] See appendix for expressions of C_1, C_2, C_3, C_4, C_5 and C_6.

[6] This is a realistic assumption since for most of the low-income developing countries share of employment in the organized sector is likely to become negligible over time, as bulk of the workforce are engaged in informal jobs, including agriculture. For example, in India, more than 90% people are engaged in agriculture and other informal activities. The focus of this paper is such LDCs. This assumption has also been used in Marjit (2003).

have $|\theta| = \theta_{K3}(\theta_{L1}\theta_{N2} - \theta_{N1}\theta_{L2}) < 0$ and $(\lambda_{L1}\lambda_{N2} - \lambda_{L2}\lambda_{N1}) < 0$. Therefore, $\Delta = \left[C_3\left(\lambda_{L1}\lambda_{N2} - \lambda_{L2}\lambda_{N1} - \lambda_{N1}\widetilde{\lambda_{L3}}\right) - \lambda_{L1}C_2 - \lambda_{N1}C_1\right] > 0$. It can be shown that by the stability condition in the market for non-traded input $\left({}^{\Delta}/_{|\lambda|}\right) < 0$[7]; $\therefore |\lambda| < 0$.

Thus one can obtain

$$\widehat{P_2} = \frac{\hat{t}}{\Delta}\left[C_6\left(\lambda_{L1}\lambda_{N2} - \lambda_{L2}\lambda_{N1} - \tilde{\lambda}_{L3}\lambda_{N1}\right) - C_4\lambda_{L1} - C_5\lambda_{N1}\right] \qquad (15)$$

Differentiation of (8) and (9) gives

$$\frac{dV}{V_1} = dD_1 + (1+t)P_3 dD_3 = J\left[(1-L_1)W\widehat{W} + tP_3\left(tP_3S\hat{t} - X_3\widehat{X_3}\right)\right]$$

Where $V_1 = \frac{\partial V}{\partial D_1}, J = \frac{1+t}{\{1+(1-c)t\}}, S = \left(\frac{\partial D_3}{\partial P_3^*}\right) + \left(\frac{\partial D_3}{\partial Y}\right)D_3$ is the Slutsky's pure substitution term, and $c = (1+t)P_3\left(\frac{\partial D_3}{\partial Y}\right)$ is the marginal propensity to consume good 3.

Now $dV/V_1\hat{t} = J\left[\left\{(1-L_1)W\frac{\widehat{W}}{\hat{t}} - tP_3X_3\left(\frac{\widehat{X_3}}{\hat{t}}\right)\right\} + (tP_3)^2S\right]$ represents the impact of tariff-reduction on welfare. (16)

From HT migration equilibrium we have,

$$L_U = \left[\left\{\left(\frac{W^*}{W}\right) - 1\right\}a_{L3}X_3\right]$$

Differentiating totally we obtain,

$$\widehat{L_U} = \frac{\lambda_{L3}}{\lambda_{LU}}\left[\left(\frac{W^*}{W} - 1\right)\left(\widehat{a_{L3}} + \widehat{X_3}\right) - \left(\frac{W^*}{W}\right)\widehat{W}\right] \qquad (17)$$

$$\widehat{W} = -\left(\frac{\theta_{N1}\hat{t}}{|\theta|}\right)\left[\left\{C_6\left(\lambda_{L1}\lambda_{N2} - \lambda_{L2}\lambda_{N1} - \tilde{\lambda}_{L3}\lambda_{N1}\right) - C_4\lambda_{L1} - C_5\lambda_{N1}\right\}\left(\frac{\theta_{K3}+\theta_{23}\theta_{K2}}{\Delta}\right) + \theta_{K2}T\right] \qquad (18)$$

These lead to the following proposition:

Proposition 1. *Given the urban wage and international price of good 3, tariff reduction may lead to a situation of 'jobless growth' in urban manufacturing sector provided* $\tilde{\lambda}_{L3} \cong 0$ *and* $|\theta| < 0$.

The assumption is about share of employment in the organized sector. To assume share of employment in the organized sector is negligible compared to the other sectors of the economy does not rule out the existence of unemployment in sector 3, nor reduce the importance of sector 3. Empirically it only indicates that productivity has improved in sector 3.

[7] See appendix for detail derivation.

Proof. It is straightforward to argue from Equations (A.1), (14), (15) and (18) when $\tilde{\lambda}_{L3}$ is negligible and $|\theta| < 0$, $C_6 < 0 => \widehat{X_3} < 0$; $\widehat{P_2} < 0$; $\widehat{W} < 0$ when $\hat{t} < 0$. Thus Equation (17) indicates the possibility of zero net job creation in the urban sector during liberalised regime. The intuition is as follows:

A reduction in import tariff lowers the domestic price of the finished manufacturing (agro-based) good produced by urban manufacturing sector, thus shrinking this sector. Capital-intensive urban sector now demands less capital which in turn lowers the return to capital, r. Of course this contraction of the urban sector reduces both demand for and supply of the non-traded input produced by advanced agro-processing sector but so long as the urban manufacturing sector accounts for significantly low share of total employment, the demand-effect dominates and P_2 falls. Now in the Heckscher-Ohlin-Subsystem (HOSS) formed by the two agricultural sectors fall in P_2 induces a Stolper-Samuelson effect, following which W falls but R (return to land-capital) rises under the assumption $|\theta| < 0$.

Note that there will be four different impacts on social welfare: total wage income decreases as W falls; rental income from land rises; return from mobile capital falls; and as X_3 falls, cost of tariff protection of the import-competing sector, tP_3X_3, falls. So there is a possibility to achieve an increase in the economy-wide social welfare: if the initial tariff rate is large enough so that the net effect of reduction in distortion costs of tariff becomes dominant.

Now consider the effect on urban unemployment: as sector 3 contracts, $a_{L3}X_3$ falls. Therefore the number of jobs available in the urban sector falls. This decreases the expected urban wage for every prospective rural migrant leading to a reverse migration from urban to rural sector. This is the ‘centripetal force’ reducing the extent of urban unemployment. However, as competitive rural wage falls, that will induce the rural workers to leave the rural sectors and to join the urban unemployment pool. This is the ‘centrifugal force’ worsening the problem. If the relative strengths of these two opposite forces are more or less equal to each other, there may be no net job creation in the urban sector. Also if the magnitude of the centrifugal force is larger, the economy might experience significant job losses in the urban sector even adopting this policy of tariff reform.

However as pointed out before, the economy-wide social welfare may improve. This indicates to the possibility of the economy to experience ‘jobless growth’ in this liberalized regime.

The organized manufacturing sector accounts for a small share of total employment in most of the low-income developing countries and this extension adds insight into why for an agriculture-dominated less developing economy trade liberalization might be welfare improving but there may be significant job losses or stagnation in urban employment.

B. Reduction in Bargaining Strength of the Labour Union in Organised Sector:

We relax the assumption of institutionally given wage in the urban sector and take into account of the fact that the urban sector faces a unionised labour market. So W^* is now endogenously determined as

$$W^* = W^*(W, U)$$

Where U is the bargaining power of the labour unions. And we have, $W^* = W$ for $U = 0$, $W^* > W$ for $U > 0$; $\left({\partial W^*}/{\partial W}\right), \left({\partial W^*}/{\partial U}\right) > 0$. So Equation (3) can be re-written as

$$W^*(W, U)a_{L3} + ra_{K3} + P_2 a_{23} = (1 + t)P_3 \qquad (3.1)$$

A policy of labour-market reform takes the form of government intervention to reduce the bargaining strength of the labour-union (U), leading to a decrease in the unionised wage rate (W^*)[8].

Accordingly the comparative statics exercise yield:

$$\widehat{X_2} = \frac{1}{|\lambda|}(\lambda_{L1}\lambda_{K3}B_2 + \lambda_{N1}\lambda_{K3}B_1 + \lambda_{N1}\lambda_{L3}B_3)\widehat{W^*} \qquad (19)$$

$$\widehat{X_3} = \frac{1}{|\lambda|}(\lambda_{L1}\lambda_{N2}B_3 - \lambda_{L1}\lambda_{K2}B_2 - \lambda_{L2}\lambda_{N1}B_3 - \lambda_{K2}\lambda_{N1}B_1)\widehat{W^*} \qquad (20)$$

See appendix for the expressions of B_1, B_2, and B_3 (Equation A.2).

As explained previously, under the assumption that sector 2 is relatively more labour-intensive compared to land than sector 1 ($|\theta| < 0$) and we have all B_1, B_2 are < 0. But sign of B_3 is ambiguous. If fraction of capital used in sector 2 is negligible, $B_3 < 0$. Therefore, from Equations (19) and (20), when $\widehat{W^*} < 0$, under the sufficient conditions $\lambda_{K2} \cong 0$ and $|\theta| < 0$ we would have $\widehat{X_2}$, $\widehat{X_3} > 0$.

Accordingly we have

$$\widehat{P_2} = -\left(\frac{\widehat{W^*}}{\Delta}\right)[B_3(\lambda_{L1}\lambda_{N2} - \lambda_{L2}\lambda_{N1}) - B_2\lambda_{L1} - B_1\lambda_{N1}] \qquad (21)$$

As stated earlier, $\Delta > 0$. So when $\widehat{W^*} < 0, \widehat{P_2} > 0$ if $\lambda_{K2} \cong 0$ and $|\theta| < 0$.

Finally, we have

[8] Several empirical studies (such as Bhalotra, 2002) have noted that in India, before the advent of economic reforms organised workers in the large firms were to reap wages higher than the supply price of labour due to strong labour regulations through collective bargaining (offer of negotiations, strikes etc.) and restricted mobility of the labour in the organised sectors through various labour laws (such as Industrial Disputes Act, 1947). This makes Indian policymakers to seriously think over to reformulate labour laws to curb union power so that unions' power to mark up wages over the supply of labour would decrease and as a consequence unionised wage would fall.

$$\widehat{W} = \left(\frac{\theta_{N1}\widehat{W^*}}{|\theta|}\right)\left[\frac{\{B_3(\lambda_{L1}\lambda_{N2} - \lambda_{L2}\lambda_{N1}) - B_2\lambda_{L1} - B_1\lambda_{N1}\}}{\left(\frac{\theta_{K3}+\theta_{23}\theta_{K2}}{\Delta}\right) + \theta_{K2}\theta_{L3}}\right] \quad (22)$$

So when $\widehat{W^*} < 0$, we have $\widehat{W} > 0$ if $\lambda_{K2} \cong 0$ and $|\theta| < 0$.

Therefore we are now in a position to state the following proposition:

Proposition 2: *Competitive wage rises following a policy of labour-market reform if $\lambda_{K2} \cong 0$ and $|\theta| < 0$.*

Proof. Government intervention to curb the bargaining power of labour-union, leading to a reduction in the unionized wage, makes it possible for the urban sector (sector 3) to save on labour input and raises the effective price of the commodity (net of labour cost) as faced by the manufacturing producers. This helps sector 3 to expand (note that ambiguous sign of B_3 will have no effect on expansion of sector 3 so long as proportion of workforce employed in sector 3 is negligible). This will increase the demand for capital given supply as the capital-intensive sector 3 will demand more capital for its expansion. That will make capital relatively costlier (rise in r). At the same time sector 3 will demand more of the non-traded input produced by sector 2. As output of sector 2 is used in a fixed proportion in sector 3, that will enable sector 2 to expand. But since r rises that will tend to push P_2 downwards to satisfy zero-profit condition for sector 3. However under the sufficient condition $\lambda_{K2} \cong 0$ (proportion of capital employed in sector 2 is negligible), P_2 rises. This will induce a Stolper-Samuelson effect in the HOSS formed by sectors 1 and 2, owing to which competitive rural wage rises as sector 2 is relatively more labour-intensive than sector 1 ($|\theta| < 0$).

Note that this again points to the possibility of 'jobless growth' in the urban manufacturing sector:

a) **Joblessness:** As the urban sector expands this raises the number of jobs available in the urban sector, which is accentuating the urban unemployment problem (centrifugal force). However under the sufficient conditions mentioned above, competitive rural wage rises that prevents the rural workers from joining the urban unemployment pool (centripetal force). It's again possible that these two opposite forces more or less equal, resulting stagnation in urban employment. Also there may be significant job-losses if the centrifugal force is stronger enough.
b) **Growth Effect:** But note that as a result total wage-earnings rises, total rental income from land falls while return to capital remains unchanged. But as sector 3 expands, the cost of tariff-protection on the supply side increases which works negatively on welfare. Of course social welfare may increase if the positive impact of rise in aggregate wage-earnings outweighs the negative forces. But that benefit will not accrue to the job-losers if in the economy there is no net job-creation/significant loss in productive jobs. So the economy will again experience a 'jobless growth'.

4. Policy Implications and Concluding Remarks

Here I have tried to make a theoretical prediction about the puzzling incidence of 'jobless growth' which has made India's liberalization policy a real contentious issue. I have theoretically dicusssed the consequences of trade-liberalization (captured by a tariff-reform in the protected import-competing sector) and liberalization of labour laws (captured by a reduction in the bargaining strength of the labour unions). This analysis also has also been able to show

a) Impact of trade liberalization policy in presence of labour market imperfection on the competitive rural (informal) wage when there exists agricultural dualism in the rural economy; and
b) Labour market reforms, contrary to the conventional wisdom, may raise the competitive wage.

These results suggest that government needs to be very careful in the implementation of these different liberalization policies to achieve welfare gains, while the latter result is extremely crucial as it suggests why labour market reform is an important liberalization policy in the context of an agro-dominated developing economy. However, none of these possible liberalization policies can rule out the prediction of 'jobless growth' for such a developing economy.

The different theoretical models here tries to show that economic reforms may lead to output growth without a growth in productive employment in the organized sector. Therefore, it is still possible that this 'growth-effect' does not 'trickle down' to the job losers. That's precisely why increasing productive employment becomes a real challenge for a developing economy like India during this liberalized regime (World Development Report, 2013).

References

1. **Bhalotra, S.,** "The Impact of Economic Liberalisation on Employment and wages in India", (ILO, Geneva, 2002).
2. **Chaudhuri, S.,** "Foreign capital, welfare and urban unemployment in the presence of agricultural dualism". Japan and the World Economy 19 (2007): 149–165.
3. **Chaudhuri, S. and Mukhopadhyay, U.,** Revisiting the Informal Sector: A General Equilibrium Approach (New York: Springer, 2010), 33-35.
4. **Corden, W.M. and Findlay, R.,** "Urban unemployment, intersectoral capital mobility, and development policy in a dual economy". Economica 42 (1975): 59–78.
5. **Harris, J.R. and Todaro, M.,** "Migration, unemployment, and development: a two-sector analysis". American Economic Review 60 (1970): 126-142.
6. **Marjit, S. and Beladi, H.,** "Protection and the gainful effects of foreign capital". Economics Letters 53 (1996): 311 – 326.

7. **Marjit, S.,** "Economic reform and informal wage—a general equilibrium analysis". Journal of Development Economics 72 (2003): 371– 378.
8. **Mukherjee, S.,** "Revisiting the Apparent Paradox: Foreign Capital Inflow, Welfare Amelioration and 'Jobless Growth' with Agricultural Dualism and Non-traded Intermediate Input". Journal of Economic Integration 27 (2012): 123 – 133. DOI: http://dx.doi.org/10.11130/jei.2012.27.1.123.
9. **World Bank,** World Development Report 2013: Jobs, (Washington, DC: The World Bank, 2013).
10. **Yabuuchi, S., Beladi, H.,** "Urban unemployment, informal sector and development policies". Journal of Economics 74 (2001): 301 – 314.
11. **Yabuuchi, S., Beladi, H. and Wei, G.,** "Foreign Investment, Urban Unemployment, and Informal Sector". Journal of Economic Integration 20 (2005): 123 – 128. DOI: http://dx.doi.org/10.11130/jei.2005.20.1.123.

Appendix:

$$C_1 = \frac{1}{|\theta|}\begin{bmatrix} (\theta_{K3}+\theta_{23}\theta_{K2})\bar{\lambda}_{Li}\bar{S}_{Lj}^{k}+\theta_{N1}(\theta_{K3}+\theta_{23}\theta_{K2})(1-\lambda_{L3})- \\ \theta_{23}(\theta_{L1}\theta_{N2}-\theta_{N1}\theta_{L2})(\lambda_{L2}S_{LK}^{2}+\tilde{\lambda}_{L3}S_{LK}^{3}) \end{bmatrix} < 0$$

$$|\lambda| = \left(\lambda_{L1}\lambda_{N2}\lambda_{K3}-\lambda_{L2}\lambda_{N1}\lambda_{K3}+\tilde{\lambda}_{L3}\lambda_{N1}\lambda_{K2}\right)$$

$$\tilde{\lambda}_{L3} = \left(\frac{W^*}{W}\right)\lambda_{L3}$$

$$\bar{\lambda}_{Li}\bar{S}_{Lj}^{k} = (\lambda_{L1}S_{LN}^{1}+\lambda_{L2}S_{LN}^{2}+\lambda_{L2}S_{LK}^{2}\theta_{N1}) > 0$$

$$\Delta = \left[C_3\left(\lambda_{L1}\lambda_{N2}-\lambda_{L2}\lambda_{N1}-\lambda_{N1}\widetilde{\lambda_{L3}}\right)-\lambda_{L1}C_2-\lambda_{N1}C_1\right]$$

$$C_2 = \left(\frac{1}{|\theta|}\right)\left[\left(\theta_{K3}+\theta_{23}\theta_{K2}\right)\bar{\lambda}_{Ni}\bar{S}_{Nj}^{k}-\theta_{23}(\theta_{L1}\theta_{N2}-\theta_{N1}\theta_{L2})\lambda_{N2}S_{NK}^{2}\right] < 0$$

$$\bar{\lambda}_{Ni}\bar{S}_{Nj}^{k} = (\lambda_{N1}S_{NL}^{1}+\lambda_{N2}S_{NL}^{2}+\lambda_{N2}S_{NK}^{2}\theta_{L1}) > 0$$

$$C_3 = \left(\frac{1}{|\theta|}\right)\left[\left(\theta_{K3}+\theta_{23}\theta_{K2}\right)(1-S_{KK}^{2}\theta_{L1})\lambda_{K2}-\theta_{23}(\theta_{L1}\theta_{N2}-\theta_{N1}\theta_{L2})\lambda_{K2}(S_{KL}^{2}+S_{KN}^{2})\right] < 0$$

$$C_4 = \frac{T}{|\theta|}\left[\bar{\lambda}_{Ni}\bar{S}_{Nj}^{k}\theta_{K2}-(\theta_{L1}\theta_{N2}-\theta_{N1}\theta_{N2})\lambda_{N2}S_{NK}^{2}\right] < 0$$

$$C_5 = \frac{T}{|\theta|}\left[\theta_{K2}\bar{\lambda}_{Li}\bar{S}_{Lj}^{k}-(\theta_{L1}\theta_{N2}-\theta_{N1}\theta_{L2})(\lambda_{L2}S_{LK}^{2}+\tilde{\lambda}_{L3}S_{LK}^{3})\right] < 0$$

$$C_6 = \frac{T}{|\theta|}\left[\theta_{K2}\tilde{\lambda}_{L3}(\theta_{L1}S_{KK}^{2}-1)-(\theta_{L1}\theta_{N2}-\theta_{N1}\theta_{N2})\lambda_{K2}(S_{KL}^{2}+S_{KN}^{2})\right]$$

(A.1)

Where S^i_{jk} is the degree of substitution between factors j and k in the i[th] sector $(j, k = L, N, K$ and $i = 1, 2, 3)$. For example, $S^2_{KL} = (\partial a_{K2}/\partial W)(W/a_{K2})$. $S^i_{jk} > 0$ for $j \neq k$ and $S^i_{jj} < 0$.

Also,

$$B_1 = \left(\frac{1}{|\theta|}\right)[\theta_{K2}\theta_{L3}(\lambda_{L1}S^1_{LN} + \lambda_{L2}S^2_{LN} + \lambda_{L2}S^2_{LK}\theta_{N1}) - (\theta_{L1}\theta_{N2} - \theta_{N1}\theta_{L2})\{\theta_{L3}\lambda_{L2}S^2_{LK} + \lambda_{L3}S^3_{LK}(\theta_{L3} + \theta_{L3})\}]$$

$$B_2 = \frac{\theta_{L3}}{|\theta|}[\theta_{K2}(\lambda_{N1}S^1_{NL} + \lambda_{N2}S^2_{NL} + \lambda_{N2}S^2_{NK}\theta_{L1}) - (\theta_{L1}\theta_{N2} - \theta_{N1}\theta_{L2})\lambda_{N2}S^2_{NK}]$$

$$B_3 = \frac{1}{|\theta|}[\theta_{K2}\theta_{L3}\lambda_{K2}(\theta_{L1}S^2_{KK} - 1) - (\theta_{L1}\theta_{N2} - \theta_{N1}\theta_{L2})\{\lambda_{K2}\theta_{L3}(S^2_{KL} + S^2_{KN}) + \lambda_{K3}S^3_{KL}(\theta_{L3} + \theta_{L3})\}]$$

(A.2)

Stability Condition in Non-traded Intermediate Input Market

P_2, the price of non-traded intermediate input must adjust to clear its domestic market. Therefore, the stability condition for equilibrium in this market needs

$$\{d(X^D_2 - X_2)/d\,P_2\} < 0$$

That means around equilibrium, initially, $X^D_2 = X_2$. Therefore,

$$\{(\hat{X}^D_2/\widehat{P_2}) - (\widehat{X_2}/\widehat{P_2})\} < 0 \quad \text{(A.3i)}$$

Now $X_2^D = a_{23}X_3$ is the demand for non-traded input. Totally differentiation gives, $\hat{X}_2^D = \hat{X}_3$. Using Equations (13) and (14), we get respectively

$$\left(\frac{\hat{X}_2}{\hat{P}_2}\right) = \left(\frac{1}{|\lambda|}\right)(\lambda_{N1}\lambda_{K3}C_1 + \lambda_{L1}\lambda_{K3}C_2 + \lambda_{N1}\widetilde{\lambda_{L3}}C_3)$$

(A.3ii)

$$\left(\frac{\hat{X}_3}{\hat{P}_2}\right) = \left(\frac{1}{|\lambda|}\right)(\lambda_{L1}\lambda_{N2}C_3 - \lambda_{L1}\lambda_{K2}C_2 - \lambda_{L2}\lambda_{N1}C_3 - \lambda_{N1}\lambda_{K2}C_1)$$

(A.3iii)

Using Equations (A.3i) – (A.3iii) we get the required stability condition

$$\frac{\Delta}{|\lambda|} < 0 \tag{A.3iv}$$

Where

$$\Delta = \left[C_3\left(\lambda_{L1}\lambda_{N2} - \lambda_{L2}\lambda_{N1} - \lambda_{N1}\widetilde{\lambda_{L3}}\right) - \lambda_{L1}C_2 - \lambda_{N1}C_1\right]$$