# LA LETTRE DU

# CEPII

## CRISIS AND TRADE : BAD TIMES FOR HIGH QUALITY

*Similar products are imported at different prices, suggesting that varieties are vertically differentiated between low and high quality. This differentiation of varieties according to their quality enables to provide new evidence regarding the collapse of world trade during the recent crisis. The decrease of world demand has affected the imports of high quality varieties to a larger extent, leading to a decrease of import prices. Our econometric estimations over a period of ten years confirm that the revenue elasticity of import quantity is larger for high quality imports. Hence, a decrease of world revenue is expected to decrease more the world imports of high quality as compared with the imports of low quality. To the contrary, recovery should benefit more to the imports of high quality*

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### ■ World trade has collapsed

Much attention has been paid to the recent collapse of world trade, during the last quarter of 2008 and the first quarter of 2009. Recent forecasts by the IMF point to a reduction of world trade volume by 11% for the year 2009, while the value of world trade should contract by 23%. These numbers are by far larger than the -1.1% prediction regarding world production.[1]

Recent empirical contributions have provided some explanations to the decrease of world trade. First, the availability of trade finance instruments such as letters of credit may be one of the key parameters there. Indeed, exporting and importing firms typically make use of such instruments to insure against the risk of payment, with the assistance of issuing (for the importer) and advising (for the exporter) banks. In a context of global financial crisis, the incapacity of banks to provide such instruments may be a source of disruption of trade relationships. The data on trade credit, though, are very scarce, which makes it difficult to disentangle "pure" finance and "trade" finance mechanism. Beyond trade credit issues, the lack of overall credit available to firms may have contributed to the collapse of trade volume. Second, in times of recession, nations have the possibility to raise their protection on imports of goods by making use of measures allowed by the WTO rules. Those measures comprise subsidies, anti-dumping measures, bailout packages, licensing requirements and standards. Hence, access to finance and the rise of protection are good candidates to explain the decrease of trade volumes.[2]

The trade collapse has been larger in values than in volume, which has resulted in a reduction of aggregate import price indexes by 20% for advanced economies, between April 2008 and April 2009.[3] In a recent Vox article, Joseph Francois and Julia Woerz[4] show that part of the decrease of import prices can

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1. IMF, *World Economic Outlook*, October 2009.
2. About the collapse of world trade, see A. Bénassy-Quéré *et al.* (2009), "Is Trade the Victim of Globalisation?", *La Lettre du CEPII* no 291, 14 september; See S. Evenett & R. Baldwin, "The collapse of global trade, murky protectionism, and the crisis: Recommendations for the G20", CEPR, 2009.
3. This is what we find using the CPB Netherlands Bureau for Economic Policy Analysis.
4. J. Francois & J. Woerz, "The big drop: Trade and the Great Recession", Vox, April 2009.

be explained by the reduction of world commodity prices. But the contraction of markups and individual prices, or the selection of varieties according to their price, may have also contributed to the decrease of import price indexes.

Shocks on income can indeed affect differently the demand addressed to low price varieties, and high price varieties, that are imported. Higher price varieties are usually assumed to be characterized by a higher quality. If variations of income affect differently imports of high quality varieties, as compared to the demand addressed to low qualities, this would result in a change in the composition of varieties in the import price index. More precisely, if consumers substitute imported varieties to the benefit of cheaper ones, in times of crisis, this would result in a decrease of import price indexes. This is an important policy question, since the reaction of aggregate exports to shocks on aggregate demand may depend on the vertical specialization of countries over different quality ladders.

■ Imports of high quality
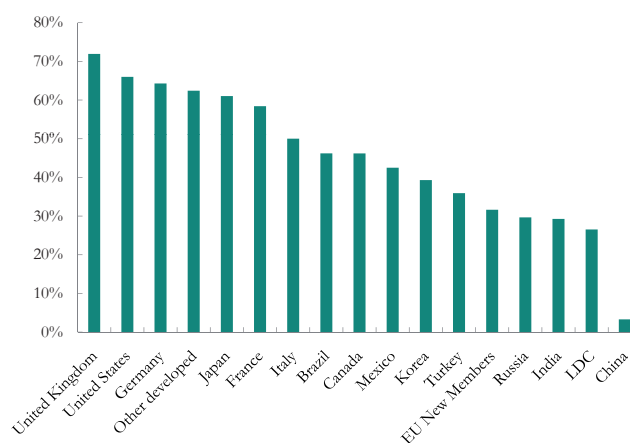have been more affected by the crisis

Measuring differences in the levels of quality offered by countries on each market is challenging. Previous works have extracted information about quality from prices or unit values (See Fontagné *et al.* 2008).[5] Goods within a detailed product category are indeed imported at different prices on each market, suggesting that varieties are actually vertically differentiated according to their origin. To illustrate this, one can refer to a narrow category of cars called "motor cars with spark-ignition internal combustion reciprocating piston engine, of a cylinder capacity >1000cc but not >1500cc". Within this category of cars, import unit values can differ a lot according to the country of origin. Though, each variety continues to be imported. This is what has been called vertical differentiation: different characteristics associated with each variety (*e.g.* quality) justifies that each variety is sold at a different price on the importer's market. We therefore rely on the classification of varieties according to their price, to allocate them across low quality or high quality groups of varieties.

We proceed to a classification of varieties in low or high quality categories by considering the distribution of import prices within detailed product categories. Varieties with an import price above the average price observed on the market are classified as high quality varieties, and those varieties with an import price below the average import price are classified as low quality varieties. We proceed to this classification by using

a database containing international trade data at the highest level of disaggregation (HS 6 to 10 digits according to the declaring – importing country). These data are provided by United Nations for the year 2005, and report both import values and quantities. Importantly one exporter can sell both high and low quality varieties, across products and markets. Moreover, as the classification in low or high quality is specific to the destination, a variety exported to two different destinations can be classified in different quality segments.

Figure 1 below reports the share of high quality exports for a selection of countries. For advanced economies exports of high quality varieties represent the highest share of their exports, while high quality exports represent only 3.3% of Chinese exports in 2005. This emphasizes that in a majority of cases, the unit value of Chinese varieties is below the average import price observed on the import market. On average, our data indicate that unit values of OCDE countries are twice the unit values of China, over all import markets.

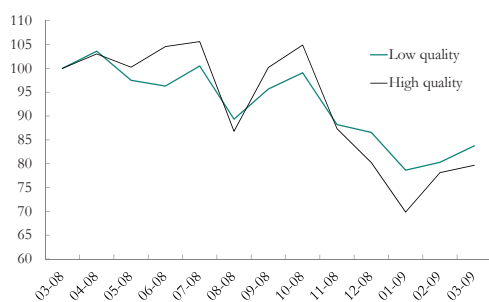Figure 1 – Share of exporting countries' exports with high quality, in 2005



*Source*: ONU, Comtrade, authors' calculations.

With this classification of varieties between high and low quality, within product categories, we compute the evolution of low quality imports, and high quality imports, by the EU15. Data are provided by Eurostat Comext, from which we extract data for a sample composed of major exporters to the EU15,[6] at the Combined Nomenclature (CN) 8-digits level of disaggregation. Figure 2 reports the evolution of import quantity, for high and low quality varieties, over the recent months. The comparison of the light grey curve (high quality) and dark grey curve (low quality) shows that the decrease of import quantity has been larger for high quality imports (-23%), as compared to low quality imports (-17%), in

5. L. Fontagné, G. Gaulier & S. Zignago, "Specialization Across Varieties and North–South Competition", *Economic Policy*, 23 (53): 51-91, 2008.
6. This sample of countries is composed of the individual countries members of the EU27, the United States, Canada, Japan, Australia, Switzerland, Israel, Korea, Mexico, Chile, Argentina, Brazil, Russia, Turkey, India, Singapore, Indonesia, China, Thailand, Egypt, Morocco, Senegal and Ivory Coast.

Figure 2 – Evolution of low quality
and high quality import quantity by the EU15
March 2008 = 100



*Source*: Eurostat, Comext, authors' calculations.

march 2009 as compared to the previous year. The disconnection between the high and low quality was more pronounced during the fourth quarter of 2008.

■ ...because they are more sensitive
to income variations

Why should income elasticity of imports differ across quality levels? Textbooks in microeconomics detail how income variations can possibly channel through consumption. In the case where consumer's choice is focused on quantity, an increase of income leads to an increase in the consumption of each variety by the same amount. This is the traditional "Engel curve". Textbooks though discuss the possibility that substitution may occur between luxury goods and necessity/normal goods.

Recently, Bils and Klenow (2001) have developed a model where consumer choice focuses on quality rather than on the quantity of consumption for each good.[7] An increase of income is associated with consumption of higher quality goods. This relation can be qualified of "quality Engel Curve". Empirical tests on a consumer survey for durable goods in the United States confirm that higher income is associated with consumption of higher quality goods. Fajgelbaum *et al*. (2009) also develop a model where consumers have different incomes and different tastes. The model predicts that the fraction of consumers that buy high quality varieties rises with income.[8]

These predictions are in line with the descriptive statistics that we discussed above. The recession in 2008 and 2009 has been associated with a decrease of the market share of high quality varieties in the EU15 imports. This suggests that the income elasticity is larger for high quality varieties, than for low quality varieties. We test this prediction by estimating elasticity of import quantity for each quality segment, with respect to variations of the GDP for the period 1996-2007. Import quantity and unit values
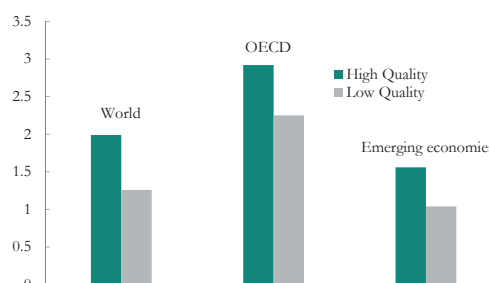
are provided by the BACI database (CEPII), with HS6 product disaggregation (some 6,000 single product categories). GDP and nominal exchange rates are provided by the World Development Indicators (World Bank). We estimate import demand equations separately for each HS4 level of product disaggregation, and 184 exporting and importing countries.

Since we have as many coefficients as HS4 product categories, we report the median of income elasticity in the Figure 3 below, considering all coefficients. Estimation results are reported for the whole sample of importers (world), for OECD importers and for emerging countries.

First of all, estimation results show that, as expected, an increase of aggregate income (measured by GDP) increases the quantity of goods that is imported. However, the income elasticity differs significantly across low and high quality varieties. The income elasticity is almost 60% higher for high quality varieties, as compared to the income elasticity for low quality varieties. This indicates that imports of high quality/high price varieties are more sensitive to GDP variations. This result is obtained by considering all countries. Results are qualitatively similar when the elasticity is estimated for OECD destinations or emerging economies destinations.

Secondly, the median income elasticity is always above unity. This is the case for both high quality/high price varieties, and low quality/low price varieties. This implies that variations of import quantity are always larger than variations of GDP. This result is in line with the recent statistics regarding trade and GDP, with a larger collapse trade volume as compared to the decrease of world production. If we apply this decrease of world production to our results, we find that the predicted contraction of world GDP in 2009 should lead to a 1.6% decrease of the import quantity for low quality varieties, and a 2.6% decrease of import quantity for high quality varieties. The difference between our

Figure 3 – Income elasticity of imports according
to their quality ladder
Estimation result for 1996-2007



*Note:* Income elasticity of imports correspond to the growth of imports in percentage when the income increase by 1%.
*Source*: BACI, authors' calculations.

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7. M. Bils & P. Klenow, "Quantifying quality growth", *The American Economic Review* 91 (4): 1006-1030, 2001.
8. P. Fajgelbaum, G. M. Grossman & E. Helpman, "Income distribution, product quality and international trade", *mimeo*.

prediction and the actual data however suggest that other factors, such as the rationing of credit or the rise of protection, have also contributed to the decrease of world import volumes.

Finally, Figure 3 reports that the income elasticity is larger for OECD destinations, as compared to emerging destinations. Recession has been worse for advanced economies. These figures, taken together, contribute to explain the recent collapse of world trade: countries for which import demand is more elastic to GDP variations also had the largest recession this year.

## ■ Specialization over quality can influence the evolution of aggregate exports

Using predictions for the GDP variations in 2009, it is possible to quantify the evolution of aggregate exports.[9] For each exporter and each destination, the variation of aggregate exports is obtained by using the distribution of exports across the high quality and low quality categories.

Considering separately each individual destination, predictions show that the heterogeneous reaction of exports to GDP variations is quantitatively important. Where GDP is decreasing, the demand addressed to Chinese varieties is less decreasing than the demand addressed to the varieties exported by advanced economies. The difference in the response of exports, between countries specialized on low or high quality exports, can reach two percentage points on each individual market.

Note however that these predictions do not take into account country or country-pair specific factors that can affect the reaction of exports. For instance, the evolution of aggregate exports to China is expected to be very positive, given the predicted increase of GDP. However, barriers to entry may prevent exports to expand at this rate. This exercise suggests, nevertheless, that specialization on low or high quality ladders can have large aggregate effects, regarding the response of exports to GDP variations.

Table 1 – Forecasts for export quantity variations in 2009 (selected exporting countries)

|  |  | Importer | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
|  |  | Germany | France | United States | Japan | United Kingdom | Brazil | China | India |
| Exporter | Germany | - | -8.0 | -7.7 | -16.9 | -11.0 | -1.7 | 9.1 | 6.2 |
|  | France | -14.6 | - | -7.5 | -17.0 | -10.4 | -1.7 | 9.0 | 6.2 |
|  | United States | -14.5 | -8.1 | - | -16.7 | -10.8 | -1.7 | 8.5 | 6.1 |
|  | Japan | -14.8 | -8.1 | -7.6 | - | -10.6 | -1.8 | 8.3 | 6.2 |
|  | United Kingdom | -14.9 | -7.8 | -7.8 | -16.7 | - | -1.8 | 8.8 | 6.4 |
|  | Brazil | -14.2 | -7.2 | -7.1 | -15.7 | -10.1 | - | 9.3 | 6.3 |
|  | China | -13.1 | -7.0 | -6.5 | -14.7 | -9.5 | -1.5 | - | 5.0 |
|  | India | -13.7 | -7.3 | -7.1 | -16.0 | -9.8 | -1.6 | 9.2 | - |
| GDP prediction |  | -5.6 | -3.0 | -2.8 | -6.2 | -4.1 | -1.3 | 6.5 | 4.5 |

*Note*: Countries are classified by alphabetical order, distinguishing developed and emerging countries.
*Source*: BACI and FMI, authors' calculations.

What can we expect for the recovery? High quality varieties are more affected by variations of income. This result has important policy implications for future perspectives regarding trade. Several countries have already provided signs that the recession has come to an end. One can therefore expect that future expansion of income should be associated with an increase of the volume of world trade. The main findings of this short paper suggest that the increase of income in importing countries should be associated with a quicker recovery for imports of high quality. In other words, while countries specialized on high quality ladders suffer more in times of crises and when aggregate demand contracts, they should also experience a quicker recovery regarding their exports. Another implication of these results is that high quality exports are more volatile than low quality exports. This implies policies that promote innovation may also lead exports to be more responsive to the business cycle.

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