

**DEPARTMENT OF ECONOMICS  
OxCarre (Oxford Centre for the Analysis of  
Resource Rich Economies)**

Manor Road Building, Manor Road, Oxford OX1 3UQ  
Tel: +44(0)1865 281281 Fax: +44(0)1865 281163  
[reception@economics.ox.ac.uk](mailto:reception@economics.ox.ac.uk) [www.economics.ox.ac.uk](http://www.economics.ox.ac.uk)



**OxCarre Research Paper 22**

**Economic Integration in Remote Resource-Rich Regions**

**Anthony J Venables  
(OxCarre, University of Oxford)**

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## **Economic integration in remote resource-rich regions\***

Anthony J. Venables

### **Abstract**

What are the effects of regional integration and other trade policy measures in regions such as Central Asia or the Great Lakes Region of Africa where countries are remote with poor access to the outside world and where foreign exchange earnings come largely from natural resource based exports? We show that if countries have unequal natural resource endowments, then the gains from non-preferential trade liberalisation accrue largely to the more resource-rich economies, while the opposite is true for regional integration. Regional integration is a powerful way to spread the benefits of resource wealth more widely, but may also be an obstacle to external trade liberalisation.

**Keywords:** regional integration, natural resources, landlocked, Central Asia.

**JEL codes:** E60, F34, F35, F43, H21, H63, O11, Q33

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### **Correspondence address:**

Oxford Centre for the Analysis of Resource Rich Economies,  
Department of Economics,  
University of Oxford,  
Manor Road Building,  
Oxford OX1 3UQ,  
United Kingdom

[Tony.venables@economics.ox.ac.uk](mailto:Tony.venables@economics.ox.ac.uk)

## 1. Introduction

Regional integration in Asia frequently focuses on the development of production networks and the linking of economies that are growing fast on the basis of exports of manufactures. But there is another Asian region containing economies with quite different characteristics. Central Asia contains countries that are landlocked and are, in some cases, rich in natural resources. The opportunities facing these countries are different from those facing East or South Asia, yet this region too is seeking to develop regional integration. Countries in the region are members of the Commonwealth of States (CIS) Free Trade Agreement, and Kazakhstan, the Kyrgyz Republic, Tajikistan and Uzbekistan are also members of the Eurasian Economic Community (EAEC). The integration process is also being driven forward by the Central Asian Regional Economic Cooperation (CAREC) which seeks to promote cross-border activities particularly in the areas of transport, trade policy and trade facilitation, and in energy. It currently has eight members: Afghanistan, Azerbaijan, Kazakhstan, Kyrgyz Republic, Mongolia, Tajikistan, Uzbekistan, and the People's Republic of China (PRC), focusing on the Xinjiang Uygur Autonomous Region.

The characteristics of these countries raise issues for the analysis of economic integration that have received relatively little attention in the literature. The countries are remote, landlocked, with a restricted set of opportunities for engagement with the world economy and little chance of following a manufacturing export route to economic development. At the same time, resource abundance ensures a flow of foreign exchange to the region, although it is uneven across countries and volatile over time. These circumstances make it natural to think that regional integration might be particularly valuable, but the debate on “natural trading partners” alerts us to the dangers of such thinking. Policy formulation needs to focus not on existing trade patterns, but on the alterations to trade flows that will be caused by policy change.

This paper starts by sketching some of the key features of the region. It then highlights those features that are most important for trade policy formulation and undertakes some economic modelling to draw out their implications. The analysis is intended to offer some insights not just for Central Asia, but also for trade policy and regional integration in other remote resource-rich regions, for example, in the Common Market for Eastern and Southern Africa and in the proposals for deeper integration in the East African Community. Our results show that the effects of

preferential and non-preferential liberalisation are quite different, with the former tending to benefit resource-poor countries in the region, and the latter benefiting countries that are resource-rich. Integration is therefore a powerful tool for spreading the benefits of resource wealth within the region, although it creates incentives for resource-poor countries to resist regional liberalisation with the rest of the world.

## **2. Regional characteristics.**

The land-lockedness and remoteness of the Central Asian region is apparent, and the economic scale of this can be calculated in various ways. The World Bank's 'Doing Business' database<sup>1</sup> ranks six of the CAREC members (all except Mongolia and the PRC) in the bottom 10 of 181 countries for its "trade across borders" measure. This is a composite of time taken, documents required, and direct costs of shipment; the average costs of importing a container to these six countries is around \$3,000, compared to less than \$1,000 in the East Asian and Pacific region and \$450 for Singapore. The costs of shipping a container from the US east coast to Tajikistan reach \$9,000, the leg from Georgia to Tajikistan accounting for two-thirds of this. By one estimate (World Bank 2004) trade logistics costs amount to 23% of the value of Tajikistan's external trade and, including domestic movement of goods, total logistics costs amount to 27% of GDP.

Economic geographers approach the problem by calculating measures of market access. The "foreign market potential" of a country, developed by Redding and Venables (2004), is a micro-founded way of measuring market access, and can be calculated from trade data and gravity modelling. Recent calculations by Mayer (2008) establish that, in a ranking of 196 countries (including a lot of small island states), six<sup>2</sup> of the countries in the region rank in the range 131 (Kyrgyz Republic) to 168 (Uzbekistan). The market potential of these countries is comparable to that of Uganda or Zambia, around six times less that of Malaysia or the Republic of Korea (Korea), or ninety times less that of Belgium, the top ranked country. This means that if Tajikistan were — with its current endowments — relocated to Belgium, its exports would be ninety times their current level. Not only are the regional

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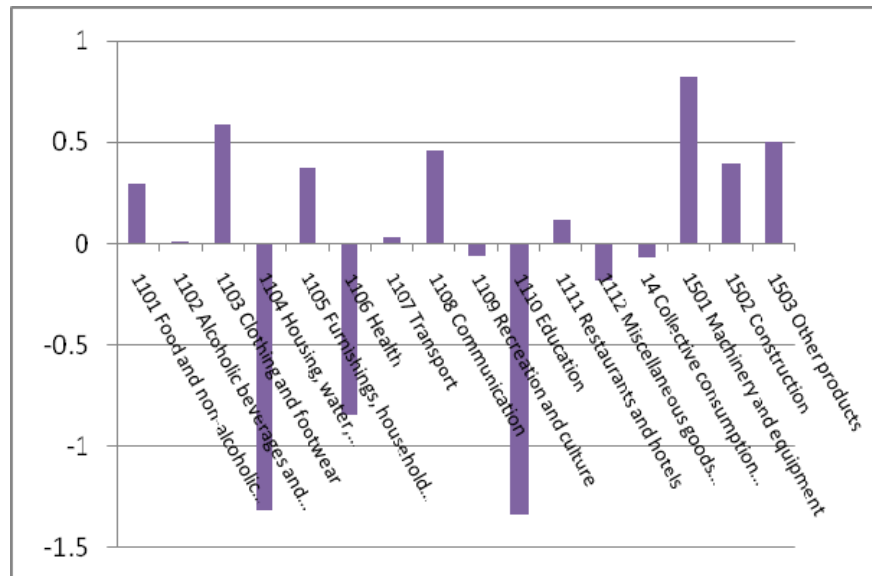
<sup>1</sup> <http://www.doingbusiness.org/EconomyRankings/>

<sup>2</sup> In increasing order: Uzbekistan, Tajikistan, Afghanistan, Kazakhstan, Azerbaijan. Mongolia and the PRC as a whole rank considerably higher.

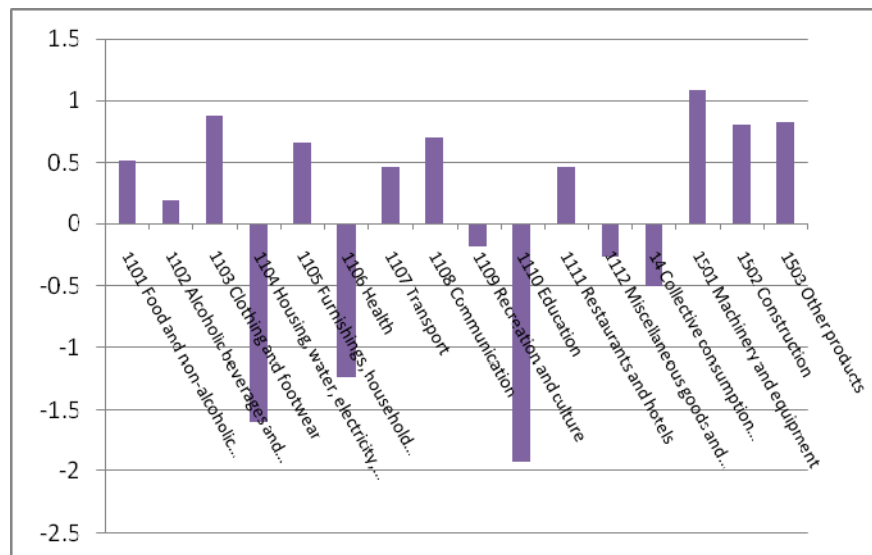
economies remote from external markets, they are also sparsely populated, and generally lack good internal communications infrastructure.

**Figure 1: Relative prices in the region**

*Azerbaijan*



*Tajikistan*

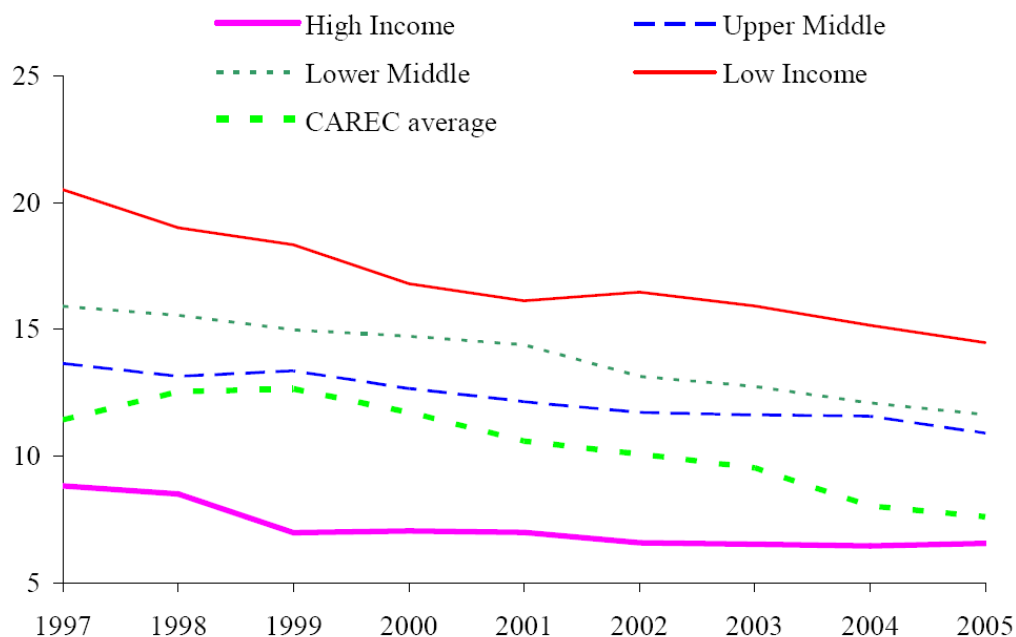


A further way of seeing the impact of remoteness is to look at relative prices of commodities within the region. Figure 1 gives these prices for two countries, Azerbaijan and Tajikistan. The figures give log deviations from world average prices,

and are based on the price level indices of the 2005 International Comparison Program (World Bank 2008). For example, a positive deviation of 0.8 means that the price of machinery and equipment (relative to GDP) in Azerbaijan is 123% ( $=100(e^{0.8} - 1)$ ) higher than it is on average in the world. Figure 1 indicates the extremely high prices of tradable goods, such as machinery and equipment, clothing and footwear, transport and communications relative to non-traded goods, in particular services such as education, health and utilities.

Despite, or perhaps because of, this natural protection, tariff barriers in the region are low (Figure 2). This reflects membership in the CIS free trade area and of the EAEC, although researchers point to the presence of non-tariff (but man-made) barriers associated with customs clearance, transit fees, complicated systems of trade permits, “unofficial payments”, and limited progress towards installation of modern information systems.

**Figure 2: Trends in import tariffs; CAREC and other country groupings.**



Source: IMF Trade Policy Database. Unweighted average import tariffs.

The second outstanding feature of the region is its resource wealth, as summarised in Table 1. For Azerbaijan, Kazakhstan and Mongolia hydro-carbon and minerals account for more than 50% of exports and, in the case of oil and gas

(Azerbaijan and Kazakhstan) more than a 25% of fiscal revenue. The exports of Azerbaijan and Kazakhstan nearly quadrupled in value between 1999 and 2004, and these countries have had major resource and associated construction booms. However, the distribution of this resource wealth is uneven. Afghanistan, Tajikistan, Uzbekistan and Xinjiang Uygur Autonomous Region have much lower levels of natural resource wealth, and the exports of the Kyrgyz Republic, Tajikistan and Uzbekistan increased by less than 50% over the period 1999-2004.

**Table 1: Mineral wealth of CAREC countries**

	Resource	Government Mineral/ hydrocarbon revenues 2000-05		Mineral/ hydrocarbon exports 2000-05		Population (million) 2005	GDP (PPP) (\$billion) 2005
		% fiscal revenue	% GDP	% exports	% GDP		
Afghanistan						32.7	35
Azerbaijan	Oil/gas	33.3	8.5	87.3	36.1	8.2	65
Kazakhstan	Oil/gas	25.1	6.3	52.6	24.1	15.3	168
Kyrgyz Republic	Gold	1.7	0.3	39.1	12.5	5.4	11
Mongolia	Copper/ gold	8.2	2.9	51.2	26.3	3.0	9
Tajikistan						7.2	12
Uzbekistan	Oil/gas Gold			29.8	8.6	27.3	64
China (Xinjiang Uygur AR)							
<i>Turkmenistan*</i>	Oil/gas	43.2	8.7	83.5	28.7	5.2	27

\* Applicant for CAREC membership.

Data sources:

IMF Guide on Resource Revenue Transparency (2007)

CIA World Factbook

The overall implications of these facts for the region's trade have been studied by a number of authors (including Asian Development Bank 2006, Grafe, Raiser and Sakatsume 2005, Grigoriou 2007, Raballand 2003). Points made are: Intra-regional trade is high relative to extra-regional trade. Extra-regional exports are dominated by

primary commodities, with natural resources taking a very large share. Equipment and capital goods account for a high share of imports from outside the region.

### **3. Trade policy for remote-rich economies**

How do the features that we have sketched above shape trade and trade policy? The characteristics we have described dictate a number of issues that need to be put at the centre of analysis of integration in the region.

#### ***3.1: Low supply response of external exports:***

The first point is that both resource dependence and remoteness make it difficult to export non-resource based items outside the region. This means that the quantity response of exports to changes in trade policy is likely to be extremely small; the equilibrium elasticity of export volumes with respect to domestic costs will be low.

One reason for this is that natural resource exports are based on a fixed factor, so expanding supply faces sharply diminishing returns. Trade policy can be used to change the domestic price of imports and domestic goods and services (including labor and other inputs) relative to the price of oil or gold. But since local costs are a relatively small share of the value of such products, these changes in relative prices are unlikely to have much effect on the supply of oil or gold. This may apply most acutely to mineral and hydro-carbon exports, but also applies to agricultural products the output of which is constrained by a sector-specific factor.

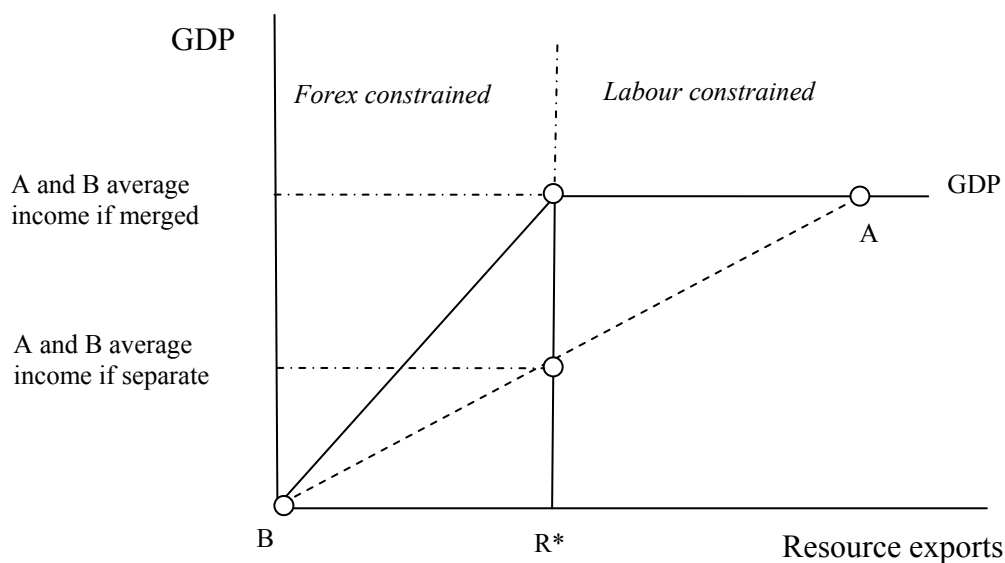
Another reason for the low responsiveness of export volumes to trade policy stems from remoteness and high trade costs. The coastal regions in developing Asia have attracted footloose export oriented manufactures, and for these goods there is the possibility that small changes in trade policy and in competitiveness may lead to extremely large changes in the volume of exports. However, for Central Asia, remoteness means that the region is not on the cusp of an explosion of manufacturing exports. This constraint is further exacerbated by the large presence of resource exports that tend to raise the real exchange rate and create a Dutch disease problem for other exports. The combination of remoteness and resources therefore means that the region is left with a narrow base of inelastically supplied resource-based exports.



### 3.2: *The distribution of natural resources:*

The second point is that the supply of natural resources is unevenly distributed among the countries. This has implications for equity, and also for economic efficiency. Since the economic impact of resource revenues is likely to be subject to diminishing returns their unequal distribution leads to an efficiency loss. A simple example makes the point. Suppose that every country consumes and produces a single non-tradable good. Production of the good uses foreign exchange (imported oil or equipment) and domestic labor in fixed proportions. The only source of foreign exchange is resource revenues, and labor is in fixed supply. Real income in such an economy is illustrated in figure 3, in which resource revenue is measured on the horizontal axis. If resource exports are less than  $R^*$ , then production is foreign exchange constrained, and real income is given by the upwards sloping section of the line (with slope equal to the foreign exchange content per unit GDP). If natural resource earnings are greater than  $R^*$ , then the economy is labor constrained, this fixing income; further resource earnings beyond this point are simply accumulated as foreign assets. As a simplest case, suppose that one economy has no resource revenue (so is at point B) and another has resource revenue and is at point A. Average income – of the two separate countries – is the midpoint between A and B. Merger of the two economies would exactly double income, as illustrated.

**Figure 3: Income loss from uneven distribution of resources**



This is an extreme example but serves to highlight some points. First, the resource abundant country has run into diminishing returns in its ability to use resource revenues. In the example of Figure 3 this economy has hit full employment, so no more labor is available to produce further income. The argument applies not just to labor, but to a range of inelastically supplied non-tradable goods and services. For example, a resource boom often leads to inflation in the construction sector as supply bottlenecks are encountered. Spending bids up the price of these inputs and services but does not buy additional real services. More generally, spending from resource revenues will be met by a combination of increased output and crowding out of other expenditures. What are the expenditures that are crowded out? It may be exports, thus giving rise to the “Dutch disease”. Alternatively, monetary and exchange rate policy might be used to mitigate this problem, in which case crowding out will affect domestic activities, quite likely investment. If these activities are particularly valuable (as they would be if they are initially operating at a sub-optimal level) then crowding them out may actually reduce income.

The economy without resources exhibits the opposite characteristics. The wage is low, particularly relative to the price of imports, including imported capital equipment and inputs to production. Low wages might be expected to translate into a competitive position in other activities, but there are two obstacles to this. One is the need to use expensive imported inputs and capital equipment in production. And the other relates back to the remoteness of these economies. We argued above that low prices of non-traded inputs are unlikely to lead to a significant quantity response in the exports of landlocked Central Asian economies.

The logic of Figure 3 seems to present a compelling case for regional integration. Simply merging the two economies has the effect of doubling income. Regional trade should mean that the resource-poor country can increase its foreign exchange earnings, while the resource-rich country can import goods that were previously supply constrained. However, we will show that it is likely that the distribution of gains between countries will be highly unequal. This creates real problems of undertaking integration in a region with these characteristics.

### ***3.3: Regionally and globally traded goods:***

The final point concerns the dichotomy between tradable and non-tradable goods. We have argued that the set of goods that can be exported outside the region is quite small, but a much larger set may be traded within the region, where transport costs are lower. Similarly on the import side; trade costs make the import of some goods from the rest of the world extremely expensive, although regional trade can substitute for some goods. Study of regional integration therefore requires that we distinguish between “globally traded” goods and “regionally traded” goods (as well as non-traded goods or factors). It is important that this is not an exogenously fixed distinction, but one that is set by barriers to trade — real trade costs, and also tariff and other trade barriers. In the model that follows the division of products into globally and regionally traded goods will emerge endogenously from a continuum of goods facing different transport costs and tariffs.

The presence of an endogenously determined set of regionally traded goods has two important implications for trade policy. The first is that the terms of trade for these goods is endogenous. Even though the countries under study are price-takers on world markets, trade policy will change the price of regionally traded goods. This is a mechanism for distributing real income between countries in the region, and we will see that it is crucial in determining the international distribution of the effects of trade policy. The second implication concerns the analysis of trade creation and diversion in a regional integration scheme. The changing sets of goods produced domestically, imported from the region, or imported from the rest of the world provide an insightful way of capturing the trade creating and diverting effects of policy.

## **4. A benchmark model.**

The region we focus on contains two economies, A and B, each endowed with a fixed and equal quantity of labor,  $L$ , and with natural resources. These natural resources are the only exports to the rest of the world (i.e., outside the region) and are in fixed supply. The values of these exports are denoted  $N_A$ ,  $N_B$ , and the only difference between the two countries — the only source of comparative advantage — is that country A has more of these exports than does country B,  $N_A > N_B$ . Clearly, fixing external exports is a strong assumption, but it serves the purpose of capturing the

implications of unequal resource wealth and remoteness for the responsiveness of exports that we outlined above.

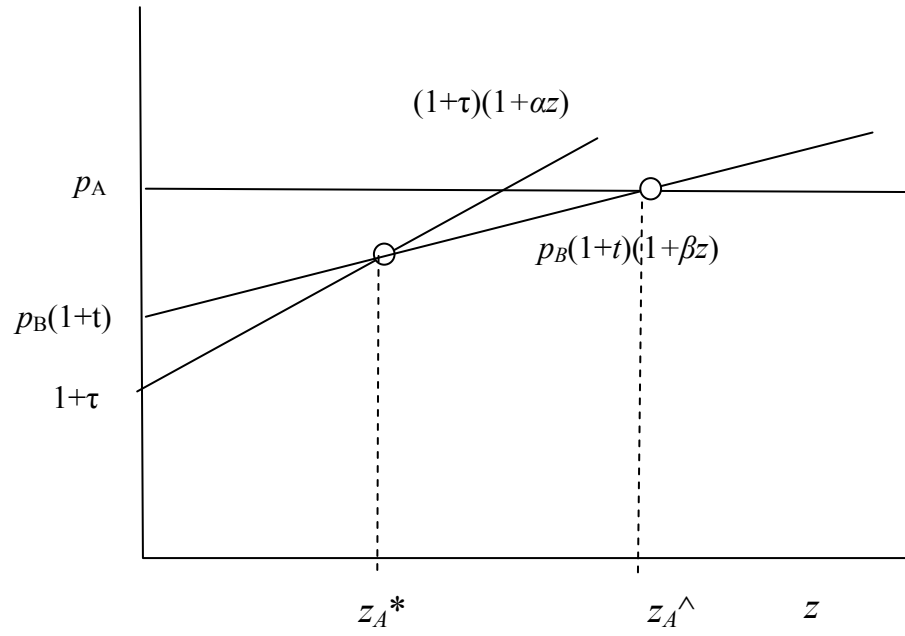
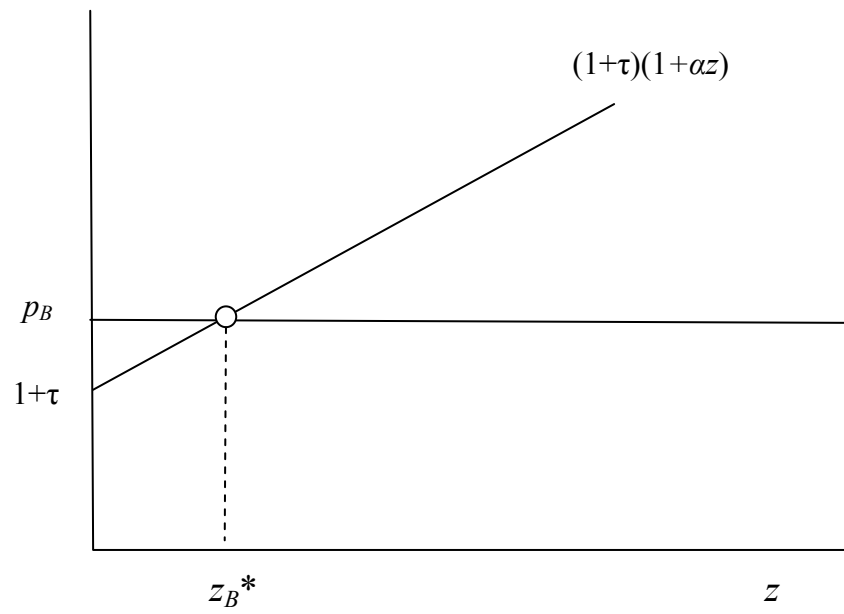
In addition to their natural resources, countries A and B produce and consume goods from a continuum of sectors, indexed by  $z \in [0, 1]$ . For simplicity, we assume that all these sectors have identical technologies, using an imported intermediate good and labor. They have Cobb-Douglas technology with intermediate share  $\mu$ , so the unit cost of output produced in country  $i$  is

$$p_i(z) = w_i^{(1-\mu)} v^\mu, \quad i = A, B, \quad (1)$$

where  $w_i$  is the wage and  $v$  the price of the imported intermediate. We take the world price of this intermediate as the numeraire and assume that it faces no tariff, so  $v = 1$ .

As well as being produced domestically, each good  $z$  can also be imported from the rest of the world with import price  $q(z)$ , strictly increasing in  $z$ . This variation with  $z$  can be thought of as capturing the different levels of transport costs for each good and, for simplicity, we set  $q(z) = 1 + \alpha z$ . In addition to importing from the rest of the world, goods may be traded intra-regionally, trade which faces transport costs but at a lower rate than external trade. The unit cost of importing a good from the partner country is then  $r_i(z) = p_j(z)(1 + \beta z)$ ,  $i, j = A, B$ ,  $i \neq j$ . External and internal trades face ad valorem tariffs at rates  $\tau$  and  $t$  respectively, so consumer prices in country  $i$  are: for domestically produced goods,  $p_i(z)$ ; for imports from the partner country  $p_j(z)(1 + t)(1 + \beta z)$ ; and for imports from the rest of the world,  $(1 + \tau)(1 + \alpha z)$ .

This structure gives an endogenous division of goods into a set that are non-traded; a set that are traded intra-regionally; and those goods that are imported from the rest of the world. Before turning to the general equilibrium of the model, we illustrate how this works, given values of prices, transport costs, and tariffs in each country. The two panels of Figure 4 depict outcomes for country A and B respectively. We draw the figures with  $p_A > p_B$ , a property that will surely be true in equilibrium with resource endowments  $N_A > N_B$ . These inequalities mean that resource-poor country B will import from the rest of the world, but not from country A. Resource-rich country A, in contrast, will import both from B and from the rest of the world. We look at country B, the lower panel, first.

**Figure 4a: Market division in country A****Figure 4b: Market division in country B**

The horizontal axis is the continuum of products, and the vertical axis the price of supply from different sources. The unit cost of domestic production is  $p_B$ , while imports from the rest of the world have unit cost  $(1+\alpha z)$  and tariff inclusive price  $(1+\tau)(1+\alpha z)$ , as illustrated by the upward sloping line. The economy imports goods with the lowest consumer price, so it imports a range of low transport cost goods,  $z \in [0, z_B^*]$ , and supplies the rest from domestic production,  $z \in [z_B^*, 1]$ . The dividing value is given by

$$z_B^* = \frac{1}{\alpha} \left\{ \frac{p_B}{1+\tau} - 1 \right\}. \quad (2)$$

For country A there may also be a range of products for which imports from the partner are cheapest. The tariff inclusive price of such products is  $p_B(1+t)(1+\beta z)$ , giving the flatter of the upward sloping lines in Figure 4a. In the situation illustrated the goods with the lowest transport costs are imported from the rest of the world,  $z \in [0, z_A^*]$ . Those with intermediate transport costs are imported from the partner country,  $z \in [z_A^*, z_A^\wedge]$ , and domestic production supplies the remainder. The two critical values are given by,

$$z_A^* = \frac{(1+\tau) - p_B(1+t)}{\beta p_B(1+t) - \alpha(1+\tau)}, \quad z_A^\wedge = \frac{1}{\beta} \left\{ \frac{p_A}{p_B(1+t)} - 1 \right\}. \quad (3), (4).$$

The trade policy changes that we will explore operate by shifting these lines, thus changing the sources of supply to each market, which in turn will change demand for labor, wages, and prices. We now turn to closing the general equilibrium of the model to capture these price effects.

Consumers in each country have fixed coefficient preferences over the continuum of goods,  $z \in [0, 1]$  consuming an equal quantity of all goods, regardless of relative prices. We denote the equilibrium consumption of each product in each country by  $x_A, x_B$ . Given the production technology, labor market clearing is

$$w_A L_A = (1-\mu)(1-z_A^\wedge) p_A x_A, \quad (5)$$

$$w_B L_B = (1 - \mu) p_B \left[ x_B (1 - z_B^*) + x_A \int_{z_A^*}^{\hat{z}_A} (1 + \beta s) ds \right] \quad (6)$$

In the first of these equations the value of domestic output is  $(1 - z_A^*) p_A x_A$  and fraction  $(1 - \mu)$  goes to labor rather than to imported intermediate goods. In the second, equation (6), demand for country B labor additionally comes from its exports to A, as captured by the integral of products in the interval  $z \in [z_A^*, \hat{z}_A]$ . Notice also that trade costs are “iceberg” — they use up the good being shipped, thereby creating a demand for labor.

Finally, we have goods market clearing. Given the structure of preferences, this can be written simply using the budget constraint. We assume that all tariff revenue is distributed in a lump sum manner to consumers, so the budget constraint can be expressed as the equality of the value of imports to foreign exchange earnings,

$$x_A \left[ \int_0^{z_A^*} (1 + \alpha s) ds + p_B \int_{z_A^*}^{\hat{z}_A} (1 + \beta s) ds \right] + \mu p_A x_A = N_A \quad (7)$$

$$x_B \int_0^{z_B^*} (1 + \alpha s) ds + \mu p_B x_B = N_B + p_B x_A \int_{z_A^*}^{\hat{z}_A} (1 + \beta s) ds. \quad (8)$$

For country A, foreign exchange earnings are simply the resource revenue,  $N_A$ . Imports are quantity  $x_A$  of each product imported times the unit cost, which depends on the source and on transport costs, as in the integrals. Additionally, the country has to import intermediate goods the value of which is fraction  $\mu$  of the value of output. For country B, imports come only from one source, the rest of the world (products  $z \in [0, z_B^*]$  and intermediates  $\mu p_B x_B$ ), but foreign exchange is earned on exports to A, (products  $z \in [z_A^*, \hat{z}_A]$ ), the final term in equation (8), as well as resource exports.

Equations (1) – (8) fully characterise equilibrium, giving prices, wages, consumption levels and the three market-source dividing values,  $z_A^*$ ,  $\hat{z}_A$  and  $z_B^*$ . Notice also that the levels of consumption,  $x_A$ ,  $x_B$ , can be used as the real income or utility index for each country. To develop intuition, it is helpful to think first about how resource wealth — an increase in  $N_A$  — will effect equilibrium. By raising demand in country A this increase will raise consumption,  $x_A$ , (equation (7)) and hence labor demand, wages and prices (equation (5) with (1)). The increase in  $p_A$  makes imports from the partner country more competitive, increasing the range of

products imported,  $z_A^\wedge$ , (as well as the quantity of each), as is clear from Figure 4a. This is the mechanism through which resource wealth in one country is transmitted to its neighbours; namely, through an increase in the range and quantity of locally traded goods. This extra foreign exchange accruing to country B raises income and  $x_B$  (equation (8)), thereby increasing wages and prices in country B (equation (6) with (1)). An increase in the  $p_B$  affects both Figures 4a and 4b, making imports from the rest of the world more competitive, thus raising  $z_A^*$  and  $z_B^*$  and the set of products imported.

## 5. Trade liberalisations.

### *Trade policy and the intra-regional terms of trade:*

We start by drawing out some results about the quite different effects of reductions in external ( $\tau$ ) and internal tariff ( $t$ ) on the terms of trade between the two economies. External trade liberalisation will generally worsen the terms of trade of the resource-scarce country, while internal liberalisation will improve its terms of trade (and conversely for the resource-rich country).

The point of reference is to consider the case in which traded goods are not used in domestic production, so  $\mu = 0$ . If we look just at equations (1) – (6) (or at Figures 4a and 4b) then it is apparent that a reduction in the external tariff,  $(1 + \tau)$ , if matched with an equal proportionate reduction in domestic prices  $p_A$  and  $p_B$ , will leave the division of markets,  $z_A^*$ ,  $z_A^\wedge$ ,  $z_B^*$ , unchanged. Can these changes be the full equilibrium response to the tariff reduction? With  $\mu = 0$ , remaining equilibrium conditions (goods market clearing) are

$$x_A \left[ \int_0^{z_A^*} (1 + \alpha s) ds + p_B \int_{z_A^*}^{z_A^\wedge} (1 + \beta s) ds \right] = N_A \quad (7')$$

$$x_B \int_0^{z_B^*} (1 + \alpha s) ds = N_B + p_B x_A \int_{z_A^*}^{z_A^\wedge} (1 + \beta s) ds. \quad (8')$$

Evidently, if there is no internal trade, that is  $z_A^* = z_A^\wedge$ , and if changes in  $(1 + \tau)$ ,  $p_A$  and  $p_B$  leave  $z_A^*$ ,  $z_A^\wedge$ ,  $z_B^*$  constant, then these equation are unaffected. The change in the external tariff then has *no* real effect, leaving the pattern of production, trade and consumption ( $x_A$  and  $x_B$ ) unchanged.



This is an application of a result established in a more general model by Collier and Venables (2008). They show that, in a resource-rich economy with inelastic export supply, an import tariff has no real effect apart from shifting revenues between recipients of resource rents and trade taxes. So, for example, a tariff reduction simply shifts resource revenues from the government's tariff revenue account to its resource revenue account. The reason is that the demand for imports has to be held constant, given fixed foreign exchange earnings, and this means that a tariff reduction must be matched by an equal proportion reduction in domestic prices. Real wages are unchanged, tariff revenue falls, but the domestic purchasing power of resource rents is increased. (The argument may alternatively be seen by Lerner symmetry, the equivalence of import tariffs and export taxes. An export tax is fully shifted to the owners of the resource, so it redistributes rent but has no effect on relative prices or on any quantities). As we saw above, the effect applies in this model under the assumptions that  $\mu = 0$  and that there is no intra-regional trade (or alternatively, if we were to collapse the model down to a single country).

With this as the benchmark, what is the effect of the reduction in  $(1 + \tau)$  when there is intra-regional trade? Since this trade takes the form of exports from the resource-poor to the resource-rich the reduction in  $p_B$  is a terms of trade loss for the resource-poor economy. Its real income effects are obvious, and seen clearly from equations (7') and (8'); a reduction in  $p_B$  must be associated with an increase in  $x_A$  and fall in  $x_B$ . In line with Collier and Venables, a reduction in the tariff redistributes real income towards resource owners, here the resource-rich country. Of course these changes in  $x_A$  and  $x_B$  cause further changes for equilibrium to be restored (as they must, see equations (5) and (6)), and we examine the full changes in more detail below. But these changes will not reverse the terms of trade effect outlined above.

Can a similar argument be made for a change in the internal tariff,  $t$ ? The argument is less clear cut, but it is apparent that the effect must be in the opposite direction. There is no direct effect on the division of market A if a reduction in  $(1 + t)$  is met by an equi-proportionate *increase* in  $p_B$ . By inspection of equations (3) and (4) we see (holding market shares constant) that changes in  $(1 + \tau)$  and in  $(1 + t)$  have opposite effects on  $p_B$ , the intra-regional terms of trade. Whereas a reduction in external tariffs  $(1 + \tau)$  redistributes real income to the resource-rich (via a fall in  $p_B$ ), a reduction in the internal tariff  $(1 + t)$  enables an increase in  $p_B$  and hence the terms of trade of the resource-poor country.

With these general arguments established, we now turn to a more detailed analysis of the effects of trade policy, and also restore the possibility that imports are used in production,  $\mu > 0$ .

***Trade policy; general equilibrium outcomes:***

We want to explore the interaction between various trade policy experiments and resource wealth. We focus initially on the impact on real income (utility) in each country, and summary results are shown in Figures 5a and 5b. These, and all subsequent results, are derived from numerical simulation.<sup>3</sup> The horizontal axis gives resource income relative to non-resource income in country A. The exogenous variable that changes as we move along the horizontal axis is country A resource wealth,  $N_A$ , but for ease of interpretation we report this relative to non-resource income  $N_A/w_A L_A$ .  $N_B$  is held constant at 50% of the lowest value that we use for  $N_A$ .

Looking first at the resource poor country, figure 5b reports real income,  $x_B$ , as a function of  $N_A$  under three different trade regimes. The bottom line is the initial high tariff regime where trade — between A and B and with the rest of the world — is subject to a 50% tariff ( $t = 0.5$ ,  $\tau = 0.5$ ). At low levels of  $N_A$  these tariffs are sufficient to choke off all trade between A and B, so country B utility is invariant with respect to country A resource wealth, and  $x_B$  is constant. Once  $N_A$  becomes large enough (exceeding 60% of non-resource income in our example) the price differential,  $p_A/p_B$ , becomes wide enough that intra-regional trade begins, raising real consumption and, by linking the two economies, making utility in B an increasing function of that in A.

The higher two lines in Figure 5b report  $x_B$  under non-preferential free trade (middle line,  $t = 0$ ,  $\tau = 0$ ) and regional integration ( $t = 0$ ,  $\tau = 0.5$ ). There are several points to note. Both forms of trade liberalisation bring benefits, and both increase the degree of linkage from the resource-rich to the resource-poor country. However, regional integration brings much larger gains than non-preferential liberalisation. The main reason is the different terms of trade effects that we discussed above.

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<sup>3</sup> Parameter values are:  $L_A = 1$ ,  $L_B = 1$ ,  $N_A \in [1, 10]$ ,  $N_B = 0.5$ ,  $\alpha = 2$ ,  $\beta = 0.2$ ,  $\mu = 0.2$ .

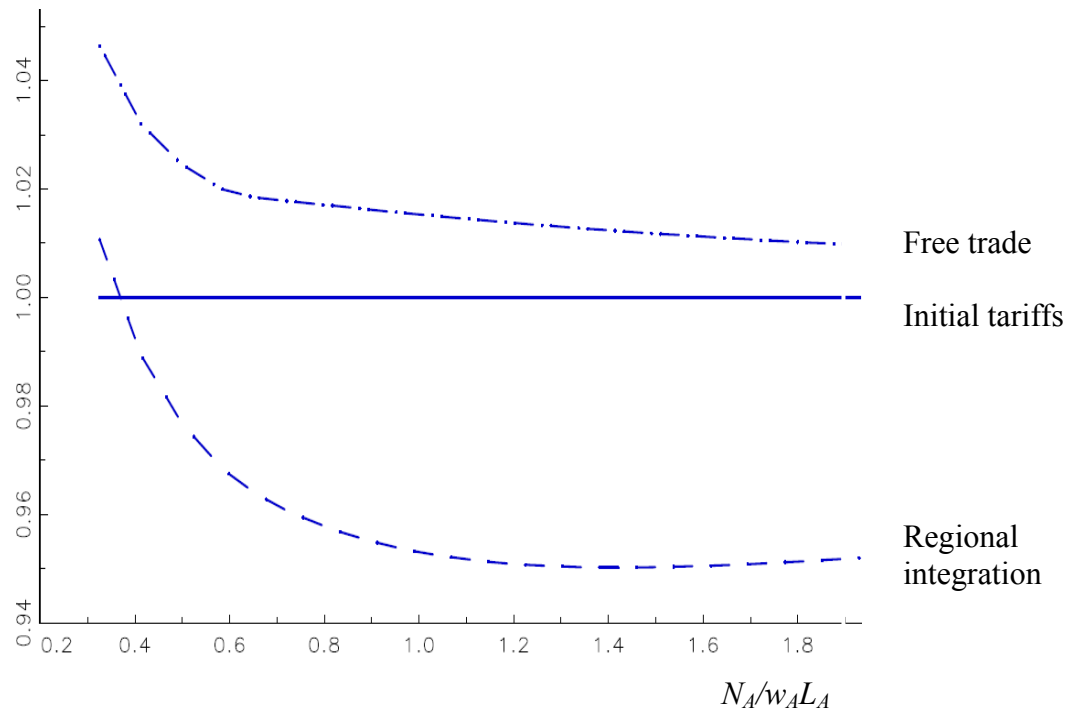
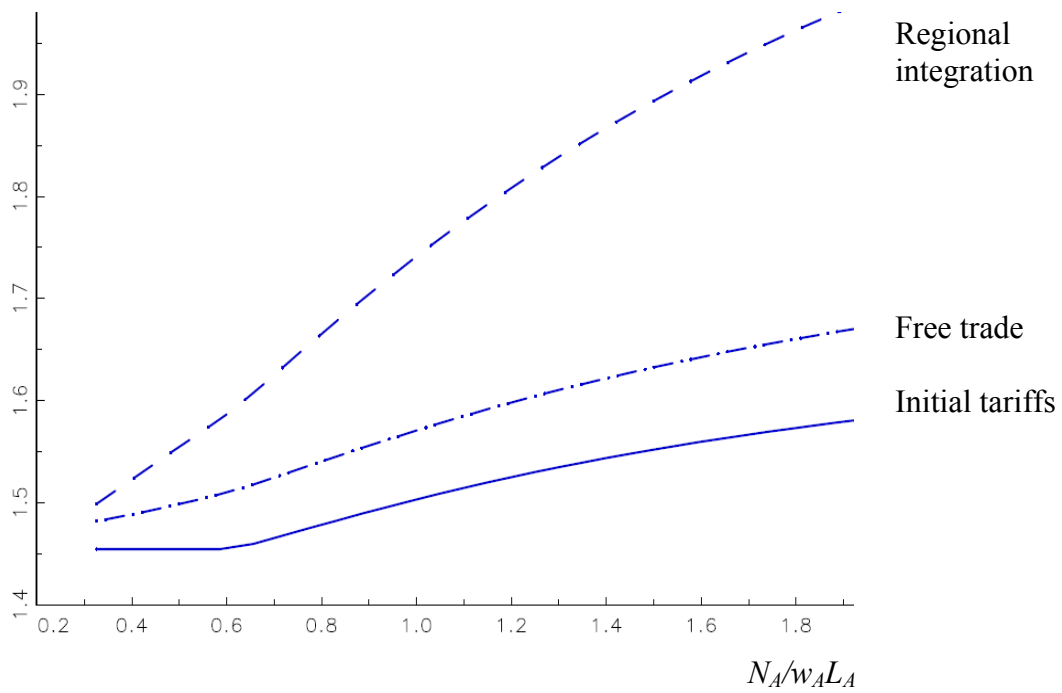
**Figure 5a. Country A Real Income****Figure 5b. Country B Real Income**

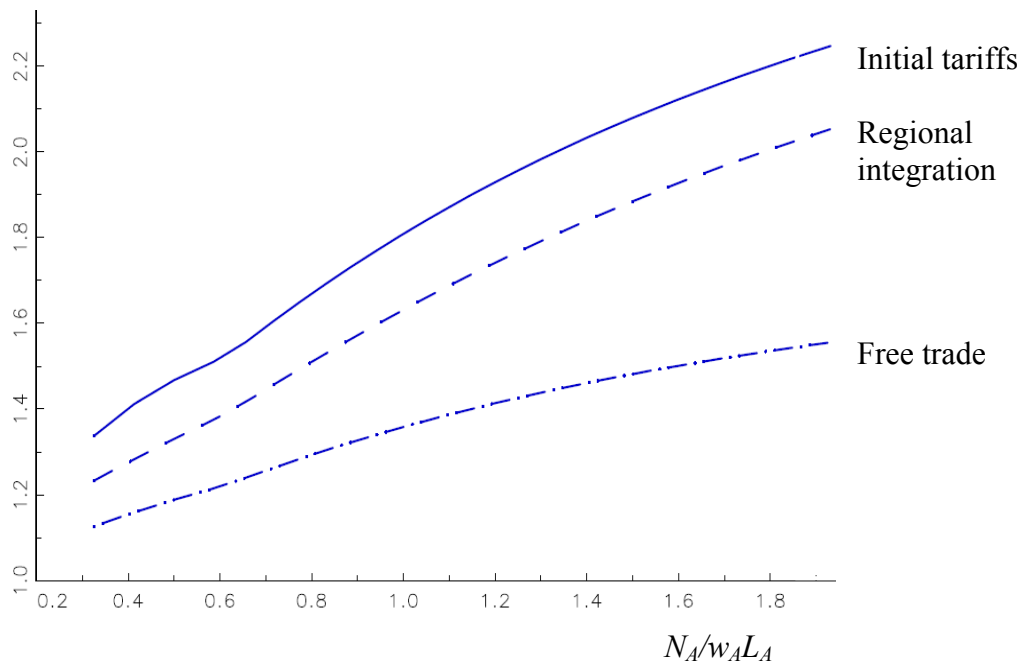
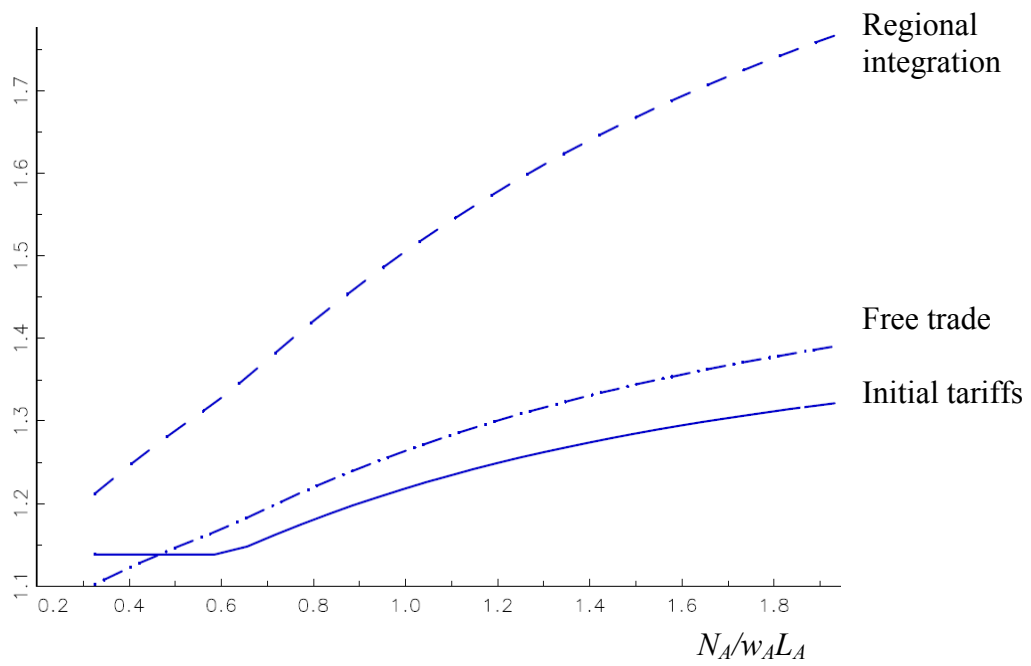
Figure 5a reports real income for the resource-rich country,  $x_A$ , but with variables expressed relative to their value in the tariff regime. (This is for ease of viewing; otherwise the figure is dominated by the direct effect of additional resource wealth). There are three points. First, regional integration, the lower curve, brings gains only at low levels of resource wealth, and losses at higher levels, because of its adverse terms of trade effect. Second, regional integration is dominated by free trade (the upper curve) at all levels of resource wealth. And finally, the gains from trade liberalisation relative to initial tariffs decline with resource wealth, although this relative effect is driven largely by the direct effect of additional resources on country A real income.

Combining the results of Figures 5a and 5b, we conclude that the opposite effects of non-preferential liberalisation and regional integration that we discussed above (the terms of trade effect), are not overturned by the full general equilibrium analysis. While gains to each country vary with the trade regime, the aggregate gains are quite clear. The aggregate real consumption of countries A and B combined is highest under free trade, followed by regional integration, and lowest with the initial restrictive tariff policy.

### ***Non-resource income and within country income distribution***

We now turn to concentrating on the effect of the different trade regimes on real wages plus tariff receipts (which are transferred to workers), stripping out the direct impact of the resource income itself. The experiment is useful, both because it makes our main results very clear cut, and because it sheds some light on potential within-country conflicts of interests between workers and recipients of resource revenues.

The different impacts of regional integration and non-preferential liberalization are seen by comparison of Figures 6a and 6b. For the resource-poor country the pattern of non-resource income is, unsurprisingly, very similar to real consumption ( $x_B$ , Figure 5b) with regional integration yielding much the largest gains. For the resource-rich country (A, Figure 6a), the effect is very different. We see that real non-resource income is highest under the restrictive tariff policy, then is less under regional integration, and is lowest under free trade. The reason is the downward pressure that openness places on wages. Recipients of resource revenues are major beneficiaries from lower prices, but openness reduces the real income of those dependent on wages and tariff revenues.

**Figure 6a. Country A Real Non-Resource Income****Figure 6b. Country B Real Non-Resource Income**

One final point comes from comparison of Figure 6a with 6b. The level of real wages in country B remains below that in country A at all corresponding points on the figures. However, under free trade the difference is a function simply of intra-regional trade costs,  $\beta$ . As  $\beta \rightarrow 0$ , the economies become fully integrated and wages become equalised, thereby involving real wage gain in country B and real wage decline in country A.

***Trade creation and trade diversion:***

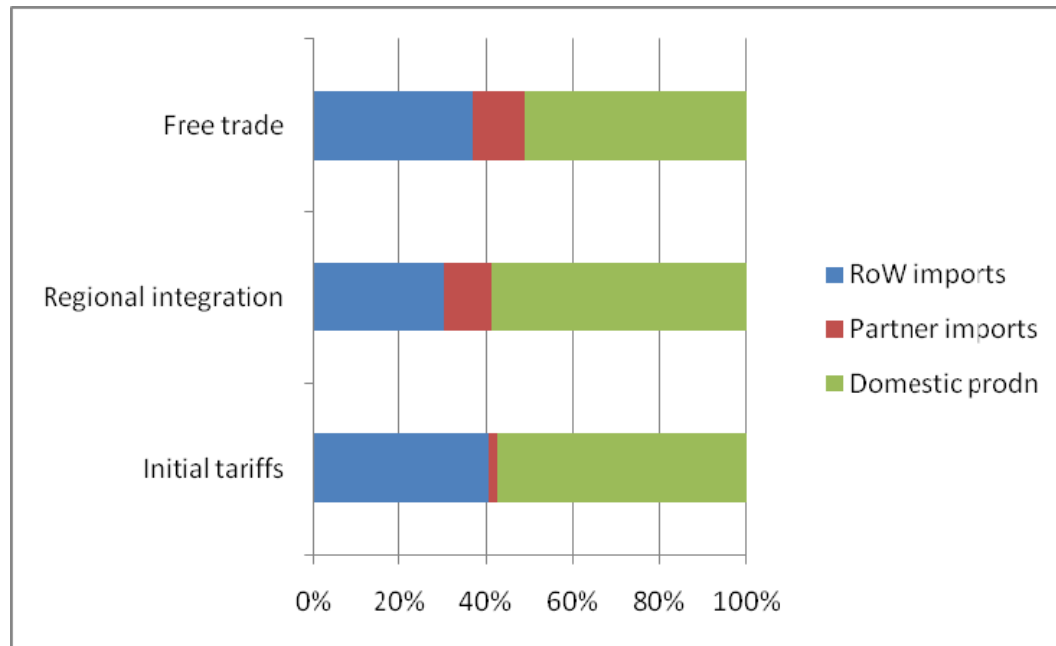
There are three mechanisms underlying the effects of alternative trade policies. They are changes in the intra-regional terms of trade, trade creation, and trade diversion. The particular features of remote resource-rich economies that we have captured in the model are crucial to these effects. These countries are price-takers in world markets but their remoteness and the consequent importance of regional trade means that the terms of trade within the region are endogenous. And it is movements of the margin between regional and global trade that creates trade diversion.

We argued above that the effects of regional integration and of non-preferential trade liberalisation have opposite effects on the terms of trade, and we see this come through most clearly in Figures 6a and 6b. Trade creation and diversion effects are drawn out in Figure 7. The figure illustrates changing sources of supply to country A at a fixed intermediate value of  $N_A$ , the three rows corresponding to the different trade regimes. Comparing regional integration with the initial situation, there is an increase in the share of imports coming from the partner country, and this is largely — from the standpoint of country A — trade diversion; goods that were being imported from the rest of the world are now imported from the partner. Comparing free trade with regional integration we see trade creation, with expansion of the market shares of imports from the rest of the world and from the partner country. The latter arises because country B's opening to imports reduces  $p_B$ , increasing the competitiveness of imports from the partner country.

In country B (not illustrated) the share of the market taken by imports (i.e., fraction  $z^*_B$ ) goes from 11% under the tariff regime, to 34% with regional integration and 39% with free trade. The regional integration regime nevertheless yields the highest country B real consumption because of terms of trade effects; country B

prices are some 40% higher under regional integration than free trade, thus increasing the volume of rest of the world imports than can be purchased.

**Figure 7: Market shares in country A:**



**Note:** boundaries between lines are  $z^*_A$ ,  $z^{\wedge}_A$ .

## 5. Policy implications.

The real income of the region as a whole — the resource-poor and resource-rich countries combined — is maximised by free trade, as must be the case in a framework where the region as a whole is a price-taker on world markets and there are no market failures. But comparing the trade options we have studied, there are large changes in relative prices and wages and large redistributions of income between the cases, creating incentives for deviations from free trade.

Within the resource-rich country, tariff reductions reduce wages and the cost of living. The move to free trade, in particular, has a negative effect on real wages and non-resource incomes, while increasing the domestic purchasing power of resource rents. This points to the importance of paying attention to who receives the

resource rents. The direct effects of the tariff reduction may occur entirely within government: transfers are between its resource revenue accounts and tariff accounts. Nevertheless, the fall in real wages associated with the move to free trade makes it essential that trade liberalization is accompanied by measures to use resource revenues for the benefit of workers, either directly or through investments in human capital or other measures that enhance productivity and thereby raise wages.

The resource-poor country gains more from regional integration than it does from a regional movement to non-preferential free trade. Essentially, this is because of the terms of trade improvement that it gets as a consequence of duty-free access to the resource-rich partner. This effect points to the importance of regional integration as a way of spreading the benefits of unevenly distributed resource wealth. Of course, there are other channels for spreading these benefits — notably migration — but trade alone can deliver a substantial part of the benefits. However, the fact that the benefits of regional integration exceed those of free trade raises the danger that regional preferences may become an obstacle to more general liberalisation. The way to overcome this obstacle is to look for other policy measures that can accompany non-preferential opening. This could include direct sharing of resource wealth between countries, but most important is the use of resource wealth to develop regional infrastructure. In this way the competitive position of the resource-poor country can be maintained at the same time as external opening takes place.

## **6. Concluding comments**

Remote resource-poor economies are disadvantaged in exporting outside their region, and as a consequence are critically short of the foreign exchange needed to finance essential imports. In many cases foreign aid has to fill this gap. Yet, in many regions of the world, they have neighbors that are resource-rich. These countries are possibly concerned about the “resource curse,” including the damage that large foreign exchange windfalls might inflict on other sectors of their economies. Regional integration appears to be a way of solving both problems, and this paper has presented a highly stylised model to investigate the issue. It turns out that the gains from integration are so unevenly distributed, particularly compared to other trade policies, that it may be difficult to achieve.



Better integration with a resource-rich economy is extremely valuable for the resource-poor. Remote and land-locked developing countries have very limited export potential with the external world, but need foreign exchange to purchase inputs for production — equipment and basic energy needs — as well as consumption goods. Regional integration enables them to earn foreign exchange via their exports to the resource-rich partner. The benefits arise as the prices of these regionally traded goods are bid up, raising wages and creating a terms of trade gain for the resource-poor economy.

However, resource-rich economies lose (or at best have very modest gains) from regional integration. The terms of trade gain for the resource-poor country is, of necessity, a terms of trade loss for the resource-rich economy. Added to terms of trade effects are trade creation and diversion. The resource-rich economy runs into diminishing returns as it seeks to spend its resource revenues, and trade is a way to relax this constraint. But these gains come from non-preferential opening, and regional integration leads preponderantly to trade diversion.

The analysis points to the potential for conflicts of interest between resource-poor countries that seek regional integration, and resource-rich countries seeking non-preferential opening. A way to resolve this conflict is to accompany non-preferential opening with regional infrastructure improvement. Lower intra-regional trade costs bring real income benefits to both countries, although their capital costs are of course project specific (and beyond the scope of the modelling exercise of this paper).

The framework that has been developed in this paper provides some new insights on the core issues of trade policy, but many other aspects of the economic integration of remote resource-rich economies remain to be studied. Diminishing returns to resource wealth occur not just because of long run supply constraints, but also because of short run absorption and macro-economic problems as the economy seeks to adjust to resource wealth, because of the way the economy handles volatility, and for numerous political economy reasons. Each of these sources of diminishing returns may be relaxed if the resource rent is spread over a wider economic space. Analysis of regional integration needs to be extended to look at these other issues, and also at integration tools beyond trade policy, including labor mobility, regional infrastructure, and macro-economic and monetary issues.

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