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A note on quantitative trade restrictions, income effects and wage inequality☆

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ABSTRACT

This paper examines the effects of conversion of one type of physical trade restrictions into another on the intra-country wage inequality in a standard $2\times2\times2$ Heckscher–Ohlin–Samuelson model. It shows that a conversion of an import-quota into an equivalent voluntary export restraint raises wage-inequality in the country importing the unskilled-labor intensive good and lowers the wage-inequality in its trading partner. This result does not depend on whether the unskilled-labor intensive good or the skilled-labor intensive good was initially subject to an import quota. Conversion of the import-quota into an equivalent import tariff, on the other hand, may lead to a rise in wage inequality in both countries. The driving force behind these results is the real income effect that conversion of one type trade restriction instrument into another results in.

1. Introduction

This note examines the impact of conversion of import quotas into equivalent voluntary export restraints (VER) and into tariffs on the wage inequality. It offers an explanation for two-way (or global) rise in wage inequality in trading nations that has been observed over the last couple of decades.

The effect of freer trade on income distribution within and across countries seems to have been settled once and for all since the publication of the two influential papers by Samuelson (1948) and Stolper and Samuelson (1941). The latter paper, and its subsequent variations [such as Jones (1971) and Mussa (1974)] had remained the connoisseur for providing clear directions to which within-country income distribution is expected to change when a country liberalizes its regime. But the empirical observations regarding symmetric changes in within-country wage inequality during the 1980s and 1990s almost across the globe contradicted its predictions. [1] It also posed a theoretical challenge to provide analytical framework that explains trade liberalization causing the rise in wage inequality in the developed and developing countries alike.

There have been some recent theoretical attempts to generate predictions similar to the empirical observations (Acharyya, 2010; Davis, 1996; Feenstra and Hanson, 1996; Marjit and Acharyya, 2003, 2006; Zhu and Trefler, 2005). Most of these papers consider changes in production specialization and consequently in the relative demand for skilled workers through either tariff reductions or capital inflow (or foreign direct investment). But the instruments and degree of trade liberalization have not been symmetric across the globe. There have been conversions of one type of physical restrictions into another such as the case of conversion of import quota into VER by USA and many other countries in the mid 1980s. There has also been conversion of physical restrictions on imports into price restrictions, such as conversion of import quotas into equal-import tariffs, which in the Indian liberalization episode during the 1990s is known as tariffication. The implications of such conversions of one type of trade restrictions into another for within-country wage inequality have not yet been examined. One might be thus concerned with questions as to whether these policies can at least in theory lead to a global rise in wage inequality.

This is the major concern of this paper. However, the thought experiments, though are motivated by the stylized facts and relate to policy changes in different countries, are put in a purely theoretical perspective. The attempt here is to provide channels through which symmetric wage inequality may arise in theory even in a standard two-commodity Heckscher–Ohlin–Samuelson model without resorting to any kind of production specificities that the above-mentioned set of papers use.[2]

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[1] For documentation of the global rise in wage inequality, one may refer to Marjit and Acharyya (2003).

[2] Though some of the results derived here are consistent with the stylized facts, the policy changes under consideration may explain only a part of the wage inequality phenomenon and that too in the immediate post-conversion period.

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Within the standard two-commodity, two-factor, two-country framework, we establish the following results. First, conversion of import quota into an equivalent VER negotiated with a trading partner will not lead to symmetric changes in the wage inequality. But, even without any change in the volume of imports of the good that was subject to an import quota, and thus any change in the openness or effective liberalization, the wage inequality in the country importing the unskilled-labor intensive good will rise. VERs and import quotas may be significantly different when there is more than one source of imports for a country.[3] Since VERs are negotiated bilaterally, total import may be more than under import quota. In fact, in the context of the above example, the German and other non-Japanese cars were left totally unrestrained for exports to the US markets. However, even when total import under VER is less than that under an import quota, the domestic import-competing industry *may* expand under VER in an oligopolistic production environment. Thus, more effective protection for the domestic industry can be generated through less-restrictive VERs (Acharyya, 1995, 1999). But in the present case of two-country world with perfect competition everywhere, neither of these possibilities arises. Thus, there is no effective change in either imports or domestic production of the import competing good after conversion of an import quota into a VER to account for the change in wage inequality. Rather the result follows from the real income effect of a terms of trade (TOT) change brought about by such conversion of import-quota into an equivalent VER. This income effect, which is quite obvious in a general equilibrium framework, has even been ignored by Lizondo (1984) when he discussed non-equivalence of these trade restrictions in the same framework. What is interesting to observe is that our result is invariant with respect to which country had initially imposed an import quota. That is to say, whether unskilled-labor intensive imports or the skill-intensive imports were subject to import quotas does not really matter.

Second, tariffication, which replaces an import quota by an equal-import tariff, can explain the observed global rise in the wage inequality. Once again, under perfectly competitive conditions, we can expect no change in the effective liberalization. But, real income gains are realized for the importing country as a consequence of a decline in the DUP-lobbying activities that such a tariffication brings about. This raises the import demand for the skill-intensive good and its world price. The intra-country wage inequality in both the skill-intensive good importing and the exporting countries, therefore, would rise after tariffication. Thus, once again the real income effect is the key factor.

The rest of the paper is organized as follows. Section 2 describes the standard 2×2×2 HOS model. The effect of conversion of an import quota into an equivalent VER is discussed in Section 3, whereas that of tariffication is discussed in Section 4. Finally, Section 5 concludes the paper.

2. The 2×2×2 HOS Model

Consider the standard 2×2×2 HOS model: Two countries, home (H) and foreign (F), produce two goods, 1 and 2, with two internationally immobile (but mobile across sectors in each country) factors of production, skilled labor (S) and unskilled labor (L). All the standard assumptions are assumed to hold: Production functions exhibit constant returns to scale technology with diminishing returns to the variable factor; technology for each good is identical in both the countries; all domestic and world markets are perfectly competitive; skilled and unskilled workers in each country are fully employed. Suppose, home country is relatively unskilled-labor rich and the foreign country is relatively skilled-labor rich by the physical factor abundance definition and good 1 is relatively skilled-labor intensive whereas good 2 is unskilled-labor intensive.[4] Thus, under the standard restrictions of identical and homothetic tastes, by the Hecksher–Ohlin (HO) theory the home country (or the developing country by specification) has a comparative advantage in producing relatively unskilled-labor intensive good 2 and thus exports this good to the foreign country. The foreign country, on the other hand, has a comparative advantage in relatively skilled-labor intensive good 1 and thus exports this good to the home country.

Let p^{w}, p_{d} and p_{d}^{*} denote respectively the world relative price of the skill-intensive good 1 (the import good of the home country), the domestic relative price of good 1 in the home country and the domestic relative price of good 1 (the export good of the foreign country) in the foreign country. For our purpose, it is sufficient to define world market equilibrium and the relationship between the two domestic prices and the world price. For convenience, we specify the world market equilibrium as the following trade-balance condition for the home country:

$$p^{w}M(p_{d},y) = M^{*}(p_{d}^{*},y^{*}) \tag{1}$$

where, $M(.)$ and $M^{*}(.)$ are respectively the home and foreign import demand functions; y and y^{*} are respectively home and foreign country's real income levels measured in terms of their respective export goods.

Under an import quota in our home country at the level $\overline{M}$ or a VER negotiated with the foreign country at the level $\overline{M}^{*}$, the relevant import demand function in Eq. (1) is replaced by the corresponding import quota or VER level. Then, given the relationship between the domestic and world relative prices, which differ under the three protective regimes considered here—import quota, VER and import tariff—the trade balance condition (1) determines the world relative price, and consequently the two domestic relative prices.

Another set of key algebraic expressions that will be used throughout this paper is the decomposition of real income changes for each country[5]:

$$dy = -Mdp^{w} + (p_{d} - p^{w})dM + (p_{d}dX_{1} + dX_{2}) \tag{2}$$

$$dy^{*} = Mdp^{w} + (p_{d}^{*} - p^{w})dM^{*} + (p_{d}^{*}dX_{1}^{*} + dX_{2}^{*}) \tag{3}$$

where, dX_{j}, $j=1,2$, are the full employment output levels of the two goods in the Home country and dX_{j}^{*} are those in the Foreign country.

The first term in both expressions capture the terms of trade effect whereas the second term captures the volume of trade effect. The third term is the positive effect of growth in output when there is growth in factor endowment or when there is technological progress. Note that, the underlying assumption of (2) and (3) is that both countries are incompletely specialized.

Two sets of assumptions will be used throughout. First, both goods are normal goods. This is important as the real income effect of a change in TOT will be the key factor in this model. Second, whatever revenue or rent accrues to the Home and Foreign country governments from restricting trade (through import quota and VER) is redistributed in a lump sum manner to the mass of population. This assumption is commonly used in general equilibrium models.[6]

[3] For a comparative analysis of import-quota and VER see Dinopoulos and Kreinin (1989) and Murray et al. (1988).

[4] We rule out factor-intensity reversals, which per se can explain rising wage-inequality in both these countries.

[5] See Caves et al. (2007) for algebraic details.

[6] If governments spend revenues by themselves on the two traded goods, then the TOT change after an import tariff, for example, may be different from what is usually predicted, depending on the private sector's marginal propensity to consume goods relative to that of the government. This was first pointed out by Lerner (1936). Lizondo (1984), on the other hand, argues that this assumption is important in determining the movement in domestic relative price after imposition of a trade restriction.