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Developing Country Growth and Developed Country Response

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ABSTRACT

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This paper makes a theoretical argument that growth in developing countries is likely to worsen the income distribution in developed countries and lead to a protectionist response that undermines the incentives for developing country growth. The model for this purpose is the two-cone version of the Heckscher-Ohlin (HO) trade model, in which countries have different factor prices even with free trade and in which they produce mostly different groups of goods. In that model, unlike the HO model with factor price equalization, growth by the poor country expands the output of its capital-intensive good, which is also the labor-intensive good of the other country. Regardless of whether factors are mobile or immobile across sectors, this reduces the real wages of factors that are either intensive or specific in the labor-intensive sector of the rich country. The paper argues that this will then lead to the rich country restricting trade. This in turn will lower the return to capital in the poor country and reduce the incentive for further growth.

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Developing Country Growth and Developed Country Response*

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I. Introduction

For many years, the developed world encouraged the developing world to grow, implicitly assuming, I suppose, either that progress for developing countries would be beneficial to all, or that it would never be important enough to matter. For an unfortunately long time, due to misguided policies, growth of developing countries was indeed too slow to matter much for world markets. But in recent years, that has ceased to be true, and many of those in developed countries suddenly find themselves threatened, or perceived to be, by growth in the developing world. This concern is often attributed more to "globalization" than to developing-country growth, but in fact the two go hand in hand. Resistance to globalization in the developed world, now that developing countries are finally themselves globalizing and growing, is bound at best to slow down the progress that is finally being made in the developing world.

This paper will explore, in theoretical terms, some of the implications of developing country growth in a world where both the causes and the effects of that

* I have benefited from discussion of this topic with Bob Stern and with participants at all of the previous DEGIT conferences. This paper grew out of a more policy-oriented paper, Deardorff (2000), prepared recently for a conference at Harvard. I benefited also from the comments of participants at both conferences, and especially from my two discussants at the Harvard conference, Patrick Low and Craig VanGrasstek.

growth rest heavily on international trade. The lesson will be that, given the configuration of factor endowments in the world economy today, growth in poor countries is likely to worsen the income distribution in rich countries, even as it presumably improves the income distribution of the world as a whole. As a result, those who are threatened within the developed world will naturally turn (and have turned) to protection from these adverse consequences of developing country growth and trade. When they do, they restrict the very market access that was crucial for progress by developing countries in the first place.

I will examine these issues in the theoretical framework of the standard Heckscher-Ohlin (HO) model of international trade. I will start in section II by briefly noting the effects of capital accumulation in a neoclassical world if the relative factor endowments of countries are sufficiently similar for there to be factor price equalization (FPE). This is important primarily because it suggests what might have been the case historically if economic growth had proceeded at comparable rates throughout the world as a whole. However, I will argue, as others have before, that however we may have gotten here, the world of today conforms less closely to the HO equilibrium of FPE than it does to a "multi-cone" equilibrium in which countries occupy different diversification cones. That is, factor endowments internationally are sufficiently diverse that global FPE is not possible. Instead countries are sorted into groups, within which there may be FPE but between which there is not. These different groups, because of their different factor prices, are able to produce efficiently only a subset of the world's goods in common, and the groups therefore tend to specialize in different sets of goods. These goods are the

more capital-intensive ones in the developed group of countries and the more labor-intensive ones in the developing group, or groups, of countries.

Thus it is within this multi-cone model that we should explore the implications of developing country growth, and I do that in Section III. Using the increasingly familiar two-country, three-good, two-cone HO model, I examine what happens to world prices and related variables when the poorer of these two countries grows relative to the richer one. The implications are not at all surprising, but as far as I know they have not been carefully worked out before. They include the ironic possibility that the terms of trade of *both* countries may worsen. More importantly, they predict with certainty that the real wage of the scarce factor in the developed country, labor, will fall as a result of developing country growth. Thus the income distribution in the rich country worsens at the same time that income distribution improves in the poor country. It is this worsening of the rich-country income distribution that may give rise to calls for protection and resistance to trade in the rich country.

In section IV I elaborate a bit on this protectionist response, although I do not attempt to model it formally. Then in section V I examine what effects such rich-country protection will have, when added to the effects of poor-country growth. Again, most of the effects are not surprising, but they are nonetheless important if calls for protection by rich countries are in fact heeded. They include, of course, a reduction in trade. They may include a worsening of developing-country terms of trade, although this depends on the nature of the protection that is implemented. Most importantly though, as has already been shown implicitly in the work of Davis (1996), and independently of the nature of that protection, they reduce the return to capital in the poor country and thus the incentive

for further growth. This is the greatest danger from a protectionist response by the developed world to developing country growth. By reducing market access, it undermines the ability of poor countries to grow.

II. Growth in an Integrated World Economy

The interactions of economic growth and international trade have long been the subject of theoretical analysis. The HO model, with its emphasis on factor endowments, was a natural framework for studying growth, and Harry Johnson (1957) was one of the pioneers in this effort. Early attention dealt mostly with the effects of growth on a country's terms of trade, with perhaps the most memorable outcome being Bhagwati's (1958) coining of the term (and the word) "immiserizing growth." Implicit in some of this literature were results for income distribution, although that was not usually the primary emphasis.

As time has progressed, we have come to realize that the HO model in the form that it was most frequently examined – with FPE – behaves in the large very much like a closed economy. A world economy with FPE is equivalent to one with factors that are perfectly mobile internationally, and thus to what Dixit and Norman (1980) called an Integrated World Economy (IWE). Therefore the effects of growth in that model are essentially the same as in a closed economy, as studied by Solow (1956) with one sector and by Uzawa (1961) with two. In particular, growth due to capital accumulation causes an increase in the wage of labor and a decrease in the real return to capital.[1] This is true

[1] If growth at constant prices increases the demand for the capital-intensive good by more than the supply, as is possible under extreme circumstances in the Uzawa model if the investment good is capital-intensive,

throughout the world, due to FPE, and it therefore does not tell us anything very interesting about the effects on income distribution in different countries.

If we think of this world as being divided into a rich North with abundant capital and a poor South with abundant labor, then this means that capital accumulation benefits labor in both countries, regardless of where it occurs. If the South manages to accumulate capital, then Northern workers should only be pleased, in this model, and any loss is confined to Northern owners of capital, to the extent that they fail to keep up with the expanding capital stock of South.

In my discussion below I will sometimes allow for the possibility of that factors in the short run are specific – that is, immobile across sectors – as in Jones (1971), Samuelson (1971), and Neary (1978). If that is the case, and if we nonetheless start from an equilibrium of an IWE, then capital accumulation in the South will hurt labor in the North to the extent that it is specific in the capital-intensive sector. The reason is that expanded output of the capital-intensive sector in the South will force down the world price of the capital-intensive good, causing mobile factors in the North to reallocate out of that sector. If some types of labor (or capital, for that matter) are specific to that sector, they will suffer a loss.

This specific-factors result is somewhat different from the results I will derive below, but it is in the same spirit. The main difference is that below I will find factors in the North's labor-intensive sector being hurt, not its capital-intensive sector. I find both the result itself and the assumptions upon which it is based more plausible than this one. Therefore I will not spend any more time on this.

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then the return to capital may rise. However, this requires that either the short-run market equilibrium or

The main problem with this and other results for an IWE is that the IWE itself does not seem to be a particularly plausible picture of today's world economy. This only partly because it has factor prices equalized internationally, which is far from true empirically. In fact one could modify the assumptions of the model somewhat to generate something similar to an IWE equilibrium, but with differences in factor prices, by assuming that factors from different countries have different intrinsic productivities (which they take with them when they move), although this formulation would not necessarily be any more plausible on its face than the alternatives. More important to me in rejecting the IWE are other aspects of the IWE equilibrium, such as the international similarity of factor endowments and the implication that all countries everywhere are able to produce all goods competitively.

Furthermore, the HO model with FPE has been subjected to extensive empirical tests in recent years, never with any resounding success. This failure has been taken by some to be evidence against the HO model itself, but in fact the model without FPE has seldom been given an empirical chance to perform.[2] Recently, however, Davis and Weinstein (1998, 1999) have allowed for this possibility in their empirical work, with some success.[3]

Note, of course, that the HO model itself does not in any way predict that the IWE equilibrium is somehow more likely or appropriate than the equilibrium without FPE. Within the general HO model, FPE depends on the international similarity of factor endowments, in a sense that I have formalized in Deardorff (1994), and the HO model

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the long run steady state be dynamically unstable under normal assumptions.

[2] See Bowen, Leamer, and Sveikauskas (1987).

takes these factor endowments as exogenous. Whether or not the dynamics of growth will cause factor endowments to become more similar over time has been the subject of extensive debate in the "convergence" literature,[4] and I have addressed it myself in a previous contribution to this series of conferences, Deardorff (1998). Suffice it to say that there is no consensus answer to this question. But the fact that it is even being asked is some indication that convergence has not yet been achieved, even if it will ultimately arrive.

Why, then, has so much theoretical and empirical attention been given over the years to the model with FPE? One answer, I think, is its simplicity. Very strong theoretical results can be derived for HO equilibria with FPE, and these results are both manageable theoretically and often counter-intuitive to the uninitiated. Therefore they make good academic copy. The simplicity also generates a very exact and easily testable prediction about the factor content of trade[5] and this provides a natural basis, therefore, for empirical work. A second answer, however, is the early preoccupation by many trade theorists with the two-sector version of the HO model.[6] With only two sectors, the equilibrium without FPE does look rather extreme and implausible, because it has one or both countries producing only one good.

In any case, I will devote most of my own attention to an equilibrium of the HO model without FPE, and I will include enough goods – three – so that both of my countries can still produce two of them and display some interesting behavior. This "two-

[3] Debaere and Demiroglu (1998) have also provided separate empirical evidence in favor of the multi-cone model for the world as a whole.
[4] See, for example, Galor (1996) and Quah (1996).
[5] See Vanek (1968), Leamer (1980).

cone" model, which in turn is a special case of a many-cone model, has gotten increasing theoretical attention of late, for example by Davis (1996). It strikes me, as it apparently did Davis, as a particularly useful version of the model to address issues of the relationship between developing and developed countries, since the two cones permit such wide differences between the two.

III. Growth in a Two-Cone World

Suppose then that a HO world includes three goods, X, Y, and Z, produced from two factors, labor and capital (with capital interpreted as physical and/or human capital, as desired[7]) in two countries, North and South. Good X is relatively labor intensive compared to both other goods, while good Z is relatively capital intensive. North is relatively well endowed with capital and South with labor. These endowments differ sufficiently that attainment of the IWE equilibrium is not possible, and instead the two countries have different factor prices.[8] I also assume that the two countries sizes, together with the demands for the three goods, are such that, in the free trade equilibrium with which we start, South produces only goods X and Y while North produces only Y and Z. I will then ask what happens to this equilibrium as South accumulates more capital, but I

[6] Only some, however. Although Samuelson often stooped to two dimensions to explain the model to us, his (1953) treatment had no such restriction.

[7] This is not to say that human and physical capital really are the same. A better model would allow for both as separate factors, and the effects of growth would then depend on the mixture of the two that was accumulated, as in the final section of Deardorff (1999). However, for the points to be made here, the distinction between the two is not critical.

[8] Exactly how the factor endowments need to differ for this to be true was shown in Figure 4.6 of Dixit and Norman (1980, p. 116). See Deardorff (1994) for the generalization of that figure to the "lens condition" that holds with more goods, factors, and countries.

will keep the amount of that accumulation small enough so that this pattern of specialization does not change.[9]

Equilibrium in this model requires equality of supply and demand for all three goods. Demands for every good come from both countries. But only good Y is supplied from both, goods X and Z being supplied only by South and North respectively. Since both countries produce only two goods, supplies for each country depend only on the relative price of these two, as in the standard transformation-curve diagram of 2-sector trade theory. I will consider both the HO case of factors being perfectly mobile between these sectors and the specific-factors case of one factor being immobile between these sectors. Either way, the response of supplies to relative prices is qualitatively the same, output of a good rising as its relative price goes up.

On the demand side, since all three goods are demanded, behavior can be somewhat messier, especially if two of the goods are strong complements or substitutes in demand. As my base case, therefore, I will exclude these possibilities by making the strong assumption of Cobb-Douglas preferences, whereby demand for each good will be determined only by income and its own price. I will also try to note how things may be different if this is not the case.

Equilibrium is then depicted conveniently in Figure 1. The two axes measure the prices of goods X and Z, the numeraire being good Y, which is produced in common. Starting from an assumed world-market equilibrium at point E, we can examine how excess supplies and demands change with small changes of prices from that point.

[9] There are, of course, many other patterns of specialization that are possible here, depending mostly on the sizes of the two countries. They could produce any one of the three goods in common, but only one, and

For example, moving horizontally to the right, p_X rises while p_Z (and p_Y) are unchanged. In North, which does not produce X, outputs remain fixed since the relative price of Y and Z is unchanged, but demand for X falls with its rise in price. Therefore North's excess supply of X increases along the arrow to the right of E, as indicated by the notation $+ ES_X^N$. In South, on the other hand, since the relative price of X increases along this arrow, output of good X increases as long as either factor is mobile. South's income, in units of the numeraire good Y, also rises, as a result of both the price increase and the output increase. This raises the remote possibility that its demand for X might rise by more than its supply. However with Cobb-Douglas preferences this cannot happen, and I therefore also label this arrow $+ ES_X^S$ as well. Together, these two changes imply that world excess supply of good X is positive at points directly to the right of E, as shown.

By similar reasoning, movements straight up in the figure lead to excess demand for X, shown as negative excess supply. In this case, since only the relative price of X and Y matters for production in the only country that is producing X (South), there is no change in output of X anywhere in the world. Demand for X in South therefore depends on whether it is a substitute or a complement for the more expensive Z, and with Cobb-Douglas preferences it is neither, so $\pm ES_X^S$ actually means no change. Meanwhile, in North where good X is not produced, the rise in price of Z unambiguously raises income and therefore demand for X, causing a negative change in excess supply: $- ES_X^N$. Together these changes imply that excess supply is negative here for the world as a whole.

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except for that good, all of North's products must all be more capital intensive than all of South's. See Jones (1974) and Deardorff (1979).

To further pin down where excess supply may be zero, however, we need to look at good Y. Consider an equi-proportionate increase in the prices of both goods X and Y, or in other words a movement in Figure 1outward along the ray from the origin through point E. This is equivalent to a fall in the price of Y, both other prices constant, and it will cause a fall in the output of Y in both countries. Thus output of X rises in South. Furthermore, while the fall in price of Y could change demands for the two goods differently depending on complementarities, with Cobb-Douglas preferences demands for both X and Y will depend only on income, which falls in units of those goods as their prices rise.[10] Therefore, world excess supply of good X is positive for movements outward along the ray from E, as shown.

Together, these last two results tell us a lot about the locus of equilibria for good X. Moving away from point E, excess supply of good X can remain zero only if prices of X and Z both rise (or fall) together and if the price of Z changes by proportionally more than the price of X. That is, the locus $ES_X = 0$ lies between the vertical arrow and the arrow along the ray.

For good Z, the reasoning is completely symmetric, so the locus $ES_Z = 0$ is also upward sloping, but flatter than this ray, as shown. This is enough for the results I will derive, but for completeness I note that there is also an equilibrium locus for good Y that is downward sloping through E.

Now suppose that South accumulates more capital. At initial prices, it will surely produce more of its more capital-intensive good, good Y. If both factors are mobile, this

[10] This is easily seen by rotating a price line around a transformation curve, which can represent either a specific-factors or a HO model.

is the familiar Rybczynski (1955) result, which includes that the output of good X falls and that the increase in output of good Y is more than proportional to the increased capital stock. If capital is specific and the new capital all goes into sector Y (which is the only sensible place for it, if in the long run it will become mobile), then output of Y rises by less than this, but it still rises. And sector Y draws mobile labor from sector X, reducing output there as well. So in this case too, South's output of Y rises and of X falls. Only if it is labor that is the specific factor will we see outputs of both sectors rise and even then, although either sector may expand output by more depending on elasticities of substitution, the capital intensity of good Y compared to X makes is likely that South's output of good Y will rise by more.

South also gets an increase in income from this accumulation of capital, and that permits it to demand more of all three goods. Focusing on the excess supplies that position the equilibrium loci of Figure 1, we can be sure therefore that South's excess supply of good Z falls, since its demand rises and it does not produce it. South's excess supply of good Y, on the other hand, very likely rises, as its output expands by more than demand, and its excess supply of good X is likely also to fall.

Since capital accumulation in South does not cause any changes at all in supplies or demands in North, except those caused by price changes, these changes in South are enough to tell us what happens to all three equilibrium loci: The curve for good X shifts to the right, that for Z shifts up, and that for Y shifts up and to the right. All this is shown in Figure 2, and together it tells us that the equilibrium combination of prices moves up and to the right as well. That is, capital accumulation in South causes the prices of both

X and Z to increase relative to the price of good Y, or conversely, the relative price of good Y falls.

What happens to the relative price of goods X and Z? This we cannot tell for sure from the analysis so far, but there is a presumption, I will argue, in favor of the price of X rising by more than the price of Z, especially in the long run. At fixed prices, after all, the output of Z is fixed, and its price rises only due to the increase in demand. But the output of good X, especially in the long run with the Rybczynski effect, falls, at the same time that demand for it rises. Thus if other things are equal (as of course they need not be), the price of X will rise more than the price of Z. In any case, I will take this to be the normal outcome, to the extent that this relative price ever matters at all.

My primary interest in this paper is the effects of this growth on the factor returns in North. These depend on what happens to the prices of the goods, which we now know. Since the price of Z rises relative to that of Y, North experiences a rise in the relative price of its more capital-intensive good. What this will do to North's factor prices again depends on the mobility of factors. If both factors are perfectly mobile, then we have (almost) the Stolper-Samuelson result for North, that its real return to capital rises and its real wage falls. I say "almost," however, because these effects on real returns are certain only in the two-factor model of Stolper and Samuelson (1941). In our model we have the slight additional complication that a third good, Z, which is not produced in North. It has risen in price, certainly relative to good Y and probably, as I just argued, relative also to good Z. This can only exacerbate the decline of the real wage of labor, but it may conceivably reverse the increase in the real return to capital. That is, if owners of capital depend sufficiently on consumption of good X, which has just become more expensive

due to South's growth, then they may find that their real return has actually gone down due to that growth, along with the real wage. Thus, both factors may lose!

This is most likely to happen in the long run, when the Rybczynski effect causes the greatest decline in the output of X and thus presumably its greatest price increase. But it may also happen in the short run, since I already noted that output of X is likely to fall there as well, at least if it is capital that is specific in the short run. Of course, in the short run some factor is also immobile in the North, and whatever factor is specific in sector Z would be expected to gain from the increase in the relative price of Z compared to Y. But even here, if that improvement happens to be small compared to the price increase of X, and if that factor consumes a lot of good X, even it too may lose. Thus in the short run also, it is possible that all factors in North may lose from South's growth.

Why is this? The reason may be seen more broadly by looking at the effect on real income in the North as a whole. At fixed prices, of course, this is unchanged, so any change that we get is due to price changes and therefore the terms of trade. In the initial equilibrium, North exports good Z, imports good X, and may trade good Y in either direction. The price changes that we found in Figure 2 have very mixed effects on North, depending on their sizes and the pattern of trade in good Y, but it is easy to see how any ambiguities can be resolved. Suppose that in the initial equilibrium either there is no trade at all in good Y, or the North is large enough that it exports it. Then the fall in the relative price of good Y that we are sure to have does not help North, and may hurt it. If in addition, as argued above, the price of X rises by more than the price of Z, then North's terms of trade, which now consists primarily of the relative price of Z compared to X, has

deteriorated. This is why North may well lose from growth in South, and it is also why both factors in North may lose as well.

Of course there are other effects on North than just these changes in prices. The rise in the relative price of Z compared to Y causes an expansion of its Z industry and a contraction of its Y industry. These in turn draw whatever factors are mobile out of Y and into Z. At the same time, if there are specific factors in industry Y, these are hurt even more than labor will be hurt in the long run. I will return to these effects on North in the next section when I discuss how North may respond to all of this.

For now, let me turn to other effects in South. The changes in world prices matter there too, but somewhat differently than for North because South is producing different goods. First, the rise in the prices of X and Z compared to Y constitutes, for South, a rise in the price of its labor-intensive good, not the capital intensive good as it was for North. Therefore, the Stolper-Samuelson Theorem tells us (again almost) that the real return to South's capital will fall, while the real wage will rise, just the opposite of what we found in North even though the set of price changes in the same. Again, however, we must factor in the additional effect of the rise in price of the good that South does not produce, in this case Z whose price has risen. This to some extent offsets the benefit to labor and increases to loss to capital. Is it possible, once again, that both will lose? In general, yes, and this is just a variant of Bhagwati's (1958) immiserizing growth. However, since if it happens at all it is due to a worsening of South's terms of trade, it cannot happen at the same time that North also loses. And under the assumptions that I made above – that p_X rises more than p_Z and there is no initial trade in Y – South's terms of trade improves and both groups of factor owners therefore cannot lose. This does not necessarily rule out

both real factor prices falling, since the fall in the real return to capital can be made up for by its increased quantity, but it does mean that this is less likely.

As for other effects in South, these are all the combined effects of the capital accumulation itself together with the price changes. Output of good Y, for example, must still rise, even though the price change causes it to rise by less than it would have at constant prices. Output of X, on the other hand, is now more likely to rise (although by less than the increase in South's demand), since the price increase may more than offset the effect of the increased capital stock. Effects on the locations of factors are therefore correspondingly ambiguous once the effects of price changes are taken into account. In particular, it is not even certain that labor will be pulled out of sector X, even in the long run.

This completes my analysis of the effects of Southern growth in this model. On the one hand, there is nothing here that is analytically surprising, since these are all effects that we have known and understood in other contexts. I am not aware, however, that they have been put together like this before, even though analytically this is no more than an exercise.

On the other hand, I am less sure that two aspects of these results are commonly expected. One is that growth by South may well reduce real national income of North, due to terms of trade effects. And the other is that growth by South will almost certainly be harmful to particular groups in North, either labor in general or specific factors in labor-intensive industries, or both. In combination, this negative message for the developed world as an implication of growth by the developing world is not one that I, at least, had previously had in mind. On the contrary, I had agreed with Krugman (1994)

who answered "No" to the question in his title, "Does Third World Growth Hurt First World Prosperity?"[11] Nor is it a message that I am particularly happy to see, although I think it helps to explain some of the resistance to trade in the developed world that we have recently observed. I turn now to that response.

IV. Response to Growth

All that I say in this section of the paper is that, in response to the changes just found, North is likely to use protection against imports. Exactly why it does this, or even how, is more or less immaterial, mainly because there are so many reasons and so many ways. I therefore do not attempt to model the generation of this response. Instead, I merely mention a variety of reasons and a variety of ways that it might do this.

In all cases, however, I see the response as arising from the distributional effects of the growth that has occurred in the South. It is also likely to be true, as I have noted, that the growth has hurt the North overall by worsening its terms of trade, and one might imagine that North would respond to this event by using protection. But to the extent that it can in fact reverse this movement in its terms of trade by restricting imports, it could have done that almost as well before the South succeeded in growing. Therefore the growth has not provided a very compelling reason for it to choose only now to use a tariff to improve its terms of trade.[12]

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[11] Krugman (1994) pursed this question is a series of simple models. However, when he got implicitly to this one, with different factor prices in North and South, he asked only about the effects of trade, not of growth, and answered it empirically rather than theoretically, citing Lawrence and Slaughter (1993).

[12] Not compelling, but there are at least two possible rationales for such a response. First, the North and South may have been in a tit-for-tat cooperative equilibrium of a tariffs-with-retaliation prisoners' dilemma game. North may then incorrectly perceive that South has defected from this equilibrium and that its terms of trade has worsened, not because of South's growth but because of South's protection. Alternatively, North may have been using an optimal tariff before, but because South was so small the optimal tariff was

To me the important effects of South's growth, then, have been on the well-being of particular factors of production in North. Theoretically these could include specific factors in the import competing industry, Y, or they could include all labor, to the extent that factors are mobile and we are in a HO world. In reality they are likely to include both. The point is that there are individuals in the North's economy who are made worse off by the growth in the developing world, and these individuals will seek protection. Furthermore, there is a good chance that many of these individuals are themselves near the lower end of the income distribution in North, and this will strengthen the incentive for North to provide them some sort of assistance.

Now it is not exactly true that these individuals are hurt by trade, for there has been no trade liberalization here, only growth. On the other hand, assuming that we started with good Y either not traded or imported by North, then it is true that North's imports of Y have increased and that the harm to importing-competing factors in North would not have occurred if that increase had somehow been prevented.[13] In these circumstances, those who are hurt will surely perceive that the harm has come from trade, and they will also believe correctly that the harm can be reversed by restricting trade. So it is surely plausible that protection will be provided.

There are many ways that this could be modeled, if I were so inclined. Recent years have seen considerable progress in the modeling of interactions between politics and trade policies, and I presume that any number of these models could serve the

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also small. Now that South has grown, North may find that its optimal tariff is larger than before and increase it. I suspect that at least this second explanation is inconsistent with my assumption of an initial two-cone equilibrium, however.

[13] This is the "but-for" interpretation of trade as a cause of worsening income distribution described in Deardorff and Hakura (1994) and in Krugman (2000).

purpose. For example, if it is all labor in the North that is hurt by the growth, as in the HO model, then labor may constitute a majority of the electorate and be able to vote itself protection as in Mayer (1984). Or if it is specific factors that are suffering, they may be able to "buy" protection in the manner of Grossman and Helpman (1994). Or in either case, well-meaning bureaucrats may provide protection out of genuine concern for the losses that would otherwise be felt by a significant portion of the population, as argued by Corden (1974) in his conservative social welfare function. It seems that every ten years, somebody has provided a rationale for governments to provide protection in response to some sort of distributional incentives. With such an abundance of models, and no consensus among them that I know of, I see no reason to settle on one as a basis for predicting behavior. One might almost be content to resort of common sense: when growth in the developing world begins to bite in the developed world, causing labor intensive industries to contract and factors of production there to lose out, developed countries will do what they can to help, and that is likely to include protection against imports.

The form of that protection is also uncertain. I will model it simply as a tariff because that is easiest. But of course the real world has anticipated such a response and to some extent blocked it with the GATT. Therefore the response that we actually see may include forms of protection that attempt to bypass GATT rules. However, even within the constraints of the GATT, some tariff protection is possible. The Safeguards Clause (Article XIX) is precisely intended for this purpose, providing temporary tariff protection when increased imports cause injury among domestic producing interests.

Expansion of foreign industries due to economic growth would provide a good case for such a response.

Of course, those who request protection will not be satisfied with just the temporary tariff that Article XIX permits, but GATT has allowed for more permanent import relief under certain circumstances. The rules for granting anti-dumping duties (AD) ostensibly require that imports be "unfairly" priced, but in practice, as we all know, that criterion is easily met without any abnormal behavior on the part of producers. Countervailing duties (CVD), against subsidized imports, are not quite so easy to get, but they too provide a more permanent source of protection. Both of these channels for protection remain very much available, even as the GATT has been transformed into the WTO.

With the exception of the steel industry, however, AD and CVD protection have typically been used only in rather narrowly defined industries, and they do not seem to represent the sorts of broad based protection that developed countries seem likely to want, in theory, in response to developing country growth. Prior to the WTO, these needs seem to have been handled either outside the GATT, through bilaterally negotiated restrictions such as Voluntary Export Restraints (VERs), or even more importantly by negotiating exceptions to GATT rules for large vulnerable sectors such as textiles/apparel and agriculture. The Multi-Fibre Arrangement (MFA) seems the clearest case of developed country protection designed expressly as a response to developing country growth, but the carve-out of agriculture in the early years of the GATT has had this effect as well. Both of these exceptions, as well as the use of VERs, were finally addressed in the Uruguay Round, and the WTO promises to eliminate VERs, phase out the MFA, and gradually

liberalize trade in agriculture after first turning non-tariff barriers into (even more protective) tariffs. So far it is not clear that any of this liberalization has actually taken place, but perhaps the WTO will at least succeed in preventing further protection from being initiated at the expense of developing countries.

It is worth noting that, in the past, some protection that was instituted either in spite of the GATT or in conformity with its explicit exceptions has taken the form not of tariffs but of quotas that were administered by the exporting countries, who therefore got to keep the rents. This was the case both with VERs and with the MFA. Therefore, although both of these are supposedly being eliminated by the WTO, we should allow for the possibility that any protection that is prompted in response to developing country growth may take this form as well. That is, I will assume in the next section that the North imposes a tariff on imports from the South, but that the revenues (rents) from this tariff may accrue to the South rather than the North.

V. Effects of a Tariff

I turn, then, to the effects of a tariff on imports levied by North in the two-cone HO model of the world. This requires even less analysis that the previous results because it has already been done. Davis (1996) examined exactly this case, though in reverse, showing that trade liberalization by the capital-abundant country in a two-cone model would worsen the income distribution in both cones. That is, due to a tariff cut in North, the relative wage of labor falls in both North and South. The reason is that the tariff cut on good Y reduces its price within the North, where it is relatively labor intensive compared to Z, and raises its price in South, where it is capital intensive compared to X.

Therefore, if we now reverse this argument, when North responds to growth in South and the consequent increased imports of good Y by restricting its imports, this will cause the wage of labor to *rise* in both countries compared to the return to capital. And just as important, here, is the effect on the return to capital itself. This will fall in both North and South. In particular, the incentive for further capital accumulation in South is reduced.

Since Davis already derived it, there is no need to dwell on the mechanics of this result. However, it is easy enough to see in Figure 3. When North levies a tariff on good Y, this reduces North's demand for imports of good Y from the world market at initial word prices, while increasing its excess demands for both good X (due to expenditure of the tariff revenue) and good Z (due to expenditure plus reduced supply). Therefore the equilibrium loci for all three markets shift even further in the same directions that they moved due to Southern growth.[14] The equilibrium prices of p_X and p_Z both rise relative to numeraire p_Y. Thus within South, the relative price of the labor-intensive good X goes up, causing the wage to rise and the return to capital to fall. Within North, the price of Y includes the tariff, so that its relative price can go up, not down. And this too causes the wage of labor to rise and the return to capital to fall within North.

These are the results when North protects its markets with a tariff. If it uses instead a quota with the rents accruing to South, such as a VER, then all the effects on prices are the same, so long as South spends the rents the same way that North would have spent the revenues. The only difference will be in effects on national welfare.

[14] Except that this time it is the locus for good Z, not X, that is likely to shift more because of its change in output. Thus the relative price of good Z compared to X is likely to rise, this time further improving North's terms of trade.

A tariff by North may increase North's welfare for the usual terms-of-trade reasons. A quota implemented by South with it getting the rents, on the other hand, may likewise improve South's national welfare just as an export tax could, also for terms-of-trade reasons. And in both cases of course, it is also possible that welfare of both countries will fall, since world welfare is reduced in either case.

However, the more important message, to my mind, remains the effect on factor prices. In particular, protection will reduce the real return to capital in South, regardless of whether it is implemented by North or by South.[15] This must reduce the incentive for South to grow.

Like so much else in this paper, the process of economic growth has not been modeled here, partly for simplicity and partly because I see no consensus as to what model of growth is the right one to use. But as long as growth in the South must occur through capital accumulation, on which I suspect we do agree, a reduction in South's return to capital must surely slow that process down.

VI. What Happens Next?

Let me conclude by taking a small peek into the future and ask where all this is leading. Maybe nowhere. If protection in the North causes South's growth to grind to a halt, then the story simply stops in its tracks. However, I have more faith in the gumption of those in developing countries – especially now that many of them have tasted the fruits of economic expansion – than to believe that they will let resistance by the North get in their way.

Instead, I expect that the developing world will continue to grow, albeit more slowly than they might have if the developed world had accepted their exports more enthusiastically. And as they grow, the same theory that got us into this mess offers a way out. As the capital-labor ratio in South rises towards that in North, the two cones are brought closer together. Eventually, relative factor endowments may become sufficiently similar, between South and North, for a single-cone equilibrium to be possible, therefore with factor price equalization. Of course, the protection that has appeared along the way means that we will not actually be in that equilibrium, replicating an integrated world economy, but at least this equilibrium will be possible to reach if protection can be reduced. And if that happens, then further growth by South will *not* have to put North's labor at further disadvantage, and perhaps both groups of countries can grow from then on in relative peace.

[15] Actually, there is one exception to this that I can see. If a quota on North's imports of good Y is allocated to South's owners of capital producing good Y, so that their earnings include the rents, then their returns to capital may go up, not down. However, it is not clear to me that this will provide an incentive for them to accumulate more capital, since their ability to use it to produce more of good Y is restricted.

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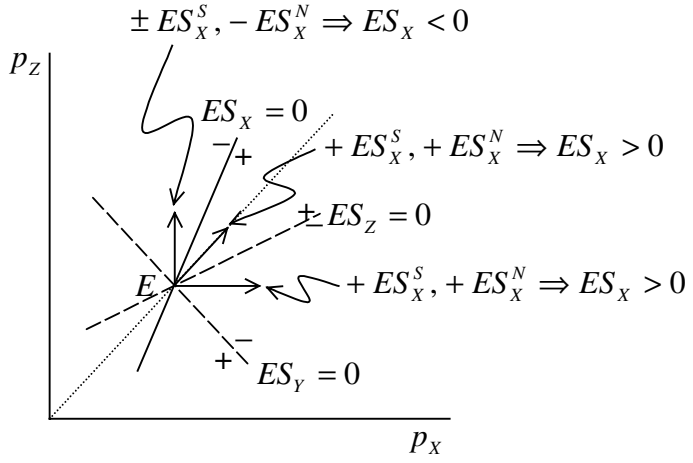


Figure 1
Equilibrium Loci in the 3-Good, 2-Cone Model

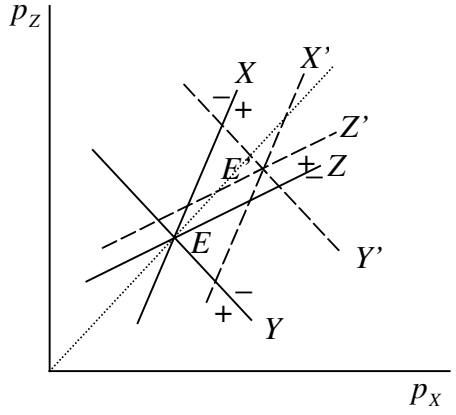


Figure 2
Effects of Capital Accumulation in South

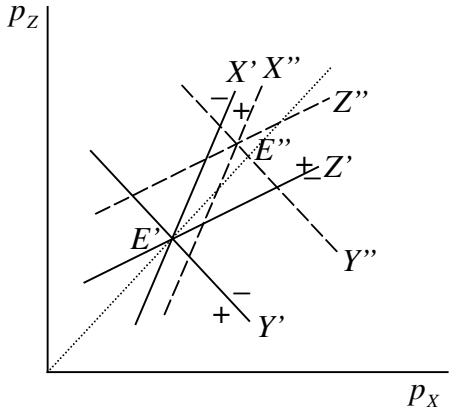


Figure 3
Effects of a Tariff on Y in North