Export Quality and the Dynamics of North-South Competition

Jorge Chami Batista – Universidade Federal do Rio de Janeiro
Yan Liu* – Dalian Nationalities University

Abstract
This paper introduces and applies a new methodology to deal with competition among exporters of vertically differentiated products and to address the following questions: Considering product markets are segmented, to what extent have developed countries been losing market shares in international trade to non-developed countries, the South, or to other developed countries, the North? And to what extent has China been gaining market share from the North and the South? Imports of manufactured goods from Japan at the most detailed level of classification are used to answer these questions.

Resumo
Este artigo introduz e aplica uma nova metodologia para lidar com a competição entre exportadores de produtos diferenciados verticalmente e responder as seguintes questões: considerando que os mercados de produtos são segmentados, em que medida os países desenvolvidos vêm perdendo participação no comércio internacional para os países em desenvolvimento, o Sul, ou para outros países desenvolvidos, o Norte? E em que medida a China vem ganhando participação do Norte e do Sul? Importações de bens manufaturados do Japão ao nível mais detalhado de classificação dos produtos são usadas para responder essas questões.

Keywords: quality; differentiated products; international trade; competition; developed countries; developing countries.

Palavras-chave: qualidade; produtos diferenciados; comércio internacional; competição; países desenvolvidos; países em desenvolvimento.

F12, F14, F16, O19, O33, O57

* Financial support from the National Social Fund of China (Project no. 13CGJ034) is gratefully acknowledged.

Export Quality and the Dynamics of North-South Competition

In the past two decades (1991-2011), the share of developed economies in world merchandise trade fell approximately 20 percentage points (p.p.)[1]. Export revenue of the North, as developed economies are often referred to in the literature, was down to slightly over half of world export revenues (53%) in 2011. Considering all countries, the North's loss corresponds to the South's gain of market share. The share of developed economies major exporters of manufactured goods fell even more, 22 p.p. in the same period. The G-7 (the US, Germany, Japan, France, the UK, Italy, and Canada) accounted for 91% of the loss of market share of developed countries major exporters of manufactured goods. The main gainers in the South were emerging economies led by China, which accounted for over 42% of the South gains in world exports, Russia, India, Mexico, Vietnam, Brazil, Thailand and Turkey.

As the South expanded its share in world exports, particularly in the 1990s and 2000s, empirical research documented a new pattern of trade specialization. Large economies of the South export roughly the same range of products as the North, but specialize in lower-price varieties of each of these products, while high-income countries specialize in higher-price varieties (Schott, 2004; and Hummels and Klenow, 2005).

This new pattern of trade specialization raises important theoretical and empirical issues. Schott (2004), for example, provides strong evidence that this vertically differentiated pattern of specialization within products can largely be explained by the traditional factor proportion argument that the North exports high-unit-value varieties, which are intensive in the region's abundant capital and skills, while the South exports low-unit-value varieties, which are intensive in the region's abundant unskilled labour[2].

Bearing in mind the evidence of large differences in prices observed between varieties within products defined at the most detailed level of classification, an interesting empirical issue is to what extent exports from the North enter into direct competition with exports from the South. Fontagné et al. (2008, p.54) suggest that they do not. Therefore, high-income countries would not have to worry so much about the South's rising share in world trade, as long as they kept their share in an expanding upmarket segment. Without direct competition from the South, exports of high-price product varieties would sustain employment and relative wages of skilled labour in the North.

Fontagné et all (2008) also argue that Western Europe has been more resilient to competition from the South than the US economy, just by examining their changes in market shares by segments between 1995 and 2004. The North as a whole can only gains from or lose to the South. However, a country or a particular region in the North, such as Western Europe, may lose market share to the South as well as to other Northern countries. A reduction in the market share of Western Europe does not say whether the region is losing to the South or to other groups of countries in the North.

The main objective of this article is to estimate the changes of market share of major exporting countries or groups of countries of the North and the South in the past two decades, due to direct competition, and uncover to whom each exporter of the North is losing market share on each segmented product market. In addition to finding out whether the North is losing market share in the lower or upper segments of the market, we shall be able to say if North America, for example, is losing market share to developed countries of Western Europe or Asia, or to China and other developing countries, through direct competition.

To achieve this objective, we pioneeringly combine two existing methods. First, we segment the import value of each product into three categories: low, medium and high segments, as in Fontagné et al (2008). Then we apply a method of distributing the gains and losses of each exporting country to each of its competitors in each product market, as in Chami Batista (2008). This latter method allows us to estimate, for instance, how much a Northern country or region gained or lost to other Northern or Southern countries or regions in a particular period.

[1] Unctad Database. The list of developed countries varies a little according to the source. For Unctad's list see: http://unctadstat.unctad.org/TableViewer/dimView.aspx (accessed 7 July 2012).

[2] The main contrast with the traditional factor argument is that specialization takes place within products rather than within industries.

The combination of the two methods allows us to measure to what extent exports from the North are in direct competition with exports from the South in different segments of the market and to test the resilience of countries or regions of the North to South competition. It also allows us to test the sensitivity of our results to changes in a particular parameter of the segmentation method that affects the size of each segment, helping us to identify where product varieties of the North and the South enter into direct competition.

Chami Batista (2010) shows that his method of distributing exporters' gains and losses among competitors is consistent with the main theoretical models of competition. However, the method requires that product markets are defined in such a way that the varieties exported by each exporting country directly compete with or are substitutes of the varieties of all the other exporting countries in each product market. These are the relevant product-variety markets. By computing the distribution of gains and losses of each exporter among competitors with different degrees of product market segmentation, the combined methods help to identify the relevant segmented product markets, thus improving both of them.

We also test the two ways of calculating the gains and losses of market share due to direct competition, using Laspeyres and Paasche indices, to provide more robust results.

In addition to this introduction, the article is organized in three parts. Part I provides the theoretical framework, main concepts, and methodology. It is divided in four sections as follows. Section I.1 briefly reviews the literature on North-South models of trade and growth based on vertical differentiation. Section I.2 presents the main concepts used in the article such as relevant product markets and direct and indirect product competition. Section I.3 describes the segmentation method. Section I.4 describes the Constant Market Share Model (CMS) and the method of distributing the gains and losses of market share of countries of the North and the South, due to direct competition, among their competitors. Part II reports the empirical results and is divided in four sections. Section II.1 applies the segmentation method and reports the changes in market shares and the revealed comparative advantages of the North and the South in each segment and without any segmentation. Section II.2 presents the results of the CMS model and the effect of segmentation on the direct competition. Section II.3 shows the gains and losses of the main regions of the North to the South and among themselves. Section II.4 examines the gains and losses of China to the main groups of countries of both the North and the South. Part III concludes.

I. Theoretical framework, main concepts and methodology

I.1 North-South models with vertically differentiated products

Theoretically, North-South models based on specialization in vertically differentiated products has a long tradition [3], and the quality ladder family of endogenous growth models seems to capture the fundamental characteristics of the recent North-South trade competition between varieties within products: The North innovates by improving the quality of its product varieties, while the South imitates and receives investment from Northern firms to produce product varieties first invented in the North[4]. The trade models that emphasize product horizontal differentiation and economies of scale (as for instance, Krugman, 1979) appear to be more relevant to explain trade and growth performances of individual countries with different sizes within either the North or the South.

Quality ladder models traditionally make the simplifying assumption that there is perfect substitution between the vertically differentiated varieties within a product, so that the firm producing the variety with the lowest quality-adjusted price[5] will price out all competitors and become the sole producer and exporter of the product. However, vertically differentiated varieties within a product may be weakly substitutable or not substitutable at all, once we drop the assumptions that quality is unidimensional[6] and consumers are homogeneous. In fact, varieties may have different qualities and features (durability,

[3] See the pioneer works of Linder (1961) and Vernon (1966).

[4] Grossman and Helpman (1991) set up a North-South model that includes innovation and imitation, while the model developed by Glass and Saggi (2002) also includes foreign direct investment of high-wage countries into low-wage countries.

[5] Innovation in quality ladder models can be modeled as a quality improvement as well as a cost reduction. In the first case, quality rises while price remains constant, in the second quality remains constant while price is reduced. In any case, the quality-adjusted price falls and the innovator becomes more competitive.

[6] Unidimensional means that quality can be measured in just one axis and there is no horizontal differentiation at all within vertically differentiated varieties.

design, mobility, functionality etc.), consumers may have different income levels (Fajgelbaum, Grossman and Helpman, 2009), and heterogeneous firms may have different preferences regarding their purchases of intermediate and capital goods. Heterogeneous consumers may value different qualities differently (Glass, 2001) and thus come up with very different quality-adjusted prices for each variety in the market.

I.2. Relevant product markets and direct versus indirect competition

It has been well documented that countries export different varieties of the same product at very different prices[7] (Schott, 2004). It has also been well documented that higher per capita income countries tend to export varieties of high unit values, while lower per capita income countries tend to export varieties of low unit values (Schott, 2004; Hummels and Klenow, 2005).

Therefore, countries at different levels of development that sell different varieties of the same product may not be in direct competition, since they may be operating in different market segments. A car that sells for $20k can hardly be a substitute for one that sells at $100k. The buyer of the cheaper (more expensive) car is unlikely to buy the more expensive (cheaper) one because of a 10 or 20 per cent discount.

As pointed out by Fontagné et al. (2008), if countries like China and Germany sell the same products, according to available classifications at the most disaggregated level, but are specialized in different segments of each product market, they may not be in direct competition. As a result of little direct competition between countries in the North and the South, they argue that there will be only a weak link between trade and factor prices.

Fontagné et al. (2008) propose a method to segment each product market in three different levels (low, medium, high) based on relative unit values of the exporting countries[8]. They then show that the similarity indices between higher and lower income countries are much smaller when products are segmented than otherwise. Applying their segmentation method and comparing the export market share of each main country/region, they conclude that Western Europe has been more resilient than other developed countries to competition from the South.

Two exporters are in direct competition when they export varieties of a product that are substitutes to each other. The varieties that are substitutes define the relevant product market. If an exporting country gains market (micro) share in a relevant product market, it does through direct competition with other exporting countries.

A country gains market (macro) share through indirect competition when its micro shares do not change (no gains or losses in the relevant product markets), but its total market share rises or falls. This occurs when the size of the product markets in which the country has higher/lower shares increase relatively to the other product markets. Suppose that one country exports to two relevant product markets A and B. Assume that it has 10% of A, 2% of B, and 3% of the two markets together, because market B is larger than market A. Suppose now that, after some time, market A grows to become as large as B and the country maintains the same share in both product markets. As a result, the overall share of the country will rise from 3% to say 6%, although it did not gain market share through direct competition in any of the two markets. It gained through indirect competition.

Constant Market Share Models (CMS) split changes in overall (macro) market share into two components: the competitiveness effect or the direct competition component; and the product composition effect or the indirect competition component.

I.3. Segmentation method

In order to segment each product market we apply the same method as in Fontagné et al. (2008). Each product market at the 9-digit level of Japan's HS classification is divided into three segments: low, medium and high, according to the relative unit value of the variety exported by each country.

[7] In fact, as prices are not directly observable in international trade statistics, empirical work use unit values, defined as the ratio of the export value to quantities, as a substitute for prices.

[8] The segmentation method will be presented in Part II of this article.

We denote the relative unit value ratio from country h for product j as $r_{hj} = UV_{hj} / UV_{wj}$, where UV_{hj} is the unit value of product j imported by Japan from country h and UV_{wj} is the trade weighted (geometric) average of unit value over all flows to Japan for the product j. If $r_{hj} < 1$ then the import value from country h to Japan for product j is divided into low and medium ranges as follows: the share of low range is $(1 - r_{hj}^{\alpha})$ and the share in medium range is the complement r_{hj}^{α}; if $r_{hj} > 1$ then the import value from country h to Japan for product j is divided into high and medium ranges as follows: share in top range is $(1 - 1/r_{hj}^{\alpha})$ and share in medium range is $1/r_{hj}^{\alpha}$. If $r_{hj} = 1$, the whole flow is ascribed to the medium range.

Since the method allocates each country's export revenue of each product into two different segments, it recognizes that each unit value represents the weighted average of some firms' export prices, during the course of one year, that are likely to be dispersed around that average. The parameter α regulates the smoothness of the market segment allocation function. Fontagné et al. (2008) sets it equal to four so as to make each segment equal to one third of world trade. We see no reason why to do the same with Japan's imports. Furthermore, it should be recalled that Fontagné et al. (2008) uses data at the 6-digit level of classification. Since segmentation is very sensitive to the data level of aggregation and our study uses a more detailed level of classification, a specific criterion should be found to justify the value of the alpha parameter.

I.4. The CMS model and the distribution of market share changes

The basic Constant Market Share (CMS) model breaks down the change in the aggregated market share (or macro share) of a particular exporter into two main components: the direct competition, or competitiveness effect, and the indirect competition, or the product composition effect.

The micro share of country H in country L's imports of product i in year t is defined as: $a^{HLi}(t) \equiv X^{HLi}(t) / M^{Li}(t)$, where X^{HLi} is country H's exports of product i to country L and M is country L's imports of product i. Assuming there are n products, we may define the row vector of dimension n as:
$\mathbf{a}^{HL} \equiv (a^{HL1}, \ldots a^{HLi}, \ldots, a^{HLn})$.
The macro share of country H in country L's imports in year t is:
$A^{HL}(t) \equiv \sum_i X^{HLi}(t) / \sum_i M^{Li}(t)$.
The macro share change of exporting country H to importing country L in the period between year 0 to year t (ΔA^{HL}) may be written as:
$\Delta A^{HL} \equiv A^{HL}(t) - A^{HL}(0)$ (1)
where $A^{HL}(t)$ is the inner product of the vector of H's micro shares ($\mathbf{a}^{HL}$) and the vector of product shares of country L ($\mathbf{b}^{L}$) in year t.
$A^{HL}(t) \equiv \mathbf{a}^{HL}(t)\mathbf{b}^{L}(t)$ (2)
where $\mathbf{b}^{L}$ is the column vector of dimension m: $\mathbf{b}^{L} \equiv (b^{L1}, \ldots, b^{Li}, \ldots, b^{Lm})$ and $b^{Li} \equiv M^{Li}(t) / \sum_i M^{Li}(t)$.

Combining identities (1) and (2), we have:
$\Delta A^{HL} \equiv \mathbf{a}^{HL}(t)\mathbf{b}^{L}(t) - \mathbf{a}^{HL}(0)\mathbf{b}^{L}(0)$ (3)
and,
$\Delta A^{HL} \equiv [\mathbf{a}^{HL}(t) - \mathbf{a}^{HL}(0)]\, \mathbf{b}^{L}(0) + \mathbf{a}^{HL}(t)[\mathbf{b}^{L}(t) - \mathbf{b}^{L}(0)]$ (4)
where the two terms on the right hand side of the identity are the direct and the indirect competition components of the macro share change of exporting country H to importing country L in the period between year 0 to year t.
Identity (4) may also be written as:
$\Delta A^{HL} \equiv [\mathbf{a}^{HL}(t) - \mathbf{a}^{HL}(0)]\, \mathbf{b}^{L}(t) + \mathbf{a}^{HL}(0)[\mathbf{b}^{L}(t) - \mathbf{b}^{L}(0)]$ (5)

Therefore, the direct competition component of the macro share change may be calculated in two different ways, one using initial-year weights (a Laspeyres index) as in identity (4), and the other using end-year weights (Paasche index) as in identity (5).

The method of distribution of market share changes due to direct competition in international trade was developed in Chami Batista (2008) and its theoretical foundations were discussed in Chami Batista

(2010). The method starts with the micro share change of exporting country H in importing country L of commodity i in the period from year 0 to year t. We drop the superscripts L and i to ease the notation:

$$\Delta a^{H}(t) \equiv \sum_{J \neq H} \Delta a^{HJ}(t) \equiv \sum_{J \neq H} [\Delta a^{H} a^{J}(t) - \Delta a^{J} a^{H}(t)] \quad (6)$$

where J represents all countries competing with H in the i market and Δa^{HJ} is defined as the part of the micro share change of H that is ascribed to the micro share change of J. It is assumed that the varieties supplied by country H and countries J in the product market i are substitutable to each other. As a result of identity (6), the sum of country H's gains and losses to all competing countries J is identical to country H's net gain or loss. In addition to that, Chami Batista (2008) assumes that:

$$\Delta a^{HJ} = \Delta a^{H} a^{J} - \Delta a^{J} a^{H} = a^{H} a^{J} (\Delta a^{H}/a^{H} - \Delta a^{J}/a^{J}) \quad (7)$$

so that $\Delta a^{HH} = 0$ (country H does not gain or lose market share to itself) and $\Delta a^{HJ} = -\Delta a^{JH}$ (country H's gain from country J is equal to the loss of country J to country H). Summing up equation (7) across all relevant markets i, we find the net gain or loss of exporting country H to exporting country J in the importing country L in the period from 0 to t.

II. Empirics

This study uses annual data on Japanese imports of manufactured products[9]. There were 6108 manufactured products at the 9-digit level of the harmonized System (HS) in 2010[10]. The nine-digit HS was introduced in 1988 and revised in 1992, 1996, 2002 and 2007. To trace each product category consistently through time, we use the initial and end-year data of five sub-periods: 1988-1991, 1992-1995, 1996-2001, 2002–2006 and 2007-2010.

As a result, we have a much longer time period of analysis (1988-2010) and a much more detailed product classification (the 9-digit level of the Harmonized System) than the period (1994-2005) and product disaggregation (6-digit level) used by Fontagné et al (2008).

Our data also differs from Fontagné's, because it focuses only on Japan imports rather than on world imports. Although we obviously lose in coverage, there are some advantages in focusing on Japan only[11]: (i) since richer countries import more from countries that produce higher quality products[12], differences in demand for quality across countries are removed when only one importing country is considered; (ii) Japan is one of the largest trading partner of China, North America and Western Europe; and (iii) Japan does not have trade agreements with none of these trading partners[13].

Countries are classified by region and income levels, according to the World Bank classification, and are reported in the Appendix. According to their income levels, countries are classified in ascending order as Low, Lower Middle, Upper Middle, and High. Countries are part of the North if they are classified as High and are otherwise part of the South. Because relative unit values are related to the level of development and we are interested in the dynamics of such a relation, we allow countries to change their classification according to their per capita income between different sub-periods. Within each sub-period, countries are classified at the initial year.

II.1 Market shares and trade specialization of the North and the South

The top part of Table (1) shows that, without any segmentation, the share of the North in Japan's imports of manufactured goods declined drastically from 1988 to 2010, losing 25 percentage points (p.p.), despite the fact that some countries moved up from the South to the North in the period[14]. The share of the North falls in every sub-period analysed in this work and is smaller than the share of the South in 2010.

The shares of developed North America (NA) and Western Europe (WE) increase from 1988 to 1991, but fall significantly from 1991 to 2010. NA loses 17 p.p. from 1988 to 2010 and WE loses 8 p.p.

---

[9] Data is from the Trade Statistics of Japan -Ministry of Finance (MOF)

[10] We only considered products HS 9-digit from chapter 28 to 96 (manufactured products), for which information on quantities are available.

[11] Kiyota (2010).

[12] Hallak (2006).

[13] http://www.mofa.go.jp/policy/economy/fta/index.html (accessed 13 January 2013).

[14] South Korea, Macao, Portugal, Malta, Greece, Estonia, Croatia, Check Republic, Slovak Republic, and Slovenia are the main countries that have made their way from the South to the North.

in the same period. The share of WE has become larger than the share of NA since at least 2006. Therefore, the share of WE has generally been more resilient to competition in Japan than the share of NA.

The share of developed Asia goes up 4 p.p. from 1988 to 2010, but this is due exclusively to South Korea entering the developed group in 1995/96. Without South Korea, the share of developed Asia would have declined 1.6 p.p. in the period. The share of South Korea also falls 1.3 p.p. from 1988 to 2010.

As the North's share falls, the share of the South rises from 28% in 1988 to 55% in 2010. The main driver of the rising share of the South has been the consistent and robust increase in China's market share during the whole period of 1988-2010. Excluding South Korea from the South, the Rest of developing Asia (RoA) also gains market share in the period. It is worth noting that the share of all other non-developed countries taken together falls in the period.

Before segmenting the product markets, we tested the segmentation of both Japan's total imports of manufactured goods and of a quite homogeneous product for setting a reasonable range of possible values for alpha. Chami Batista and Silveira (2010) show that the unit values of internationally traded tin behave in a manner very close to what is theoretically expected from a homogeneous product. They use monthly data on unit values from imports of the US and Japan at the most detailed level of classification available in each country[15].

Table (2) reports the size of the medium segment for Japan's imports of manufactured goods for Japan's imports of tin for different years in the period 1988-2010 and for different values of alpha. The smaller is the alpha value, the larger is the size of the medium segment. We would like to choose a range of values for alpha such that the size of the medium segment is significantly smaller than half of Japan's imports of manufactured goods, in order to capture a scenario in which Japan's import market is quite segmented. After all, we want to estimate the effects of direct competition among exporters under the hypothesis that product markets are segmented. But we would also like to choose a value for alpha such that a high percentage of the import value of tin is allocated to the medium segment, in order to reflect the high degree of homogeneity of the product.

As Tables (2) reveals, for alpha smaller than 3 the medium segment of Japan's imports of manufactured goods would not allow much segmentation, and for alpha greater than 5 the medium segment of tin would be too small for a quasi-homogeneous good. We conclude that a range between 3 and 5 for alpha is quite appropriate for our sensitivity tests.

When Japan's import market of manufactured goods is segmented[16], it is possible to observe on the bottom part of Table (1) that the North suffers dramatic losses in the low and medium segments in the 1988-2010 period and in each and every sub-period. This is a clear evidence of the fierce price competition from the South with which the North was confronted in these segments during this period. In the early period of 1988-91, the North makes some gains in the high segment, but that is not enough to offset the losses in the low and medium segments. In all the other sub-periods from 1992 to 2010, the share of the North falls in the high segment[17].

Based on this surprising evidence and on North-South growth models, one could say that, during this period, the rate of quality improvement applied to products produced in the North was lower than the rate applied to products produced in the South through imitation and knowledge transferred from Northern firms.

China's market share gains take place largely in the low and medium segments. In the low segment, China's share jumps from 9.8% in 1988 to reach a staggering 52% in 2006, remaining stable after that. In the medium segment, the rise is continuous from 4.5% in 1988 to 42% in 2010. China's share in the high segment was about 1% from 1988 to 1996. After that, it rose continuously, and at a faster rate than China's shares in the other two segments, to reach 6.2% in 2010. The Rest of Asia, formed

[15] In the US tin is classified as HS 800110.0000 and in Japan is HS 800110.000.

[16] The figures presented in the analysis by segment are calculated with alpha equal to 4. Changing the parameter alpha of the segmentation method to 3 raises the relative size of the medium segment, while changing it to 5 does the opposite. However, the impact is quite small and has little effect on the dynamics described in this section.

[17] In fact, the share of the North rises between 1995 and 1996 (not shown), but this is exclusively due to South Korea leaving the South and joining the developed North.

by developing Asia countries other than China (RoA), also shows significant gains in market share in all segments in the period 1988-2010, once South Korea is excluded.

Given that South Korea is one of the few examples of a developing country that has moved up to become a high-income economy, it is interesting to look into her changing shares by segment. Her share in the low segment suffers a drastic fall, much like other developed countries of Asia, and in sharp contrast with China and the RoA. However, in the high segment, South Korea does not show a definite trend in her market share, showing some ups and downs. This is again in contrast with China and the RoA in the South and also with developed Asia, as the shares of all these parts of Asia reveal a clear upward trend in the high segment. South Korea seems to be positioned somewhere in between the performance of the developed countries of the western world and the performance of other countries of Asia.

The group of countries of the South classified as others show a fall in their market share in all segments and periods, except in the high segment between 1995 and 2010, when it shows a rising trend. It appears that these countries have been forced to improve the quality of their manufactured products and compete in the upper market segment, given their difficulties in facing the price competition of China and other non-developed Asian countries in the low and medium segments.

Considering that the North still maintains 30% of the low segment in 2010, the South can still make further gains. Low-income countries like Cambodia (L) and Bangladesh (L) and low-middle-income countries like Vietnam (LM), Indonesia (LM) and the Philippines (LM), among others, have some potential to increase their market share. On the other hand, China appears to face difficulties in further raising her share in the low segment, having moved up from a low-income (L) in 1988 to a lower-middle-income in 1997 and to an upper-middle-income (UM) economy in 2010.

Table (3) reports the changes in the specialization index (Balassa's revealed comparative advantage) of the main groups of developed and developing countries during the period between 1988 and 2010.

As expected, the North reveals comparative advantage in the high segment, while the South reveals comparative advantage in the low and medium segments. More interestingly, while the North has become more specialized in the upper market segment, the South has reduced its revealed comparative advantage (RCA) in the lower market segment. In other words, the losses of the North in the high segment were relatively smaller than in the low and medium segments. On the other end, the gains of the South in the low segment were relatively smaller than in the medium and high segments.

Western Europe has shown RCA in the high segment since the start of our period of analysis, while North America, developed Asia and other developed countries have become specialized in the high segment during our period of analysis. Western Europe has the highest RCA in the high segment and the lowest in the medium segment. The RCA of North America has been similar to Western Europe's in the low segment, but it has been much higher in the medium segment and much lower in the high segment[18]. Developed Asia has the highest RCA in the low segment and the lowest in the high segment among these three main groups of the North.

Within the South, China is more specialized in the low segment than the Rest of Asia (RoA) and has become more specialized in the medium segment than the RoA within this period. On the other hand, China has a much lower RCA in the high segment than the RoA, though both are not specialized in the upper market segment. However, one can say that China is gradually rising in the quality ladder, given her declining RCA in the low segment and her better performance in the medium and high segments since the mid-1990s. Finally, it is noteworthy that the dynamics of the South specialization has been largely influenced but what happens to China.

II.2 Breaking down of the macro share changes into direct and indirect effects

We have applied identities (4) and (5) of the Constant Market Share Model (CMS), which use Laspeyres and Paasche indices, respectively, to breakdown the macro share changes into direct competition (competitiveness) and indirect competition (composition) effects. Table (4) reports the direct

[18] North America was specialized in the medium segment from 1988 to 2007. The most specialized countries in the medium segment tend to be large exporters of manufactured products that are intensive in natural resources, such as South Africa, Chile, UAE, Russia, New Zealand, Australia, Indonesia, Brazil and Canada.

and indirect effects in the aggregated period of 1988-2010, without and with the segmentation of product markets, assuming alpha equal to 4 for segmenting product markets[19]. These two identities were first applied to each sub-period and then aggregated to sum up the changes in the eighteen years period between 1988 and 2010[20].

We can observe that the market share losses of the North and the gains of the South due to direct competition are always smaller than the macro share changes, no matter if Laspeyres or Paasche indices are used and if markets are segmented or not. This means that the low and medium segments of Japanese imports of manufactures, in which the South is more specialized, were more dynamic than the high segment, making the indirect competition (or composition) effects positive for the South and negative for the North, hence making the South's macro share gains and the North's macro share losses larger than the direct competition effect.

Comparing the columns of direct competition effects with segmentation and with no segmentation on Table (4), we can also conclude that if relevant product markets are segmented, assuming no segmentation overestimates the direct competition effects. However, although this is true for the 18-year period from 1988 to 2010, it was not true for the earlier sub-periods of 1988-91 and 1992-95.

What is true for the North and the South in aggregate does not necessarily hold for the groups that make up the North and the South. Using Laspeyres indices, the loss in the market share of NA due to direct competition is much larger than Asia's and WE's losses with or without segmentation. WE's loss due to direct competition is slightly larger than Asia's without segmentation, but it is much smaller with segmentation. On the other hand, using Paasche indices and segmenting the product markets, the loss of NA due to direct competition is the smallest of these three groups, the loss of WE is the largest, and Asia's is in between. Therefore, it is not possible to say which group of developed countries has been the most or the least resilient to direct competition from both the North and the South together.

As to the gains of the South, Table (4) shows that China's gains due to direct competition are smaller than her macro share gains and are even smaller with segmentation than without, regardless of whether Laspeyres or Paasche indices are used. Without segmentation and using Laspeyres indices, the macro share gains of RoA are due to indirect competition, since the direct competition effect is negative. If product markets are segmented, the direct competition effect, based on Laspeyres indices, becomes positive and quite large, hence the indirect effect is highly negative. On the other hand, using Paasche indices, the direct competition effect is positive and smaller than the macro share change with or without segmentation.

The more segmented the market, that is, when the parameter alpha is increased from zero (no segmentation) to 3, 4 and 5, the losses of the North and the gains of the South and China are reduced, regardless of which index is used. However, the effects of increasing segmentation on the direct competition of other developed or developing countries depend on which index is used and are, therefore, ambiguous.

III.3 North-South and North-North Direct Competition

Table (5) sums up the direct competition gains and losses of the main groups of the North to both the South and the North in the period 1988-2010, using Paasche and Laspeyres indices and alpha equal to four for segmenting product markets.

North-South Direct Competition

The North loses market share in direct competition with the South in each and every segment (low, medium and high) and in each and every sub-period from 1988 to 2010, except in the earliest sub-period of 1988-1991 when it was still gaining from the South in the high segment. This quite extraordinary result is robust to alpha equal to 3, 4, and 5, and to Laspeyres and Paasche indices[21].

[19] Changing alpha to 3 or 5 does not change our conclusions in this section.

[20] Recall that the changes between 1991 and 1992, 1995 and 1996, 2001 and 2002, and 2006 and 2007 were not calculated because of changes in product definitions of the Harmonized System of classification at the 9-digit level in these pairs of years. Therefore, 1988-2010 macro market share changes exclude the changes in the above sub-periods.

[21] All statements thereafter are valid for both Paasche and Laspeyres methods and all three levels of market segmentation used (alpha 3, 4, and 5), unless clearly stated otherwise.

It is true, however, that most of the North's direct loss to the South took place in the low and medium segments, which accounted for between 80% (P5) and 86% (L3) of the total direct loss to the South in the period 1988-2010[22].

Considering the average annual losses of the North in each period, we observe that the bulk of these losses took place in the sub-periods between 1992 and 2006. The average annual loss of the North was much smaller in the sub-period 2007-2010 and even smaller in the sub-period 1988-1991. More interestingly, the North gained in the high segment in the earliest period (1988-1991), mitigating the large losses in the low and medium segments, whereas, in the latest sub-period (2007-2010), the high segment accounted for between 34% (P3) and 45% (L5) of the North's direct losses to the South. This is a clear indication of the deteriorating capacity of the North to compete even in the upper product markets.

The North's loss to the South is largely due to the gains of China and other non-developed countries of Asia (RoA). Aggregating all segments and all sub-periods, China accounts for between 54% (L5) and 61% (P3) of the North's loss to the South, while the RoA accounts for between 30% (L3) and 32% (P5). However, again, this distribution is uneven by segments. While China accounts for between 68% (L3) and 77% (P5) of the North's loss to the South in the low segment, she accounts for only between 15% (L3) and 23% (P5) in the high segment. The developing countries of the RoA, on the other hand, accounts for between 19% (P5) and 27% (L3) of the North's loss to the South in the low segment, but accounts for between 58% (L5) and 75% (P3) in the high segment[23]. Therefore, China has shown to be very competitive against the North in the lower markets, while the RoA has shown to be quite competitive against the North in the upper markets.

Developed Asian countries are the big losers to the South, accounting for half of the North's overall loss to the South (P3=49%; L4=50%) in the period 1988-2010. But developed Asia's loss to the South is heavily concentrated in the low and medium segments, whereas NA and WE explain between 76% (L5) and 90% (P3) of North's losses in the high segment in this 18-year period. Although developed Asia is the least resilient group of the North to South competition in the 3 segments taken together, it is the most resilient in the high segment, regardless of whether Laspeyres or Paasche is applied.

However, the resilience of NA and WE to direct competition from the South depends on whether Laspeyres or Paasche is applied. Using Laspeyres indices, WE is the group of developed countries most resilient to South competition in the 3 segments taken together and in the low and medium segments, followed by NA and Asia. In the high segment, WE follows Asia, as the second most resilient group of developed countries to South direct competition. Using Paasche indices, on the other hand, NA is the most resilient group of developed countries in the 3 segments taken together, followed by WE and Asia. NA is the most resilient in the low segment, WE is the most resilient in the medium segment, and Asia is the most resilient in the high segment.

Therefore, Fontagné's, Gaulier's and Zignago's thesis that WE is more resilient than NA to South competition, considering just the effects of direct competition, cannot be confirmed for Japan's imports. It should be stressed that the methodology of Fontagné et al (2008), which just look into the changes of market shares by segment, is not appropriate to address the question of competition between the South and groups of developed countries of the North.

North-North Competition

Developed Asia gains market share through direct competition from all the groups of the North in all three segments in the period 1988-2010, regardless of the index applied and for any value of alpha in the 3 to 5 range. Using Laspeyres index, developed WE also gains market share through direct competition from the North taken together and in direct competition with NA in the low, medium and high segments. On the other hand, using Paasche indices, WE loses market share in all the segments to all the regions of the North, including NA.

[22] P5 and L3 stand for Paasche with alpha equal to 5 and Laspeyres with alpha equal to 3, respectively. $P\alpha$ and $L\alpha$, for α=3,4,5, define the minimum and the maximum of the range of possible shares and any other $P\alpha$ or $L\alpha$ will be inside that range.

[23] Note that using Laspeyres or Paasche indices can make significant differences, but changing alpha in the range of 3 to 5 typically makes very little difference.

II.4 China's Gains through direct competition

As seen on Table (4), China made substantial overall gains of market share through direct competition in the 18-year period from 1988 to 2010. Overtime, China's average annual gains through direct competition in the earliest period of 1988-1991 are 11% (for any L□ or P□□ □=3, 4, or 5) of the sum of the average annual gains of all five sub-periods, rise to between 20% (L5) and 31% (L3) in the three intermediate sub-periods, and fall to between 8% (L5) and 12% (P5) in the latest sub-period of 2007-2010. Therefore, the bulk of China's gains take place in the three sub-periods between 1992 and 2006.

Table (6) reports the results of the distribution of China's gains and losses, through direct competition, among exporting competitors in the period 1988-2010. It shows that approximately two thirds of China's total gains come from direct competition with the North and one third come from the South, largely from the RoA, regardless of whether Laspeyres or Paasche index is used and the applied degree of segmentation (alpha from 3 to 5). Overtime, however, China's gains from the South, which account for between 55% (P5) and 57% (L5) of the total in the earliest sub-period of 1988-1991 sub-period, fall drastically in the 1990s and 2000s, and in the latest sub-period of 2007-2010 it is the North that account for between 82% (P5) and 100% (L5) of China's gains.

The low and medium segments account for the bulk of China's total gains in the period 1988-2010, while the high segment accounts for between just 3.6% (L3) and 7.0% (P5) of them. There is not much difference in the importance of each segment when China's gains from direct competition with the South are compared with the North.

More telling is the evolution of China's gains by segment overtime. In the earliest sub-period of 1988-1991, China's gains in the low segment accounted for between 66% (L3) and 87% (P5) of China's total gain. The share of China's gains in the low segment went down in the 1990s and 2000s to reach between 17% (P3) and 20% (L5) in the sub-period 2007-2010. On the other hand, the share of China's gains in the medium segment went up to between 46% (L5) to 63% (P3) in the sub-period 2007-2010 from between 12% (P5) and 32% (L3) in the sub-period 1988-1991. As a result, the share of the high segment in China's gains went up from between 1% (P3) and 3.4% (L5) in 1988-91 to between 19% (P3) and 37% (L5) in 2007-10. This is a clear evidence of China's increasing capability to directly compete in upmarket products.

The gains of China from direct competition with the South, which accounted for over half of China's total gains in the low segment in the three earliest sub-periods, went down to 30% in 2002-2006. In 2007-10 China lost market share in direct competition with the South in the low segment, both to the RoA and to the group of other developing countries.

Therefore, as China's per capita income gradually made its way up from low (1988-1996) to lower-middle (1997-2009), and upper-middle (2010), her gains drastically fell in the low segment. The potential for new gains in the low segment appears to be fading away as China begins to lose through direct competition with other competitors of the South. This is a clear evidence of China's immense difficulties in further penetrating the low-end of product markets.

III. Conclusions

The North lost market share, both in general as well as in direct and indirect competition with the South, in each and in all of the three segments (low, medium and high) and in each and every sub-period from 1988 to 2010, except in the high segment in the 1988-1991 sub-period. Considering the North-South models in which the North innovates, the South imitates and Northern firms can transfer technology to the South, our results suggest that imitation and technology transfers to the South have been faster than innovation in the North in this period. As a result, gains in cost efficiency of firms in the South appear to have made the quality-adjusted prices of their product varieties more competitive than those produced by firms in the North in each and every segment. The South's gains in direct competition with the North in each of the three segments and the possible greater technological progress of the South, for such a long period, are quite extraordinary phenomena, unlikely to have been observed in the post-war North-South trade relations.

Most of the North's direct loss to the South took place in the low and medium segments and China and other developing countries of Asia accounted for most of the South's direct gains. Overtime, however, there is a significant increase in the gains of the South in the high segment. China accounts for most of the South direct gains in the low segment, while the rest of developing countries of Asia accounts for most of the South gains in the high segment.

The direct competition gains of the South and the direct competition losses of the North are reduced the more segmented product markets are assumed to be in the 1988-2010 period, but the gains and losses of particular groups of countries in the North and South are not necessarily inversely related to the level of segmentation. Fontagné's, Gaulier's and Zignago's thesis that WE is more resilient than NA to South competition, considering the effects of direct competition at the most detailed level of product classification, cannot be confirmed for Japan's imports.

Although segmentation reduces the importance of high-income countries direct competition with China, North-South competition accounted for the bulk of China's gains and losses. As China relative per capita income rose and moved from a classification of low income to lower-middle and to upper-middle income, China's immense difficulties in further penetrating the low-end of product markets and China's increasing capability to directly compete in upmarket products became quite evident.

However, to move into the club of high-income countries, China will have to keep raising her share in the segment of high price varieties at the expense of the North. Developed countries can make entry in the North more difficult to all upper-middle-income countries, China in particular, if they are able to raise their rate of innovation relatively to imitation and to the transfer of technology to the South. This is likely to make South-South competition fiercer in the low and medium price variety markets, as lower-income countries will try to increase their share in the low and medium price variety segments at the expense of China's. As revealed in this paper, this has already been happening in a yet small scale.

References

Chami Batista, J. (2008), Competition between Brazil and Other Exporting Countries in the US Import Market: A New Extension of Constant-Market-Shares Analysis, *Applied Economics*, **40**, 2477-2487.

Chami Batista, J. (2010), Theoretical Basis for a Method of Distribution of Market Share Changes in International Trade, *Revista de Economia Contemporânea*, **14**, 499-514.

Chami Batista and G.B. da Silveira (2010), Trade Costs and Deviations from the Law of One Price, *American Journal of Agricultural Economics*, **92**, 1011-1023.

Fajgelbaum, P.D., G.M. Grossman and E. Helpman (2009), Income Distribution, Product Quality, and International Trade, NBER Working Paper No. 15329, (Cambridge, MA: NBER).

Fontagné L., G. Gaulier and S. Zignago (2008), Specialization across Varieties and North–South Competition, *Economic Policy*, **23**, 51.

Glass, J.A. and K. Saggi (2002), Intellectual Property Rights and Foreign Direct Investment, *Journal of International Economics*, **56**, 387–410.

Glass, J.A. (2001), Price Discrimination and Quality Improvement, *Canadian Journal of Economics* **34,** 549-569.

Grossman, G. and E. Helpman (1991), *Innovation and Growth in the Global Economy*, Cambridge and London: MIT Press.

Hallak, J.C. (2006), Product Quality and the Direction of Trade, *Journal of International Economics*, **68**, 238-265.

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

Kiyota K. (2010), Are US Exports Different from China's Exports? Evidence from Japan's Imports, *The World Economy*, **33**,1302-1324.

Krugman, P. (1979), Increasing Returns, Monopolistic Competition, and International Trade, *Journal of International Economics*, **9**, 469-479.

Linder S. (1961), *An Essay on Trade and Transformation*, Stockholm: Almqvist & Wiksell.

Schott, P. (2004), Across-Product versus Within-Product Specialization in International Trade, *The Quarterly Journal of Economics*, **119**, 647-678.

Vernon, R. (1966), International Investment and International Trade in the Product Cycle, *The Quarterly Journal of Economics*, **80**, 2, 190-207.

Table (1): Market Shares by Region and Income*

Region	Market Shares						Changes in Market Shares in p.p.				
Total	1988	1992	1996	2002	2007	2010	1991-1988	1995-1992	2001-1996	2006-2002	2010-2007
North	70%	68%	68%	57%	49%	45%	-0.34	-4.96	-8.95	-7.41	-4.10
NA	31%	31%	29%	21%	16%	13%	0.78	-2.21	-5.85	-4.75	-2.42
WE	24%	25%	22%	20%	17%	16%	1.09	-2.95	-2.25	-2.42	-1.10
Asia	8%	8%	14%	13%	13%	13%	-0.71	0.94	-0.30	0.10	-0.15
Developed Others	6%	4%	3%	3%	3%	3%	-1.49	-0.74	-0.55	-0.35	-0.42
South	28%	32%	32%	43%	51%	55%	0.66	5.04	8.95	7.42	4.10
China	5%	9%	15%	25%	32%	37%	1.55	4.62	7.73	6.90	4.39
RoA	17%	17%	12%	14%	13%	14%	0.05	0.52	1.58	-0.76	0.55
Developing Others	6%	6%	5%	4%	6%	5%	-0.94	-0.10	-0.35	1.27	-0.84
Non-allocated	2%	0%	0%	0%	0%	0%	-0.32	-0.08	0.00	0.00	0.00
TOTAL	100%	100%	100%	100%	100%	100%	0.00	0.00	0.00	0.00	0.00
Low Segment	1988	1992	1996	2002	2007	2010	1991-1988	1995-1992	2001-1996	2006-2002	2010-2007
North	59%	52%	52%	37%	33%	31%	-4.90	-3.75	-9.88	-6.16	-2.16
NA	20%	19%	18%	9%	8%	8%	-1.24	-1.40	-7.74	-0.96	-0.40
WE	17%	15%	11%	12%	10%	10%	-1.20	-3.56	0.31	-1.67	-0.52
Asia	17%	15%	21%	16%	13%	12%	-0.94	2.02	-2.43	-3.17	-1.15
Developed Others	5%	2%	1%	1%	1%	1%	-1.52	-0.80	-0.01	-0.36	-0.09
South	39%	48%	48%	63%	67%	69%	5.56	3.85	9.88	6.16	2.16
China	10%	20%	30%	43%	51%	52%	6.30	7.05	8.20	9.01	0.89
RoA	25%	24%	15%	17%	14%	15%	0.59	-2.24	1.69	-2.92	1.59
Developing Others	5%	4%	3%	2%	2%	2%	-1.32	-0.96	-0.02	0.08	-0.32
Non-allocated	2%	0%	0%	0%	0%	0%	-0.67	-0.10	0.00	-0.01	0.00
TOTAL	100%	100%	100%	100%	100%	100%	0.00	0.00	0.00	0.00	0.00
Medium Segment	1988	1992	1996	2002	2007	2010	1991-1988	1995-1992	2001-1996	2006-2002	2010-2007
North	69%	67%	65%	54%	42%	38%	-0.15	-6.12	-11.02	-9.66	-4.36
NA	35%	37%	33%	23%	16%	12%	2.37	-3.81	-10.11	-6.54	-3.90
WE	19%	19%	16%	14%	11%	10%	0.11	-1.90	-1.65	-2.11	-1.55
Asia	6%	6%	12%	12%	10%	12%	-0.80	0.62	1.14	-0.53	1.86
Developed Others	8%	5%	4%	4%	4%	3%	-1.83	-1.03	-0.41	-0.47	-0.78
South	29%	33%	35%	46%	58%	62%	0.17	6.18	11.03	9.66	4.36
China	5%	6%	12%	26%	35%	42%	0.28	5.12	11.98	7.56	7.32
RoA	17%	18%	14%	14%	14%	13%	0.31	-0.08	-0.26	-0.46	-0.49
Developing Others	7%	8%	8%	7%	9%	7%	-0.42	1.14	-0.69	2.56	-2.47
Non-allocated	3%	0%	0%	0%	0%	0%	-0.02	-0.06	-0.01	0.00	0.00
TOTAL	100%	100%	100%	100%	100%	100%	0.00	0.00	0.00	0.00	0.00
High Segment	1988	1992	1996	2002	2007	2010	1991-1988	1995-1992	2001-1996	2006-2002	2010-2007
North	84%	86%	89%	85%	82%	77%	2.34	-3.73	-5.43	-3.17	-4.44
NA	30%	30%	33%	33%	25%	23%	1.20	2.06	3.32	-5.65	-2.17
WE	45%	48%	43%	37%	37%	37%	2.02	-5.48	-7.08	-2.38	0.35
Asia	6%	5%	10%	12%	17%	14%	-1.19	-0.57	-0.53	5.00	-2.28
Developed Others	3%	3%	3%	3%	4%	4%	0.31	0.26	-1.14	-0.14	-0.34
South	15%	14%	11%	15%	18%	22%	-1.99	3.83	5.44	3.17	4.44
China	1%	1%	1%	3%	4%	6%	-0.28	0.02	0.60	1.62	2.44
RoA	9%	9%	7%	10%	11%	12%	-0.67	4.43	4.40	1.05	1.09
Developing Others	4%	3%	3%	3%	3%	4%	-1.04	-0.62	0.43	0.50	0.91
Non-allocated	1%	0%	0%	0%	0%	0%	-0.35	-0.10	-0.01	0.00	0.01
TOTAL	100%	100%	100%	100%	100%	100%	0.00	0.00	0.00	0.00	0.00
Republic of Korea	Market Shares						Changes in Market Shares in p.p.				
Total	8.8%	7.1%	5.5%	5.4%	6.3%	5.7%	-1.28	-0.46	0.10	1.13	-0.59
Low Segment	15.4%	9.9%	5.6%	6.3%	4.8%	5.4%	-3.54	-3.23	1.38	-1.07	0.52
Medium Segment	7.4%	6.7%	5.2%	5.5%	5.3%	6.0%	-0.71	-0.45	0.38	0.05	0.74
High Segment	5.8%	5.0%	5.9%	4.4%	9.9%	5.5%	-0.78	2.24	-1.75	5.42	-4.41

*Product markets are segmented using alpha equal to 4.

NA: United States of America; Canada; Greenland; St.Pierre and Miquelon.

WE: Iceland; Norway; Sweden; Denmark; United Kingdom; Ireland; Netherland; Belgium, Luxembourg; France; Germany, Switzerland; Portugal from 1995 on; Spain; Italy; Finland; Austria; Greece from 1996 on; Cyprus; Slovenia from 2001 on.

Asia: Korea, R from 1995 on; Taiwan; Hong Kong; Singapore; Brunei; Macao fom 1995 on.

RoA: R. of Korea until 1994; North Korea; People's Republic of China; Mongolia; Viet Nam; Thailand; Malaysia; Philippines; Indonesia; Cambodia; Laos; Myanmar; India; Pakistan; Sri Lanka; Maldives; Bangladesh; Timor Leste; Macao until 1994; Afghanistan; Nepal; Bhutan.

Table (2): Medium Segment of Japan's imports

Japan's total imports of manufactured goods					
alpha	share in total				
	1988	1996	2002	2006	2010
3	63%	50%	46%	47%	51%
4	58%	44%	41%	42%	46%
5	54%	40%	37%	38%	42%
Japan's imports of tin, not alloyed, unwrought					
	share in total				
alpha	1988	1996	2002	2006	2010
3	98%	98%	94%	96%	94%
4	97%	97%	92%	95%	92%
5	97%	97%	91%	94%	90%

Table (3) Specialization Index (RCA) by Region and Segment*

Low Segment	1988	1991	1992	1995	1996	2001	2002	2006	2007	2010
North	0.84	0.78	0.76	0.76	0.77	0.72	0.65	0.62	0.67	0.68
NA	0.66	0.60	0.62	0.62	0.63	0.45	0.41	0.47	0.53	0.59
WE	0.69	0.61	0.61	0.53	0.53	0.61	0.59	0.58	0.59	0.60
Asia	2.03	2.09	1.88	1.91	1.47	1.33	1.16	0.92	1.01	0.93
Developed Others	0.73	0.64	0.60	0.50	0.48	0.59	0.48	0.40	0.42	0.45
South	1.40	1.56	1.51	1.40	1.49	1.41	1.47	1.37	1.32	1.26
China	1.98	2.47	2.35	2.06	2.07	1.72	1.74	1.65	1.59	1.42
ROA	1.47	1.50	1.37	1.21	1.21	1.20	1.25	1.09	1.04	1.11
Developing Others	0.74	0.62	0.68	0.53	0.52	0.56	0.56	0.44	0.42	0.42
Non-allocated	0.96	0.80	1.25	0.91	0.77	1.95	1.73	0.70	0.38	0.17
Medium Segment	1988	1991	1992	1995	1996	2001	2002	2006	2007	2010
North	0.98	0.99	0.99	0.97	0.96	0.92	0.94	0.88	0.86	0.84
NA	1.13	1.18	1.21	1.18	1.16	1.01	1.09	1.01	1.03	0.92
WE	0.81	0.78	0.74	0.75	0.73	0.73	0.72	0.70	0.66	0.61
Asia	0.73	0.70	0.71	0.71	0.85	0.95	0.92	0.88	0.81	0.97
Developed Others	1.29	1.31	1.33	1.32	1.32	1.46	1.35	1.35	1.30	1.22
South	1.02	1.00	1.03	1.05	1.08	1.11	1.08	1.12	1.14	1.13
China	0.91	0.74	0.75	0.87	0.85	1.09	1.04	1.05	1.07	1.14
ROA	0.99	1.01	1.05	1.01	1.14	0.99	1.02	1.04	1.06	0.98
Developing Others	1.20	1.33	1.37	1.59	1.59	1.56	1.53	1.64	1.66	1.44
Non-allocated	1.19	1.36	0.75	0.63	1.03	0.41	0.44	0.33	0.29	0.11
High Segment	1988	1991	1992	1995	1996	2001	2002	2006	2007	2010
North	1.21	1.25	1.27	1.31	1.31	1.42	1.48	1.64	1.67	1.72
NA	0.98	1.00	0.96	1.10	1.15	1.58	1.53	1.62	1.55	1.67
WE	1.87	1.87	1.93	1.94	1.96	1.82	1.86	1.98	2.11	2.28
Asia	0.68	0.59	0.68	0.54	0.73	0.71	0.93	1.30	1.32	1.15
Developed Others	0.47	0.68	0.73	0.98	1.04	0.8	1.07	1.16	1.22	1.29
South	0.52	0.44	0.43	0.47	0.34	0.40	0.36	0.37	0.35	0.41
China	0.23	0.13	0.13	0.08	0.08	0.08	0.11	0.13	0.12	0.17
ROA	0.54	0.50	0.53	0.76	0.55	0.80	0.70	0.82	0.84	0.89
Developing Others	0.72	0.65	0.57	0.48	0.56	0.69	0.73	0.65	0.59	0.89
Non-allocated	0.49	0.41	1.25	1.74	1.20	0.80	1.00	2.43	3.03	3.81

*Product markets are segmented using alpha equal to 4.

Table (4): North and South Direct and Indirect Competition Gains and Losses 1988-2010*

Gains & Losses in percentage points	Macro Share Change	Laspeyres Indices		Paasche Indices	
		No Segments	With Segments	No Segments	With Segments
		Direct Competition	Direct Competition	Direct Competition	Direct Competition
North	-25.77	-23.10	-18.99	-25.22	-20.96
NA	-14.45	-12.04	-12.01	-14.26	-5.51
WE	-7.63	-5.69	-2.15	-6.23	-8.73
Asia	-0.13	-5.50	-5.16	-4.22	-6.05
Developed Others	-3.56	0.13	0.32	-0.51	-0.67
South	26.18	22.96	18.82	25.11	20.88
China	25.19	21.67	15.79	22.64	19.47
ROA	1.94	-0.31	8.10	1.16	0.40
Developing Others	-0.96	1.60	2.22	1.30	1.00
Non-allocated	-0.41	0.14	0.17	0.11	0.09
TOTAL	0.00	0.00	0.00	0.00	0.00

Gains & Losses in percentage points	Macro Share Change	Laspeyres Indices		Paasche Indices	
		No Segments	With Segments	No Segments	With Segments
		Indirect Competition	Indirect Competition	Indirect Competition	Indirect Competition
North	-25.77	-2.67	-6.78	-0.55	-4.81
NA	-14.45	-2.41	-2.45	-0.19	-8.94
WE	-7.63	-1.95	-5.48	-1.40	1.10
Asia	-0.13	5.37	5.03	4.09	5.93
Developed Others	-3.56	-3.69	-3.88	-3.05	-2.89
South	26.18	3.22	7.36	1.07	5.30
China	25.19	3.53	9.40	2.55	5.73
ROA	1.94	2.26	-6.16	0.78	1.54
Developing Others	-0.96	-2.56	-3.18	-2.26	-1.96
Non-allocated	-0.41	-0.55	-0.58	-0.52	-0.50
TOTAL	0.00	0.00	0.00	0.00	0.00

Alpha 4 was used to segment product markets

Table (5): Distribution of Direct Competition Gains and Losses of the North 1988/2010*- in p.p.

	based on Laspeyres alpha 4					based on Paasche alpha 4				
All Segments	Gains and Losses of Developed North					Gains and Losses of Developed North				
From	Asia	WE	NA	Others	North	Asia	WE	NA	Others	North
North	4.27	1.80	-6.92	0.85	0.00	4.38	-3.73	-0.70	0.05	0.00
NA	3.34	3.15	0.00	0.44	6.92	2.71	-1.94	0.00	-0.07	0.70
WE	0.84	0.00	-3.15	0.51	-1.80	1.49	0.00	1.94	0.30	3.73
Asia	0.00	-0.84	-3.34	-0.10	-4.27	0.00	-1.49	-2.71	-0.18	-4.38
Developed Others	0.10	-0.51	-0.44	0.00	-0.85	0.18	-0.30	0.07	0.00	-0.05
South	-9.44	-3.88	-4.96	-0.61	-18.90	-10.45	-4.99	-4.77	-0.77	-20.97
China	-7.08	-1.58	-1.56	-0.16	-10.39	-8.50	-2.30	-1.69	-0.20	-12.69
ROA	-2.33	-1.15	-2.23	-0.15	-5.87	-2.02	-1.91	-2.49	-0.23	-6.66
Developing Others	-0.03	-1.15	-1.17	-0.30	-2.64	0.08	-0.77	-0.59	-0.35	-1.63
Non-allocated	0.01	-0.07	-0.12	0.08	-0.09	0.01	-0.01	-0.04	0.06	0.01
TOTAL	-5.16	-2.15	-12.01	0.32	-18.99	-6.05	-8.73	-5.51	-0.67	-20.96
Low Segment	Asia	WE	NA	Others	North	Asia	WE	NA	Others	North
North	1.33	0.53	-1.83	-0.03	0.00	1.04	-0.98	0.00	-0.06	0.00
NA	0.92	0.94	0.00	-0.03	1.83	0.41	-0.36	0.00	-0.06	0.00
WE	0.38	0.00	-0.94	0.03	-0.53	0.58	0.00	0.36	0.05	0.98
Asia	0.00	-0.38	-0.92	-0.03	-1.33	0.00	-0.58	-0.41	-0.05	-1.04
Dvled.Others	0.03	-0.03	0.03	0.00	0.03	0.05	-0.05	0.06	0.00	0.06
South	-5.10	-1.46	-1.50	-0.25	-8.31	-5.88	-1.62	-0.61	-0.12	-8.22
China	-4.04	-0.90	-0.66	-0.08	-5.68	-4.61	-1.06	-0.51	-0.08	-6.26
ROA	-1.08	-0.40	-0.62	-0.12	-2.23	-1.27	-0.38	0.08	-0.07	-1.64
Developing Others	0.02	-0.16	-0.22	-0.05	-0.40	0.00	-0.18	-0.18	0.04	-0.32
Non-allocated	0.01	0.01	0.00	-0.04	-0.02	0.00	0.00	0.00	-0.02	-0.02
TOTAL	-3.76	-0.91	-3.33	-0.32	-8.33	-4.84	-2.60	-0.60	-0.20	-8.23
Med.Segment	Asia	WE	NA	Others	North	Asia	WE	NA	Others	North
North	2.04	0.90	-3.53	0.59	0.00	2.00	-0.77	-1.42	0.20	0.00
NA	1.66	1.61	0.00	0.26	3.53	1.46	-0.10	0.00	0.06	1.42
WE	0.31	0.00	-1.61	0.41	-0.90	0.47	0.00	0.10	0.21	0.77
Asia	0.00	-0.31	-1.66	-0.07	-2.04	0.00	-0.47	-1.46	-0.07	-2.00
Developed Others	0.07	-0.41	-0.26	0.00	-0.59	0.07	-0.21	-0.06	0.00	-0.20
South	-3.63	-1.48	-2.25	-0.40	-7.76	-4.17	-1.88	-2.31	-0.63	-9.00
China	-2.87	-0.57	-0.76	-0.07	-4.27	-3.63	-0.98	-0.89	-0.11	-5.61
ROA	-0.84	-0.28	-0.86	-0.01	-1.98	-0.65	-0.48	-1.00	-0.12	-2.24
Developing Others	0.08	-0.63	-0.63	-0.32	-1.50	0.11	-0.43	-0.42	-0.41	-1.15
Non-allocated	0.00	-0.09	-0.09	0.09	-0.08	0.00	-0.07	-0.03	0.03	-0.06
TOTAL	-1.58	-0.67	-5.87	0.29	-7.84	-2.17	-2.73	-3.76	-0.40	-9.06
High Segment	Asia	WE	NA	Others	North	Asia	WE	NA	Others	North
North	0.90	0.37	-1.56	0.29	0.00	1.35	-1.97	0.71	-0.09	0.00
NA	0.75	0.60	0.00	0.21	1.56	0.84	-1.49	0.00	-0.07	-0.71
WE	0.15	0.00	-0.60	0.07	-0.37	0.44	0.00	1.49	0.04	1.97
Asia	0.00	-0.15	-0.75	0.00	-0.90	0.00	-0.44	-0.84	-0.06	-1.35
Developed Others	0.00	-0.07	-0.21	0.00	-0.29	0.06	-0.04	0.07	0.00	0.09
South	-0.71	-0.95	-1.22	0.05	-2.84	-0.40	-1.49	-1.85	-0.02	-3.76
China	-0.18	-0.12	-0.14	0.00	-0.44	-0.26	-0.26	-0.29	-0.01	-0.82
ROA	-0.41	-0.47	-0.75	-0.02	-1.66	-0.10	-1.06	-1.57	-0.04	-2.77
Developing Others	-0.12	-0.36	-0.33	0.07	-0.74	-0.03	-0.16	0.01	0.03	-0.16
Non-allocated	0.00	0.02	-0.03	0.02	0.01	0.00	0.06	-0.02	0.05	0.09
TOTAL	0.19	-0.56	-2.81	0.36	-2.82	0.95	-3.40	-1.15	-0.06	-3.67

* Product markets are segmented using alpha equal to 4. Negative figures on this table mean losses of the North to the groups shown on the first column. Recall that there are one-year gaps between each sub-period, so that the 1988-2010 aggregation is not a continuous period. The gains and losses of each sub-period are calculated as changes in market shares of each variety (low, medium and high) within each product in percentage points and then added up.

Table (6): Distribution of Direct Competition Gains and Losses of China 1988/2010 - in p.p.

	Laspeyres			Paasche		
Low Segment	alpha 3	alpha 4	alpha 5	alpha 3	alpha 4	alpha 5
North	5.22	5.68	6.00	5.73	6.26	6.63
NA	0.60	0.66	0.70	0.47	0.51	0.53
WE	0.83	0.90	0.95	0.97	1.06	1.11
Asia	3.72	4.04	4.26	4.21	4.61	4.90
Developed Others	0.08	0.08	0.09	0.07	0.08	0.09
South	2.40	2.64	2.82	2.85	3.19	3.46
RoA	2.22	2.45	2.61	2.65	2.97	3.21
Developing Others	0.18	0.20	0.21	0.20	0.23	0.25
Non-allocated	0.00	0.00	0.00	0.01	0.01	0.01
TOTAL	7.62	8.32	8.82	8.58	9.46	10.09
Medium Segment	alpha 3	alpha 4	alpha 5	alpha 3	alpha 4	alpha 5
North	5.24	4.27	3.60	6.62	5.61	4.91
NA	1.01	0.76	0.61	1.23	0.89	0.67
WE	0.76	0.57	0.45	1.13	0.98	0.92
Asia	3.40	2.87	2.48	4.14	3.63	3.23
Developed Others	0.08	0.07	0.06	0.12	0.11	0.10
South	3.02	2.56	2.21	3.75	3.32	2.97
RoA	2.71	2.28	1.96	3.38	2.95	2.62
Developing Others	0.31	0.28	0.26	0.38	0.36	0.35
Non-allocated	-0.03	-0.03	-0.04	-0.06	-0.06	-0.06
TOTAL	8.23	6.80	5.78	10.32	8.87	7.82
High Segment	alpha 3	alpha 4	alpha 5	alpha 3	alpha 4	alpha 5
North	0.39	0.44	0.47	0.68	0.82	0.95
NA	0.12	0.14	0.16	0.24	0.29	0.33
WE	0.11	0.12	0.12	0.22	0.26	0.30
Asia	0.16	0.18	0.18	0.21	0.26	0.31
Developed Others	0.00	0.00	0.00	0.01	0.01	0.01
South	0.18	0.23	0.26	0.23	0.31	0.38
RoA	0.17	0.20	0.23	0.26	0.34	0.41
Developing Others	0.02	0.02	0.03	-0.03	-0.03	-0.03
Non-allocated	0.01	0.01	0.01	0.01	0.01	0.02
TOTAL	0.59	0.67	0.74	0.92	1.13	1.34
Total	alpha 3	alpha 4	alpha 5	alpha 3	alpha 4	alpha 5
North	10.85	10.39	10.07	12.49	12.69	12.49
NA	1.73	1.56	1.47	1.53	1.69	1.53
WE	1.69	1.58	1.52	2.33	2.30	2.33
Asia	7.28	7.08	6.93	8.43	8.50	8.43
Developed Others	0.16	0.16	0.15	0.20	0.20	0.20
South	5.60	5.43	5.29	6.80	6.82	6.80
RoA	5.10	4.93	4.80	6.24	6.26	6.24
Developing Others	0.51	0.50	0.50	0.57	0.56	0.57
Non-allocated	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04
TOTAL	16.43	15.79	15.34	19.26	19.51	19.26

APPENDIX

World Bank Analytical Classifications - *GNI per capita in US$ (Atlas methodology)*

Data for calendar year :	**1988**	**1996**	**2002**	**2007**	**2010**
Low income (L)	<= 545	<= 785	<= 735	<= 935	<= 1,005
Lower middle income (LM)	546-2,200	786-3,115	736-2,935	936-3,705	1,006-3,975
Upper middle income (UM)	2,201-6,000	3,116-9,645	2,936-9,075	3,706-11,455	3,976-12,275
High income (H)	> 6,000	> 9,645	> 9,075	> 11,455	> 12,275
Afghanistan	L	L	L	L	L
Albania	..	LM	LM	LM	UM
Algeria	UM	LM	LM	LM	UM
American Samoa	H	UM	UM	UM	UM
Andorra	..	H	H	H	H
Angola	LM	L	L	LM	LM
Antigua and Barbuda	UM	UM	H	H	UM
Argentina	UM	UM	UM	UM	UM
Armenia	..	L	LM	LM	LM
Aruba	H	H	H	H	H
Australia	H	H	H	H	H
Austria	H	H	H	H	H
Azerbaijan	..	L	L	LM	UM
Bahamas, The	H	H	H	H	H
Bahrain	H	UM	H	H	H
Bangladesh	L	L	L	L	L
Barbados	UM	UM	H	H	H
Belarus	..	LM	LM	UM	UM
Belgium	H	H	H	H	H
Belize	LM	LM	UM	UM	LM
Benin	L	L	L	L	L
Bermuda	H	H	H	H	H
Bhutan	L	L	L	LM	LM
Bolivia	LM	LM	LM	LM	LM
Bosnia and Herzegovina	..	L	LM	LM	UM
Botswana	LM	LM	UM	UM	UM
Brazil	LM	UM	LM	UM	UM
Brunei Darussalam	..	H	H	H	H
Bulgaria	..	LM	LM	UM	UM
Burkina Faso	L	L	L	L	L
Burundi	L	L	L	L	L
Cambodia	L	L	L	L	L
Cameroon	LM	L	L	LM	LM
Canada	H	H	H	H	H
Cape Verde	LM	LM	LM	LM	LM
Cayman Islands	..	H	H	H	H
Central African Republic	L	L	L	L	L
Chad	L	L	L	L	L
Channel Islands	H	H	H	H	H
Chile	LM	UM	UM	UM	UM
China	L	L	LM	LM	UM
Colombia	LM	LM	LM	LM	UM
Comoros	L	L	L	L	L
Congo, Dem. Rep.	L	L	L	L	L
Congo, Rep.	LM	L	L	LM	LM
Costa Rica	LM	LM	UM	UM	UM
Côte d'Ivoire	LM	L	L	L	LM
Croatia	..	UM	UM	UM	H
Cuba	..	LM	LM	UM	UM
Curaçao	..	..	..	..	H
Cyprus	H	H	H	H	H
Czech Republic	..	UM	UM	H	H
Denmark	H	H	H	H	H
Djibouti	..	LM	LM	LM	LM
Dominica	LM	LM	UM	UM	UM
Dominican Republic	LM	LM	LM	LM	UM

Ecuador	LM	LM	LM	LM	UM
Egypt, Arab Rep.	LM	LM	LM	LM	LM
El Salvador	LM	LM	LM	LM	LM
Equatorial Guinea	L	L	L	H	H
Eritrea	..	L	L	L	L
Estonia	..	LM	UM	H	H
Ethiopia	L	L	L	L	L
Faeroe Islands	H	H	H	H	H
Fiji	LM	LM	LM	UM	LM
Finland	H	H	H	H	H
France	H	H	H	H	H
French Polynesia	..	H	H	H	H
Gabon	UM	UM	UM	UM	UM
Gambia, The	L	L	L	L	L
Georgia	..	LM	L	LM	LM
Germany	H	H	H	H	H
Ghana	L	L	L	L	LM
Greece	UM	H	H	H	H
Greenland	H	H	H	H	H
Grenada	LM	LM	UM	UM	UM
Guam	H	H	H	H	H
Guatemala	LM	LM	LM	LM	LM
Guinea	L	L	L	L	L
Guinea-Bissau	L	L	L	L	L
Guyana	L	L	LM	LM	LM
Haiti	L	L	L	L	L
Honduras	LM	L	LM	LM	LM
Hong Kong SAR, China	H	H	H	H	H
Hungary	UM	UM	UM	H	H
Iceland	H	H	H	H	H
India	L	L	L	LM	LM
Indonesia	L	LM	L	LM	LM
Iran, Islamic Rep.	UM	LM	LM	LM	UM
Iraq	UM	LM	LM	LM	LM
Ireland	H	H	H	H	H
Isle of Man	H	UM	H	H	H
Israel	H	H	H	H	H
Italy	H	H	H	H	H
Jamaica	LM	LM	LM	UM	UM
Japan	H	H	H	H	H
Jordan	LM	LM	LM	LM	UM
Kazakhstan	..	LM	LM	UM	UM
Kenya	L	L	L	L	L
Kiribati	LM	LM	LM	LM	LM
Korea, Dem. Rep.	..	LM	L	L	L
Korea, Rep.	UM	H	H	H	H
Kosovo	..	..	..	..	LM
Kuwait	H	H	H	H	H
Kyrgyz Republic	..	L	L	L	L
Lao PDR	L	L	L	L	LM
Latvia	..	LM	UM	UM	UM
Lebanon	LM	LM	UM	UM	UM
Lesotho	L	L	L	LM	LM
Liberia	L	L	L	L	L
Libya	UM	UM	UM	UM	UM
Liechtenstein	..	H	H	H	H
Lithuania	..	LM	UM	UM	UM
Luxembourg	H	H	H	H	H
Macao SAR, China	UM	H	H	H	H
Macedonia, FYR	..	LM	LM	LM	UM
Madagascar	L	L	L	L	L
Malawi	L	L	L	L	L
Malaysia	LM	UM	UM	UM	UM

Maldives	L	LM	LM	LM	UM
Mali	L	L	L	L	L
Malta	UM	UM	H	H	H
Marshall Islands	..	LM	LM	LM	LM
Mauritania	L	L	L	L	LM
Mauritius	LM	UM	UM	UM	UM
Mexico	LM	UM	UM	UM	UM
Micronesia, Fed. Sts.	..	LM	LM	LM	LM
Moldova	..	L	L	LM	LM
Monaco	..	H	H	H	H
Mongolia	..	L	L	LM	LM
Montenegro	..	..	..	UM	UM
Morocco	LM	LM	LM	LM	LM
Mozambique	L	L	L	L	L
Myanmar	L	L	L	L	L
Namibia	..	LM	LM	LM	UM
Nepal	L	L	L	L	L
Netherlands	H	H	H	H	H
New Caledonia	UM	H	H	H	H
New Zealand	H	H	H	H	H
Nicaragua	LM	L	L	LM	LM
Niger	L	L	L	L	L
Nigeria	L	L	L	L	LM
Northern Mariana Islands	..	H	UM	H	H
Norway	H	H	H	H	H
Oman	UM	UM	UM	H	H
Pakistan	L	L	L	L	LM
Palau	..	UM	UM	UM	UM
Panama	LM	LM	UM	UM	UM
Papua New Guinea	LM	LM	L	L	LM
Paraguay	LM	LM	LM	LM	LM
Peru	LM	LM	LM	LM	UM
Philippines	LM	LM	LM	LM	LM
Poland	LM	UM	UM	UM	H
Portugal	UM	H	H	H	H
Puerto Rico	UM	UM	H	H	H
Qatar	H	H	H	H	H
Romania	UM	LM	LM	UM	UM
Russian Federation	..	LM	LM	UM	UM
Rwanda	L	L	L	L	L
Samoa	LM	LM	LM	LM	LM
San Marino	..	..	H	H	H
São Tomé and Principe	L	L	L	L	LM
Saudi Arabia	H	UM	UM	H	H
Senegal	LM	L	L	L	LM
Serbia	..	..	..	UM	UM
Seychelles	UM	UM	UM	UM	UM
Sierra Leone	L	L	L	L	L
Singapore	H	H	H	H	H
Saint Maarten (Dutch part)	..	..	..	..	H
Slovak Republic	..	UM	UM	H	H
Slovenia	..	UM	H	H	H
Solomon Islands	LM	LM	L	L	LM
Somalia	L	L	L	L	L
South Africa	UM	UM	LM	UM	UM
South Sudan	..	..	..	..	..
Spain	H	H	H	H	H
Sri Lanka	L	L	LM	LM	LM
St. Kitts and Nevis	UM	UM	UM	UM	UM
St. Lucia	LM	UM	UM	UM	UM
St. Martin (French part)	..	..	..	..	H
St. Vincent and the Grenadines	LM	LM	LM	UM	UM
Sudan	L	L	L	LM	LM

Suriname	UM	LM	LM	UM	UM
Swaziland	LM	LM	LM	LM	LM
Sweden	H	H	H	H	H
Switzerland	H	H	H	H	H
Syrian Arab Republic	LM	LM	LM	LM	LM
Taiwan, China	H	H	H	H	H
Tajikistan	..	L	L	L	L
Tanzania	L	L	L	L	L
Thailand	LM	LM	LM	LM	UM
Timor-Leste	..	..	L	LM	LM
Togo	L	L	L	L	L
Tonga	LM	LM	LM	LM	LM
Trinidad and Tobago	UM	UM	UM	H	H
Tunisia	LM	LM	LM	LM	UM
Turkey	LM	LM	LM	UM	UM
Turkmenistan	..	LM	LM	LM	LM
Turks and Caicos Islands	..	..	..	..	H
Tuvalu	..	..	..	..	LM
Uganda	L	L	L	L	L
Ukraine	..	LM	LM	LM	LM
United Arab Emirates	H	H	H	H	H
United Kingdom	H	H	H	H	H
United States	H	H	H	H	H
Uruguay	UM	UM	UM	UM	UM
Uzbekistan	..	LM	L	L	LM
Vanuatu	LM	LM	LM	LM	LM
Venezuela, RB	UM	LM	UM	UM	UM
Vietnam	L	L	L	L	LM
Virgin Islands (U.S.)	H	H	H	H	H
West Bank and Gaza	..	LM	LM	LM	LM
Yemen, Rep.	LM	L	L	L	LM
Zambia	L	L	L	L	LM
Zimbabwe	LM	L	L	L	L

Note: Income classifications are set each year on July 1 for all World Bank member economies, and all other economies with populations of more than 30,000. These official analytical classifications are fixed during the World Bank's fiscal year (ending on June 30), thus economies remain in the categories in which they are classified irrespective of any revisions to their per capita income data. The historical classifications shown are as published on July 1 of each fiscal year. http://data.worldbank.org/about/country-classifications/a-short-history (accessed 5 January 2013).