A GUIDE TO TRADE DATA ANALYSIS

A GUIDE PRODUCED BY THE WORLD BANK'S INTERNATIONAL TRADE DEPARTMENT

International Trade Department
The World Bank

A GUIDE TO TRADE DATA ANALYSIS[1]

August 2010

International trade is a key contributor to growth and poverty reduction. At the macro level, past trade liberalizations have generated on average about two percentage points of additional growth per year.[2] At the micro level, export-oriented firms are more productive and pay higher wages, and production for export correlates positively with farm income.

Beyond its direct association with growth, trade performance—by which we mean summary measures of the ability of the private sector to trade goods and services with foreign partners—is correlated with a host of business-environment factors that also correlate with growth. Thus, assessing a country's trade performance is also assessing to what extent it is poised for growth.

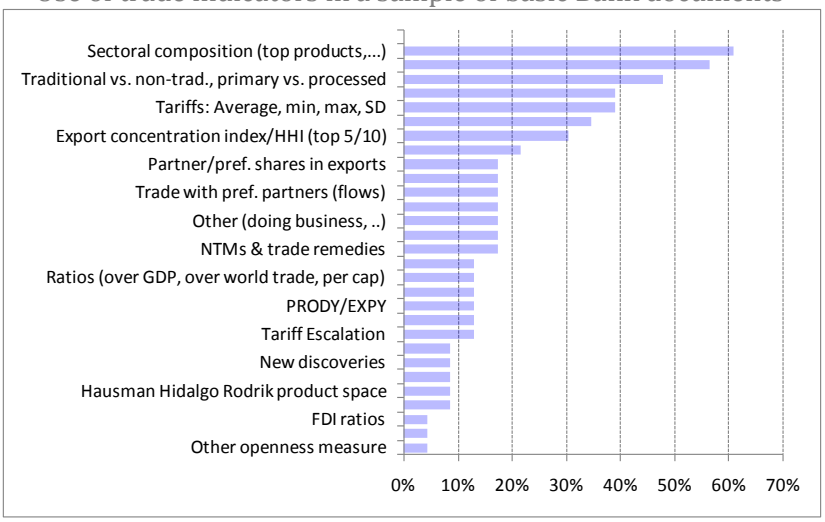
If basic facts about a country's economy should include a snapshot of its trade performance, the question is how to organize the data in a way that tells a story. This note is meant for the Bank's economists and consultants who routinely or occasionally write on trade. Its objective is to present a basic toolbox of indicators that can do a good job at either providing background or telling a particular story. Although the note is far from exhaustive, we will try to present more indicators than typically needed to present a basic snapshot of a country's trade and give some guidance on which indicators to display for what purpose. This note will focus on trade flows; a subsequent one will focus on trade policy.

1. What's in it? What should be?

A country's trade snapshot (TS) usually revolves around three questions: (i) how conducive to trade integration is the country's trade policy; (ii) how integrated is the country; (iii) to what extent is its trade structure conducive to growth. The first two of those questions, and the way data is used to answer them, reflect an agenda of promoting trade reform, often—at least in the past—in the face of political resistance. Yet, today client countries are often more interested in gauging national "competitiveness"—however fuzzy that concept is—than in pro-liberalization arguments; and the way we present trade data should reflect this evolution in the trade agenda.

[1] This note was written by Olivier Cadot with input from Jean-François Arvis, Thomas Farole, Julien Gourdon, Arti Grover, Jose Guilherme Reis, Yolanda Strachan, and Swarnim Wagle.
[2] See Wacziarg and Welsh (2008).

Figure 1
Use of trade indicators in a sample of basic Bank documents



The portfolio of indicators presented in the typical Bank document, shown in Figure 1, varies across countries—depending perhaps more on the TTL than on the country's specifics. 60% of the documents rely primarily on basic numbers such as export flows in values, shares and growth rates, often split between "traditional" vs. "non-traditional" categories. The typical trade snapshot has also started to embody only recently (and marginally) the descriptive tools that have been recently developed in the literature. This note will present and discuss some of these new tools.

There are two models for the TS. In the first, the TS is simply part of background data on the country, without any particular story or burning policy issue. In that case it can be limited to a set of basic indicators common to more or less all countries. No matter what the data is, three golden rules apply to the "basic TS":

- Benchmark all indicators against meaningful comparators (regression is a good tool to do that)
- Whenever possible, show graphs and relegate detailed tables to appendices
- Put each graph's message in plain English—if a graph suggests no comment, it is probably unnecessary.

In the second model, the TS is part of a full chapter on trade. If a separate trade chapter is included in a country report, presumably it is because there is action on the trade front—gain or loss of competitive position on key markets, failure to integrate in global value chains, redirection of trade following an agreement, or some other important development. A qualitative analysis of what is at stake and what are the likely policy implications should then guide the choice of data to be displayed. Aggregate data (all products lumped together) will likely prove insufficient to support a meaningful narrative; as action is likely to show up more clearly at the sectoral level. A good test of whether the extended TS is useful/well designed is if the action is apparent in the data itself, without the narrative.

2. A few useful indicators and how to make them speak

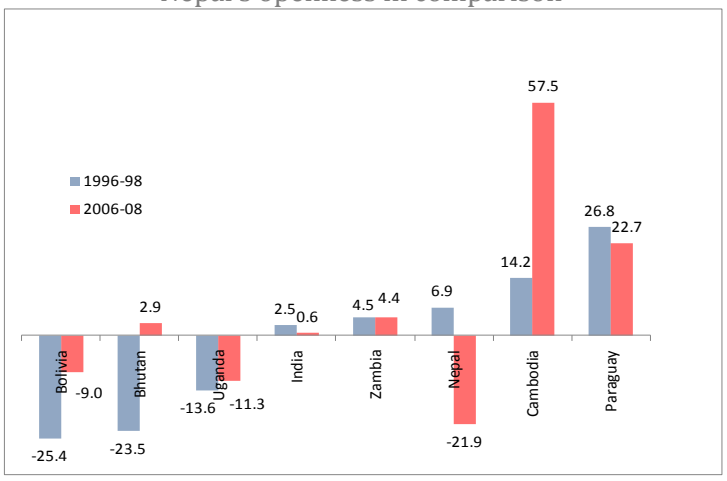
2.1 Overall openness

Openness measures must always be benchmarked, as the simple ratio *O = (X + M)/GDP* varies systematically across income levels and country sizes. The benchmarking can be done in several ways:

- By running a cross-country "openness regression" of *O* on GDP per capita, population, and a landlockness dummy variable (fancier control variables can be added but are unlikely to make much difference). The regression's residual is the benchmarked openness measure. One way of showing the data is by a simple bar chat of residuals for the country of interest and selected comparators. Figure 2 gives an example. An alternative is to do a partial-correlation scatterplot of openness against one selected explanatory variable (say, GDP per capita), controlling for other variables.[3] A country below the regression line "under-trades" and vice versa. Two charts can be shown with a substantial interval in between to highlight the evolution.
- By running a gravity equation and looking at bilateral residuals across the country's trade partners This is definitely more cumbersome, but highlights bilateral dimensions (the country can be under-trading with some partners but over-trading with others and the comparison may highlight market-access issues).

Setting up the data for a cross-country regression and estimating it is relatively straightforward for someone having familiarity with Stata, and can be done in a matter of roughly a day or two. Running a gravity equation is considerably more time-consuming and requires knowledge of econometrics to produce credible results. Both exercises can be carried out by PRMTR staff on demand.

Figure 2
Nepal's openness in comparison



Source: WDI

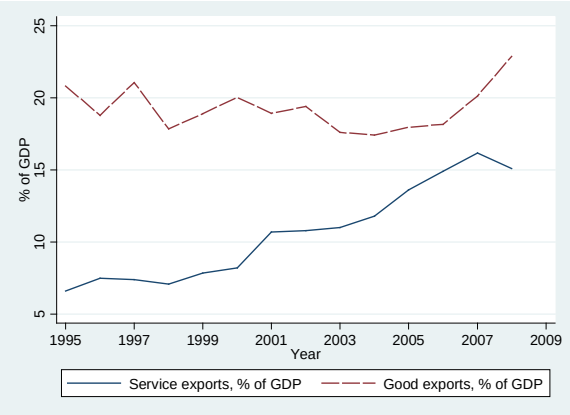
[3] This can be done by first regressing openness against all explanatory variables, and then typing avplot gdp_cap (if that's the name of GDP per capita in the database).

Figure 2 shows that Nepal's openness has gone from slightly above average (conditional on national characteristics) to substantially below. The data raises a question, which will have to be addressed through either further data analysis or a narrative . We'll return to Nepal's story later on.

2.2 Services and FDI

Services are an important margin of trade growth for many countries. The simplest way of illustrating graphically the rising importance of service exports is through a line chart showing the share of service and goods exports in GDP, as in Figure 3.

Figure 3
Good and service exports as a % of GDP, Morocco, 1995-2007



Source: WDI.

Figure 3 shows that service exports declined relative to GDP in 2008, whereas goods exports kept on growing, belying the notion that service activities are less cyclical.

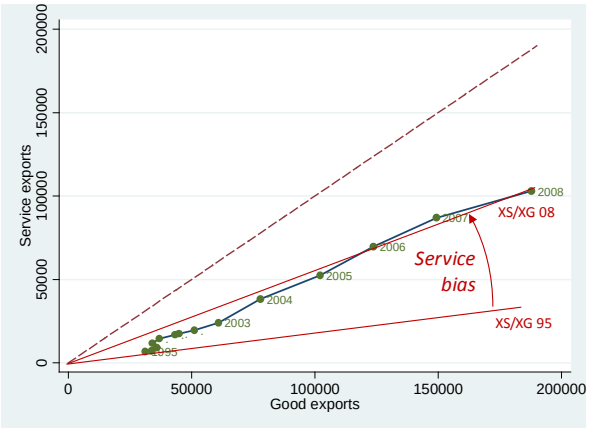
The rising importance of service trade can be illustrated in a fancier way that allows comparisons across countries of the "service bias" (the rising relative importance of services in a country's export portfolio) while at the same time preserving the information contained in plain dollar values (as opposed to ratios). This is illustrated in Figure 4, where the horizontal axis measures goods exports (in thousand dollars), the vertical axis measures service exports, and a country's path can be traced, year by year, through points in the graph. Putting the dollar value of service and good exports in a single graph is a risky approach as service exports are measured imprecisely and using a different source than goods exports, so comparability is an issue. With this caveat, Figure 4 (a) and Figure 4 (b), for India and Morocco respectively, suggest several observations.

First, the yearly points are increasingly far from each other, showing accelerating growth in both goods and service exports. Second, both India's and Morocco's paths are below the diagonal, because service exports are less than good exports. However, the ratio of services to goods exports, given by the slope of a ray from the origin to each year's point (*XS/XG* in the graphs), is steadily rising. That's what we call the "service bias", which can be compared easily across countries using this representation. Finally, the

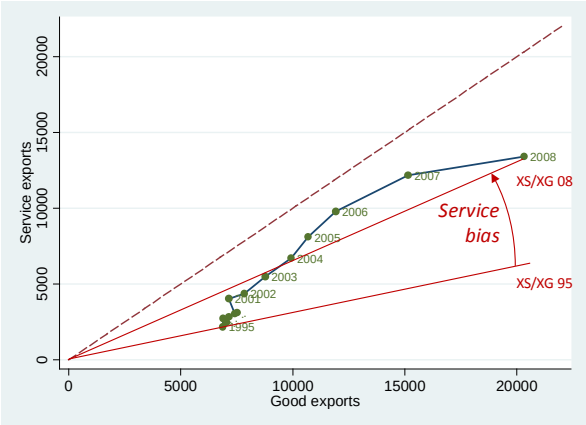
slope of the line gives by how much service exports have increased, on average, for a dollar of additional goods exports. The slope (the correlation coefficient) is 0.6 for India over the whole period. For Morocco, it was 1.2 until 2007, where it dropped sharply. Thus, the redeployment from goods to service exports was faster for Morocco than for India.

Figure 4
Good and service exports, 1995-2008, India and Morocco

(a) India



(b) Morocco

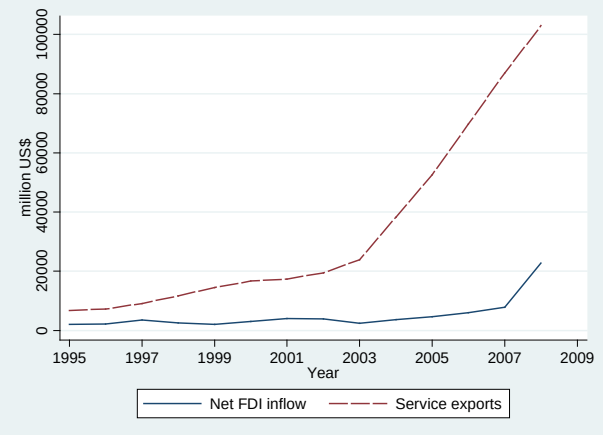


Note: Both goods and service exports in million current U.S. dollars. Source: WDI.

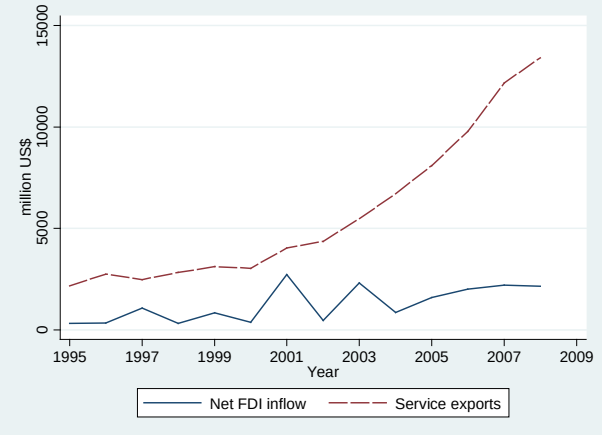
Service-trade expansion may be linked to **FDI** if the privatization of service provision (telecom, transport, energy) attracts foreign investors, but the relationship may or may not show up in the data. To see this, Figure 5 superimposes FDI inflows and service exports. In neither India nor Morocco is the relationship apparent, as the spectacular growth of service exports seems to have been triggered by other causes.

Figure 5
Service trade and FDI

(a) India



(b) Morocco



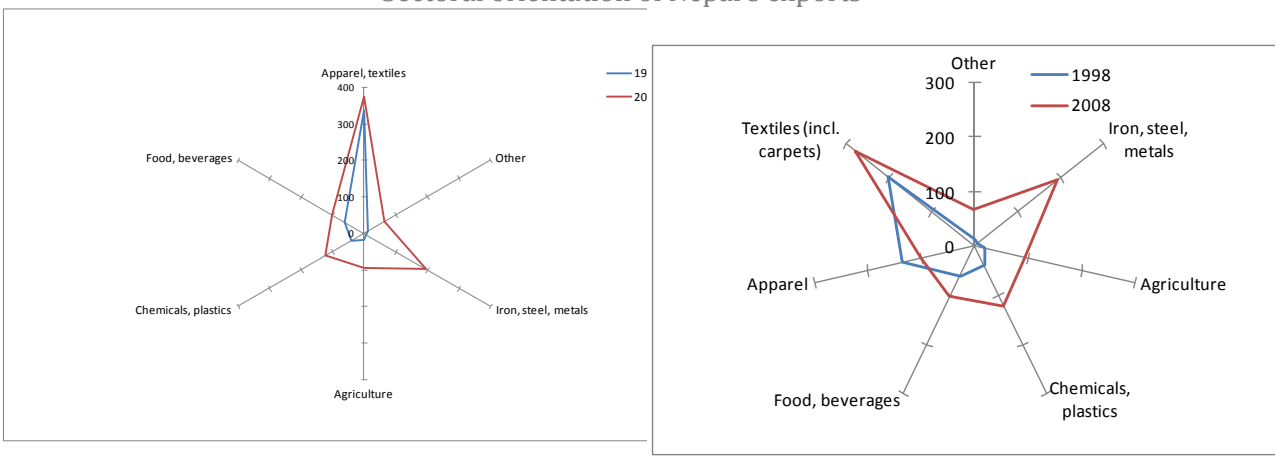
Note that FDI flows can be shown as either gross or net flows. Gross inflows are always positive; net flows (inflows minus outflows) can be positive or negative. Which is the best is a matter of judgment. On one hand, gross inflows can be artificially inflated by accounting tricks if firms keep important cash balances abroad for fiscal purposes and repatriate them as FDI when needed. On the other hand, net flows can obfuscate important action. For instance, a country with a poor domestic investment climate may have neither inflows (because nobody wants to come in) nor outflows (because domestic investors are weak), resulting in low net flows. But a country with a good investment climate and dynamic home investors can have both large inflows and outflows that cancel each other, also resulting in low net flows. FDI data originating from OECD countries can be found from the OECD, UNCTAD and IMF, respectively (see data source appendix at the end of this note).

2.3 The composition of goods trade

The **sectoral** composition of a country's trade in goods should be in the TS for two reasons. First, it may matter for growth if some sectors are growth drivers, although whether this is true or not is controversial.[4] Second, constraints to growth may be more easily identified at the sectoral level.[5] The **geographical** composition highlights linkages to dynamic regions of the world (or the absence thereof) and helps to think about export-promotion interventions. It is also a useful input in the analysis of regional integration, an item of rising importance in national trade policies.

The simplest way of portraying the sectoral orientation of a country's exports is in the form of a "radar screen", as in Figure 6. When displaying a graph of that type, sectoral aggregates have to be selected carefully (more detail in the categories that matter for that country), and so has to be the scale. When one sector/product hugely dominates the picture, it will be more readable on a log scale. Log transformations are often useful to prevent outliers from obfuscating the picture.

Figure 6
Sectoral orientation of Nepal's exports

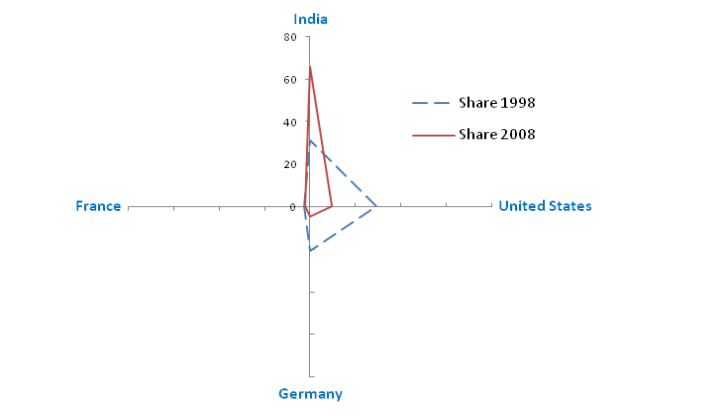


[4] See Hausmann, Hwang and Rodrik 2005.
[5] On this, see McKinsey Global Institute 2010.

Note that Figure 6 has been drawn twice, and the two pictures look rather different. In the left-hand side panel, textiles & apparel are lumped together. In the right-hand side, they are broken down into textiles, including carpets, vs. apparel. Now a new and unusual pattern appears: Apparel exports are shrinking. We will return to the shrinkage of Nepal's apparel exports later on in this note; but for now the take-out is: Aggregating is never innocent. It can hide interesting action, and often does.

The geographical composition can be shown the same way, with the same scaling issues, or in percentages, as in Figure 7. Notice the drastic re-orientation of Nepal's exports toward India. This calls for an explanation, which we postpone to Section 3.

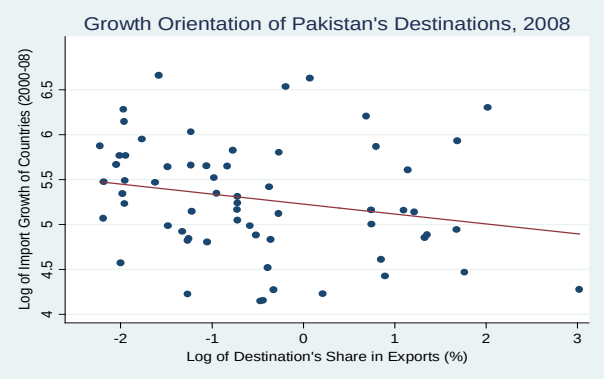
Figure 7
Geographical orientation of Nepal's exports, 1998 and 2008



One can go a step further and assess, with a simple graph, to what extent outside demand-pull factors affect domestic trade performance. Consider the geographical version of the thing; the sectoral version goes the same way. Take all destination countries for home exports; calculate their share in total home exports, call it *x*, and put it in logs.[6] Next, record the growth rate of total imports for each of those countries over the last ten years; call it *y*. Do a scatterplot of *y* against log(*x*) and draw the regression line. If it slopes up, larger destinations have faster import growth; the orientation is favorable. If it slopes down, as in Figure 8, larger destinations (to the right of the picture) have slower import growth; the orientation is unfavorable. In the latter case, the story may e.g. reflect a mixture of the country's location and policy choices; in Pakistan's case, proximity to slow-growing Gulf and Central Asian states combined with failure to promote trade integration with fast-growing India to produce a negative orientation.

[6] Logs will be negative because shares are less than one. That is not a problem.

Figure 8
Geographical orientation of Pakistan's exports



A similar scatterplot can be constructed using product shares in home export and the rate of growth of world trade in those products, or, even better, product-destination shares. A negative correlation, indicating positioning on slow-growing products, may provide a useful factual basis for discussions about whether Government resources should be used to foster growth at the extensive margin (e.g. through sector-specific fiscal incentives).

2.4 Margins of expansion/diversification

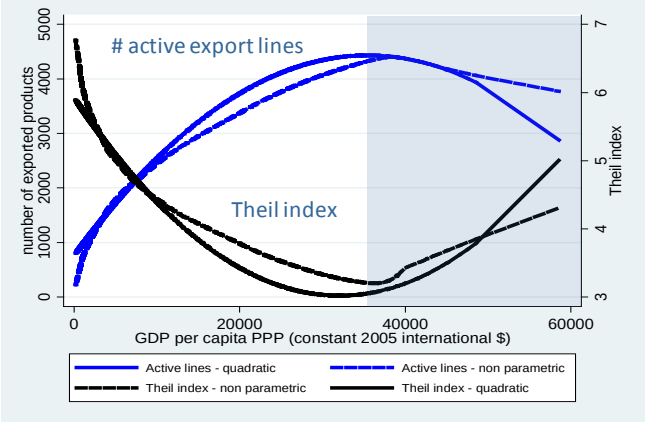
Export **Diversification**, in terms of either products or destinations, can be at the intensive margin (a more evenly spread portfolio) or at the extensive margin (more export items). Diversification is measured (inversely) by indices like Herfindahl's concentration index (the sum of the squares of the shares) or Theil's (more complicated but pre-programmed in Stata). If the indices are calculated over active export lines only, they measure concentration/diversification at the intensive margin. Diversification at the extensive margin can be measured simply by counting the number of active export lines. The first thing to observe is that, in general, diversification at both the intensive and extensive margins goes with economic development, although rich countries re-concentrate (see Figure 9).

Whether diversification is a policy objective in itself is another matter. Sometimes big export breakthroughs can *raise* concentration, as semiconductors did for Costa Rica. Diversification is also often justified to avoid the so-called "natural resource curse" (a negative correlation between growth and the importance of natural resources in exports), but whether the curse is real or a statistical illusion has recently become a matter of controversy. [7] So one should be careful in taking diversification as a policy objective *per se*. What is clear is that, in principle, diversification reduces risk, although the concept of

[7] On export breakthroughs raising concentration, see Easterly, Resheff & Schwenkenberg (2009). On the natural-resource curse, see e.g. Brunnschweiler and Bulte (2009) and the contributions in Lederman and Maloney (2009).

"export riskiness" has been relatively unexplored.[8] In addition, diversification at the extensive margin reflects "export entrepreneurship" and, in that sense, is useful evidence on the business climate.

Figure 9
Export concentration and stages of development



Source: Cadot, Carrere and Strauss-Kahn (forthcoming). Theil's index calculated on active lines only.

One drawback of measuring diversification by just counting active export lines (as in Figure 9) is that whether you diversify by starting to export crude petroleum or mules, asses & hinnies is the same: you add one export line (at a given level of product disaggregation). Hummels and Klenow (2005) have proposed a variant where new export lines are weighted by their share in world trade. Then, starting to export a million dollars worth of crude counts more than starting to export a million dollar worth of asses, because the former is more important in world trade (and therefore represents a stronger expansion potential).

Let K^i be the set of products exported by country *i*, X_k^i the dollar value of *i*'s exports of product *k* to the world, and X_k^W the dollar value of world exports of product *k*. The (static) intensive margin is defined by HK as

$$IM^i = \frac{\sum_{K^i} X_k^i}{\sum_{K^i} X_k^W}$$

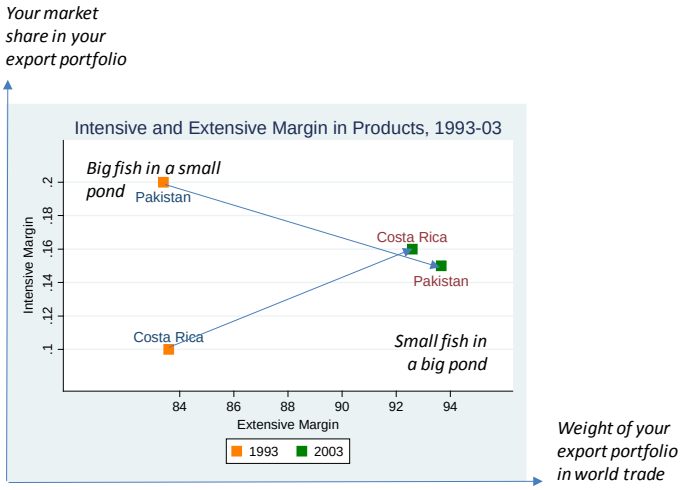
In words, the numerator is i's exports and the denominator is world exports of products that are in i's export portfolio. That is, IM^i is *i*'s market share in what it exports. The extensive margin (also static) is

$$XM^i = \frac{\sum_{K^i} X_k^W}{\sum_{K^W} X_k^W}$$

where K^w is the set of all traded goods. XM^i measures the share of the products belonging to *i*'s portfolio in world trade. Both measures are illustrated in Figure 10.

[8] PRMTR is working on a concept of "export riskiness" for foodstuffs, using econometric analysis of counts of sanitary alerts at the E.U. and U.S. borders. Di Giovanni and Levchenko (2010) propose a more general measure of riskiness based on the variance-covariance matrix of sectoral value added.

Figure 10
Evolution of intensive and extensive margins, Pakistan and Costa Rica



For Pakistan, the picture shows that its export portfolio was broadening during the period, but that existing exporters failed to maintain market share.

As for Costa Rica, it managed to diversify at *both* the intensive and extensive margins after Intel's investment in 1996. This may seem surprising—one would have expected the country to move from big fish in the (relatively) small pond of banana exporters to small fish in the larger pond of semiconductor exporters. Yet it became "bigger fish in a bigger pond". The reason for this paradox is simple: Costa Rica was *already* exporting semiconductors, albeit in very small quantities, before Intel. This highlights another golden rule: Always look at the raw numbers, not just indicators. It is very easy to get puzzled or misled by indicators, and the more complicated the trickier.

Export **expansion** can also be defined at the intensive margin (growth in the value of existing exports), at the extensive margin (new export items, new destinations) or at the "sustainability margin" (longer survival of export spells). A useful decomposition goes as follows. Using notation already introduced, let base-year exports be

$$X_0 = \sum_{K_0} X_{k0}$$

and terminal exports

$$X_1 = \sum_{K_1} X_{k1}.$$

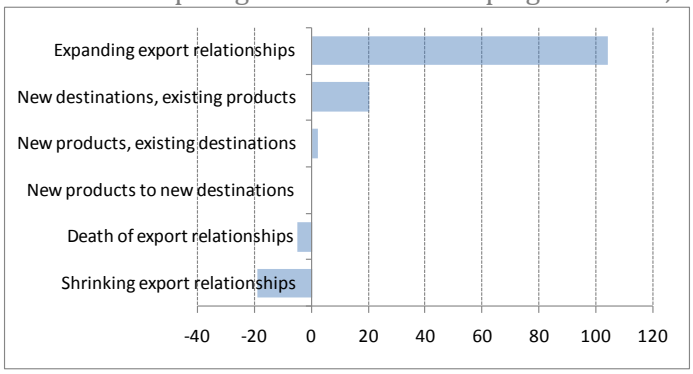
The variation in total export value between those two years can be decomposed into

$$\Delta X = \underbrace{\sum_{K_0 \cap K_1} \Delta X}_{} + \underbrace{\sum_{K_1 \setminus K_0} X_k}_{} - \underbrace{\sum_{K_0 \setminus K_1} X_k}_{}$$

where the first term is export variation at the intensive margin, the second is the new-product margin, and the third is the "product death margin". In words, export growth can be boosted by exporting more of existing products, by more new products, or by fewer failures. Note that the new-product margin, which is conceptually equivalent to the extensive margin, is measured here by the dollar value of new exports, not by their number.

More complicated decompositions can be constructed, along the same lines, combining products and destinations. One useful fact to know is that the contribution of the new-product margin to export growth is generally small (Figure 11).

Figure 11
Decomposition of the export growth of 99 developing countries, 1995-2004



Source: Brenton and Newfarmer (2009).

There are two reasons for that, one technical and one substantive. The technical one is that a product appears in the extensive margin only the first year it is exported; thereafter, it is in the intensive margin. So unless you start exporting on a huge scale the first year (unlikely) the extensive margin's contribution to overall export growth can only be small. The substantive reason is that most new exports fail shortly after they have been launched: median export spell length is about two years for developing countries. There is a lot of export entrepreneurship out there, but there is also a lot of churning in and out. Raising the sustainability of exports (which requires an understanding of the reasons for their low survival) is one under-explored margin of trade support.[9]

2.5 Export-expansion potential

Suppose that it is easier for a producer to expand into new markets with existing products than to start exporting new products. Based on this idea, Brenton and Newfarmer (2009) proposed an index of export market penetration defined, at the product level, as the share of potential destination markets that the country actually reaches (i.e. the ratio of the number of *i*'s destination countries for product *k* relative to the number of countries importing product *k* from anywhere). This type of information is useful

[9] PRMTR is currently exploring the causes of Africa's low export survival. Surveys highlight the unavailability of credit as a key binding constraint not just to export entrepreneurship but to the survival of existing export relationships.

background for trade-promotion interventions. The index can also be adapted to be applied at the firm level (using firm-level export data from customs, when it is available).

When the issue is *regional* export-expansion potential (e.g. to be expected from a preferential agreement) one useful index is Michaely's bilateral trade-complementarity index. Intuitively, it is best thought of as a correlation between country A's exports *to the world* with country B's imports *from the world*. A is likely to have a comparative advantage in products it exports a lot to the world (i.e. without the help of tariff preferences); if those products are those in which B has a comparative *dis*-advantage (because it imports a lot of it), well then A and B should marry.

Formally, the TCI is not a statistical correlation but an (algebraic) indicator. Let m_k^A be product *k*'s share in A's imports from the world and x_k^B its share in B's exports to the world; both should be at the HS6 level of disaggregation. The formula is

$$C^{AB} = 100\left[1 - \sum\nolimits_k \left|m_k^A - x_k^B\right|/2\right]$$

and can easily be calculated in excel. The higher the index, the higher the scope for non-diversion (efficient) trade expansion between A and B. Note that there are two indices for each country pair, one taking A as exporter and one taking it as importer. Sometimes the two indices are quite different. The country in a bloc whose *import* pattern fits with its partners' exports will act as a trade engine for the bloc; the one whose *export* pattern fits with its partners' imports will benefit (in political-economy terms) from the agreement.

2.6 Comparative advantage

The current resurgence of interest for industrial policy sometimes confronts trade economists with difficult questions, like providing guidance to pick winners. In general, there is little to rely on to predict the viability of an infant industry, beyond comparative advantage. But even identifying comparative advantage is tricky. The traditional measure is Balassa's Revealed Comparative Advantage (RCA) index, a ratio of product *k*'s share in country *i*'s exports to its share in world trade. But Balassa's index simply records country *i*'s current trade pattern; it cannot be used to say whether or not it would make sense to support a particular sector.

An alternative approach draws on the PRODY index developed by Hausmann, Hwang and Rodrik (2005). The PRODY approximates the "revealed" technology content of a product by a weighted average of the GDP per capita of the countries that export it, where the weights are the exporters' RCA indices for that product (adjusted to sum up to one). Intuitively, a product exported by high-income countries is likely to be more technology intensive than one exported by low-income countries. A recent database constructed by UNCTAD extends that notion to revealed factor intensities. Let $k^i = K^i/L^i$ be country *i*'s stock of capital per worker, and let H^i be a proxy for its stock of human capital, say the average level of education of its workforce, in years. These are *national factor endowments*. Good *j*'s revealed intensity in capital is

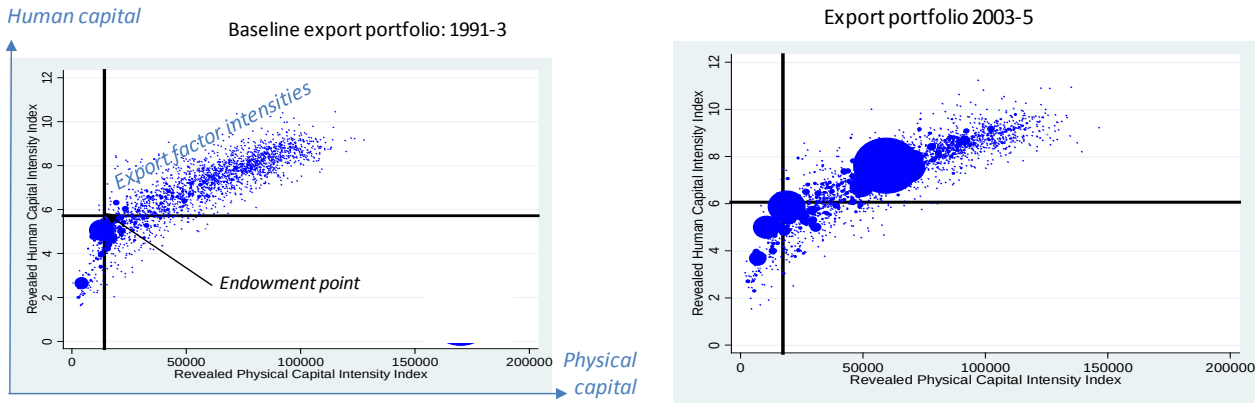
$$\kappa_j = \sum_{I^j} \omega_j^i K^i$$

Where I^j is the set of countries exporting good *j* and the weights ω are RCA indices adjusted to sum up to one.[10] For instance, if good *j* is exported essentially by Germany and Japan, it is revealed to be capital-intensive. If it is exported essentially by Vietnam and Lesotho, it is revealed to be labor-intensive. Similarly,

$$h_j = \sum_{I^j} \omega_j^i H^i$$

is product *j*'s revealed intensity in human capital. The database covers 5'000 products at HS6 and over 1'000 at SITC4-5 between 1970 and 2003; UNCTAD plans to update it in Fall 2010. Because the weights sum up to one, revealed factor intensities can be shown on the same graph as national factor endowments. The distance between the two is an inverse measure of comparative advantage. The resulting picture is shown in the two panels of Figure 12 for Costa Rica, which are separated roughly by a decade and, most importantly, by Intel's arrival.

Figure 12
Evolution of Costa Rica's export portfolio and endowment



In each panel, the horizontal axis measures capital per worker (in constant PPP dollars) and the vertical axis measures human capital (in average years of educational attainment). The intersection of the two black lines is the country's endowment point. The ink stains are the country's export items, with the size of each stain proportional to current dollar export value in the period.

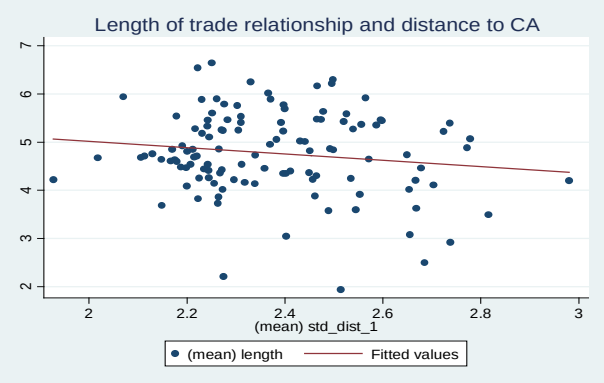
The LHS panel shows Costa Rica before Intel. A dust of small export items in the NE quadrant indicates exports that are typical of countries with more capital and human capital than CR has. The RHS panel shows the huge impact of Intel's arrival (the large stain in the NE quadrant, which corresponds to semiconductors). Note that it is located not too far from Costa Rica's comparative advantage: the reason

[10] Adjustments based on the World Bank's agricultural distortions database (Anderson et. All 2008) were also made to avoid agricultural products subsidized by rich countries (say, milk or beacon) to appear artificially capital- and human-capital intensive.

is that semiconductor assembly (which produces the final product) is performed typically in middle-income countries. Yet, it remains that semiconductors exports are typical of countries with two years of educational attainment more than Costa Rica (and over twice more capital per worker).

Comparing the two panels shows that there was more change in Costa Rica's export portfolio than in its factor endowment. Is this sustainable? Figure 13 shows a negative relationship, (across countries and products, between export survival and "comparative disadvantage" (the distance between a product's revealed factor intensity and the exporting country's endowment point). The relationship is significant, although the magnitude of the effect is small. In plain English, it may be a good idea for industrial policy to shoot for sectors that are "better" than the country really is, but you don't want this to go one bridge too far.

Figure 13
Comparative advantage and export survival



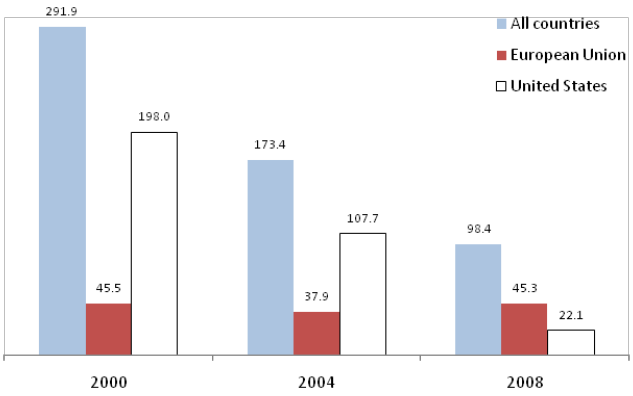
What this all means is that a look at the adequacy of a country's export portfolio to its current capabilities can say something about the portfolio's viability. It can also help provide a factual basis for discussions on "picking winners" via fiscal or other incentives, providing a graphical entry point for arguments about building capabilities (policies on education, infrastructure, investment climate and so on), and linking trade with other dimensions of the policy dialogue.

3. Using trade data to support a narrative

Data about Nepal, scattered around this note, implicitly suggest some action. Figure 2 (openness) showed shrinking integration. Figure 6 (sectoral orientation) showed de-specialization away from garments, although the revealed factor intensity of garments (5 years of education, $20'000 of capital per worker) is about what comes closest to Nepal's factor endowment (2.1 years of educational attainment and $4'500 per worker in 2003). Figure 7 showed a geographic redeployment of Nepal's exports, with India gaining importance. So far, the story is ambiguous: shrinking openness is bad, de-specialization in garments is probably bad, but increasing integration with India is not necessarily a bad thing given that India is a fast-growing economy. Is Nepal going in the right direction or not?

Sometimes, the story behind a country's trade performance is so stark that a plain bar chart tells it all. Between 2000 and 2008, Nepal's apparel exports plummeted. The raw numbers plotted in Figure 14 show it clearly.

Figure 14
Nepal's apparel exports, million dollars



What explains this disaster? Several competing explanations can be thought of. The phase-out of the ATC quotas has exposed Nepal to tough competition in the garment sector. African countries have expanded into the garment business under AGOA preferences. However, Figure 14 suggests that competition from AGOA beneficiaries is unlikely to have played a major role, since the shrinkage was not limited to U.S. markets.

So what is at play: internal or external forces? The resilience of Nepal's exports on the E.U. market might be suggestive of external forces, but it mainly reflects relatively small niches of exports complying with the EBA regime's stiff rules of origin. There is a good alternative candidate for the decline, and it is internal: the intensification of the civil war in 2001. We saw in Figure 7 that Nepal drastically reoriented its trade toward India. As Nepal's business environment worsened, trade activities, which could no longer feed on a home manufacturing base, turned to arbitraging India's tariff preference margins by trans-shipping products like palm oil that had undergone little or not local transformation. As a result, a large chunk of Nepal's exports (the 75 top products at HS6) are today sold in India under the protection of high tariff preference margins. How artificial this trade is can be assessed by the trade complementarity index—a dismal 3.78 on a scale from one to a hundred.

From India's point of view, what is going on is pure trade diversion; from Nepal's, it is a vulnerable export pattern, because it can all go away with a change in India's trade policy (which presumably sees little benefit in it—at least in terms of trade). In this case, trade outcomes appear to be endogenous to (adverse) developments in the productive base. Policy remedies are probably to be looked for in the domestic agenda rather than in further trade preferences.

References

Anderson, Kym; M. Kurzweil, W. Martin, D. Sandri, and E. Valenzuela (2008), "Measuring distortions to agricultural incentives"; *World Trade Review* 7, 675–704.

Brenton, Paul, and R. Newfarmer (2009), "Watching More than the Discovery Channel to Diversify Exports"; in R. Newfarmer, W. Shaw and P. Walkenhorst, eds., *Breaking into new markets*; The World Bank.

Brunnschweiler, Christa, and E. Bulte (2008), "Linking Natural Resources to Slow Growth and Violent Conflict"; *Science* 320, 616-617.

Cadot, Olivier, C. Carrère and V. Strauss-Kahn (forthcoming), "Export Diversification: What's Behind the Hump?"; *Review of Economics and Statistics*.

Chen, Maggie, and A. Mattoo (2004), "Regionalism in Standards: Good or Bad for Trade?"; University of Colorado at Boulder Center for Economic Analysis working paper 04-12.

Di Giovanni, Julian, and A. Levchencko (2010), "The Risk Content of Exports: A Portfolio View of International Trade"; NBER working paper 16005.

Easterly, William; A. Resheff and J. Schwenkenberg (2009), "The Power of Exports"; World Bank Policy Research Working Paper 5081.

Hausmann, Ricardo; J. Hwang and D. Rodrik (2005), "What You Export Matters"; NBER working paper 11905.

Hummels, David, and P. J. Klenow (2005), "The Variety and Quality of a Nation's Exports" American Economic Review, American Economic Review 95, 704-723.

Lederman, Daniel, and W. Maloney (2009), *Natural resources: Neither curse nor destiny*; The World Bank.

McKinsey Global Institute (2010), *How to compete and grow: A sector guide to policy*.

Shihotori, Miho; B. Tumurchudur and O. Cadot (2010), Revealed Factor Intensities at the Product Level; Policy issues in international trade and commodity studies #44, UNCTAD.

Wacziarg, Romain, and K. H. Welsh (2008), "Trade Liberalization and Growth: New Evidence"; World Bank Economic Review 22, 187-231.

Data sources

FDI

The WDI publishes net and gross-inflow FDI data with several ratios since 1960. Similar data with projections to 2030 is published by the Economist Intelligence Unit (EIU). Balance-of-payment data can be found in the IMF's International Financial Statistics and Balance of Payment Statistics. *Bilateral* FDI data from OECD countries to any country can be found in OECD's database (International Direct Investments Statistics database) from 1985 onward, via either StatExtract or SourceOECD (neither offers very efficient download, though). UNCTAD's Division on Investment and Enterprises also provides data on FDI stocks and flows with coverage that varies across countries. Finally, data on FDI *regulations* can

be found in the new Investing Across Borders (IAB) database constructed for 2010 by the Bank's ICA group.

Services

The basic source for service imports and exports since 1975 is the IMF's Balance-of-Payments (BOP) statistics http://www2.imfstatistics.org/BOP/.

UNCTAD publishes service-trade data extracted from BOP statistics for more or less all countries since 1980 for four service categories. (http://www.unctad.org/Templates/Page.asp?intItemID=1890&lang=). The same numbers can be found in the World Development Indicators (WDI), which for some countries go as far back as 1960.

Data on *bilateral* service trade between 47 countries over 2000-2008 (coverage differs across categories) is available from the UNSD's unstat publication, which is freely available online at http://unstats.un.org/unsd/ServiceTrade/.

The OECD also has bilateral service trade data for 28 OECD members over 1999-2008, freely available at http://stats.oecd.org/Index.aspx?datasetcode=TIS#.

Goods

Aggregate imports and exports as shares of GDP can be found in the WDI.

Aggregate bilateral flows can be found in the IMF's Direction of Trade Statistics.

Bilateral flows disaggregated by product up to the HS6 level (5'000 lines) or SITC4 (around 1'000 lines) since 1988 can be found in COMTRADE, available through WITS. Coverage is genuinely universal since 1992.

Data similar to COMTRADE but with import and export sources reconciled (making mirroring unnecessary) is freely available under the name of BACI from CEPII, a Paris-based think tank. The CEPII also offers gravity variables (bilateral distances, distance from equator, religion, language, colonizator, etc.).

U.S. Bilateral imports and exports disaggregated at up to 10 digits can be found on the USITC's site, together with imports by regime (AGOA, NAFTA etc.). This is particularly useful to calculate preference utilization rates. U.S. trade data can also be found on the NBER's site.

Concordance tables between nomenclatures can be found on Jon Haveman's web page (just google Jon Haveman Trade and you will be redirected to the right page).

The World Bank's Trade, Production and Protection database offers trade and production data put in a common nomenclature (SIC), but it has not been updated recently. The World Bank also has import-demand elasticities at the HS6 level for each country estimated econometrically by Hiao Loo Kee, Alessandro Nicita and Marcelo Olarreaga. The reference year is 2001.

Revealed Factor Intensity and country endowment data are available between 1970 and 2003 from UNCTAD (google Revealed Factor Intensities UNCTAD and you will be directed to UNCTAD's statistics page).

Rauch's classification of goods (homogenous, reference-priced, or differentiatied) at SITC3 can be found on Jon Haveman's page, together with a whole lot of concordance tables (google Jon Haveman data).

THE WORLD BANK
1818 H Street NW, Washington DC 20433 USA
Website: http://www.worldbank.org/trade
E-mail: tradenews@worldbank.org