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IS SOUTH–SOUTH TRADE A TESTING GROUND FOR STRUCTURAL TRANSFORMATION?

by

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ABSTRACT

The purpose of this paper is to analyse the composition of South–South as opposed to South–North trade in recent years, applying emerging methodologies and highly disaggregated trade data to consider whether the South as a market provides developing countries with greater opportunities to transform their productive structures and move to more sophisticated export sectors than the Northern market does. The results show that for a group of developing countries, primarily in Africa, Latin America and Central Asia, exports within the South are more sophisticated and better connected in the product space than exports to the North, whereas the opposite is true for the faster-growing economies of Asia and Eastern Europe (excluding the Commonwealth of Independent States). It is shown that the primary source of cross-country variation in export sophistication and connectedness is between Northbound rather than Southbound export baskets. And yet it is clear that for a large group of developing countries, current export flows to the North are not particularly growth-enhancing, nor do they offer learning opportunities to fuel structural transformation, and for these countries South–South trade flows may indeed be a testing ground for structural transformation. This paper focuses on clearly establishing the facts about export composition by market, and identifying promising avenues for further investigation.

Keywords: South–South trade, diversification, structural transformation

JEL classification: F13

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Introduction

The purpose of this paper is to investigate the composition of South–South trade in recent years and make comparisons with the composition of South–North trade. Proponents of South–South trade have argued that it represents an opportunity for developing countries to diversify production and to export "relatively high skill content" manufactures to the South as compared with the North – products with greater "developmental effects" (UNCTAD, 2005). Others argue that South–South trade flows are merely the by-product of poor policies and that they go against the dictates of comparative advantage (Havrylyshyn, 1985), or that the most dynamic export sectors for developing countries are to the North. Empirical evidence has been mixed and is often based on imprecise notions of product sophistication and learning potential.

In this paper we take advantage of emerging methodologies and highly disaggregated trade data to consider whether the South as a market provides developing countries with greater opportunities to transform their productive structures and develop more sophisticated export sectors. The goal here is to clearly establish the facts. We also highlight key questions as to the determinants of the patterns observed and their implications for policy, to be addressed in future work.

The first section examines the theoretical and empirical literature on the composition of South–South as opposed to South–North trade, and is followed by a discussion of the data and methodology employed in this paper. We then present the central results, paying particular attention to the strong regional patterns that emerge. To add some texture to the macro-level data, we explore the particular product-market flows underlying the aggregate results in four particular countries. The final section explores some potential causes for the patterns that emerge from these results, suggesting directions for future research.

Literature review

The workhorse theory for analysing the composition of trade flows between countries, particularly between countries with differing productive structures, is the Heckscher-Ohlin model. This foundational theory of trade predicts that countries will specialize in those activities that most intensively use its relatively abundant factors. Therefore, according to this model, the South is expected to specialize in those goods that are intensive in its abundant factors: land and labour. The North, in turn, would specialize in goods intensive in its abundant factors: human and physical capital. As a result, South–North trade would confine developing countries to a specialization in unsophisticated products that, it is assumed, would have fewer learning-by-doing productivity-enhancing benefits than those exported by the North to the South (Stokey, 1991).

But the Heckscher-Ohlin model has little to say on the composition of South–South or North–North trade, when factor endowments are similar across countries. Given that a great deal of trade observed in the world is between countries with remarkably similar factor endowments, alternative models that could explain such flows have emerged. First was Linder's hypothesis (Linder, 1961) that trade was determined by similarity in demand structures. According to this hypothesis, countries with similar levels of income per capita would trade more with one another, and therefore one would expect North–North and South–South trade to flourish given similar demand structures among Southern countries. After correcting for the methodological shortcomings of earlier studies, it has indeed been found to hold in the data that countries with similar levels of gross domestic product (GDP) per capita trade with one another more. This is true at the international level (Hallak, 2006), among Organization for Economic Cooperation and Development (OECD) countries (McPherson et al., 2000) and among developing countries (McPherson et al., 2001).

In addition to Linder's hypothesis on demand patterns, the substantial trade flows between countries with similar relative factor endowments can be justified by models of

increasing returns to scale and monopolistic competition, pioneered by Paul Krugman. In these models, increasing returns production leads countries to trade in slightly differentiated products, even if the products' factor intensities (and the countries' factor endowments) are quite similar.

For our purposes here, it is not important whether the source of South–South flows is demand or production technology. What is important is that while the Heckscher-Ohlin model suggests that South–North trade will be confined to goods low in both human and physical capital, the alternative models for analysing flows between countries that are similar to each other, such as South–South trade, allow for trade in a broader variety of sectors. According to these models, South–South trade need not be confined to the raw materials and simple labour-intensive manufactures that Heckscher-Ohlin would expect to dominate South–North trade, but could also include more "sophisticated" products. In other words, these models hold out the possibility of South–South trade taking place in more sophisticated, growth-enhancing sectors than South–North trade.

A number of empirical studies in the 1980s examined the difference in skill composition between South–South and South–North trade, often seeking to test the Heckscher-Ohlin predictions and evaluate the development potential of South–South trade. The predominant finding was that exports from the least developed countries (LDCs) to the countries of the South had greater skill content than exports from LDCs to the North (Amsden, 1976, 1980; Richards, 1983). This finding gives empirical justification for a model that states that greater learning effects and technological spillovers arise from South–South trade (Amsden, 1986), although the results are questioned in Van Beers (1991). Havrylyshyn (1985) also finds that while trade flows from the South to the North conform to Heckscher-Ohlin, "exports from LDCs to other LDCs contain relatively more physical and human capital than exports to industrial countries" (p. 264). These studies suggest that South–South trade is, or at least was, a testing ground for structural transformation.

However, studies examining more recent data have come to the opposite conclusion: that South–South trade is less sophisticated and more concentrated in raw materials than South–North trade is (OECD, 2006). UNCTAD (2005) performed a detailed examination of trade flows between 1995 and 2005 and found that "in the dynamism of South–South trade, primary commodities have played a more important role than in South–North trade, and the most dynamic manufactured product categories in South–South trade tend to be less skill- and technology-intensive than those in South–North trade." This is largely due to the emergence of China, which significantly increased its raw material imports from Africa (South–South trade) and its manufactured exports to the United States of America and Europe (South–North trade).[1]

The literature on the composition of South–South trade is therefore mixed. It suggests that whereas traditionally the bulk of South–North trade flows were in less sophisticated sectors with fewer learning opportunities, this may not be the case today, particularly among the dynamic Asian economies. Because of the spectacular growth observed in those economies, South–North trade may now defy the predictions of Heckscher-Ohlin, with South–South trade now relatively more concentrated in primary commodities and not acting as a testing ground for structural transformation.

The composition of South–South trade as opposed to South–North trade therefore deserves further study. Moreover, many previous analyses relied on broad definitions of industries and often used preconceived notions about a sector's sophistication and about benefits for future learning and growth. We now have new methodologies available to evaluate trade flows and their potential for accelerating structural transformation and growth. These new methodologies are more systematic and empirically supported.

[1] It is interesting to note that the finding of greater dynamism in relatively sophisticated South–North exports was noted as far back as Havrylyshyn (1985).

Methodology

To determine whether South–South trade is a testing ground for structural transformation, we will focus on two relatively new and closely related characteristics of an export package: sophistication and connectedness. These metrics have several advantages over those used in the previous literature. Firstly, they are defined at a highly disaggregated level (in this case, HS 4- digits), which makes the evaluation very fine-grained. Past analyses often used broad categorizations at a very high level of aggregation (e.g. all raw materials, all manufactures, Lall's 10 categories), which miss important heterogeneity across sectors (Hausmann and Klinger, 2007). Moreover, as will be explained below, the new metrics are outcomes-based, whereas past metrics were based on a priori assumptions of sophistication (e.g. all agriculture is less sophisticated, all manufactures are more sophisticated). Finally, the previously used categorizations of product sophistication and learning potential had very little empirical basis. As will be illustrated below, these new metrics have linkages with structural transformation and economic growth, with robust empirical support.

Export sophistication

Our measure of export sophistication is *EXPY*, which was created by Hausmann, Hwang and Rodrik. This is an outcomes-based measure of the sophistication of a country's export package, which is essentially the GDP per capita associated with the basket. Export baskets typical of rich countries will have a high *EXPY*, and export baskets typical of poor countries will have a low *EXPY*.

EXPY is constructed in two stages. The first stage involves measuring the GDP per capita associated with each product in the world. This product-level measure of sophistication is called *PRODY*, and it is calculated as the revealed comparative advantage (RCA)-weighted GDP per capita of each country that exports the good. So, if a product accounts for a large percentage of poor-country export baskets but a small percentage of rich-country export baskets, then it will have a lower *PRODY* as it is a "poor-country" export. One such example is jute, which makes up a significant percentage of exports in many poor countries. Conversely, if a product accounts for a large percentage of rich-country export packages but is not significant among poor-country exports, it will have a higher *PRODY* as it is a "rich-country" export. One such example is aeroplanes, which are exported by Europe, the United States, Canada and Brazil. The *PRODY* of aeroplanes will therefore be an average of all these countries' GDPs, weighted by each country's RCA.

The formula is as follows:

$$PRODY_{i,t} = \sum_{c} \frac{\left(x_{i,c,t} / X_c\right)}{\sum_{j}\left(x_{i,c,t} / X_c\right)} Y_c$$

where $x_{i,c,t}$ equals exports of good i by country c in year t, X_c equals total exports by country c, and Y_c equals GDP per capita of country c. This product classification is a continuous rather than a categorical metric, and it is measured for every single product at the highest level of disaggregation available, giving a much finer measurement of sophistication.

The authors use this product-level variable to measure the overall level of income associated with a country's export basket. This is what *EXPY* means. It is simply the *PRODY* of each good that a country exports, weighted by that product's share of exports. So, if one country exports primarily jute, that country will have a low *EXPY* compared to another country than exports primarily aeroplanes. Formally:

$$EXPY_{c,t} = \sum_{i} \left(\frac{x_{c,i,t}}{X_{c,t}} \right) PRODY_{i,t}$$

Naturally, since *PRODY* is measured using the GDP per capita of the typical exporter, rich countries have a high *EXPY* and poor countries have a low *EXPY*. This is by construction: rich countries export "rich-country" goods and poor countries export "poor-country" goods. However, there is significant variance in this relationship. There are many countries that have roughly equivalent levels of GDP per capita, but some of these have somehow managed to export a relatively more sophisticated, rich-country export package than others. For example, Argentina and Poland have roughly the same level of development, but

Poland's *EXPY* is much higher than Argentina's. Poland's export package is dominated by products that are typically exported by countries that are much richer than Poland, whereas the opposite is true in the case of Argentina.

Most importantly, Hausmann, Hwang and Rodrik (2007) show that a country's relative level of export sophistication has significant consequences for subsequent growth. That is to say, if a country has a sophisticated export basket relative to its level of income, subsequent growth is much higher. So, controlling for the level of development, those countries that have somehow managed to export a higher-*EXPY* export package enjoy faster growth in the future. How countries have managed to move to a more sophisticated export basket is not known, but Hausmann, Hwang and Rodrik's paper goes to great lengths to resolve any questions on the direction of causality: what countries export has an effect on their growth. The authors' *EXPY* gives us a fine-grained measure of sophistication with clear and strong links to growth.

Export connectedness

South–South trade is often suggested in order to allow developing countries to export products that cause greater "learning effects" than the products they export to the North (see e.g. Amsden, 1986). Certain goods are understood to represent greater learning opportunities, generating future structural transformation and productivity growth. But the goods that provide such opportunities are typically assumed to be either manufactures in general, or certain categories of high-tech manufactures. That is to say, they are pre-defined and based on unclear prior notions of learning spillovers.

Recent research by Hausmann and Klinger (2006 and 2007) and Hidalgo et al. (2007) provides a new metric that allows this learning potential to be measured more directly. These researchers seek to understand why it is that some countries are more able than others to transform their productive structures and move to more sophisticated export sectors. To this end, they map the world's "product space", which is a network of products with varying degrees of linkage between them. The authors show that countries tend to focus on goods that are "near" to one another in this space, and therefore a country's ability to move to new export sectors depends on how connected its existing export package is in this space. Some countries are concentrated in highly peripheral activities in the product space, such as producing oil or cotton. These sectors are poorly connected, as few countries are able to move from them to other products. But other countries are concentrated in more central activities in the product space, such as forestry or packaged food. These sectors are well connected, which means that the countries concerned are more able to move from these activities to a wide range of other activities.

This pattern is explained by a model of product-specific factors of production that are imperfectly substitutable across sectors. There are institutions, physical assets, intermediate inputs and labour skills, as well as infrastructure and knowledge, that are specific to production in each sector. The capabilities required to produce wine are very different from those used to produce cotton. Established industries have already sorted out the many potential failures involved in assuring the presence of all of these inputs, which are then available to subsequent entrants in the industry. But firms that venture into new products will find it much harder to secure the requisite sector-specific capabilities. For example, they will be able to find neither workers who have experience with the product in question, nor suppliers who regularly furnish that industry. Specific infrastructure needs such as cold-storage transportation systems may not exist, regulatory services such as product approval and phytosanitary permits may be underprovided, research and development capabilities related to that industry may be absent, and so on.

If the set of capabilities specific to a new activity does not yet exist in a country, firms seeking to enter that new activity must adapt the capabilities that are specific to other products and that do already exist in the country. The set of capabilities required for one industry can – with a greater or lesser degree of difficulty – be redeployed to another industry. The broad set of capabilities required for producing computer monitors is rather similar to the set of capabilities required for producing flat-screen TVs, but it is very different from the set of

capabilities needed for just-in-time manufacturing of wiring harnesses for automobile production. Therefore it will be easier for firms in a country with established computer-monitor manufacturing to enter the flat-screen TV industry – as these two industries already have similar requisite capabilities – than it will be for them to enter the wiring harness industry. Flat-screen TVs and computer monitors are closer in the product space. More generally, products that are better connected in the product space represent greater learning opportunities, as they lead – over time – to a larger set of other new products in the future.

As with export sophistication, these linkages in the product space are measured using an outcomes-based approach. Ideally, one would want to measure the similarity in the necessary productive capabilities for each pair of products directly. But this would require knowledge as to what particular dimension of similarity matters, and in what circumstances. The authors' approach is instead to measure these distances as revealed by actual production patterns. If a pair of products require similar capabilities, this should be revealed by a higher probability that if a country exports one, then it exports the other. As such, the authors measure the distance between any two pairs of goods as the conditional probability that if a country exports one, then it exports the other. Formally, the proximity between product i and j, $\varphi_{i,j}$, is the minimum of the pairwise conditional probabilities of exporting with comparative advantage. (See Hausmann and Klinger 2006 and 2007 for technical details.) To continue with the example, since the set of sector-specific inputs required for the production both of flat-screen TVs and of computer monitors is relatively similar, countries that export one are more likely to export the other, making this probability higher.

These proximities are measured for all pairs of products across all countries, and together they comprise the product space. Most importantly, Hausmann and Klinger (2007) show that they are extraordinarily robust in predicting how a country's pattern of production will shift in the future. Countries move to nearby products as measured by these proximities.

By extension, the level of connectedness of a country's export basket as a whole is a strong determinant of its ability to move to new, more highly sophisticated export sectors. Hausmann and Klinger (2006) show that this overall connectedness is the key determinant of *EXPY* growth. The measure for the overall connectedness of a country's export basket is therefore a useful metric for evaluating the learning potential of South–South trade.

The authors' measure of export connectedness is called "open forest" and is calculated as follows:

$$open\_forest_{c,t} = \sum_i \sum_j \left[\frac{\varphi_{i,j,t}}{\sum_i \varphi_{i,j,t}} \left(1 - x_{c,j,t}\right) x_{c,i,t} PRODY_{j,t} \right]$$

Where $x_{c,j,t}$ is equal to 1 if country c has revealed comparative advantage (RCA) in product j in year t, and 0 otherwise. Intuitively, open forest is the sophistication of all unexported products, weighted by their distance from the current export basket. Or more simply, open forest is the "option value" of a particular export basket, in terms of how many new export opportunities it brings with it. Armed with this metric, which measures an export basket's learning potential, we can consider if – or for which countries – it is the case that South–South exports provide greater learning opportunities than exports to the North.

Data and sample

The analysis is performed on merchandise export data drawn from the United Nations Commodity Trade Statistics Database (Comtrade). For each country, we calculate exports net of re-exports, disaggregated by destination. The destination country is designated as being in the North if it had a GDP per capita of $10,000 or more in 2000 (according to the World Bank's *World Development Indicators*); otherwise it is designated as being in the South.[2] In addition to disaggregating by North or South, we also calculated exports within, as compared to outside, various regional trading blocs: the North American Free Trade Agreement (NAFTA), the Southern African Customs Union (SACU), the Caribbean Community (CARICOM), the Common Market of the South (MERCOSUR), the Commonwealth of Independent States (CIS) and the Association of South-East Asian Nations (ASEAN). These trading blocs are shown in the annex.

When performing this kind of analysis, it is important to ensure that changes in the sample composition from one year to the next do not distort the results. To this end, the panel was balanced by removing all countries from the sample that did not return their export figures to Comtrade each and every year from 2000 to 2005. This results in a sample of 128 countries, which are listed in the annex. They are designated there as belonging to the North or the South, and their membership of regional trading blocs is shown.

One important shortcoming to keep in mind is that these data refer to merchandise exports only; they do not include services. Unfortunately, there is no international dataset on service exports that is sufficiently disaggregated for this kind of analysis.

[2] Note that there is no single definition of "North" and "South". For example, UNCTAD (2005) included Hong Kong (China), the Republic of Korea and Singapore in the South, whereas these are classified here as being in the North. Conversely, UNCTAD included the Commonwealth of Independent States (CIS) as being in the North, whereas it is classified here as being in the South. It is important to bear in mind these differences in composition.

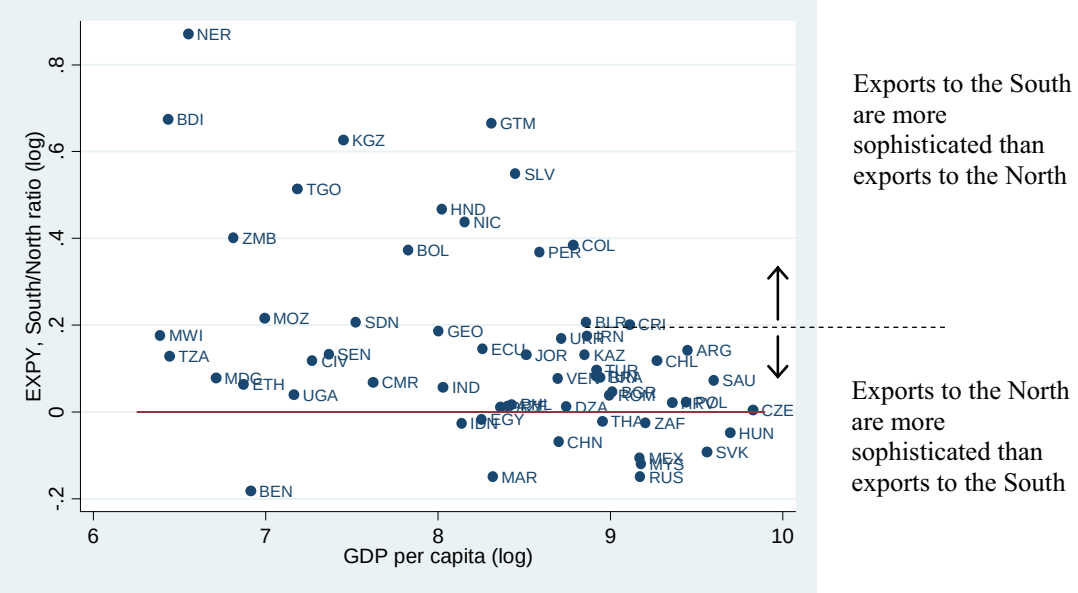
Results

A first pass at the data might be to analyse the South as an aggregate bloc, summing exports for each year, product and destination across all countries in the South and measuring their relative sophistication and connectedness compared to those destined for the North. However, the eight biggest exporters from the South (Brazil, China, Indonesia, Malaysia, Mexico, the Russian Federation, Saudi Arabia and Thailand) represent over two thirds of the South's total exports, and these countries will therefore drive the results, with the experiences of smaller countries hidden. Moreover, even among these large countries, there may be a great deal of heterogeneity behind aggregated results.

We therefore examine the differences between Southbound and Northbound exports for each country. This is done by taking the South–North ratio for each metric. We present the ratio of sophistication and connectedness of Southbound exports to that of Northbound exports in figures 1 and 2. Calculated in this way, a higher value indicates that a country's Southbound export package is more sophisticated or connected than its Northbound package, and vice versa.

Figure 1 shows that for the majority of countries, Southbound exports are slightly more sophisticated than Northbound exports. But we see that there is a great deal of heterogeneity in relative sophistication. Keep in mind that the y-axis is in logs, so while the Niger's Southbound export basket is more than twice as sophisticated as its Northbound export basket, Morocco's Southbound export basket is about 15 per cent less sophisticated than its Northbound export basket. The differences across the range of countries are very large.

Figure 1
Sophistication of Northbound and Southbound exports



For each country we take the median for the period 2000–2005 by destination. For illustrative purposes, we do not include countries from the North, or those with a population of less than 4 million. GDP is for the most recent year. Please see the annex for country abbreviations.
Source: Author's calculations using Comtrade and World Development Indicators (WDI).

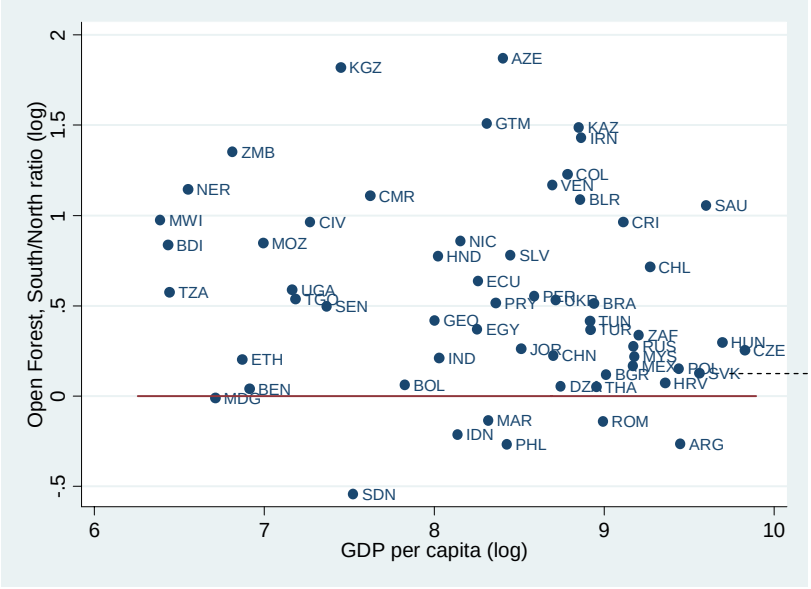
The general pattern is that the poorest developing countries tend to have much higher relative South–South export sophistication, but countries with higher incomes seem to have convergence in export sophistication by destination, with Northbound and Southbound exports having equivalent levels of sophistication. There are about eleven developing countries that export more sophisticated goods to the North than they do to the South; among them are Hungary, Indonesia, Malaysia, Mexico, Morocco, Slovakia, South Africa and Thailand. These countries would probably be considered high-growth performers in their respective peer groups. The countries at the opposite extreme, with far higher Southbound than Northbound export sophistication, include Burundi, Guatemala, Kyrgyzstan and the Niger. Compared to the former group, these countries have not enjoyed rapid growth rates over the past few decades.

The equivalent data for relative connectedness is presented in figure 2.

The relative results for connectedness are similar to those for sophistication. Overall, most developing countries' South–South export baskets tend to be more connected than their South–North export baskets, but again there is significant heterogeneity across the range of countries. For example, Guatemala's Southbound export package has a level of connectedness over four times greater than that of its Northbound basket. The level of connectedness of Argentina's Southbound export package, however, is less than three quarters that of its Northbound basket.

We observe the same relative pattern here as we did with export sophistication: the difference in connectedness between South–South and South–North exports decreases among the richer countries in the South. Southbound exports from the least developed countries are more likely to be much more connected than Northbound exports from the LDCs. This is less true for the richer developing countries, where the level of connectedness of Northbound and Southbound exports tends to merge.

Figure 2
Connectedness of Northbound and Southbound exports



Exports to the South are more connected than exports to the North

Exports to the North are more connected than exports to the South

For each country we take the median for the period 2000–2005 by destination. For illustrative purposes, we do not include countries from the North, or those with a population of less than 4 million. GDP is for the most recent year. Please see the annex for country abbreviations.
Source: Author's calculations using Comtrade and WDI.

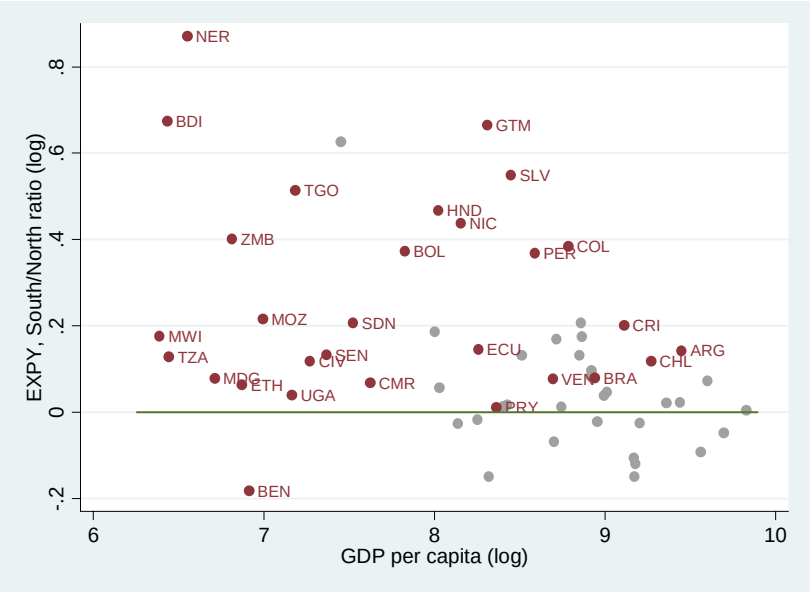
Another interesting result in figure 2 is that Azerbaijan, the Bolivarian Republic of Venezuela, the Islamic Republic of Iran, Kazakhstan and Saudi Arabia are outliers in that their Southbound export baskets are much better connected than their Northbound export baskets. These countries' Northbound exports are dominated by oil, whereas their Southbound export packages are comprised of a relatively larger share of non-oil products. The infrastructure, institutions and labour skills developed in the oil industry are very difficult to redeploy to other activities, which means that the oil industry carries out a very isolated activity in the product space. This pulls down the open forest of oil exporters' Northbound export baskets tremendously. And yet oil-exporting countries are not among the poorest developing countries, therefore oil does not have a very low *PRODY*, and these countries were not found to be outliers in figure 1.

A very striking pattern emerges in figures 1 and 2 when we examine the results by region. Below we single out Africa and Latin America (without South Africa or Mexico – which are regional exceptions) on the one hand, and Asia and Eastern Europe (excluding the CIS) on the other hand. Almost all the members of the first group have more sophisticated Southbound than Northbound export packages, whereas the reverse is true for the second group.

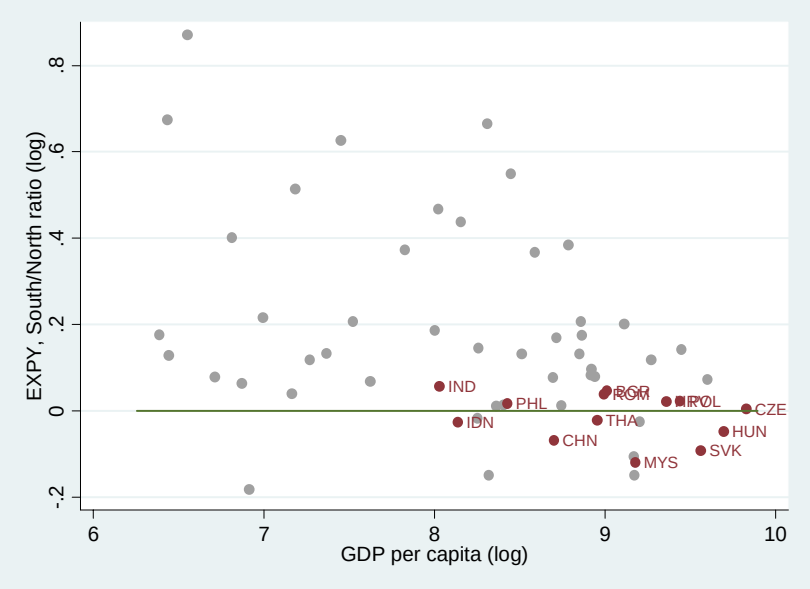
The same result holds when we consider export connectedness. The levels of open forest all tend to be higher, for the reasons discussed above, but the relative trend is clear: Africa and Latin America have better-connected export packages within the South, but this is not the case for Asia and Eastern Europe (excluding the CIS).

Figure 3
South/North *EXPY* Ratio

Africa and Latin America (excluding South Africa and Mexico)



Asia and Eastern Europe (excluding the CIS)



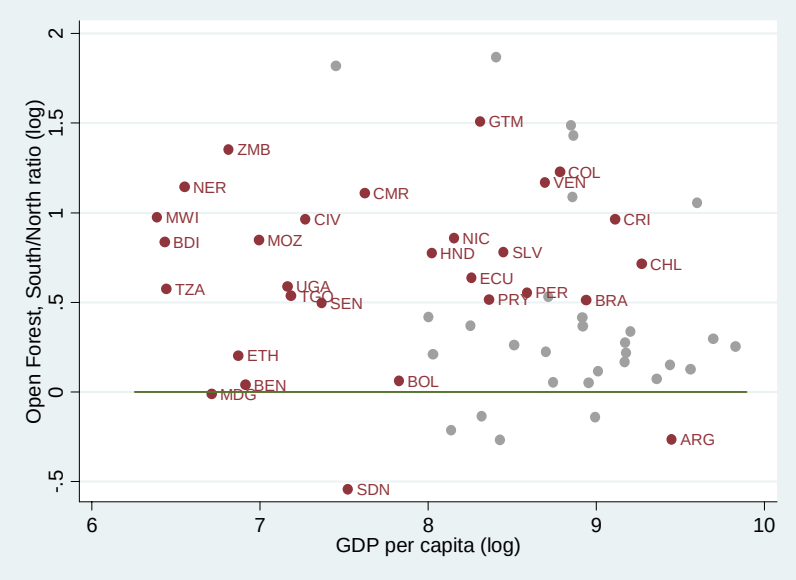
For each country we take the median for the period 2000–2005 by destination. For illustrative purposes, we do not include countries from the North, or those with a population of less than 4 million. GDP is for the most recent year. Please see the annex for country abbreviations.
Source: Author's calculations using Comtrade and WDI.

The strength of this pattern is remarkable. It is partly due to the fact that the countries in the former group tend to have lower income levels, which – as can be seen in figures 1 and 2 – substantially increases the likelihood that these countries' Northbound exports will be much less sophisticated and connected than their Southbound exports. Nevertheless, when considering the potential for South–South trade as a testing ground for structural transformation,

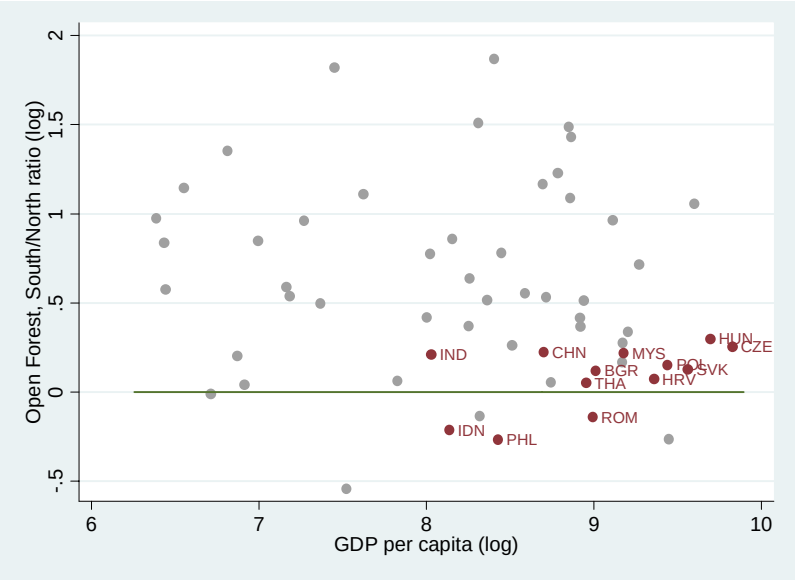
the developing world is nearly split in two. On the one side are Africa and Latin America, as well as the CIS. The Middle East and Central Asia fall into this group too. These countries conform to the Heckscher-Ohlin expectation that South–North trade is concentrated in low-sophistication goods – primarily commodities – generating few learning possibilities. In relative terms, these countries' exports to the South offer much more potential.

Figure 4
South/North open forest ratio

Africa and Latin America (excluding South Africa and Mexico)



Asia and Eastern Europe (excluding the CIS)

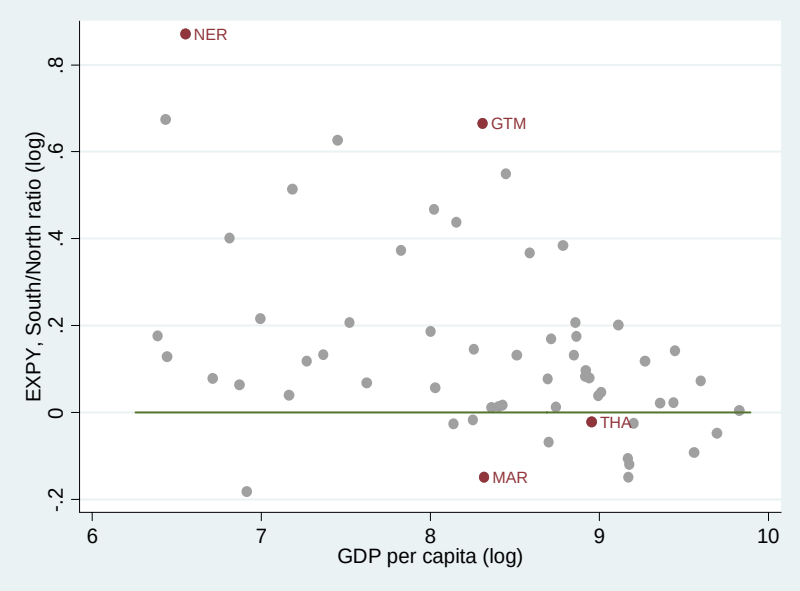


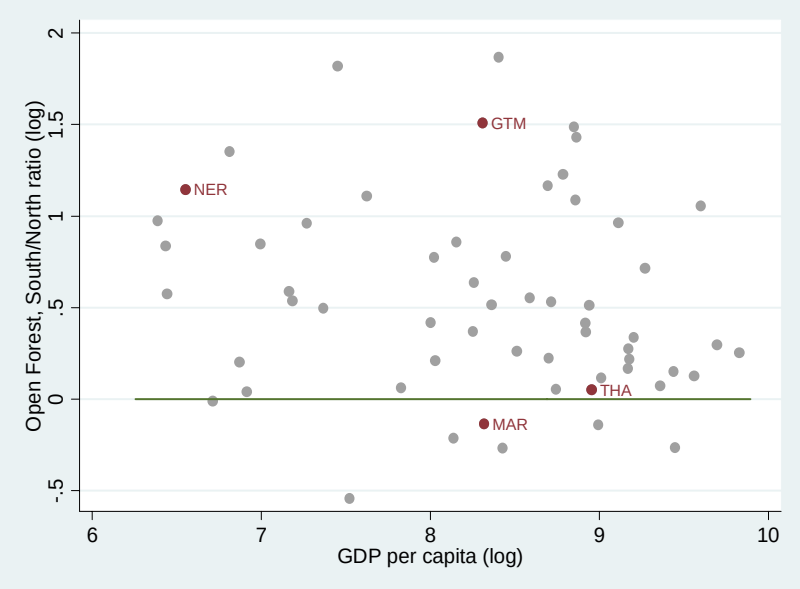
For each country we take the median for the period 2000–2005 by destination. For illustrative purposes, we do not include countries from the North, or those with a population of less than 4 million. GDP is for the most recent year. Please see the annex for country abbreviations.
Source: Author's calculations using Comtrade and WDI.

On the other side are Asia and Eastern Europe (excluding the CIS). Mexico and South Africa – which are outliers in their respective regions – fall into this group too, as do the industrialized countries of North Africa. For these countries, South–North exports are not confined to low-sophistication goods generating little structural transformation. Instead, many of these countries actually export more sophisticated goods to the North than they do to the South, defying the predictions of the Heckscher-Ohlin model. These countries seem not to use the South as a testing ground for structural transformation, at least not in recent years.

What are the particular product/market flows that are causing these patterns? In order to get a better sense of this matter, we will look at four "typical" countries in more detail – two from each group.

Figure 5
Relative sophistication and connectedness of selected countries





Source: Author's calculations using Comtrade and WDI.

Country snapshots

Four countries have been selected from different regions. Two of these – Guatemala and the Niger – are countries that have relatively high export sophistication and connectedness in their Southbound exports. The other two – Morocco and Thailand – feature relatively high export sophistication and connectedness in their Northbound exports.

In the case of Guatemala, the volume of its exports to the North is greater than the volume of its exports to the South (in 2005, US$3.2 billion as opposed to US$2.2 billion), but these are highly concentrated in a narrow range of products: bananas, sugar, coffee, oil, and simple garments, mostly bound for the United States. Although garments are a relatively new area, bananas, sugar and coffee have dominated Guatemala's exports for decades. These products are largely exported by other developing countries paying low wages, and therefore have a low level of sophistication according to the metric devised by Hausmann, Hwang and Rodrik.

Guatemala's exports to the South, on the other hand, are comprised of a wide range of products, with no single product category making up more than 10 per cent of exports. Moreover, the composition is quite different. Guatemala's largest export to the South is not bananas, coffee, or garments, which are not even in the top 20 products. Its top export is pharmaceuticals (creams and medicaments). Other significant export sectors for Guatemala's Southbound trade are soaps, insecticides, worked steel and breakfast cereal – mostly bound for other Central American countries. Unlike coffee, bananas and garments, these products are typical of countries with much higher wages. Moreover, they are much better connected in the product space, and therefore tend to lead to other new export activities more frequently than plantation agriculture and maquila manufacturing.

A similar picture is observed in the Niger. The Niger's exports to the North (principally to France, but also to Japan and Switzerland) are highly concentrated in uranium, with some exporting of gold. These two metals account for over 90 per cent of the Niger's Northbound exports[3]. The export of uranium is typical of poor countries with few other export activities, resulting in low levels of sophistication and connectedness. The Niger's uranium mines opened in the 1960s and single-handedly drove economic growth for decades, as the country has some of the world's largest deposits. But just as international changes in coffee prices drove growth cycles in Guatemala, the Niger's growth reversed when the international price of uranium declined. And just as Guatemala's coffee and bananas were commercialized and imported by one dominant trading partner – the United States – the Niger's uranium deposits were successfully mined and exported by French firms.

The Niger's exports to the South are half as large in dollar terms. They are destined primarily for Nigeria, but also for Ghana. In addition to being much more diversified across multiple sectors, the Niger's export sectors to the South include agricultural products such as fresh onions/garlic/leeks, and livestock. Unlike the export of uranium, the export of fresh agricultural produce and livestock is typical of relatively higher-wage countries. Moreover, most of the world's uranium exporters have few other exports, whereas the capabilities required for producing agricultural goods such as onions are also applicable to a wide variety of other agricultural activities, resulting in a much higher open forest value for the Niger's exports to the South.

Both Guatemala and the Niger exhibit a similar pattern. Exports to the North – although twice the value of exports to the South – are highly concentrated in a small set of low-value-added raw materials that have dominated the export package for decades and that are exported to a dominant trading partner. Guatemala and the Niger's exports to the South are not in goods that are traditionally considered to be sophisticated, such as electronics or machinery, and yet these countries' South–South trade is in products that are typical of countries with relatively higher wages. Moreover, according to the data, these products are the ones that tend to lead to much more structural transformation. The institutions and labour skills used in the

[3] Gold is a very new export – the Niger's first gold mine was only opened in 2004.

production of uranium and bananas are not as easily adapted to new activities as those used in the production of cowpeas and medicaments. For this reason, South–South trade appears to be a better testing ground for structural transformation than exports to the North for these two countries, whose Northbound export flows follow the predictions of the Heckscher-Ohlin model and are (or at least have been) limited to a narrow range of unsophisticated primary products with little or no learning potential.

The story in Thailand is very different. Although the country was historically relegated to exporting its relative land and labour abundance through one dominant staple crop – rice – it has undergone a path of export diversification towards goods such as automobiles and electronics that defies the predictions of static comparative advantage. It can be debated whether this transformation was due to Thailand's export restrictions on rice and its activist industrial policies in the distant past, to more recent free-market reforms and liberalization, or to a combination of the two policy paradigms, but the fact remains that the transformation has led to a highly sophisticated and well-connected Northbound export package.

Thailand's exports to the South are not very different from its exports to the North. This is very unlike the situation of Guatemala and the Niger, which have Northbound and Southbound export baskets that differ from each other substantially. Despite the similarities, Thailand's Southbound exports on the margin include a larger share of rice than is found in its Northbound exports, the rice being destined for its South-East Asian neighbours. The Northbound export package is relatively more weighted to the manufactured electronics sector, and therefore the Northbound export basket is relatively more sophisticated. As well as offering a diverse range of products, Thailand exports to a diverse set of Northern countries, with the largest share of its products destined for Japan, Singapore and the United States. Thailand's Southbound markets are equally diverse.

Morocco is in a similar position to Thailand. In terms of relative export values, Morocco and Thailand do not differ much from Guatemala and the Niger, with exports to the North at approximately twice the level of those to the South. Morocco's Northbound exports are concentrated in the European Union (EU), with its Southbound exports heading to its neighbours in North Africa and to India. But even more so than in the case of Thailand, Morocco's Northbound export basket is consistently more diversified, sophisticated and well connected in the product space than its Southbound basket. Morocco's exports to the South are concentrated in chemicals, fertilizers and seafood. These sectors also feature in the Northbound export basket, but to a lesser degree than more sophisticated goods such as garments, automobile components and fresh fruit, i.e. products that typically support higher wages and are observed in tandem with a wide variety of other export activities.

Discussion

The cross-country results and these four country snapshots provide some insight into why South–South trade could be a testing ground for structural transformation in some countries, but is not in others. In this section, we will explore these themes. Although we attempt to understand why the compositions are as they are, the focus here is on identifying key questions and their policy implications, to be addressed in future work.

If we look at global patterns in economic growth, a general pattern emerges that Asia and Eastern Europe have been the best performers. (These figures exclude the CIS.) Africa and Latin America have for the most part experienced relatively poor growth over the past two to three decades. So, looking at the relative position of countries in figures 1 and 2, one cannot help but notice that high-flyers such as the original East Asian tiger economies of China, India and Thailand, as well as the Czech Republic, have a very low to negative South/North ratio of connectedness and sophistication. Conversely, the African and Central American economies have not done well, and these are the countries that have a higher South/North ratio. It would therefore seem that the most successful exporters are those with a lower ratio – with a Northbound export basket that is relatively more sophisticated and

connected than its Southbound export basket – rather than vice versa.

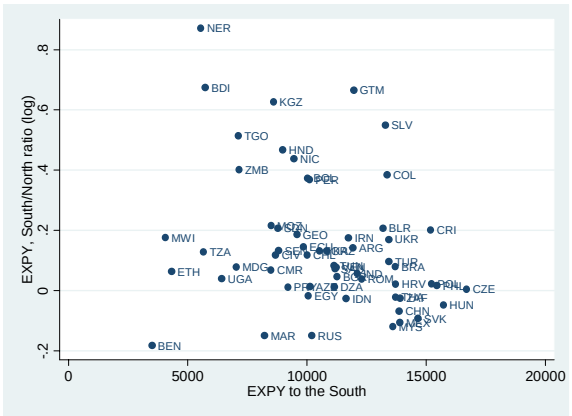
This raises a second issue: what is driving the differences in the ratio? Do countries tend to have a high ratio in figures 1 and 2 because their exports to the South are highly sophisticated, or because their exports to the North are highly unsophisticated? We saw that in the case of Guatemala and the Niger, it is the latter. These countries' Northbound exports are concentrated in uranium, bananas, sugar and coffee. By comparison, their Southbound exports such as breakfast cereal, cowpeas, and soaps and shampoos are more growth-enhancing and also present greater learning opportunities for other new sectors. In the case of Morocco and Thailand, on the other hand, their ratio is low primarily because their exports to the North have a relatively high *EXPY* and open forest, and not because they have failed to export relatively sophisticated goods within the South.

This suggests that the differences in figures 1 and 2 are driven by differences in the sophistication and connectedness of exports to the North, rather than to the South. This is confirmed below, where we show the ratio of South-to-North *EXPY* by country against the country's overall *EXPY* to either the South or the North. The figure on the left shows the country's *EXPY* to the South on the x-axis, with the ratio of South to North on the y-axis (as in figs. 1 and 2). We can see in this figure that the countries with a high ratio do not, on average, have a more sophisticated export basket to the South than countries with a low ratio. If anything, the opposite is true: countries with relatively more sophisticated exports to the South than to the North have, in an absolute sense, unsophisticated Southbound exports. Again, think of Thailand exporting electronics to the South, and Guatemala exporting breakfast cereal and soap to the South. Although breakfast cereal and soap are relatively more sophisticated than Guatemala's Northbound exports, they remain relatively unsophisticated compared to Thailand's Southbound exports.

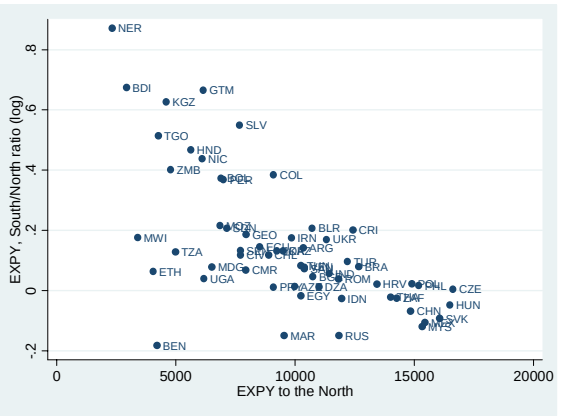
The figure on the right shows the equivalent picture, but this time with *EXPY* to the North on the x-axis. Unlike the figure on the left, here we do see a strong pattern: those countries with a high ratio have relatively unsophisticated Northbound exports, and those countries with a low ratio have relatively sophisticated Northbound exports. Going back to our motivating question – "Is the South a testing ground for structural transformation?" – the results suggest that it could be a testing ground for a particular group of countries that have much more sophisticated and connected Southbound export packages than Northbound. We see now that this group of countries is in such a position because it does not have any revealed capacity to supply the North with goods other than simple manufactures and raw materials. Although their Southbound exports are not highly sophisticated in an absolute sense, they are relatively more sophisticated than their Northbound exports.

Figure 6
Patterns of export sophistication

EXPY to the South



EXPY to the North



Source: Author's calculations using Comtrade and WDI.

Given that the cross-country variance in *EXPY* is driven by Northbound exports, these results show that the first-order question is: why are some countries able to insert themselves in sophisticated and connected Northbound production chains while others are limited to exporting unsophisticated and poorly connected export baskets to the North? Much of the literature on structural transformation and economic development focuses on exports to the North, and therefore speaks to this question. Additional clues are provided by the country snapshots examined above. For both Guatemala and the Niger, exports to the North are dominated by a handful of primary products. Questions surrounding the natural resource curse (see e.g. Sachs and Warner, 1999) may therefore be particularly relevant for analysing the group of high-ratio countries, particularly when this curse is thought of in terms of the product space and its consequences for structural transformation.

It is important to note that classifications such as primary products, raw materials, or agriculture versus manufactures are rather crude, and they miss many of the differences between products using the export sophistication and connectedness metrics – differences that are found to be very important empirically for the process of structural transformation and growth. Although it is roughly true that raw materials have low sophistication and connectedness and manufactures have high sophistication and connectedness, there are many cases where the opposite is true, as such categorizations hide a great deal of heterogeneity in the product space (see Hausmann and Klinger, 2007). Therefore, follow-up work must be carried out at a finer level of disaggregation than the broad product categories.

An important avenue for future research is to determine how the empirical findings regarding open forest and *EXPY* are qualified when we distinguish Northbound versus Southbound export baskets. The figures above suggest that the primary differences in export sophistication between countries are in their exports to the North, rather than their exports to the South. The Hausmann, Hwang and Rodrik results use overall *EXPY*, but does the growth impact hold when considering only *EXPY* to the South?

As a first pass at this question, we regress the growth rate in GDP per capita between 2000 and 2005 against GDP per capita and *EXPY* in 2000 (all in logs). Hausmann, Hwang and Rodrik's (2007) main finding is that controlling for initial GDP per capita, initial *EXPY* has a highly significant relationship with subsequent growth. Column 1 in Table 1 shows

Table 1

	(1)	(2)	(3)	(4)
	Growth of GDP per capita from 2000 to 2005			
GDP per capita, 2000 (log)	-0.095	-0.091	-0.085	-0.102
	(4.64)**	(4.55)**	(3.71)**	(4.45)**
EXPY, 2000 (log)	0.253			
	(4.44)**			
EXPY to North, 2000 (log)		0.213		0.173
		(4.36)**		(2.67)**
EXPY to South, 2000 (log)			0.227	0.084
			(3.40)**	(1.00)
Constant	-1.369	-1.032	-1.238	-1.341
	(3.57)**	(3.27)**	(2.71)**	(3.04)**
Observations	82	82	81	81
R-squared	0.22	0.21	0.15	0.22

Absolute value of T-statistics in parentheses
* significant at 5 per cent; ** significant at 1 per cent

Source: Author's calculations using Comtrade and WDI.

the original finding on overall *EXPY*, which is then split up into *EXPY* to the North (column 2) and *EXPY* to the South (column 3). As Northbound and Southbound *EXPY* are highly correlated (with a correlation coefficient of 0.86), it is not surprising that the overall result is maintained when considering either of them alone. But in column 4 we run a horserace between the two, and the result is that only the variation in *EXPY* to the North orthogonal to *EXPY* to the South has a significant relationship with subsequent growth. Once you control for Northbound *EXPY*, then *EXPY* to the South is insignificant in this regression.

Similarly, we can determine whether the Hausmann and Klinger (2006) finding that links open forest with upgrading of the export basket is driven by Northbound or Southbound exports. Table 2 shows the results. The first column is the basic result, regressing *EXPY* growth from 2000 to 2005 against initial GDP per capita, export sophistication and open forest. This is then split into the connectedness of the Northbound export package (column 2) and the Southbound (column 3), with both included in column 4. Here the significance is weaker, but the same pattern holds. What small relationship there is in this five-year window between open forest and *EXPY* growth is driven by exports to the North rather than to the South. Once you control for a country's Northbound export connectedness, Southbound open forest has no relationship with structural transformation.

These results might suggest that not only is the Northbound export basket the major source of variation across countries' export sophistication and connectedness, but it has also been the only basket that matters for structural transformation and growth.

It cannot be overemphasized, however, that this is a first pass at a complicated question. Many of the stepping-stone arguments in favour of South–South trade's role as a testing ground emphasize that learning in Southern markets is precisely what allows such countries to subsequently export sophisticated products to the more demanding North. Therefore, even if South–South sophistication and connectedness may not have a direct effect on growth, these factors may have an indirect effect by stimulating subsequent upgrading of the Northbound export basket. Future work should consider such indirect relationships.

A related issue is the time horizon under consideration. As noted in the literature review, the difference in the findings of previous

Table 2

	(1)	(2)	(3)	(4)
	Growth of *EXPY* from 2000 to 2005			
GDP per capita, 2000 (log)	0.019	-0.035	-0.029	-0.036
	(1.29)	(2.95)**	(2.65)**	(2.78)**
Open forest, 2000 (log)	0.024			
	(1.72)			
Open forest North, 2000 (log)		0.012		0.018
		(0.91)		(1.02)
Open forest South, 2000 (log)			0.003	-0.007
			(0.21)	(0.39)
Constant	1.452	0.297	0.322	0.316
	(5.22)**	(3.46)**	(3.03)**	(2.96)**
Observations	82	82	81	81
R-squared	0.29	0.13	0.12	0.13

Absolute value of T-statistics in parentheses
* significant at 5 per cent; ** significant at 1 per cent

Source: Author's calculations using Comtrade and WDI.

empirical studies on the composition of South–South versus South–North trade may be due to the time period under consideration, as there have been substantial changes to the production and export patterns of developing countries over the past 30 years, particularly in Asia. This is borne out by the country snapshots. It is likely that 25 years ago Thailand's Northbound export package was not as nearly sophisticated as it is now, and it therefore would have had a much higher South/North *EXPY* ratio. It may be generally true that the low ratios of countries in Asia and Eastern Europe (excluding the CIS), and of Mexico and South Africa, could be a recent phenomenon. The fact remains that at this point, the South is not a testing ground for structural transformation for these countries. But it would be very interesting to examine whether 20 or 30 years ago they were more like the African and Latin American countries are today in terms of export composition to the South and the North. Such a historical study would help to determine whether their transition was truly a leapfrog to highly sophisticated and well-connected exports to the North, or whether they began by upgrading their export baskets within the South.

In terms of policy implications, these findings might be taken as evidence against the argument that South–South trade is a testing ground for structural transformation, as we have shown that the better-performing countries are those that have sophisticated and well-connected exports to the North, and controlling for the Northbound export basket, the Southbound basket is insignificant. But such a conclusion would be premature. Firstly, as we have discussed, the empirical findings above are only tentative. Moreover, we have shown that a large group of developing countries, primarily in Africa, Central Asia and Latin America, have Northbound export baskets that are concentrated in sectors that pay low wages and offer very few learning opportunities that could accelerate structural transformation. By comparison, these countries' Southbound exports are in high-*EXPY*, well-connected activities that offer more opportunities for structural transformation. Even if the high-flying countries in Asia and Eastern Europe (excluding the CIS) were able to leapfrog directly to a sophisticated Northbound export basket and South–South trade were irrelevant, such a path may not be open to these other countries. If that is true, then it is quite possible that South–South trade offers those countries in Africa, Central Asia and Latin America a pathway out of the static confines of a Heckscher-Ohlin specialization in raw materials and poorly connected manufactures, and is therefore a testing ground for structural transformation.

A pervasive policy paradigm is that the pattern of specialization in these countries can be broken by requiring greater processing and value added from existing Northbound natural resource exports. The international experience, however, suggests that such a strategy is flawed (Hausmann, Klinger and Lawrence, 2007). Instead of focusing on transitions to more sophisticated versions of existing raw materials within the Northbound package alone, countries stuck in unsophisticated Northbound exports might be able to escape this trap through growth in their relatively sophisticated Southbound exports (which are often unrelated to the raw materials exported to the North) and the resulting learning which opens up new cones of diversification in relatively sophisticated Northbound exports, equally unrelated to traditional raw material exports. Future work should examine what policies might facilitate this process.

While further research remains to be done on how to bridge the South–North gap in these high-ratio countries, it seems that a reduction in their barriers to South–South trade, particularly if it does not come at the expense of flows to the North, is an immediate policy implication of these results. Such policies would offer not only the potential to increase export volumes, but also to accelerate structural transformation in countries exporting to the North that are stuck in an export basket that offers little learning and growth potential. In such cases, South–South trade may be an important testing ground for structural transformation.

Annex

Sample Composition

North					
	ASEAN	**NAFTA**	**CARICOM**	**SACU**	**MERCOSUR**
Country or territory					
Australia					
Austria					
Bahrain					
Belgium					
Canada		●			
Cyprus					
Denmark					
Finland					
France					
French Polynesia					
Germany					
Greece					
Hong Kong, China					
Iceland					
Ireland					
Israel					
Italy					
Japan					
Luxembourg					
Netherlands					
New Caledonia					
New Zealand					
Norway					
Portugal					
Republic of Korea					
Singapore	●				
Spain					
Sweden					
Switzerland					
United Arab Emirates					
United Kingdom					
United States of America		●			

…/…

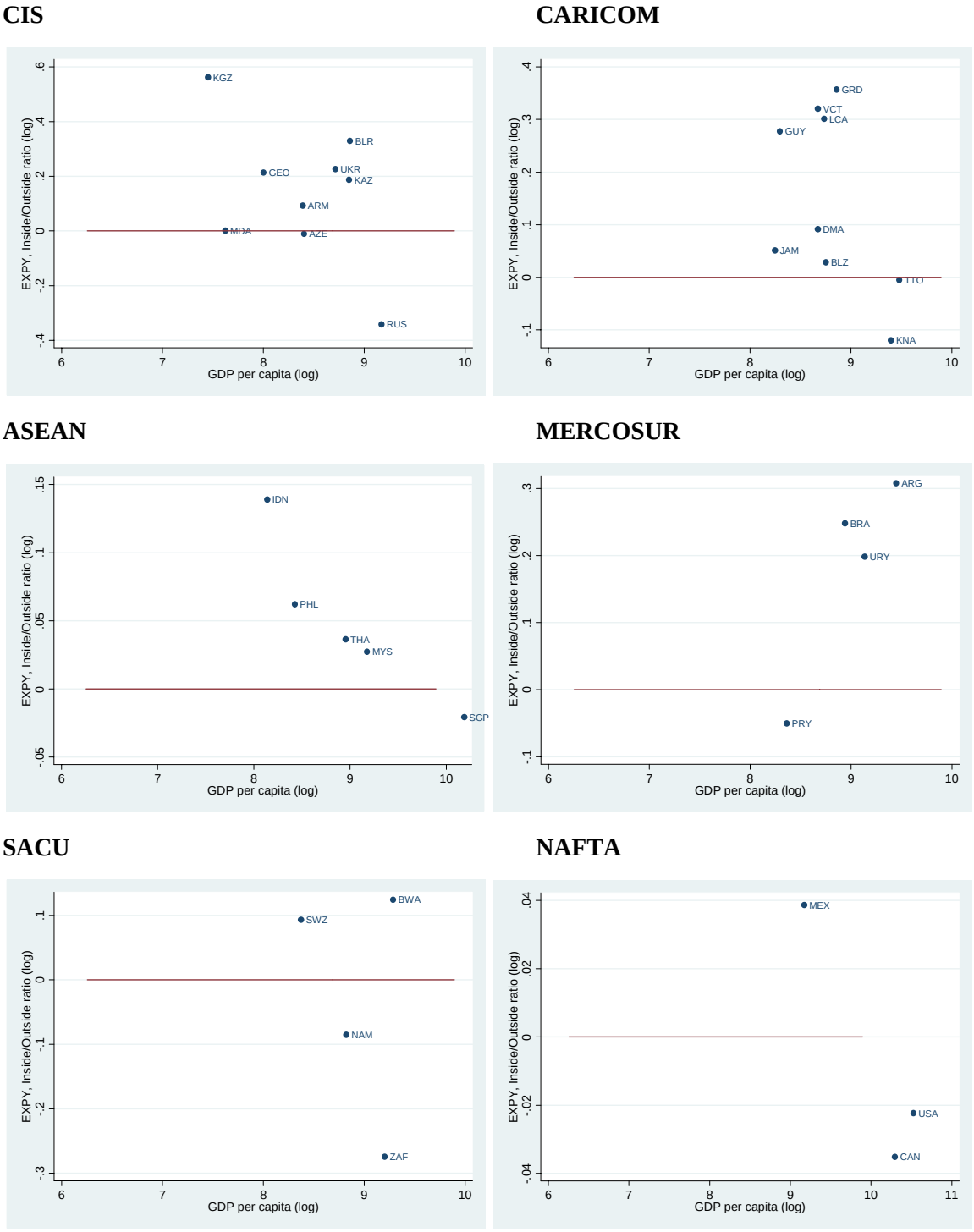
South					
	ASEAN	**NAFTA**	**CARICOM**	**SACU**	**MERCOSUR**
Country or territory					
Albania					
Algeria					
Argentina					●
Armenia					
Azerbaijan					
Barbados			●		
Belarus					
Benin					
Bolivia					
Botswana				●	
Brazil					●
Bulgaria					
Burundi					
Cameroon					
Chile					
China					
Colombia					
Costa Rica					
Côte d'Ivoire					
Croatia					
Czech Republic					
Dominica			●		
Ecuador					
Egypt					
El Salvador					
Estonia					
Ethiopia					
Faroe Islands					
Gabon					
Gambia					
Georgia					
Guatemala					
Guyana			●		
Honduras					
Hungary					
India					
Indonesia	●				
Iran (Islamic Republic of)					
Jamaica			●		
Jordan					
Kazakhstan					
Kyrgyzstan					
Latvia					
Lithuania					
Madagascar					
Malawi					
Malaysia	●				
Maldives					
Malta					
Mauritania					
Mauritius					
Mayotte					

South					
	ASEAN	**NAFTA**	**CARICOM**	**SACU**	**MERCOSUR**
Country or territory					
Mexico		●			
Mongolia					
Morocco					
Mozambique					
Namibia				●	
Nicaragua					
Oman					
Panama					
Paraguay					●
Peru					
Philippines	●				
Poland					
Qatar					
Republic of Moldova					
Romania					
Russian Federation					
Saint Lucia			●		
Saint Vincent and the Grenadines			●		
Senegal					
Slovakia					
Slovenia					
South Africa				●	
Sudan					
Swaziland				●	
Thailand	●				
The former Yugoslav Republic of Macedonia					
Togo					
Trinidad and Tobago			●		
Tunisia					
Turkey					
Uganda					
Ukraine					
United Republic of Tanzania					
Uruguay					●
Venezuela (Bolivarian Republic of)					
Zambia					

Results for trading blocs

We perform the same analysis at the level of South–South trading blocs to see if the same patterns continue to hold. This is done below, showing only the results for export sophistication. This is both for brevity (the results for diversification and connectedness are quite similar to those for sophistication) and because out of the three metrics, *EXPY* has been most robustly linked to growth.

Figure 7. Export sophistication ratio for trade blocs



Source: Author's calculations using Comtrade and WDI.
Note that a higher value indicates greater sophistication within than outside the bloc.

On the whole, these results show that the poorer countries in these trading blocs use the blocs as a testing ground for structural transformation, exporting more sophisticated goods within the blocs than outside them. The richer countries in these blocs, such as Singapore in ASEAN, South Africa in SACU, and Canada and the United States in NAFTA, show the opposite result, with more sophisticated exports going outside the blocs.

There are some exceptions. Paraguay (discussed in Hausmann and Klinger, 2007b), as well as Jamaica, Namibia and the Republic of Moldova do not seem to have taken advantage of their trading blocs as a testing ground. Across the trade areas, we see that the norm that poorer developing countries in the bloc use it as a testing ground roughly holds for SACU, CARICOM, ASEAN and the CIS, but the opposite is true for MERCOSUR, where the richer the bloc member, the greater its export sophistication is inside the bloc vis-à-vis outside the bloc. But on the whole, these results for trading blocs are consistent with the overall patterns found in the global data.

Abbreviations

ISO3 Code	Name	ISO3 Code	Name	ISO3 Code	Name
AFG	Afghanistan	GNQ	Equatorial Guinea	PAK	Pakistan
AGO	Angola	GRD	Grenada	PAN	Panama
ALB	Albania	GTM	Guatemala	PER	Peru
ARE	United Arab Emirates	GUY	Guyana	PHL	Philippines
ARG	Argentina	HKG	Hong Kong, China	PNG	Papua New Guinea
ARM	Armenia	HND	Honduras	PRK	Democratic People's Republic of Korea
ATG	Antigua and Barbuda	HTI	Haiti	PRY	Paraguay
AZE	Azerbaijan	IDN	Indonesia	QAT	Qatar
BDI	Burundi	IND	India	RUS	Russian Federation
BEN	Benin	IRN	Iran, Islamic Republic of	RWA	Rwanda
BFA	Burkina Faso	IRQ	Iraq	SAU	Saudi Arabia
BGD	Bangladesh	ISR	Israel	SDN	Sudan
BHR	Bahrain	JAM	Jamaica	SEN	Senegal
BHS	Bahamas	JOR	Jordan	SGP	Singapore
BLR	Belarus	KAZ	Kazakhstan	SLB	Solomon Islands
BLZ	Belize	KEN	Kenya	SLE	Sierra Leone
BOL	Bolivia	KGZ	Kyrgyzstan	SLV	El Salvador
BRA	Brazil	KHM	Cambodia	SOM	Somalia
BRB	Barbados	KIR	Kiribati	STP	Sao Tome and Principe
BRN	Brunei Darussalam	KNA	Saint Kitts and Nevis	SUR	Suriname
BTN	Bhutan	KOR	Republic of Korea	SWZ	Swaziland
BWA	Botswana	KWT	Kuwait	SYC	Seychelles
CAF	Central African Republic	LAO	Lao People's Dem. Rep.	SYR	Syrian Arab Republic
CHL	Chile	LBN	Lebanon	TCD	Chad
CHN	China	LBR	Liberia	TGO	Togo
CIV	Côte d'Ivoire	LBY	Libyan Arab Jamahiriya	THA	Thailand
CMR	Cameroon	LCA	Saint Lucia	TJK	Tajikistan
COG	Congo	LKA	Sri Lanka	TKM	Turkmenistan
COL	Colombia	LSO	Lesotho	TMP	Timor-Leste
COM	Comoros	MAR	Morocco	TON	Tonga
CPV	Cape Verde	MDA	Moldova	TTO	Trinidad and Tobago
CRI	Costa Rica	MDG	Madagascar	TUN	Tunisia
CUB	Cuba	MDV	Maldives	TUR	Turkey
CYM	Cayman Islands	MEX	Mexico	TUV	Tuvalu
DJI	Djibouti	MLI	Mali	TZA	United Republic of Tanzania
DMA	Dominica	MMR	Myanmar	UGA	Uganda
DOM	Dominican Republic	MNG	Mongolia	URY	Uruguay
DZA	Algeria	MOZ	Mozambique	UZB	Uzbekistan
ECU	Ecuador	MRT	Mauritania	VCT	Saint Vincent and the Grenadines
EGY	Egypt	MUS	Mauritius	VEN	Venezuela, Bolivarian Republic of
ERI	Eritrea	MWI	Malawi	VNM	Viet Nam
ETH	Ethiopia	MYS	Malaysia	VUT	Vanuatu
FJI	Fiji	NAM	Namibia	WSM	Samoa
GAB	Gabon	NER	Niger	YEM	Yemen
GEO	Georgia	NGA	Nigeria	ZAF	South Africa
GHA	Ghana	NIC	Nicaragua	ZAR	Democratic Republic of the Congo
GIN	Guinea	NPL	Nepal	ZMB	Zambia
GMB	Gambia	NRU	Nauru	ZWE	Zimbabwe
GNB	Guinea-Bissau	OMN	Oman		

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