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Reforms and Wage Inequality

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Abstract

As developing economies integrate far more with the world economy, international trade and foreign capital inflows continues to be important instruments of this increasing economic integration. However, different initial conditions in economies require different external sector reforms. Trade liberalization and regulations on foreign investment flows (especially FDI) are two of the most important components or aspects of external reforms. For instance, in some economies, trade liberalization precedes fdi reforms while in other FDI reforms precedes trade liberalization. This sequencing of trade liberalization and FDI reforms may have different impact on skilled-unskilled wage inequality. This paper uses a two sector-three factor specific factor full employment model to examine whether sequencing of external reforms matter in terms of its consequences for wage inequality in developing economies. It is found that sequencing of external reforms, i.e., whether or not trade reforms precedes reforms w.r.t FDI inflows, matter in terms of its consequences for skilled-unskilled wage inequality in developing economies. Numerical examples are also constructed to capture the extent of changes in skilled-unskilled wage inequality.

JEL classification : F16, F21, J31

Keywords : Skilled-unskilled wage inequality, foreign capital inflows, trade liberalization, sequencing

1 Introduction

With rapid globalization, international trade and foreign capital inflows continues to be two important instruments for increasing integration of developing

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economies into the world economy. Different initial conditions in these economies require different external sector reforms. The pace, order and depth of liberalization may differ from country to country. For instance, many developing economies have liberalized at an extraordinary pace eg. Uganda, Peru and Haiti have been among the world's most rapidly liberalizing economies. Some very strong export performers such as China, Vietnam have liberalized far more slowly while others have liberalized but remain relatively protected¹. As these economies integrate far more into the world economy, it becomes really important to understand how and in what order different developing economies undertake external sector reforms specifically trade liberalization and reforms w.r.t Foreign direct investment (FDI) inflows and their possible impacts on economy particularly their distributional impacts.

There can be three possibilities w.r.t. trade liberalization and reforms related to FDI flows. Trade liberalization precedes FDI reforms in some economies while FDI reforms precede trade liberalization in other economies. It might also be the case that both trade liberalization and FDI reforms take place simultaneously in some economies. The issue of sequencing of external reforms have received attention in a broader discussion on sequencing of liberalization in the literature in context of Chile and other Southern Cone countries². There are also arguments, that opening the economy to foreign investment inflows first before domestic market is opened can result in large capital outflows³. Trade liberalization and trade openness is generally considered to be a threshold for the capital account liberalization. It is argued that economies that are more open to trade face less risk from reversal of capital inflows as they can better finance the external obligations from revenues from exports. Trade openness can help reduce negative costs of capital mobility. Hence, it will be interesting to see whether the sequencing of reforms matter and to examine the distributional aspects of this issue.

In order to answer the above question, two sector-three factor specific factor full employment model is considered. In this model, three different scenarios w.r.t. trade and FDI inflows reforms have been considered to capture alternate sequencing of trade and foreign capital inflows reforms. The three scenarios considered are :-

Case 1 : Foreign capital inflows under protected trade : In this case, it is assumed that goods in import sector are protected by a tariff 't' but the economy relaxes the restrictions on foreign capital flows and hence there is an inflow of foreign capital into the economy.

Case 2 : Trade liberalization with barriers to entry on foreign capital : In this case, it is assumed that only trade liberalization takes place i.e. the import tariffs are reduced so as to facilitate trade. However, barriers to entry on foreign capital are still maintained in the economy which means there is no foreign capital inflow into the economy.

¹ Oxfam Report (2002)

² Argentina and Uruguay opened the capital account first; Chile opened the current account first. For details refer Sebastian (1987)

³ For more details, refer, McKinnon (1982)

Case 3: Foreign capital inflows with trade liberalization: It is the case in which the restrictions on foreign capital flows as well as trade are removed simultaneously in the economy which means that there is both trade liberalization as well as inflow of foreign capital into the economy.

By using the above three cases, an attempt has been made to capture the sequencing of the external sector reforms. The distributional implications of these external sector reforms are analyzed in each of the above scenarios and then compared among themselves. The model involves two sector model with an export good producing sector X and import good producing sector Y.

There can be three possibilities w.r.t sequencing of liberalization of trade and foreign capital inflows:-

a) **Trade liberalization precedes FDI flows reforms** i.e. The economy first liberalizes trade and then removes the barriers to entry on foreign capital so that there is foreign capital inflow into the economy. This can be captured by comparing case (2) and (3).

b) **FDI flows reforms precedes trade liberalization** i.e. The economy first relaxes FDI norms to allow the entry of foreign capital into the economy and then adopts trade liberalization. This can be captured by comparing the case (1) and (3).

c) **Trade liberalization and FDI reforms happens simultaneously** i.e. both norms w.r.t trade and FDI inflows are relaxed simultaneously. This can be captured directly from case(3).

The question of whether sequencing of trade liberalization and reforms w.r.t FDI flows matter in terms of its consequences for skilled-unskilled wage inequality has not received attention in the literature based on standard full employment general equilibrium models. Here, an attempt has been made to fill this gap. The results obtained can provide some insights that can be useful about how certain developing economies should frame their policies w.r.t trade and FDI reforms, as far as skilled-unskilled wage inequality is concerned, as they integrate more deeply with the world economy.

The rest of the paper is organized as follows. The section 2 presents the Model, Analysis and the Numerical examples. Finally the last section concludes.

2 Model

A small open developing economy producing two goods is considered. Sector X produces goods using unskilled labor and capital while sector Y produces goods using skilled labor and capital. Capital is mobile between the two sectors. Trade pattern is such that the goods produced in sector X are exported and good produced in sector Y are imported. Tariff 't' is imposed on imports of goods produced in sector Y. Markets are competitive and production function exhibits constant returns to scale and diminishing marginal returns to each factor. There is full employment of all the three factors. Following notations are used to set out the basic competitive equilibrium in equations (1) to (5).

a_{LX} : quantity of unskilled labor required per unit of output of sector X.

a_{SY} : quantity of skilled labor required per unit of output of sector Y.
 a_{Ki} : quantity of capital required per unit of output of sector i ; i=X,Y
 w : unskilled wages r: return to capital
 w_s : skilled wages t : tariff on imports of Y
 (\bar{P}_X, \bar{P}_Y) : world price of goods produced in Sector X and Y;
 \bar{K} : Fixed endowment of total capital stock in the economy which consists of both domestic (K_D) and foreign stock (K_F) of capital.
 (\bar{L}, \bar{S}) : fixed endowment of unskilled labor and skilled labor in the economy.
 θ_{ji} : distributive share of factor j in sector i, j=L,S,K ;i=X,Y.
 λ_{ji} : proportion of j^{th} input employed in i^{th} sector for j=L,S,K in i=X,Y;
 S_{ji}^m : the degree of substitution between factors j and i in the m^{th} sector, j=L,S,K;i=L,S,K and m=X,Y. For example, $S_{LK}^X = \frac{r}{a_{LX}} \frac{\partial a_{LX}}{\partial r}$, $S_{LL}^X = \frac{w}{a_{LX}} \frac{\partial a_{LX}}{\partial w}$ etc
 $S_{ji}^k > 0$ for $i \neq j$ and $S_{jj}^k < 0$.
 $\hat{}$ denotes the proportional change ;
The first set of equations (1)-(3) is full employment equations:-

$$a_{LX}X = \bar{L} \quad (1)$$

$$a_{SY}Y = \bar{S} \quad (2)$$

$$a_{KX}X + a_{KY}Y = \bar{K} = K_D + K_F \quad (3)$$

The second set, equations (4) and (5) is a statement of the competitive profit relationships.

$$a_{LX}w + a_{KX}r = \bar{P}_X \quad (4)$$

$$a_{SY}w_s + a_{KY}r = \bar{P}_Y(1 + t) \quad (5)$$

The model has five unknowns (w, w_s, r, X, Y) and five independent equations. Thus, the model is closed and deterministic. However, the system does not satisfy the decomposition property because endowment equations are also required to determine the factor prices.

2.1 Analysis

Now, three scenarios as discussed in section 1 are considered one by one and impact on inequality⁴ is examined. From the comparative static equations⁵, the skilled-unskilled wage gap is given by:-

⁴ Here, inequality refers to skilled-unskilled wage inequality measured by skilled to unskilled wage ratio.

⁵ Refer Appendix A.1 for Comparative static equations

$$\begin{aligned}\hat{w}_s - \hat{w} = & \frac{1}{|\Delta|}(-\lambda_{LX}\lambda_{SY}\theta_{KX}A + \lambda_{LX}\lambda_{SY}\theta_{LX}B - \lambda_{LX}\theta_{LX}\lambda_{KY}\lambda_{SY}S_{SK}^Y \\ & + \theta_{KX}\lambda_{KX}\lambda_{SY}\lambda_{LX}S_{LL}^X - \theta_{LX}\lambda_{KX}\lambda_{SY}\lambda_{LX}S_{LK}^X + \lambda_{LX}\lambda_{KY}\lambda_{SY}S_{SS}^Y\theta_{KX})T\hat{t} \\ & + \frac{\lambda_{LX}\lambda_{SY}}{|\Delta|}(-\theta_{LX}\theta_{KY} + \theta_{KX}\theta_{SY})\hat{K}\end{aligned}$$

where,

$$\begin{aligned}|\Delta| = & -\lambda_{LX}\lambda_{SY}\theta_{KX}\theta_{SY}A + \lambda_{LX}\lambda_{SY}\theta_{SY}\theta_{LX}B + \lambda_{LX}\theta_{KY}\theta_{LX}\lambda_{KY}\lambda_{SY}S_{SS}^Y \\ & -\lambda_{LX}\lambda_{KY}\lambda_{SY}S_{SK}^Y\theta_{LX}\theta_{SY} + \lambda_{LX}S_{LL}^X\theta_{KX}\theta_{SY}\lambda_{KX}\lambda_{SY} - \lambda_{LX}S_{LK}^X\theta_{SY}\theta_{LX}\lambda_{KX}\lambda_{SY}\end{aligned}$$

Case 1 : Foreign capital inflows under protected trade

In this case, it is assumed that economy relaxes only FDI norms and maintain the restrictions on trade which means that $\hat{K} > 0$ and $\hat{t} = 0$. In such a case, the impact on inequality is examined as follows:-

$$1) \hat{w}_s - \hat{w} = \frac{1}{|\Delta|} \left[\lambda_{LX}\lambda_{SY}(-\theta_{LX}\theta_{KY} + \theta_{KX}\theta_{SY})\hat{K} \right] < 0$$

if $\frac{\theta_{KX}}{\theta_{LX}} > \frac{\theta_{KY}}{\theta_{SY}}$ i.e. skilled-unskilled wage gap decreases if export sector X is more capital intensive than import sector Y⁶.

$$2) \hat{w}_s - \hat{w} = \frac{1}{|\Delta|} \left[\lambda_{LX}\lambda_{SY}(-\theta_{LX}\theta_{KY} + \theta_{KX}\theta_{SY})\hat{K} \right] > 0$$

if $\frac{\theta_{KX}}{\theta_{LX}} < \frac{\theta_{KY}}{\theta_{SY}}$ i.e. skilled-unskilled wage gap increases if import sector Y is more capital intensive than export sector X.

Case 2 : Trade liberalization with barriers to entry on foreign capital

In this case, let say this economy decides to liberalize the trade⁷ only and keep the restrictions on entry to foreign capital. The impact on income distribution is examined in such a case. When $\hat{t} < 0$, then $\hat{w}_s - \hat{w} < 0$ because $|\Delta| < 0$, $B < 0$, $T > 0$ and $A > 0$ i.e. skilled-unskilled wage gap decrease due to trade liberalization.

Case 3 : Foreign capital inflows with trade liberalization

In this case, lets say the economy liberalizes both trade and Foreign capital inflows simultaneously i.e. $\hat{K} > 0$ and $\hat{t} < 0$. The impact on inequality is examined as follows:-

⁶ Here, both the sector X and Y uses unskilled and skilled labor as specific factor respectively while capital is the mobile factor. In such a case, the two sector can be classified in terms of intersectorally mobile factor i.e. capital. Sector X is said to be more capital intensive when the relative distributive share of capital per unit of unskilled labor is higher in sector X than relative distributive share of capital per unit of skilled labor in sector Y. For details, refer Jones & Neary (1984).

⁷ Trade liberalization by reducing the import tariffs 't'

$$\begin{aligned} \hat{w}_s - \hat{w} = & \frac{1}{|\Delta|} (-\lambda_{LX}\lambda_{SY}\theta_{KX}A + \lambda_{LX}\lambda_{SY}\theta_{LX}B - \lambda_{LX}\theta_{LX}\lambda_{KY}\lambda_{SY}S_{SK}^Y \\ & + \theta_{KX}\lambda_{KX}\lambda_{SY}\lambda_{LX}S_{LL}^X - \theta_{LX}\lambda_{KX}\lambda_{SY}\lambda_{LX}S_{LK}^X + \lambda_{LX}\lambda_{KY}\lambda_{SY}S_{SS}^Y\theta_{KX})T\hat{t} \\ & + \lambda_{LX}\lambda_{SY}(-\theta_{LX}\theta_{KY} + \theta_{KX}\theta_{SY})\frac{\hat{K}}{|\Delta|} < 0 \end{aligned}$$

if $\frac{\theta_{KX}}{\theta_{LX}} > \frac{\theta_{KY}}{\theta_{SY}}$ i.e. skilled-unskilled wage gap decreases if the distributive share of capital per unit of unskilled labor in sector X is higher than the distributive share of capital per unit of skilled labor in sector Y.

Now, summarizing the above results in the Table 1 below and then comparing as described in the first section to capture the sequencing of trade liberalization and FDI reforms.

Table 1: Summary of Results obtained

Case	Description	Skilled-unskilled wage gap
1	$\hat{t}=0$ & $\hat{K}>0$	↓ if $\frac{\theta_{KX}}{\theta_{LX}} > \frac{\theta_{KY}}{\theta_{SY}}$ ↑ if $\frac{\theta_{KX}}{\theta_{LX}} < \frac{\theta_{KY}}{\theta_{SY}}$
2	$\hat{t}<0$ & $\hat{K}=0$	↓
3	$\hat{t}<0$ & $\hat{K}>0$	↓ if $\frac{\theta_{KX}}{\theta_{LX}} > \frac{\theta_{KY}}{\theta_{SY}}$
	FDI reforms precedes trade lib.	↓ if $\frac{\theta_{KX}}{\theta_{LX}} > \frac{\theta_{KY}}{\theta_{SY}}$
	Trade lib. precedes FDI reforms	↓ if $\frac{\theta_{KX}}{\theta_{LX}} > \frac{\theta_{KY}}{\theta_{SY}}$

There can be two possibilities as far as factor intensity of export and import sector is concerned.

1) Export Sector X is more capital intensive than import sector Y

It is found that in this case, whether or not reforms w.r.t FDI inflows precedes trade liberalization, the net impact on skilled-unskilled wage gap will be inequality decreasing.

2) Export Sector X is less capital intensive than import sector Y

It is observed that in this case when reforms w.r.t FDI flows precedes trade liberalization, the net impact on skilled-unskilled wage inequality which increases earlier⁸ depends on which effect i.e. trade liberalization or foreign capital inflow increase dominates. However, when trade liberalization precedes FDI liberalization, then net impact on skilled-unskilled wage inequality which decreases earlier⁹ will depend again on which effect i.e. trade liberalization or FDI inflows effect dominates.

Although direction of the impact is different only when export sector is less capital intensive than import sector, the change in skilled-unskilled wage gap

⁸when economy adopts FDI reforms first, then wage inequality increases.

⁹when economy adopts trade liberalization first, then wage inequality clearly decreases.

in terms of magnitude in both the cases will be different. Hence, in order to understand this more clearly, numerical examples are constructed to capture the extent of changes in skilled-unskilled wage gap in next section.

2.2 Numerical Example

Numerical examples are constructed to capture the extent of changes in skilled-unskilled wage inequality due to sequencing of Trade and FDI reforms. The parameter values are assigned as per assumptions in the model and in close approximation to actual data for Indian Economy. Following parameter values are chosen: $\lambda_{LX} = 1, \lambda_{SY} = 1, \lambda_{KX} = 0.25 = 1 - \lambda_{KY}, \theta_{LX} = 0.39, \theta_{SY} = 0.6, \theta_{KY} = 0.4, \theta_{KX} = 0.22$. Table 2 provides some numerical results to examine the extent of changes in skilled-unskilled wage gap owing to sequencing of trade liberalization and reforms w.r.t FDI inflows. It is observed that under plausible initial conditions, if fdi reforms proceeds trade liberalization then skilled-unskilled wage gap decreases by 1.99 percent while in case of trade liberalization preceding FDI reforms the skilled-unskilled wage gap decreases by 4.94 percent. However, when foreign capital inflows increases at 5 percent and trade liberalization at 1 percent then skilled-unskilled wage inequality increases by just 0.144 percent when FDI reforms precedes trade liberalization and it decreases by 0.19 percent when trade liberalization precedes FDI reforms. This table shows that the sequencing of external reforms matter in terms of its impact for skilled-unskilled wage inequality.

Table 2: Impact on skilled-unskilled wage gap from Numerical Example

Cases	Sim1	Sim2
FDI lib.	0.32	0.16
Trade Lib.	-2.63	-0.177
Both FDI & Trade Lib.	-2.31	-0.0156
FDI lib. precedes Trade lib	1.99(↓)	0.144(↑)
Trade Lib. precedes FDI lib.	4.94(↓)	0.19(↓)

Note : *Sim 1 : FDI incr. by 10 percent and decr. in tariff by 15 percent*

Sim 2 : FDI incr. by 5 percent and decr. in tariff by 1 percent

3 Conclusion

As developing economies integrate more deeply with the world economy, trade and foreign capital inflows continues to be two important aspects of this increasing integration. These economies adopts different external sector reforms

based on their initial conditions. Trade liberalization and regulations on foreign capital inflows are two important aspects of these external sector reforms. For instance, in some economies, trade liberalization precedes fdi reforms while in some economies fdi reforms are followed by trade liberalization. The net impact on skilled-unskilled wage inequality in these two cases of sequencing may be different in these economies. This paper made an attempt to capture whether sequencing of external reforms matter in terms of its consequences for skilled-unskilled wage inequality. For this, a two sector-three factor model for a small open developing economy based on Jones(1971) specific factor full employment model is considered. The unskilled labor is assumed to be specific to the export sector and skilled labor is specific to the import sector while capital is the mobile factor.

It is found in our paper that sequencing of external reforms i.e. whether or not trade liberalization precedes reforms w.r.t fdi inflows matter in terms of its consequences for wage inequality in developing economies. When the export sector is more capital intensive as compared to import sector then sequencing of external reforms matter in terms of its consequences for wage inequality in magnitude only. However, when export sector is less capital intensive as compared to import sector then sequencing of external reforms matter in terms of its consequences for wage inequality in both direction as well as magnitude. From the numerical results based on indian economy data, it can be said that for an economy like India, it is preferred that trade liberalization precedes reforms w.r.t FDI flows as far as skilled-unskilled wage inequality is concerned.

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A Appendix

A.1 Comparative static equations

The comparative static equations are obtained from the system of equations (1)-(5) as follows:-

$$\lambda_{LX}\hat{X} + \lambda_{LX}S_{LL}^X\hat{w} + \lambda_{LX}S_{LK}^X\hat{r} = 0$$

$$\lambda_{SY}\hat{Y} + \lambda_{SY}S_{SS}^Y\hat{w}_s + \lambda_{SY}S_{SK}^Y\hat{r} = 0$$

$$\lambda_{KX}\hat{X} + A\hat{w} + B\hat{r} + \lambda_{KY}\hat{Y} = \hat{K}$$

Where, $A = (\lambda_{KX}S_{KL}^X + \lambda_{KY}S_{KS}^Y)$, $B = (\lambda_{KX}S_{KK}^X + \lambda_{KY}S_{KK}^Y)$

$$\theta_{LX}\hat{w} + \theta_{KX}\hat{r} = 0$$

$$\theta_{SY}\hat{w}_s + \theta_{KY}\hat{r} = T\hat{t}$$