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Customs unions and trade spillovers: from bilateral agreements to multilateral impact

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Abstract. *This paper considers a general equilibrium model of trade to examine how a move from bilateral trade within a customs union to multilateral free trade affects skilled-unskilled wage inequality within the customs union. It also shows the spillover effects of a reduction in common tariffs on countries outside the union. It is interesting to see that increased liberalization raises skilled-unskilled wage inequality under reasonable conditions within the customs union. Moreover, for the country outside the customs union, export of intermediate product to the customs union rises, accompanied by an increase in income of the capitalists and the wage earners and a decrease in income of the landlords. Also, employment and output in the import competing sector falls while the exportable sector witnesses an increase in employment and output for the country outside the customs union. These results have interesting political-economic implications.*

Keywords: customs unions, skilled labour, unskilled wages, protectionism, liberalization, intermediate goods.

JEL Classification: F1, F11, F13, F16, F20, D58.

1. Introduction

The World Trade Organization (WTO) Secretariat, around 26th August 2020, had published a new information note discussing how, in the wake of the COVID-19 pandemic and subsequent lockdowns imposed worldwide, strict mobility barriers and temporary border closures have heavily affected international trade in goods and services, in addition to affecting the global tourism industry (which has performed its worst since 1950) and educational services (with many international educational institutions facing a drastic drop in international student enrollment, sometimes as much as 50 to 70 per cent) , as well as various manufacturing value chains. Such restricted cross-border movements have led to increased transaction and transportation costs, but have eventually been followed by policies that are somewhat less strict, such as allowing through "essential" foreign workers, or making way for quarantine free "travel bubbles" among trading partners. The paper stresses on the role that international co-operations play in minimizing the potential economic impact of transnational mobility restrictions, which also have huge cross-border spillover effects, coupled with scaling down of production and consumption across the globe. So far, 80 countries and separate customs territories, including 46 WTO members (72 if European Union (EU) member states are counted individually) and eight non-WTO members, have introduced several temporary prohibitory measures on exports owing to the ongoing pandemic. At least two members have already removed some of these restrictions. Though Article XI of the General Agreement on Tariffs and Trade (GATT) 1994 prohibits export bans and restrictions, members are allowed to temporarily apply such measures to meet critical food shortage or shortage of other essential products. More general exceptions to WTO rules are used to justify trade restrictions provided that they do not arbitrarily or purposefully discriminate against certain countries. When major exporters restrict their exports, domestic prices for the exportable goods are lowered in the short run, but there is a significant cost involved. Countries which relied on imports of these goods, and are unable to domestically produce the same, are hit hard. It is a two-pronged knife, while lower domestic prices reduce the incentive to produce the good domestically, higher foreign demands and hence higher foreign prices provide an impetus to smuggle the good out of the exporting country, both of which are likely to reduce domestic availability of the good. Trade restrictions may also give rise to domino effects. In the absence of secure access to essential goods, some countries may decide to substitute imports with domestic production, even at much higher prices and at the risk of lowered supply. This could have adverse long-term effects on the countries which previously exported that good.

Viani (2019) simulates econometric models to show that tariff measures undertaken by the USA have had relatively moderate direct effects on the global economy and on EU member countries, though it has led to massive escalations in USA-China trade tensions. However, the simulations warned of deteriorating trade effects that could be brought about by a fall in business confidence and unfavourable international financial markets, which indeed

seem to be the case post the COVID-crisis. Marjit and Oladi (2018) illustrates that, for an intermediate good that uses unskilled labour, increased protectionism actually reduces unskilled wages. Saggi and Yildiz (2010) assesses the relative merits of bilateralism vs purely multilateral free trade and come to the conclusion that, in a perfectly symmetric world, global free trade is the sole stable equilibrium irrespective of whether individual countries are free to enter into bilateral trade agreements or not. However, they also show that, if countries have asymmetric endowment levels, then there exist circumstances under which free trade is a stable equilibrium if and only if countries have the choice to willingly forge bilateral trade ties, and these results hold even under politically motivated government regimes where producer surplus and tariff revenues are valued more than consumer surplus. Stevens (2005) studies policy changes in the WTO and the bilateral policies of the Quad (Canada, the EU, Japan and the USA), particularly the Economic Partnership Agreements that sub-Saharan Africa needs to negotiate with the EU and changes in Europe's Common Agricultural Policy (CAP). Jorzik and Mueller-Langer (2013) have studied the endogenous network formation of bilateral and multilateral trade agreements and have introduced the equilibrium concept of multilateral stability, under a multi-country setting with a firm in each country that produces a homogeneous good and functions as a Cournot oligopolist in each market. It is found that under endogenous tariffs, the WTO/GATT regime itself, together with a bilateral preferential trade agreement (PTA) is multilaterally stable. The existence of the WTO is found to be necessary for the stability of the trading system and the formation of PTAs increases countries' incentives for multilateral tariff reduction.

The purpose of this paper is to examine the spillover effects of a trade policy change within the customs union on countries both within and outside the customs union. Specifically, in this paper we have tried to examine the impact of a tariff cut on imports of intermediates by the customs union, on countries within and outside the union. Such a work implies the spillover effects of a movement from bilateral to multilateral free trade. There is a dearth of literature on general equilibrium trade models to capture this particular issue, especially the spillover effects of such a change. The works mentioned earlier are either general equilibrium models that focus on the effects of tariff cut on wage inequality or a comparison of the merits of bilateral trade vis-à-vis those of multilateral trade. However, in neither of these models the issue of customs union and the spillover effects of changes from bilateral to multilateral trade due to tariff cut have been considered. The study is motivated by the fact that although the WTO prescribes free trade, the current global scenario considers issues related to neo-protectionism on one hand and breaking of customs union on the other hand in the form of quitting of Great Britain from the European Union (BREXIT). Our paper throws light on the issues related to lower protectionism within the union and its spillover effects. Thus our paper can be considered to be an important guide for the policy makers who are interested in contemporary policy issues for the global economy.

The paper is organized as follows. Section 2 develops the model and discusses the results. Section 3 shows comparative statics, and Section 4 summarizes the conclusions.

2. The Model with Custom Unions

We consider 3 small open economies, namely, A, B and C with four traded goods, three final goods denoted by X, Y and V, and an intermediate good denoted by M. Countries A and B form a customs union and are engaged in bilateral trade amongst themselves in the following manner. Country A exports good X to country B and country B exports good Y to country A, without imposing any tariff on their respective imports. Furthermore, both countries A and B import an intermediate input M from country C, which is outside the customs union. A common tariff, denoted by t, protects the import competing sector in both countries A and B. Both the countries within the customs union agree to accept the world price and the country outside the union is also assumed to be a price taker and accepts the world price.

Country C exports its product M to countries A and B and imports a product V from the rest of the world, which is considered to be exogenous. Goods X and Y are also produced by country C.

We further assume that sector X uses skilled labour S and the intermediate product M as inputs, while sector Y uses unskilled labour L and capital K as inputs. The intermediate sector M uses unskilled labour L and capital K to produce its output. Here L and K are perfectly mobile between sectors Y and M, while S is specific to sector X. Also, it is assumed that good Y is labour intensive while commodity M is capital intensive. Commodity V is produced using unskilled labour L and a second type of capital, say, land, denoted by R. Hence, R is a specific factor for sector V.

All production functions exhibit constant returns to scale and other standard neoclassical properties. It is also assumed that all markets are perfectly competitive and all factors of production are fully employed. The small open economy assumption implies that prices are exogenous, and they are further normalized to unity for the sake of mathematical ease. Hence, we have $P_M = (1+t)P_M{}^* = 1+t$, where P_M is the per unit domestic price of commodity M in countries A and B, inclusive of tariff and $P_M{}^*$ is the world price of commodity M, normalized to one.

2.1. The General Equilibrium

2.1.1. Commodity and Factor Markets in Country A

The competitive equilibrium conditions in country A for the markets for the three commodities X, Y and M are given by the following equations:

$$w_S a_{SX}{}^A + (1+t) a_{MX}{}^A = 1 \quad (1)$$

$$w a_{LY}{}^A + r a_{KY}{}^A = 1 \quad (2)$$

$$w a_{LM}{}^A + r a_{KM}{}^A = 1 + t \quad (3)$$

where $a^k{}_{ij}$ is the per unit requirement of factor i in sector j for country k, for $i = S, L, K, M$; $j = X, Y, M$ and $k = A, B$, whenever factor$i$ is used in the production of output in sector j. Here, $k = A$. Also, w_S, w, r and t represent, respectively, the skilled wage, unskilled wage, rental rate of capital and the tariff imposed by the customs union on the intermediate input M. Prices of goods X and Y, that is, P_X and P_Y are assumed to be equal to one. Let $T = 1 + t$.

Full employment of all factors of production, namely, S, L, K and M implies that:

$$a_{SX}{}^A X^A = S^A \quad (4)$$

$$a_{LY}{}^A Y^A + a_{LM}{}^A M^A = L^A \quad (5)$$

$$a_{KY}{}^A Y^A + a_{KM}{}^A M^A = K^A \quad (6)$$

$$a_{MX}{}^A X^A = M^A + M^{*A\prime} \quad (7)$$

where, for country A, S^A, L^A, K^A and $M^{*A\prime}$ denote the stocks of skilled labour, unskilled labour, capital and the import of intermediate good M, respectively. X^A, Y^A and M^A denote the outputs of goods X, Y and M, respectively, by country A.

Our seven endogenous variables, X^A, Y^A, M^A, $M^{*A\prime}$, w_S, w and r can be determined from equations (1)-(7). Decomposability property holds for this general equilibrium structure, since factor prices and outputs are determined independently of each other for all countries.

2.1.2. Commodity and Factor Markets in Country B

Similarly, for country B, we have the competitive equilibrium conditions given by:

$$w_S a_{SX}{}^B + (1+t) a_{MX}{}^B = 1 \quad (8)$$

$$w a_{LY}{}^B + r a_{KY}{}^B = 1 \quad (9)$$

$$w a_{LM}{}^B + r a_{KM}{}^B = 1 + t \quad (10)$$

Full employment of all factors of production in country B implies:

$$a_{SX}{}^B X^B = S^B \quad (11)$$

$$a_{LY}{}^B Y^B + a_{LM}{}^B M^B = L^B \quad (12)$$

$$a_{KY}{}^B Y^B + a_{KM}{}^B M^B = K^B \quad (13)$$

$$a_{MX}{}^B X^B = M^B + M^{*B\prime} \quad (14)$$

where, for country B, S^B, L^B, K^B and $M^{*B\prime}$ denote the stocks of skilled labour, unskilled labour, capital and the import of intermediate good M, respectively. X^B, Y^B and M^B denote the outputs of goods X, Y and M, respectively, by country B.

As in the case of country A, for country B, the seven endogenous variables, namely, X^B, Y^B, M^B, $M^{*B\prime}$, w_S, w and r can be determined from equations (8)-(14).

Returns to the various factors of production in Country C are different from those in countries A and B, since country C is not a member of the customs union. Let w^*, ${r_K}^*$ and ${r_R}^*$ denote the returns on unskilled labour, capital and land, respectively, in country C. Let M^* denote the total production of good M by country C.

We have, export of product M by country C = Import of product M by countries A and B $=M^{*\prime} = M^{*A\prime} + M^{*B\prime}$

Let ${P_M}^*$ and ${P_V}^*$ denote the world prices of commodities $M$and V. It is assumed that these prices are normalized to unity, to facilitate ease of calculation. Further, let V^* represent the output of good V by country C while L^*, K^* and R^*denotes the stocks of unskilled labour, capital and land respectively, in country C.

2.1.3. Commodity and Factor Markets in Country C

The competitive equilibrium conditions in the markets for commodities $M$and Vin country C are given by:

$$w^* {a_{LM}}^* + {r_K}^* {a_{KM}}^* = {P_M}^* \quad (15)$$

$$w^* {a_{LV}}^* + {r_R}^* {a_{RV}}^* = {P_V}^* \quad (16)$$

where ${a_{ij}}^*$ denotes the per unit requirement of input $i$by sector j in country$C$. Here, $i = L, K, R$ and $j = M,V$.

Full employment of all factors of production implies:

$${a_{LM}}^* M^* + {a_{LV}}^* V^* = L^* \quad (17)$$

$${a_{KM}}^* M^* = K^* \quad (18)$$

$${a_{RV}}^* V^* = R^* \quad (19)$$

The five endogenous variables for country$C$, namely, w^*, ${r_K}^*$, ${r_R}^*$, M^* and V^* can be determined from equations (15)-(19).

3. Comparative Statics and Results

We now proceed to analyze the effects of a decrease in the tariff rate on factor prices in country$A$. All the results obtained hold true for country B as well, by virtue of symmetry.

3.1. Effect of Tariff Cut in Country A within Customs Union

3.1.1. Impact of Tariff Cut on Input Returns and Size of the Sectors

We now examine the effects of a tariff cut for the two countries within the customs union. Using equations (1) to (7) we get the following expression,

$$\left.\begin{array}{l}\left(\frac{\hat{W}}{\hat{t}}\right)<0;\ \left(\frac{\hat{W}_S}{\hat{t}}\right)<0\\ \left(\frac{\hat{Y}}{\hat{t}}\right)<0;\ \left(\frac{\hat{M}}{\hat{t}}\right)>0;\left(\frac{\hat{X}}{\hat{t}}\right)<0\end{array}\right\} \quad \text{(A)}$$

For a tariff cut in the case of country A, we find from equation (1) that for given international price, such a tariff cut causes an increase in w_s. Again from equations (2) and (3) we find that our model for country Aconstitutes a Heckscher-Ohlin nugget within a hybrid set up. Hence a tariff cut creates a Stolper-Samuelson effect which causes rate of return on capital to fall and the unskilled wage rate to increase. The reason behind this is that sector M is more capital-intensive in physical and value terms than sector$Y$. We have already mentioned earlier that whatever is true for country A is also true for country B and hence we are not repeating the arguments for each of the two countries. It can be argued that as a reduction in tariff t (and hence a reduction in T) causes an increase in unskilled wage rate, it results in a fall in the per-unit unskilled labour requirement of sectors $Y$and M. This would mean an increase in the effective supply of unskilled labour in the economy. Following Rybczynski type effect, we find that such a situation would lead to an increase in the output of the labour intensive good $Y$and a fall in the output of the capital intensive good$M$. Intuitively, it can also be argued that for country A, as T falls, skilled wages $w_S$rise, leading to a fall in the per unit labour requirement in the production of good X, which results in an increase in the output of good$X$ if all factors of production are considered to be fully employed.

Remarks 1: The *adaptation of tariff cut by a representative country within a Customs Union leads to an expansion of sectors producing final goods, while intermediate good producing sector faces a reduction in its size of production.*

3.1.2. Impact of Tariff Cut on Skilled-Unskilled Wage Inequality

We can also determine the direction of movement of skilled – unskilled wage inequality as a result of this tariff reduction. Here, a tariff cut causes increase in the levels of both skilled and unskilled wage rate and it can easily be checked that

$$\frac{(\hat{w}_S-\hat{w})}{\hat{T}}=\frac{1}{|\theta|}[\theta_{KY}^{A}-\theta_{MX}^{A}]<0 \text{ if } \theta_{MX}^{A}>\theta_{KY}^{A} \quad (20)$$

The value share of i^{th} factor in j^{th} sector is given by θ_{ij}.We assume $\frac{\theta_{KM}}{\theta_{LM}}>\frac{\theta_{KY}}{\theta_{LY}}$, implying sector M is more capital-intensive in value terms than sector$Y$so that $|\theta|=\theta_{KM}{}^{A}\theta_{LY}{}^{A}-\theta_{KY}{}^{A}\theta_{LM}{}^{A}\Rightarrow|\theta|>0$.

Remarks 2: *The adaptation of tariff cuts by a representative country within a Customs Union leads to a contraction in the wage gap.*

3.2. Effects of Tariff Cut on the import of intermediate good by Country A

We now look into how a reduction in tariff affects the import of the intermediate good by country A. From Equation (7), using 'hat algebra' ($\hat{x} = \frac{dx}{x}$) we get:

$$\hat{a}_{MX}^{A} + \hat{X}^{A} = \delta \hat{M}^{A} + (1-\delta)\hat{M}^{*A\prime} \tag{7.1}$$

where $\delta = \frac{M^A}{M^A + M^{*A\prime}} > 0$ and $(1-\delta) = \frac{M^{*A}}{M^A + M^{*A\prime}} > 0$

From equation (7.1) we get

$$(1-\delta)\frac{\hat{M}^{*A\prime}}{\hat{T}} = \frac{\hat{a}_{MX}^{A}}{\hat{T}} + \frac{\hat{X}^{A}}{\hat{T}} - \delta\frac{\hat{M}^{A}}{\hat{T}} \tag{7.2}$$

where $T = 1 + t$ and $\hat{T} = \frac{dt}{1+t} = \alpha\hat{t}$given $\alpha = \frac{t}{(1+t)}$

After some routine algebra (shown in the Appendix) we get

$$\frac{\hat{M}^{*A\prime}}{\hat{T}} = \frac{1}{(1-\delta)}\left[-\delta\frac{(\lambda_{KY}^{A}\gamma_L + \lambda_{LY}^{A}\gamma_K)}{|\lambda||\theta|} - \frac{\sigma_X^A}{\theta_{SX}^A}\right] < 0 \tag{7.3}$$

where the physical shares of labour and capital in country A are given by ${\lambda_{LY}}^{A} = \frac{{a_{LY}}^{A}{Y}^{A}}{L^A} > 0$ and ${\lambda_{KY}}^{A} = \frac{{a_{KY}}^{A}{Y}^{A}}{K^A} > 0$ We consider ${\sigma_j}^{k}$ as the elasticity of substitution between the two factors of production used by sector $j$in country$k$, where $j = X, Y, M$ and $k = A,B$. By definition, we always have ${\sigma_j}^{k} > 0$.

We also have

$\gamma_L = \left({\lambda_{LM}}^{A}{\sigma_M}^{A}{\theta_{KM}}^{A} + {\lambda_{LY}}^{A}{\sigma_Y}^{A}{\theta_{KY}}^{A}\right) > 0$ and

$\gamma_K = ({\lambda_{KM}}^{A}{\sigma_M}^{A}{\theta_{LM}}^{A} + {\lambda_{KY}}^{A}{\sigma_Y}^{A}{\theta_{LY}}^{A}) > 0$

Finally we have $|\lambda| = ({\lambda_{KM}}^{A}{\lambda_{LY}}^{A} - {\lambda_{KY}}^{A}{\lambda_{LM}}^{A})$

As sector M is more capital-intensive in physical and value terms than sector$Y$, we have $|\lambda| > 0$ and $|\theta| > 0$.

We now consider the intuition behind the result. A fall in tariff would result in a fall in the price of the imported intermediate good for the countries within the union. This in turn would lead to an increased demand for and an increase in import of the intermediate good by the customs union. It is to be noted that fall in the tariff rate causes an increase in skilled wage rate and it causes an increase in a_{MX}in both the countries within the customs union. We have also shown earlier that a fall in the tariff rate leads to an increase in output of

sector X in both the countries within the customs union. Algebraically we can specify it as[1]

$$\frac{\hat{X}^A}{\hat{T}} = -\sigma_X^A \frac{\theta_{MX}^A}{\theta_{SX}^A} < 0 \quad (21)$$

It has also been shown that a fall in the tariff rate causes a reduction in output of sector M for both the countries as mentioned earlier. Thus algebraically we have

$$\frac{\hat{M}^A}{\hat{T}} = \frac{(\lambda_{KY}^A \gamma_L + \lambda_{LY}^A \gamma_K)}{|\lambda||\theta|} > 0 \quad (22)$$

So, we conclude that a reduction in tariff t (and hence, a fall in T) leads to a rise in the import of the intermediate good M by the countries within the customs union.

Remarks 3: *A reduction in tariffs leads to an increase in the import of intermediate goods by countries within the customs union.*

3.3. Effects of Tariff Cut on the Import Share of Countries within the Customs Union

We next examine the effect of a decrease in tariff t on the import share of countries within the customs union. Let the total import of the intermediate good M by countries A and B be represented by $M^{*\prime}$.

So, $M^{*\prime} = M^{*A\prime} + M^{*B\prime}$ (23)

Let α and $(1-\alpha)$ denote the import share out of total imports, for country A and country B respectively.

Hence, $\alpha = \frac{M^{*A\prime}}{M^{*\prime}}$ and $(1-\alpha) = \frac{M^{*B\prime}}{M^{*\prime}}$

We thus have

$$\hat{\alpha} = \hat{M}^{*A\prime} - \hat{M}^{*\prime} \quad (24)$$

If $\hat{\alpha} > 0 \Rightarrow \hat{M}^{*A\prime} > \hat{M}^{*\prime}$

From equation (23) we get

$\hat{M}^{*\prime} = \alpha \hat{M}^{*A\prime} + (1-\alpha)\hat{M}^{*B\prime}$ which implies

$$\hat{M}^{*A\prime} = \frac{\hat{M}^{*\prime} - (1-\alpha)\hat{M}^{*B\prime}}{\alpha} \quad (25)$$

If $\hat{\alpha} > 0$, from equation (24) we get

$$\hat{M}^{*A\prime} = \frac{\hat{M}^{*\prime} - (1-\alpha)\hat{M}^{*B\prime}}{\alpha} > \hat{M}^{*\prime} \Rightarrow \hat{M}^{*\prime} > \hat{M}^{*B\prime}$$

Hence we have $\hat{M}^{*A\prime} > \hat{M}^{*\prime} > \hat{M}^{*B\prime} > 0$

Now, given that $\hat{T} < 0$it is implied that $\frac{\hat{M}^{*A\prime}}{\hat{T}} < \frac{\hat{M}^{*\prime}}{\hat{T}} < \frac{\hat{M}^{*B\prime}}{\hat{T}} < 0$

Under the assumption of $\hat{\alpha} > 0$, we have $\frac{\hat{\alpha}}{\hat{T}} < 0$ and $\frac{\hat{\beta}}{\hat{T}} > 0$ where $\beta = (1 - \alpha)$

The results will be exactly opposite if we assume that $\hat{\alpha} < 0$.

Therefore, we conclude that the effects of a reduction in tariff t (leading to a fall in T) by the customs union, depends crucially on the direction of movement of the share of imports (out of total imports of the customs union) of the two countries. It determines the direction of movement of the individual volume of imports of the two countries and also the total volume of imports of the customs union. In particular, if the share of imports of country A out of total import of the customs union increases then the volume of imports of both the countries within the union will increase and in terms of ranking the increase in volume of imports of country $A$is the highest, the total increase in imports of the customs union is the second and the increase in volume of imports of country $B$is the least. All the results obtained so far allow us to make the following proposition:

Proposition 1: *A reduction in tariff on imported intermediate input for the member countries within a customs union results in an increase in skilled-unskilled wage inequality if the value of capital share of commodity produced by sector $Y$is less than the value of intermediate input share of commodity produced by sector X. Such a policy increases the volume of imports of both the countries within the customs union and its ranking depends crucially on the impact on share of import of the two countries as a result of tariff cut.*

Proof of Proposition 1: See the discussion above

QED

From the above proposition we find that when the share of imports out of total imports of country$A$increases, its volume of imports increases at the fastest rate. The rate of increase in the volume of imports of country $B$is the lowest and the rate of increase in the volume of imports of the customs union as a whole is moderate.

3.4. Spillover Effects of Tariff Cut in Country A within Customs Union

We now consider the spillover effects of a tariff cut on a country which is outside the union and for this we consider country C. It has been shown earlier that $\frac{\hat{M}^{*A\prime}}{\hat{T}} < 0$and $\frac{\hat{M}^{*B\prime}}{\hat{T}} < 0$, i.e. both and $M^{*A\prime}$ and $M^{*B\prime}$rise as T falls. Since $M^{*/} = M^{*A\prime} + M^{*B\prime}$, hence total exports of the intermediate product by country C, i.e. $M^{*\prime}$also increases as T falls, which implies $\frac{\hat{M}^{*\prime}}{\hat{T}} < 0$. Increase in production of exports causes a shift in the demand for exports of country Cin the world market which causes an increase in world price of exports in country$C$. Thus, in country Cthere is an increase in P_M^* and no increase in P_V^* so that there

is an improvement in the terms of trade. The model for country C, as shown by equations (15) to (19), is a Jones (1971) type sector-specific model and hence the standard results of Jones (1971) are valid here. We thus consider the price magnification effect of Jones (1971) model where we find that the returns to the sector-specific factors are radically affected and the returns to the mobile factors are moderately affected. Hence we have

$$\hat{r}_K^* > \hat{P}_M^* > \hat{w}^* > 0 > \hat{r}_R^* \qquad (26)$$

Equation (26) is the price magnification effect for country$C$, when there is a reduction in tariff t. It implies that a tariff cut by a customs union leads to an increase in the income of the capitalists and workers, and a decrease in the income of the landlords, for the country outside the union.

Intuitively, one can argue that a fall in tariff leads to an increase in the rental rate of capital K, therefore, the per unit requirement of capital K in sector M falls and full employment of capital in terms of equation (18) implies that M^* must rise since total stock of capital $K^*$is fixed. Similarly a fall in tariff leads to a decrease in the rental rate of capital of type R^*, therefore, the per unit requirement of capital of type R^* in sector V rises as a result of a tariff cut. Assuming that capital R is fully employed, Equation (19) implies that V^* must fall since total stock of capital R^* is fixed. Here, though the return to the mobile factor labour increases, its increase is less than the increase in the rate of return on capital used in sector M, by the price magnification effect. Hence the wage rental ratio in this sector falls and the unit labor requirement for sector Mincreases. The opposite happens in case of sector V. As already explained, output of sector Mincreases and output of sector V falls due to tariff cut and hence employment in sector M increases and employment in sector V falls. This implies that for the country outside the customs union, employment in the exportable sector increases and employment in the import competing sector falls as a result of a tariff cut by the union. All the above results together lead us to put forth the following proposition:

Proposition 2*: For a country outside a customs union which exports an intermediate input to the union, a move from bilateral trade to multilateral free trade through a reduction in tariff by the union leads to an increase in income of the capitalists and the workers, and a decrease in income of the landlords. It also leads to an increase in output and employment of the exportable sector and a decrease in output and employment of the import competing sector.*

Proof of Proposition 2: See the discussion above.

QED

3. Concluding Remarks

We have considered in this paper a three-country, three-commodity general equilibrium model with a sector specific factor of production, where two of the countries form a customs union and impose a common tariff on the import of an intermediate input from the third country outside the customs union. In this paper we have shown the spillover effects of a tariff cut pertaining to the import of the union, within and outside the union. Within the union, we find that there is an increase in wage inequality under reasonable conditions as a result of such a tariff cut. We also find that there is an increase in imports of the countries within the union. In the country outside the customs union, a move from bilateral trade to multilateral free trade leads to an increase in the income of the capitalists and the workers, accompanied by a decrease in the income of the landlords. Furthermore, the output and employment of the exportable sector rises while the output and employment of the import competing sector, which uses land as a factor of production, falls.

These results have interesting political-economic implications. With the USA adopting ever stringent protectionist measures and the escalating US-China trade war, there is a growing global concern surrounding protectionism issues. Though it had been earlier agreed upon by WTO member countries that multilateral trade is better than bilateral or plurilateral trade agreements, but our results indicate that it might be in the vested interest of landowners to run a protectionist lobby. When it comes to whether a country outside a customs union would support a tariff cut or not, it then boils down to which group in the said country has more lobbying power, the landlords or the capitalists and workers as a united front.

Note

(1) Here we show the algebraic results only for country *A*. As the results are symmetric they are also valid for country *B*.

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Annex

We look at the impact of a tariff cut on the import of intermediate good M by country A.

Equation (7) says

$$a_{MX}{}^{A}X^{A} = M^{A} + M^{*A\prime}$$

$$\Rightarrow \frac{\widehat{M^{*A\prime}}}{\hat{T}} = \frac{1}{(1-\delta)}\left[\frac{\widehat{a_{MX}^{A}}}{\hat{T}} + \frac{\widehat{X^{A}}}{\hat{T}} - \delta\frac{\widehat{M^{A}}}{\hat{T}}\right] \quad (7a)$$

Where, $\delta = \frac{M^{A}}{M^{A}+M^{*A\prime}} > 0$ and $(1-\delta) = \frac{M^{*A}}{M^{A}+M^{*A\prime}} > 0$

Also, Equation (1)

$$\Rightarrow \frac{\widehat{w_S}}{\hat{T}} = -\frac{\theta_{MX}^{A}}{\theta_{SX}^{A}} < 0 \quad (1a)$$

Where $\theta_{MX}^{A} = Ta_{MX}^{A} > 0$ and $\theta_{SX}^{A} = w_S a_{SX}^{A} > 0$

Also, from Equation (1), we have

$$\theta_{SX}^{A}\widehat{a_{SX}^{A}} + \theta_{MX}^{A}\widehat{a_{MX}^{A}} = 0$$

$$\Rightarrow \frac{\widehat{a_{MX}^{A}}}{\hat{T}} = -\frac{\theta_{SX}^{A}}{\theta_{MX}^{A}}\frac{\widehat{a_{SX}^{A}}}{\hat{T}} \quad (1b)$$

From the definition of elasticity of substitution (σ), we have

$$\sigma_X^{A} = \frac{\widehat{a_{MX}^{A}} - \widehat{a_{SX}^{A}}}{\widehat{w_S} - \hat{T}} > 0 \quad (27)$$

Substituting the values of $\frac{\widehat{a_{SX}^A}}{\hat{T}}$ and $\frac{\widehat{w_S}}{\hat{T}}$ from Equations (1a) and (1b) in Equation (27), we get

$$\frac{\widehat{a_{MX}^A}}{\hat{T}} = -\sigma_X^A \tag{28}$$

and therefore, from Equation (1b), we get $\frac{\widehat{a_{SX}^A}}{\hat{T}} = \frac{\theta_{MX}^A}{\theta_{SX}^A}\sigma_X^A$ (29)

From Equation (4) and Equation (29), we have

$$\frac{\widehat{X^A}}{\hat{T}} = -\frac{\theta_{MX}^A}{\theta_{SX}^A}\sigma_X^A \tag{4a}$$

Further, from Equations (5) and (6), it can be derived that

$$\frac{\widehat{M^A}}{\hat{T}} = \frac{\lambda_{KY}^A\gamma_L + \lambda_{LY}^A\gamma_K}{|\lambda||\theta|} \tag{5a}$$

Where, ${\lambda_{LY}}^A = \frac{a_{LY}{}^A Y^A}{L^A} > 0$,${\lambda_{KY}}^A = \frac{a_{KY}{}^A Y^A}{K^A} > 0$, ${\lambda_{LM}}^A = \frac{a_{LM}{}^A M^A}{L^A} > 0$,

${\lambda_{KM}}^A = \frac{a_{KM}{}^A M^A}{K^A} > 0$, $\gamma_L = ({\lambda_{LM}}^A\sigma_M{}^A{\theta_{KM}}^A + {\lambda_{LY}}^A\sigma_Y{}^A{\theta_{KY}}^A) > 0$,

$\gamma_K = ({\lambda_{KM}}^A\sigma_M{}^A{\theta_{LM}}^A + {\lambda_{KY}}^A\sigma_Y{}^A{\theta_{LY}}^A) > 0$

Now, we have $|\theta| = {\theta_{KM}}^A{\theta_{LY}}^A - {\theta_{KY}}^A{\theta_{LM}}^A$, $|\lambda| = ({\lambda_{KM}}^A{\lambda_{LY}}^A - {\lambda_{KY}}^A{\lambda_{LM}}^A)$

So, under the assumption that *M* is more capital intensive than *Y*, i.e., $\frac{a_{KM}{}^A}{a_{LM}{}^A} > \frac{a_{KY}{}^A}{a_{LY}{}^A}$, we see that $|\lambda| > 0$ and $|\theta| > 0$.

Finally, substituting the values of $\frac{\widehat{a_{MX}^A}}{\hat{T}}, \frac{\widehat{X^A}}{\hat{T}}, \frac{\widehat{M^A}}{\hat{T}}$ from Equations (28), (4a) and (5a) respectively in Equation (7a), we get

$$\frac{\widehat{M^{*A\prime}}}{\hat{T}} = \frac{1}{(1-\delta)}\left[-\delta\frac{(\lambda_{KY}^A\gamma_L + \lambda_{LY}^A\gamma_K)}{|\lambda||\theta|} - \frac{\sigma_X^A}{\theta_{SX}^A}\right] < 0 \quad \text{(Proved)}$$