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ABSTRACT

We identify a new set of stylized facts on the 2008-2009 trade collapse that we hope can be used to shed light on the importance of demand and supply-side factors in explaining the fall in trade. In particular, we decompose the fall in international trade into product entry and exit, price changes, and quantity changes for imports by Brazil, the European Union, Indonesia, and the United States. When we aggregate across all products, most of the countries analyzed experienced a decline in new products, a rise in product exit, and falls in quantity for product lines that continued to be traded. The evidence suggests that the intensive rather than extensive margin mattered the most, consistent with studies of other countries and previous recessionary periods. On average, quantities declined and prices fell. However, these average effects mask enormous differences across different products. Price declines were driven primarily by commodities. Within manufacturing, while most quantity changes were negative, in most cases price changes moved in the opposite direction. Consequently, within manufacturing, there is some evidence consistent with the hypothesis that supply side frictions played a role. For the United States, price increases were most significant in sectors which are typically credit constrained.

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1. Introduction

As has been widely documented, the world-wide economic crisis of 2008 and 2009 was accompanied by a severe fall in international trade. Baldwin (2009) characterizes the collapse as "sudden, severe, and synchronized… the sharpest in recorded history and deepest since WWII." A number of hypotheses exist to describe what caused the collapse and why it became so widespread and deep (for summaries, see Baldwin 2009 and CEA 2010). In addition to the fall in aggregate demand, a number of supply-side factors may have played a role. Anecdotal evidence abounds that trade finance was restricted, which could have resulted in a decline in trade from the supply side. Others have noted that with the globalization of supply-chains, a fall in manufactures could lead to an outsized fall in total trade, particularly if supply chains are disrupted. Finally, protectionism rose, although not to the extent that was initially feared.

The speed and durability of the recovery could depend on which margin, extensive or intensive,[2] has been the most affected by the crisis, and by how fast it responds to fiscal stimulus. For VOXEU, Peter Schott wrote in November 2009 that "If the current 'shock' to US trade is similar to those that have occurred before, most of the decline in exports and imports we've seen is due to less intense trade rather than firm and firm-product exit. To the extent that this is true, trade will bounce back relatively quickly once conditions improve. It is of course possible that the severe shortage of credit available to firms over the past year has led to a higher-than usual share of harder-to-reverse firm exit, potentially dampening the speed of recovery".

As indicated by Schott, if there are significant fixed costs associated with exporting or importing new products, then identifying whether most of the changes in trade were on the

[2]The intensive margin refers to changes in the value of exports due to changes in the quantities and/or prices of already exported goods. The extensive margin refers to changes in the value of exports due to changes in the number of goods exported and/or changes in the number of destinations to which a country exports old or new goods.

intensive margin is useful in predicting the speed of the recovery. There has also been substantial interest in identifying the role of demand shocks versus supply shocks in explaining the largest collapse in world trade since the 1930s. Supporters of the demand shock hypothesis argue that the collapse in trade has been the result of a synchronized postponement of purchases, especially of durable consumer and investment products. By contrast, supporters of the supply shock hypothesis suggest that the collapse in trade has been a consequence of the sudden financial arrest, which froze global credit markets and spilled over on the specialized financial instruments that finance international trade.

In this paper, we identify a new set of stylized facts on the 2008-2009 trade collapse that we hope can be used to shed light on the importance of demand and supply-side factors in explaining the fall in trade. In particular, we decompose the fall in international trade into product entry and exit, price changes, and quantity changes for imports by Brazil, the European Union, Indonesia, and the United States. To our knowledge, this is the first paper to decompose the trade collapse at the product level into changes in prices and quantities, as well as entry and exit. Our approach is inspired by earlier work analyzing the 1997 Asian crisis by Bernard, Jensen, Redding, and Schott (2009). However, we go one step further: we decompose the observed changes in trade at the intensive margin into price and quantity changes.

Our ability to identify what happened to traded prices and quantities between 2008 and 2009 allows us to suggest a new way of identifying the importance of demand versus supply factors in contributing to the observed fall in trade. We would expect that if the decline in trade was mostly driven by a negative demand shock, then both prices and quantities would be negatively affected. However, if supply side shocks were important, with a reduction in trade credit leading to a reduction in supply of traded goods independently of the negative demand

shock, then we would have expected less downward pressure, and possibly upward pressure, on prices.

When we aggregate across all products, most of the countries analyzed experienced a fall in new products, an increase in product exit, and falls in quantity for product lines that continued to be traded. Whereas the overall price effect is negative in the US, EU and Indonesia, it is positive in Brazil. These effects are similar for high-income and middle-income partner countries, but trade with low-income partner countries was much less affected. Trade with upper-middle income exporters appears to have suffered the most. Overall, the most value was lost through a reduction in value of products that continued to be traded, although potential value was also lost as more products exited and fewer products entered. This evidence that the intensive rather than extensive margins mattered the most matches previous evidence on the 1997 Asian crisis (Bernard, Jensen, Redding and Schott 2009). Across all products, both prices and quantities fell significantly in the US and EU, which is consistent with a story where the demand shock played a dominant role. Aggregating across all product categories, the evidence is consistent with the conclusions reached by Eaton et al (2010) and Levchenko et al (2010), who argue that the collapse in trade was caused primarily by a synchronized demand-side shock.

However, these average effects mask significant differences across product types. Disaggregating the data into manufactures and non-manufactures, we show that the price declines are driven primarily by commodities. Within manufacturing, while most quantity changes were negative, in most cases price changes moved in the opposite direction. This is particularly true for products imported by developing-country trading partners. Consequently, within manufacturing, there is some evidence consistent with the possibility that supply side frictions did play a role.

Considerable differences emerge across product types and exporter income levels. Some have argued that South-South trade was less disrupted during the crisis. While this appears to be the case if one examines aggregate trade patterns across all goods, there is a large decline in manufacturing trade with Sub-Saharan Africa. We indeed find a small positive quantity effect for total exports from low-income countries to Brazil and Indonesia, but there is an almost equally large negative net entry effect. Furthermore, the quantity effect for manufactures alone is negative. We also find evidence consistent with the view that credit constraints could account for the price increases which occurred in the manufacturing sector. For the United States, for example, price increases were most significant in sectors which are typically credit constrained.

In Section II, we describe the conceptual approach. Results are presented in Section III, and Section IV concludes. We focus on the decomposition of changes in trade into entry, exit, price and quantity changes. Our ability to separate price and quantity changes allows us to identify the upward trajectory of prices for manufacturing, which could be consistent with a role for credit constraints in explaining some—but obviously not the majority—of the collapse in world trade.

2. Conceptual Approach

Our approach is inspired by earlier work analyzing the 1997 Asian crisis by Bernard, Jensen, Redding, and Schott (2009). However, we go one step further: we decompose the observed changes in trade at the intensive margin into price and quantity changes. For each importing country, we can tabulate the total number of products that entered or exited or continued in the market for imports from a given partner country. Most products fall into the

"continuing" category, for which we can assign further divisions. For each continuing product, we can decompose the change in value from one year to the next into price and quantity margins. If the data are missing for one of the years, we do not assign a status.

Together, these classifications allow us to analyze whether the fall in trade values worldwide was a result of changing extensive margins (fewer products entering, more products exiting) or intensive margins (falling quantities, falling prices, or some combination thereof).

Specifically, our main decomposition is as follows. At time t, we can write total value as the sum of the value v of each product i, which is the product of price p and quantity q: (1)

$$v_t = \sum_{i=1}^{I} p_t^i q_t^i$$

Then the change in total value from period t-1 to period t can be written as follows: (2)

$$dv_t = v_t - v_{t-1} = \sum_{i=1}^{I} p_t^i q_t^i - \sum_{i=1}^{I} p_{t-1}^i q_{t-1}^i$$

This can be decomposed into products that are traded in both *t* and *t-1* (denoted *c* for continuing), only in *t* (denoted *n* for entry), or only in *t-1* (denoted *x* for exit): (3)

$$dv_t = \sum_{c=1}^{C} p_t^c q_t^c - \sum_{c=1}^{C} p_{t-1}^c q_{t-1}^c + \sum_{n=1}^{N} p_t^n q_t^n - \sum_{n=1}^{N} p_{t-1}^n q_{t-1}^n + \sum_{x=1}^{X} p_t^x q_t^x - \sum_{x=1}^{X} p_{t-1}^x q_{t-1}^x$$

Where $v_{t-1}^n = 0$ and $v_t^x = 0$: (4)

$$dv_t = \sum_{c=1}^{C} p_t^c q_t^c - \sum_{c=1}^{C} p_{t-1}^c q_{t-1}^c + \sum_{n=1}^{N} p_t^n q_t^n - \sum_{x=1}^{X} p_{t-1}^x q_{t-1}^x$$

To separate the price and quantity effects, we add and subtract $\sum_{i=1}^{I} p_t^i q_{t-1}^i$ for the continuing products: (5)

$$dv_t = \sum_{c=1}^{C} p_t^c q_t^c + \sum_{c=1}^{C} p_t^c q_{t-1}^c - \sum_{c=1}^{C} p_t^c q_{t-1}^c - \sum_{c=1}^{C} p_{t-1}^c q_{t-1}^c + \sum_{n=1}^{N} p_t^n q_t^n - \sum_{x=1}^{X} p_{t-1}^x q_{t-1}^x$$

Rearranging we get: (6)

$$dv_t = \sum_{c=1}^{C} p_t^c \Delta q_t^c + \sum_{c=1}^{C} \Delta p_t^c q_{t-1}^c + \sum_{n=1}^{N} p_t^n q_t^n - \sum_{x=1}^{X} p_{t-1}^x q_{t-1}^x$$

Note that had we added and subtracted $\sum_{i=1}^{I} p_{t-1}^i q_t^i$ we would instead obtain: (7)

$$dv_t = \sum_{c=1}^{C} p_{t-1}^c \Delta q_t^c + \sum_{c=1}^{C} \Delta p_t^c q_t^c + \sum_{n=1}^{N} p_t^n q_t^n - \sum_{x=1}^{X} p_{t-1}^x q_{t-1}^x$$

Or that we could use the average of these two: (8)

$$dv_t = \sum_{c=1}^{C} \frac{p_t^c + p_{t-1}^c}{2} \Delta q_t^c + \sum_{c=1}^{C} \Delta p_t^c \frac{q_t^c + q_{t-1}^c}{2} + \sum_{n=1}^{N} p_t^n q_t^n - \sum_{x=1}^{X} p_{t-1}^x q_{t-1}^x$$

Thus any of the last three equations gives us that the total change in value is the sum of the quantity effect, the price effect, the new product effect, and the exiting product effect, i.e., the sum of the intensive and extensive margins. Then the percentage change can be found as follows: (9)

$$\frac{dv_t}{v_{t-1}} = \frac{\sum_{c=1}^{C} \frac{p_t^c + p_{t-1}^c}{2} \Delta q_t^c}{v_{t-1}} + \frac{\sum_{c=1}^{C} \Delta p_t^c \frac{q_t^c + q_{t-1}^c}{2}}{v_{t-1}} + \frac{\sum_{n=1}^{N} p_t^n q_t^n}{v_{t-1}} - \frac{\sum_{x=1}^{X} p_{t-1}^x q_{t-1}^x}{v_{t-1}}$$

And if we want to know whether these effects are driven by the number of products or the average value of each product, we can write: (10)

$$\frac{dv_t}{v_{t-1}} = C * \frac{\sum_{c=1}^{C} \frac{p_t^c + p_{t-1}^c}{2} \Delta q_t^c}{C * v_{t-1}} + C * \frac{\sum_{c=1}^{C} \Delta p_t^c \frac{q_t^c + q_{t-1}^c}{2}}{C * v_{t-1}} + N * \frac{\sum_{n=1}^{N} p_t^n q_t^n}{N * v_{t-1}} - X * \frac{\sum_{x=1}^{X} p_{t-1}^x q_{t-1}^x}{X * v_{t-1}}$$

Thus the total change in value is the sum of the average quantity effect, the average price effect, the average new product effect, and the average exiting product effect, each weighted by the number of products.

3. Results

We analyze imports from all partner countries for the United States, Brazil, Indonesia, and each member of the European Union. We observe, for all traded products, value and quantity, from which we calculate unit-values. The data are disaggregated at the 6-digit product level by both importing and exporting countries. Observations are available by month from January 2007 to November 2009. The data are available in US dollars for the US, Brazil, and Indonesia and in Euros for the EU. The choice of currency used in this analysis is important, as both real and nominal exchange rates fluctuated sharply during the crisis. In particular, the dollar appreciated substantially against the currencies of most major trading partners, with the exceptions of Japan and China. The currencies of Brazil, Korea, Mexico, Hungary, Poland, and Ukraine depreciated more than 50 percent against the dollar, although they saw some recovery after the beginning of 2009 (CEA 2010). Figures 1a and 1b show real and nominal exchange rates of the euro, Brazilian real, and Indonesian rupiah against the US dollar. [3]

As our analysis focuses on imports, we deflate using the importer countries' Consumer Price Indices (which are available monthly, unlike GDP deflators or trade-weighted deflators). In the future, we hope to use a combination of importer country and exporter country CPIs. Final results are normalized to US dollars (at September of 2009 exchange rates). Note that real exchange rates fluctuated even within the European Union, so we use country-specific CPIs there as well (except in figures 1a and 1b, which uses a EU27-wide CPI). Nominal exchange rates and

[3] For illustrative purposes, consider the real exchange rates in March 2008 and March 2009, when the euro rose against the dollar approximately 18%, the real approximately 27%, and the rupiah approximately 16% (all in real terms). Suppose that the US saw a drop in trade during that period from 100 real dollars to 70 real dollars, or 30%. This same drop would be just 18% in real euros, 11% in real reais, and 19% in real rupiahs; one's choice of currency matters during the crisis.

CPI data are taken from Eurostat for the EU countries and from Global Financial Data for Brazil and Indonesia. CPI data for the US is from the Bureau of Labor Statistics.

Very rarely, observations on value are missing. More commonly, data on quantity are missing. Both, of course, affect our ability to calculate unit-values. The US, EU, and Brazil all report a main quantity variable and a supplemental quantity variable. We use the main quantity variable where possible, and the supplemental quantity variable where the main measure is not reported.

To maximize data reliability, only trade as reported by the importer country is used. European Union import data are collected by Eurostat and was obtained through Tradewatch. United States data are from the US International Trade Commission (USITC) and was also obtained through Tradewatch. Brazilian data was obtained from the Ministry of Development, Industry, and International Trade (MDIC), and Indonesian data from BPS-Statistics Indonesia (BPS). For all four datasets, monthly data was aggregated into quarters. 8-digit and 10-digit tariff line data are aggregated into 6-digit Harmonized System product codes. All four datasets report trade with both other nations and some territories (e.g. Taiwan, Guam, etc.). Generally we report results with these territories included in the data as separate units of observation. An exception is the section on partner income, where we only include nations and a few large territories (e.g. Taiwan). Territories represent a very small fraction of world trade, and accordingly should not influence the results.

To analyze product entry and exit, we tabulate whether products were traded for a bilateral country-pair in a given period. For instance, we assign one "point" in the first quarter of 2007 to the United States for its imports from Germany of product # 520829 (*Woven fabrics of cotton, containing 85 percent or more by weight of cotton, weighing not more than 200 g/m^2:*

Other fabrics). We again assign one "point" in the first quarter of 2008, as product # 520829 was again imported by the United States from Germany.

Before turning to the decomposition, we examine the changes in the extensive and intensive margins. This is presented in Figures 2 and 3. Figure 2 shows the fall in bilaterally traded products at the beginning of the global economic crisis. There is a drop in the total number of bilaterally-traded products for Brazil, Indonesia, and the US, all beginning in October 2008; however there is no fall for the European Union. The percentage fall in the total number of products is greatest for Brazil and Indonesia, reaching about 10 percent from peak to trough for both countries. By contrast, there is no decline in the percentage of products traded for the EU and the decline for the United States is half of that for Brazil and Indonesia, around 5 percent.

Figure 3 shows the values for the US, Brazil, Indonesia, and the average across the European Union. Each shows a sharp drop in total value of imports beginning in October 2008, with recovery beginning in early 2009. None was back to pre-crisis levels by the end of the period shown (September 2009). It is also important to note the much greater volatility experienced by the developing countries. The total value of imports fell by nearly half for Brazil and Indonesia, before beginning to recover. At the end of the sample period, however, the total loss in trade was about the same for both groups of countries, around one third to one fourth of aggregate trade. Since the sample ends in September 2009, the trends do not capture the continued slow recovery since that period.

Our decomposition is carried out in six-month periods; annual data are too aggregated as it cuts across pre-crisis and crisis months. To eliminate problems with seasonal exports, we count whether products are "entering" or "continuing" according to their status from the first half of year t to the first half of year $t+1$. For instance, product # 520829 is considered "continuing" in

2008 since it was traded in the first six months of 2007. A product that was not traded in January-June of 2007 but was in January-June of 2008 is counted as "entering." Similarly, a product that is traded in January-June 2007 but not January-June 2008 is counted as "exiting." All of these classifications are assigned at the country level; if a product were imported one year only from Germany and the next year only from Italy, it would be counted as exiting from Germany and entering Italy.

Table 1 and figure 4 show the results for the decomposition. To simplify the table, we aggregate the United States and the EU into one group, and Brazil and Indonesia into a separate group.[4] In this table we use the decomposition as it appears in equation (10).[5] That is, in calculating the quantity effect, we use the average of prices in the two periods (and similarly the average of quantities for the price effect). We eliminate observations on price and quantity where using this average, rather than one period's price or the other's, would make a substantial difference. These observations are not dropped; rather they are absorbed by the category "continuing products, price and quantity unobserved." This category also includes products which simply did not have a price and quantity recorded.

The EU and US together lost over 1 trillion dollars in imports from the first half of 2008 to the first half of 2009, or 25.2 percent. Both table 1 and figure 4 make clear that the effects along the intensive margin dramatically outweighed the effects along the extensive margin, both in the US-EU markets and in the Brazil-Indonesia markets. The reduction in quantity was largest, and it accounted for over 63% of the total value change in the US and EU. The decline in prices

[4] Results for the individual countries are available upon request. In addition, we perform the analysis both for the European Union as a whole and for individual countries. Finally, we consider both European Union trade with all partners, and EU trade exclusively with extra-EU partners. The results shown in Table 1 are qualitatively similar for the EU as a whole versus Germany, and for all partners versus extra-EU partners only. These are available upon request.

[5] Note that, as we report the number of products and the average value of each product, the results can easily be converted to match equations (8) or (9). In subsequent tables, we present results following equation (9), which can again be converted to match equation (8).

accounted for approximately 22% in the US and EU. Net entry, the sum of the new product (-6.5%) and exiting product (8.9%) contributions, contributed to only 2.4% of the total value change.

Brazil and Indonesia together lost over 25 billion dollars in imports from the first half of 2008 to the first half of 2009, or 18.9%. The effects along the intensive margins again dominated, with the quantity effect again largest. Indeed, the fall in quantity contributed to almost all of the total value change. The price effect was actually positive, partially outweighing the value lost from the quantity effect. Negative net entry accounted for 5.3% of the total value change, over twice as high as the net entry effect in the US and EU. These higher entry and exit rates are consistent with the higher volatility in trade changes documented in Table 1. The results for the intensive and extensive margins match evidence by Bricongne et al (2009), who find that for French firms, changes in the intensive margin outweighed changes in the extensive margin.[6]

3.1 Aggregate Results

The main decomposition can also be used in an OLS (ordinary least squares) linear regression. We extend Bernard, Jensen, Redding, and Schott (2009) to allow a decomposition of the intensive margin into price and quantity effects. From equation (8), we show that the change in value is the sum of the change along four margins: price, quantity, entry, and exit. This is also true for each individual trading partner. We can then regress each margin of trade on the total change in trade, where the unit of observation is a trading partner. Since equation (8) is an

[6] We also analyze entry and exit compared to entry and exit in previous time periods. We find that product entry declined during the crisis, and product exiting rose. This was generally true across countries. Available upon request.

identity, and OLS has mean-zero residuals, the coefficients from the four equations will sum to unity. Each coefficient then represents the average contribution (across trading partners) of the given margin to the total change in value from the first half of 2008 to the first half of 2009.

Table 2 shows the results for this regression decomposition. As we indicated in the introduction, the stylized facts are very different for all goods (which include commodities) and manufactures only. Consequently, in the first four columns of Table 2 we report the results for all goods, while in the last four columns we report the results for manufacturing only. Note that the total value change is negative for all columns except Brazilian imports of manufactures (which rose 4%). Hence in all other columns, a fall in prices or quantities is represented by a positive percentage of the value change, whereas in the manufactures-Brazil column, the fall in quantities is represented by a negative percentage of the total value change. Across all goods, the evidence is qualitatively similar to Table 1, but with some differences (arising from the fact that the regression averages across trading partners). For the United States, the results in column 1 suggest that price declines accounted for 36 percent of the reduction in trade across all trading partners, while a decline in quantity accounted for 57 percent. The contribution of entry and exit accounted for less than 1 percent of the observed changes. In both the EU and Indonesia, the quantity declines dominated the price effect, while for Brazil the opposite is true. For all countries, the intensive margin again is substantially larger than the extensive margin. Exit again outweighs entry, leading to negative net entry in all regions.

Across all goods, the evidence is consistent with both quantity and price declines. Without disaggregating the sample, the evidence is consistent with a pure demand shock story: a fall in demand generated both declines in prices and quantities. However, if we restrict the sample to manufacturing, as we do in the last four columns, a different story emerges. We see

that for manufactures, the fall in quantity continues to account for the major share of the observed trade collapse in the US, EU, and Indonesia. In Brazil, the value of manufactured imports increased in this time period despite a large negative quantity effect. All four regions saw positive price effects. For the US, EU, and Indonesia, these were small and did little to offset the fall in quantity. However, for Brazil the price increase was large enough to offset the contribution of declining quantities to the fall in trade. All in all, the evidence is consistent with a more important role played by supply side disruptions, possibly caused by a contraction in trade credit in manufacturing, particularly in Brazil.

Additionally, the regression technique easily allows us to identify outliers. For instance, OPEC countries experienced larger price effects for their exports to the US than did other countries, as the graph below shows. Figure 5a shows the fitted values of the price (grey) and quantity (black) effects, as well as actual data points for individual countries. Actual dollar amounts in terms of declines in billions of dollars following the crisis are shown on the horizontal axis. Figure 5b shows the same data, with a close-up excluding the largest countries. The y-axis displays the total change in the value, and the x-axis the price and quantity effects.

Oil-exporting countries, including Saudia Arabia and Venezuela (visible in Figure 5a) and Iraq, Algeria, Angola, and Russia (visible in Figure 5b) show price effects that are larger (more negative) than the average. Their quantity effects are, correspondingly, smaller than the average. Other large trading partners, such as Japan and Germany (visible in Figure 5a) and the UK, Malaysia, Italy, France, Korea, and Taiwan (in 5b) show larger quantity effects than the average across countries.

Alternatively, we can decompose the total trade value (and change in total trade value) by trading partner, product, and average value, following Bernard, Jensen, Redding, and Schott

(2009). The total trade imports by country x at time t is the product of the number of partner countries (y_t), the number of traded products i_t, the density of trade d_t, and the average value of trade $\overline{v_t}$: $v_t = y_t i_t d_t \overline{v_t}$. The density of trade is defined as the ratio of the number of traded country/product pairs to the number of "potential" country/product pairs: $d_t = o_t/(y_t i_t)$ where o_t is the number of country/product pairs with positive value. The average value $\overline{v_t}$ is conditional on the country/product pair being traded.

Results for this alternative decomposition (in table 3) show that, while the extensive margin experienced negative changes, the intensive margin mattered more. No country saw an increase in the number of trading partners from 2008 to 2009, and Brazil in fact lost almost 10 trading partners. All four regions also saw a fall in the number of products traded, although this was a very small percentage of the total loss. The largest changes were in average value, which fell by 10% to 28% across the various regions.

3.2 Heterogeneity and Mechanisms

The decompositions given above aggregate across trading partners, product types, and shipment methods, and as such they mask considerable heterogeneity. We expect to see, given the hypothesized mechanisms for the transmission of the trade collapse, differences across these dimensions. While the financial crisis originated in high income countries, its effects on trade were rapidly transmitted to low-income countries. It has been hypothesized that the effects of constrained trade finance could vary by exporter income (Malouche 2009, Berman and Martin 2010) and by geographic region (Berman and Martin 2010). High-income countries with well-developed markets were most affected in the financial crisis; on the other hand, low-income

exporters with less developed financial markets may be more reliant on trade finance originating in their trading partners.

Countries with different levels of income export different baskets of goods, which embody different levels of quality and variety. To analyze how the response in trade volumes changes with the income level of the exporting country, we decompose the fall in trade in different groups. In doing so, we classify trading partners in four categories: high, upper middle, lower middle, and low income, according to the World Bank's country classification.[7] Table 4 and figure 6 present the main decomposition along these income definitions.

Overall, upper middle income exporters were most affected by the crisis, with falls of 31% to the EU and US and 30% to Brazil and Indonesia. In terms of total volume, high income partners lost the most. From the first half of 2008 to the first half of 2009, exports from these countries to the EU and US fell from 2.8 trillion to 2.1 trillion dollars. In the US and EU, quantity effects again dominate price effects. This is particularly true for high-income trading partners and low-income trading partners; the price effect is actually positive for the latter. In Brazil and Indonesia, negative quantity effects again dominate, with positive price effects for high-income and lower-middle income trading partners and negative price effects for the other partners. This may be driven by the type of products exported by these countries (which we analyze in a later section). A notable exception is in exports from low-income countries to Brazil and Indonesia. Here we actually see a small positive quantity effect. This effect on its own matches anecdotal evidence that South-South trade was less disrupted during the crisis, but it must be contrasted with the large effect of product exits.

Among the most salient results is the small change in value for low-income trading partners; imports from these countries fell by only 4% in the US and EU and 7% in Brazil and

[7] Groupings are given in Appendix A.

Indonesia. Also notable in these countries is the large amount of product churning; the extensive margins are much larger than for any other trading partners. Also of interest, the extensive margin (entry and exit) varies considerably across trading partners. While entry and exit roughly cancel each other in high income exports to the US and EU, entry outweighed exit in the upper middle income partners, and exit substantially outweighed entry in the lower middle income partners. For exports to Brazil and Indonesia, exit outweighs entry for upper middle income, lower middle income, and low income countries.

It is not clear from the above decomposition to what extent differences across country income levels is driven by the types of products exported as opposed to macroeconomic conditions. Accordingly, we also analyze differences across product types. We aggregate across product sections, a higher level of aggregation than HS-2. A description of this aggregation is given in Appendix B. For simplicity we consider only imports by the US. Results are shown in Table 5.

The results in Table 5 (shown for the United States) confirm the trends identified earlier, where we contrasted the sharp price declines for commodities and the price increases for manufactures. In Table 5, we can identify these different effects by product category. The largest total value change is in minerals, which saw a fall of 134 billion dollars. Almost ninety percent of that decline was due to fall in the price, with very little of the effect due to reductions in quantity. Machinery/electrical equipment and transportation equipment also saw large falls in total volume, but almost all of the changes were due to a decline in quantity. Prices increased in the following product categories: chemicals, footwear, leather, miscellaneous, and transportation equipment (note that because the total value change is negative, a positive total price effect is represented by a negative percentage of the value change). All products saw falls in quantity,

with the quantity effect generally contributing to over half of the total effect. The quantity effect was only relatively small for minerals, where the price effect was largest. Most of the large negative price effects were in product categories made up largely of commodities (animal products, minerals, vegetable products). In light of the very different behavior of prices for manufactures and commodities following the trade collapse, for the rest of this paper we separate commodities versus manufactures.

Using the Rauch (1999) classification of product diversification, we separately analyze homogenous goods and price-referenced goods (commodities) and differentiated goods (manufactures). We perform the same decomposition as before, analyzing the importance of quantity, price, and entry and exit changes to the overall change in aggregate trade. Results are shown in table 6 and figure 7.

The difference across product classes is striking. The negative price effect, which contributed 22% of the total fall in the US and EU shown in Table 1, is apparent for homogenous goods (commodities) but not for differentiated goods (manufactures). While the price effect accounted for 90% of the total fall in value for homogenous commodity exports to the US and 73% to the EU, it actually rose for differentiated goods to both the US and EU. The price effect was also positive for manufactures exported to Brazil and Indonesia, and for Brazil it was larger than the negative quantity effect. We know that commodity prices fell during the crisis, and that this was the burst of the pre-crisis bubble. It is thus not surprising that the price effect was large for commodities; it is, however, noteworthy that the price effect was mostly contained to commodities. Since we know that demand for manufactures fell during the crisis, the effect on prices can tell us something about what happened to supply. Where prices rose or where they fell only slightly, it is plausible that supply shifted in. Where prices fell more, it is more plausible

that supply stayed constant or shifted out. Thus the evidence on manufactures, contrasted with commodities and particularly in the case of Brazil and Indonesia, points to a negative supply shock in manufactures in addition to the negative demand shock. This negative supply shock could be from reductions in trade finance or from the fragmentation of the global supply chain.

We then further disaggregate the above changes by both shipment method and product section. For simplicity, we present a graph showing the various margins; tables are available upon request. Figure 8 summarizes the changes in quantities and prices both by product as well as by shipment type. Shipment types include shipment by sea and air. As Figure 8 illustrates, there are not significant differences in trade responses across the mode of transport. However, the major differences are for manufactures versus commodities. Commodities exhibited both price and quantity declines, as indicated by both the dark and light bars locating on the left hand side of the graph for minerals, stone and glass, animal products, and vegetables. In contrast, manufactures showed quantity declines but mild price increases. The overall trends in Figure 9 are consistent with an overall pattern of demand contraction, with some evidence of supply constraints in manufacturing. The largest price increases were in the leather and footwear sector, where credit constraints and trade frictions may have restricted supply.

For each product section, we also show the changes in value transported by air versus by sea. For many products, the quantity effect is larger by air, excepting chemicals, foodstuffs, and transportation equipment. Our story can be further elaborated by returning to the heterogeneity across trading partner income, but restricting the sample to manufactures (table 7). We additionally consider China and Sub-Saharan Africa, two regions where researchers have hypothesized that the trade fall was unique. As mentioned above, it has been theorized that the trade finance constraint could have been either much more severe or much less severe in Sub-

Saharan Africa. China has been unique both for its more rapid recovery and because it has been a target for protectionism (Bown 2009).

For all four income levels, and for both China and Sub-Saharan Africa, quantity effects were large and negative. This is not surprising; the demand effect hit all countries. The price effect is positive for all regions, with the exception of exports from Sub-Saharan Africa to the US and the EU. The consistent positive association between price changes is striking.

3.3 Evidence on Credit Constraints and Trade Collapse

This section presents the only direct evidence linking credit constraints with upward pressure on manufacturing prices during the crisis. We adopt the classification scheme of Bricongne et al (2009) to separate products according to sectoral dependence on external finance. The Bricongne et al index is based on recent firm data from France and combines two variables: cash flow over value (as a proxy for self-financing capacity) and financial charges over turnover (as a proxy for dependence on external finance). Accordingly, we separate all products into two categories: high dependence on external finance (taking a value of 6 to 10 in the index) and low dependence (a value of 2 to 5). Table 8 presents the results by importing country/region of the OLS regression decomposition, which allows us to test the hypothesis that the two types of product were affected equally by the crisis. As before, we restrict our analysis to manufactures.

Here we see striking evidence that the positive price effect in the United States was more pronounced for sectors with high dependence on external finance. This evidence on the price effect is crucial: at first glance, one sees that overall value fell more in sectors with low dependence on external finance. However, the separation into price and quantity effects reveals

that this was due to more significant positive price pressure in the high-dependence sectors. The European Union does not show this effect. For Brazil, overall value fell for the finance-dependent sectors but rose for the low-dependence sectors. Overall value also fell more for finance-dependent sectors in Indonesian imports.

Unfortunately, our data do not allows us to separate general financial constraints from those specific to trade. However, we do see clear evidence that finance-dependent sectors in the United States, the epicenter of the financial crisis, experienced more significant upward price pressure, indicative of supply-side constraints.

3.4 Evidence using a longer time series

Next we examine whether these findings are unique to the crisis, or whether they represent the continuation of historical trends. Figures 9 through 12 show the timing of the collapse in trade by the Rauch classification. Figure 9 shows entry, exit, net entry and total product counts for US imports and Figure 10 for Indonesian imports. Figures 9 and 10 clearly show that negative net entry begins between Q3 2008 and Q4 2008, just as the crisis was breaking. Furthermore, the negative net entry is a result of both more products exiting and fewer products entering, relative to before the crisis.

In Figures 11 and 12 we perform the same decomposition as before, but on a quarterly basis, using data from Q1 2007 to Q3 2009. Entry, exit, price changes, and quantity changes are now defined relative to the previous quarter, rather than the same quarter of the previous year. Hence the magnitudes of these changes will not match the magnitudes given in the other tables, but they do show the specific timing of the collapse in trade. Figures 11 and 12 plot the value of

each margin across time, with the vertical axis showing values in billions of US dollars. It is clear from the upper left quadrants that, for both US and Indonesian imports, the fall in value begins in Q3 2008, as the economic crisis was beginning. Furthermore, this is true for both price and quantity effects. Figure 11 shows the dollar values for each margin for US imports and Figure 12 for Indonesian imports. For all three types of goods, value drops off beginning in Q3 2008. For differentiated goods, the fall is almost entirely composed of the quantity effect. For reference priced goods, the value change is a combination of quantity and price effects. For homogenous goods, the fall in US imports is almost entirely a price effect, whereas for Indonesian imports there are negative price and quantity effects.

4. Conclusion

In this paper, we identify a new set of stylized facts on the 2008-2009 trade collapse that we hope can be used to shed light on the importance of demand and supply-side factors in explaining the fall in trade. In particular, we decompose the fall in international trade into product entry and exit, price changes, and quantity changes for imports by Brazil, the European Union, Indonesia, and the United States. When we aggregate across all products, most of the countries analyzed experienced a decline in new products, a rise in product exit, and falls in quantity for product lines that continued to be traded. These effects are similar for high-income and middle-income partner countries, but trade with low-income partner countries was much less affected.

The evidence suggests that the intensive rather than extensive margin mattered the most, consistent with studies of other countries and previous recessionary periods. On average, quantities declined and prices fell. This was true for imports by Brazil, the European Union, Indonesia, and the United States. In the EU and US, net entry accounted for a loss of 24 billion dollars, the price effect accounted for a loss of 220 billion dollars, and the quantity effect 642 billion dollars. In Brazil and Indonesia, net entry accounted for 1 billion and the quantity effect 25 billion dollars; a positive price effect partially offset this by 3 billion.

However, these average effects mask enormous differences across different product types. Price declines were driven primarily by commodities. Within manufacturing, while most quantity changes were negative, in most cases price changes moved in the opposite direction. This is particularly true for products imported by developing-country trading partners. Consequently, within manufacturing, there is some evidence consistent with the hypothesis that supply side frictions played a role. For the United States, for example, price increases were most significant in sectors which are typically credit constrained.

There were also considerable differences across trading partners and shipment methods. Nevertheless, the consistency of quantity declines suggests that by far the largest contributor to the crisis was the demand shock. Yet within manufacturing, there is also systematic evidence consistent with some negative supply shocks, as there were price increases associated with quantity declines for the United States, the European Union, Brazil, and Indonesia. Generally only commodities saw a fall in prices, as the pre-crisis commodity bubble burst. The evidence pointing to supply shocks is most pronounced for sectors dependent on external finance in the US.

A large number of open questions remain regarding the falls in trade during the 2009 global economic crisis. It is our hope that the descriptive evidence presented in this paper will help guide research questions moving forward.

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Figure 1a

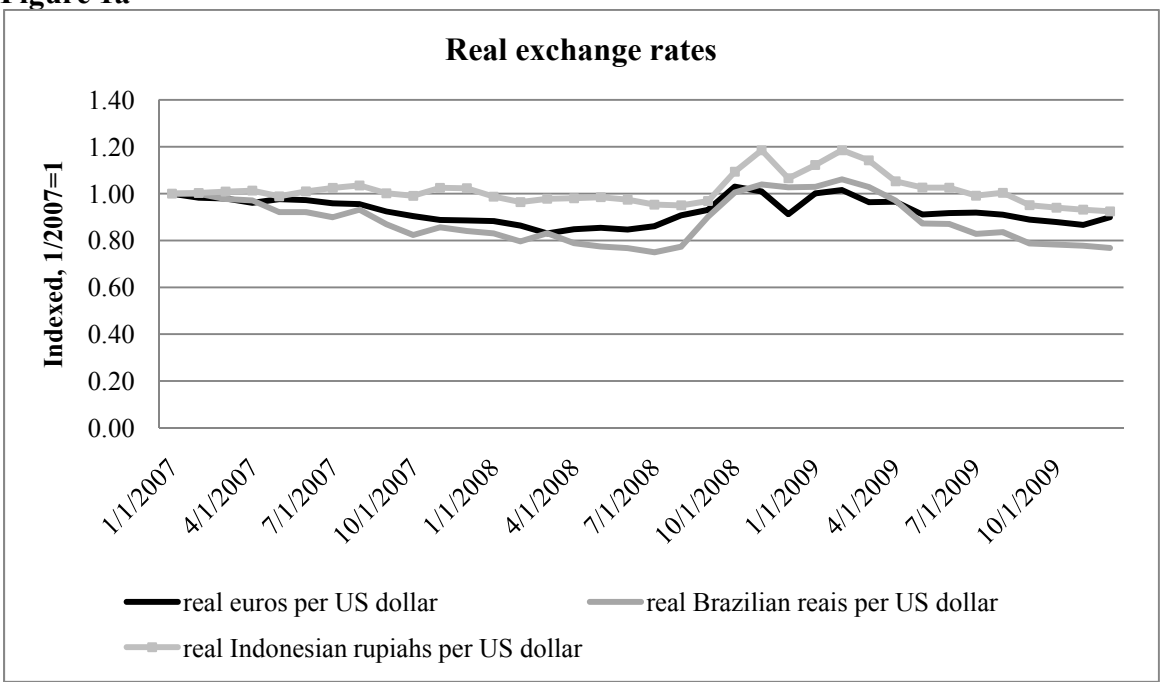


Figure 1b

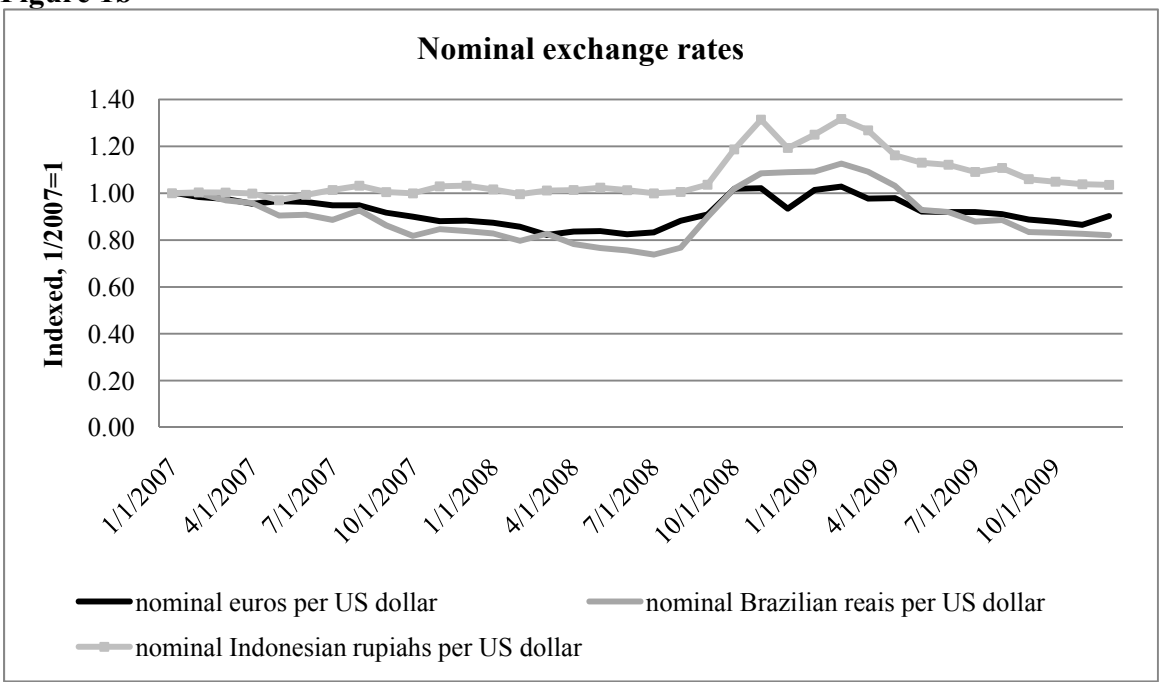


Figure 2

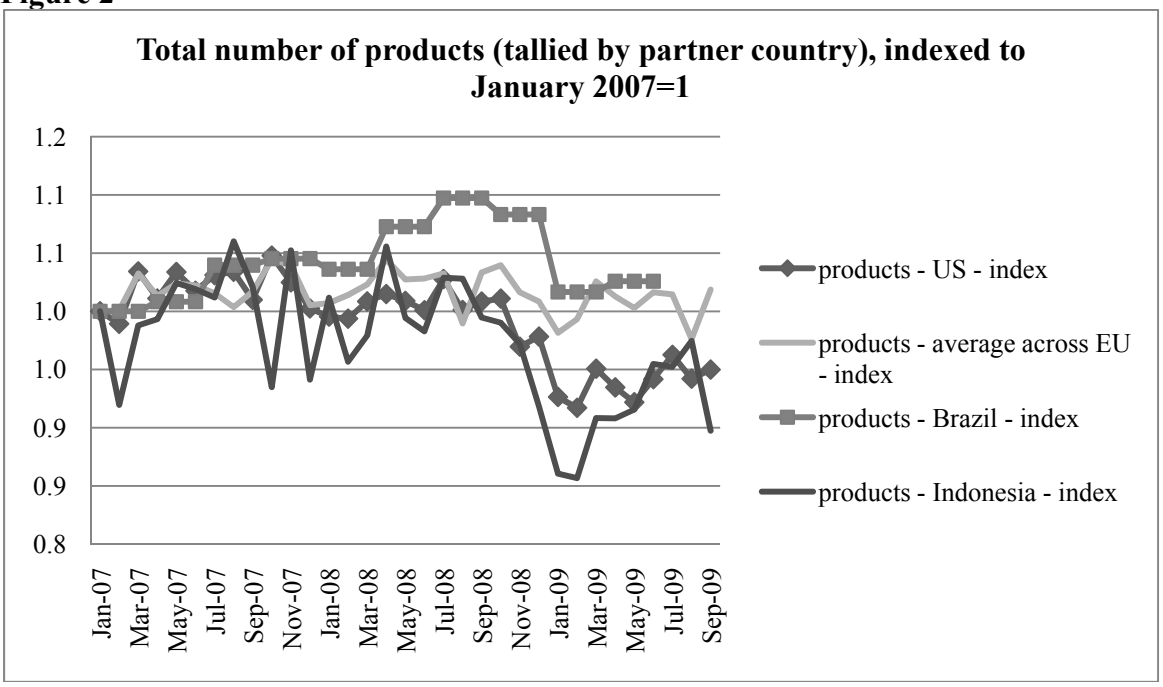


Figure 3

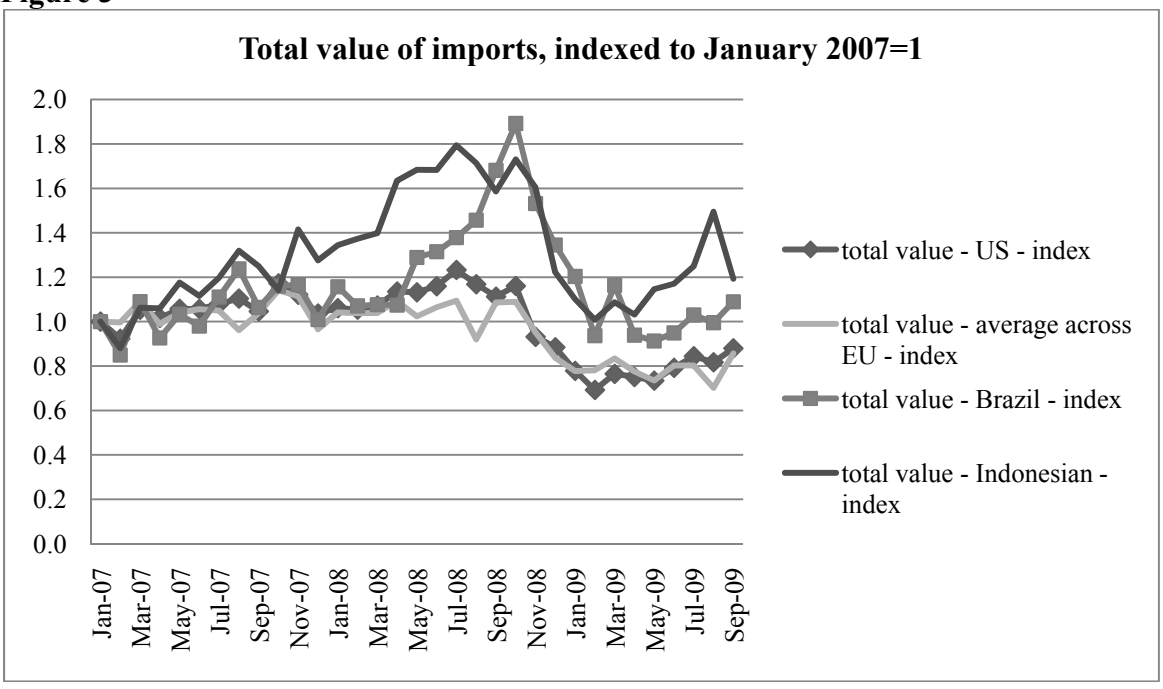
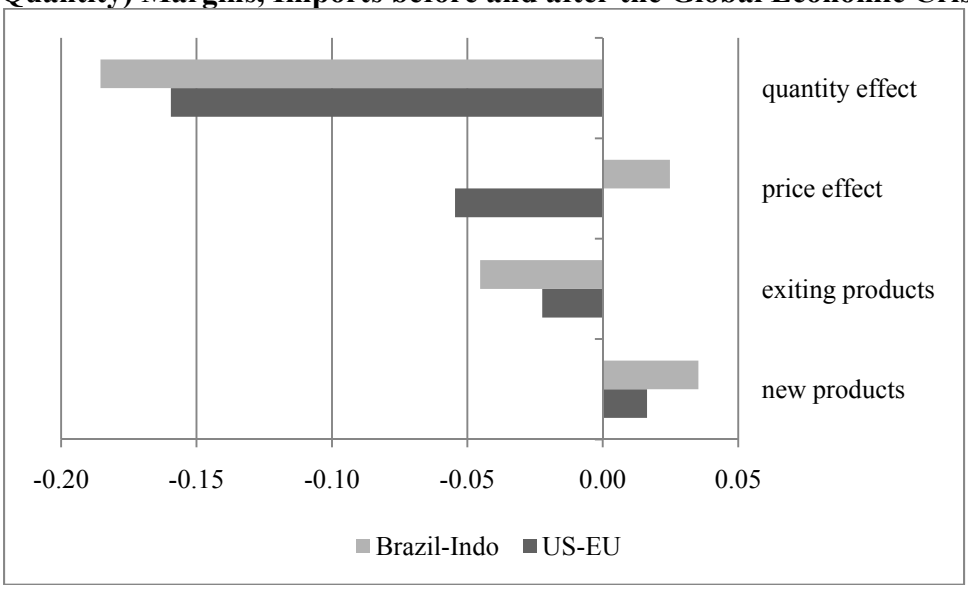


Figure 4: Decomposition Along Extensive (Entry and Exit) and Intensive (Price and Quantity) Margins, Imports before and after the Global Economic Crisis



Notes: each margin is shown as a percentage of the value in 2008. For details, see table 1.

Figure 5a: Price and Quantity Effects, by US Trading Partners, Billions of US$

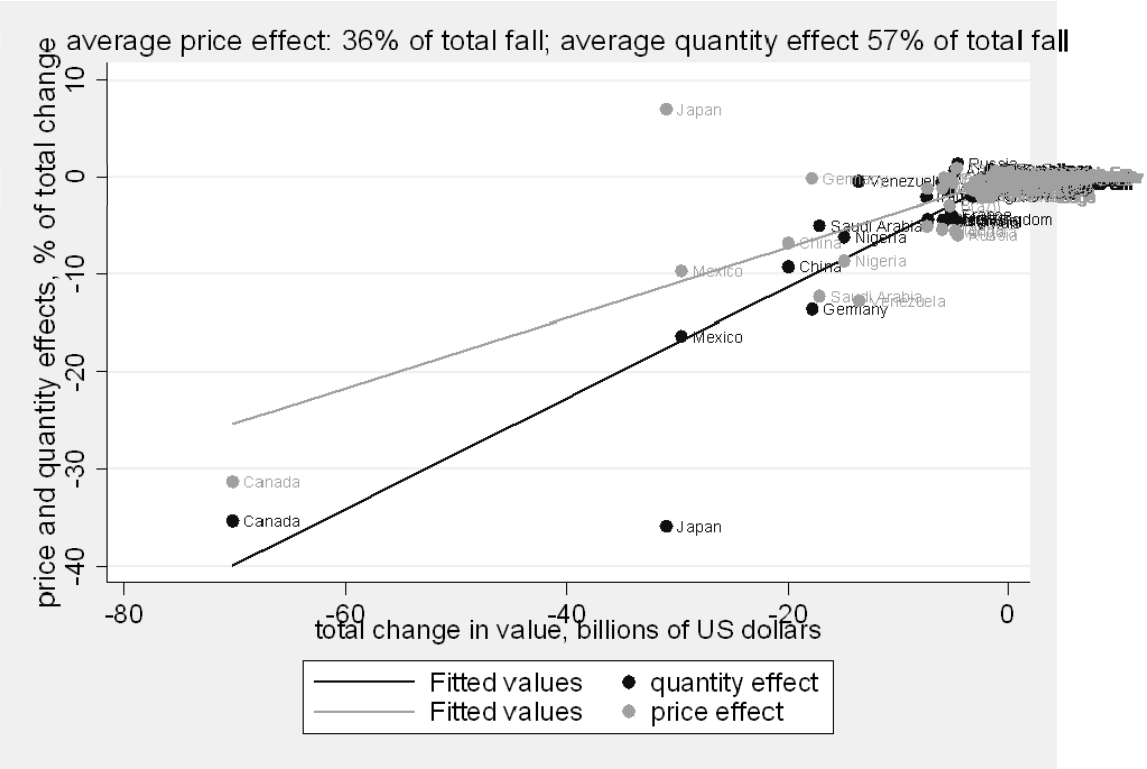


Figure 5b: Price and Quantity Effects, by US Trading Partners, Billions of US$, Close-up View

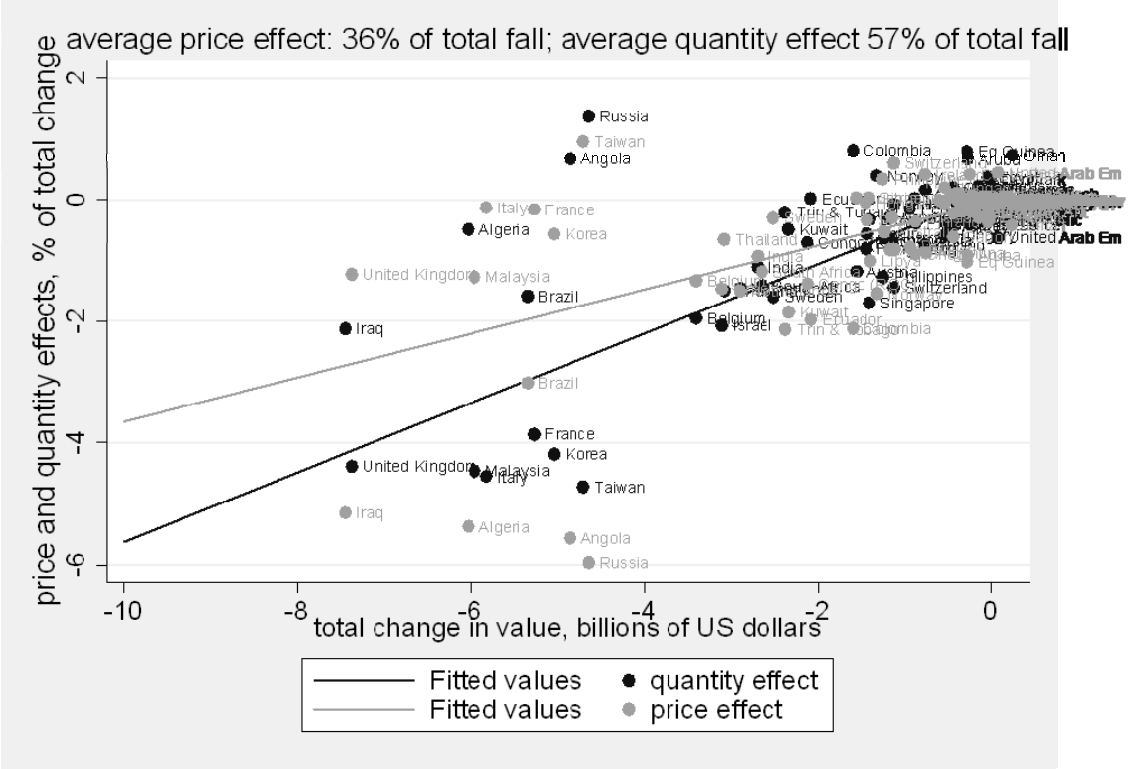
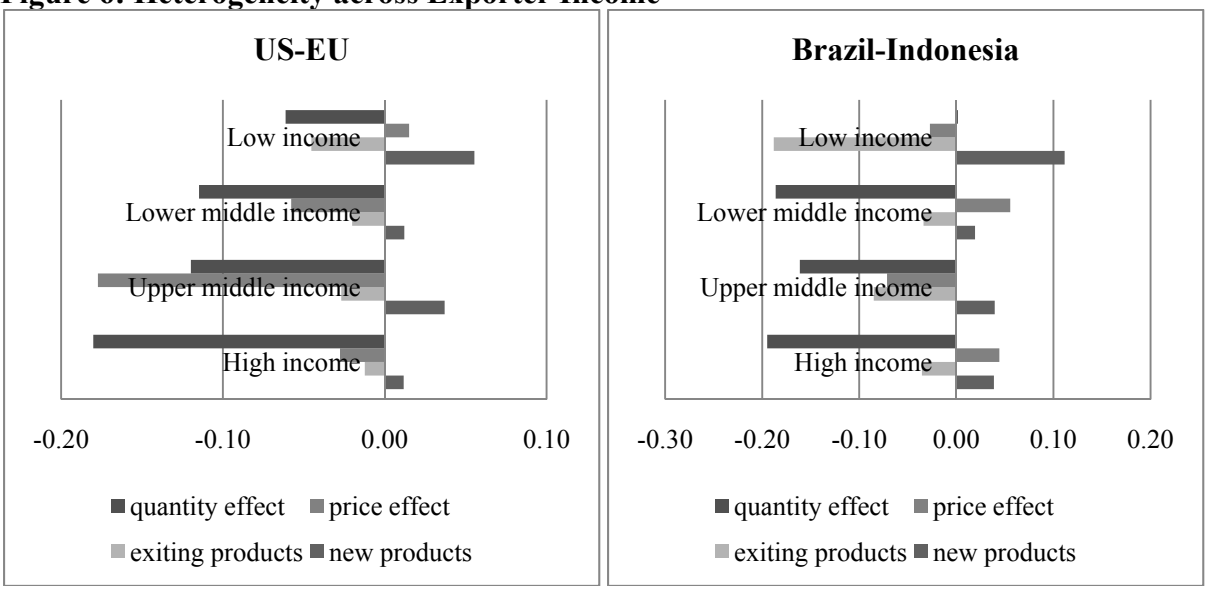
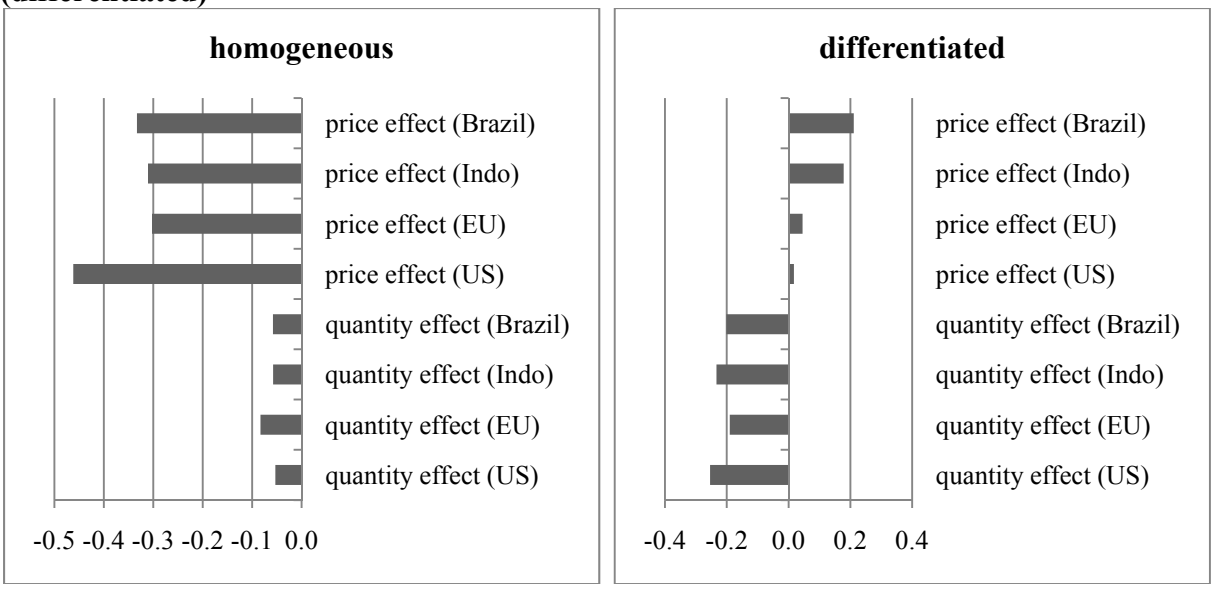


Figure 6: Heterogeneity across Exporter Income



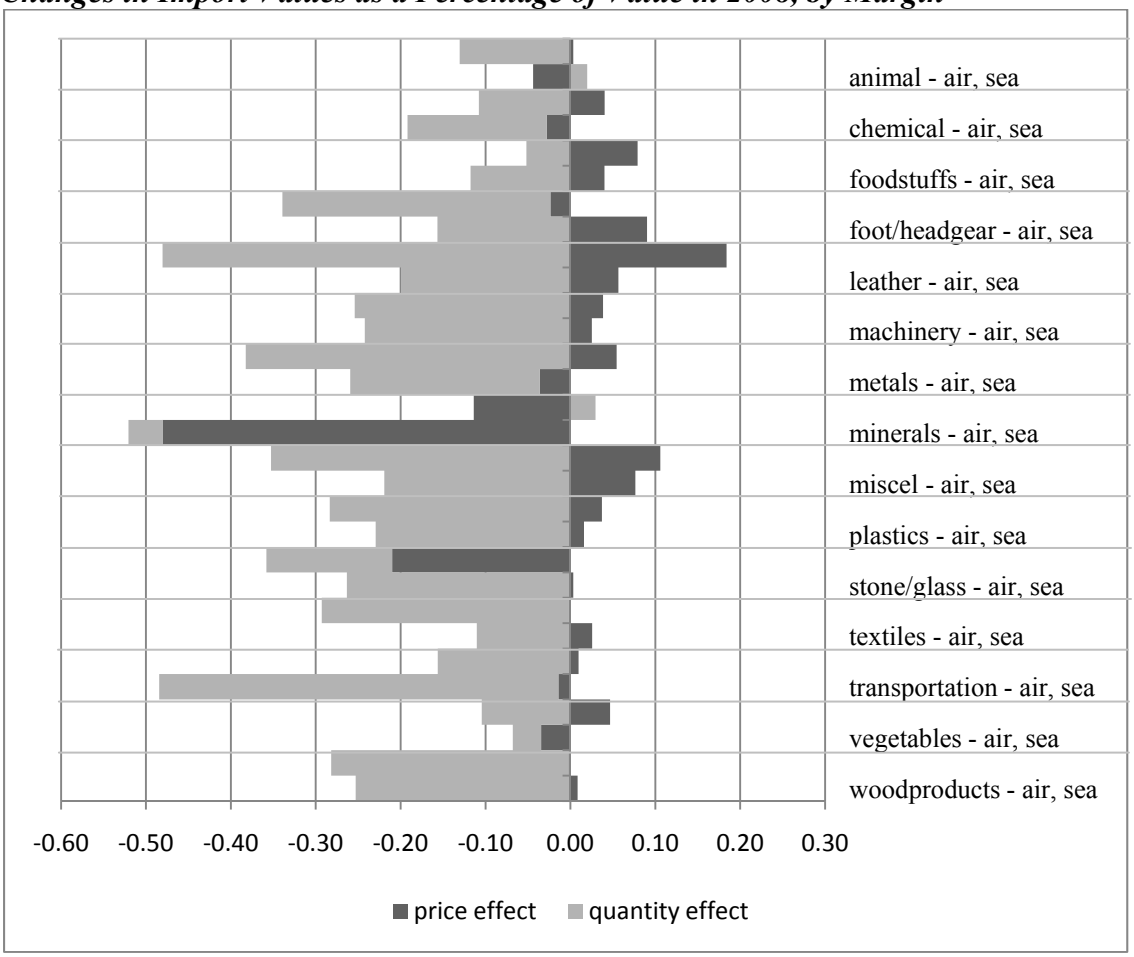
Notes: each margin is shown as a percentage of the value in 2008. For details, see table 4.

Figure 7: Heterogeneity in Commodities (homogeneous) versus Manufactures (differentiated)



Notes: each margin is shown as a percentage of the value in 2008. For details, see table 6.

Figure 8: Heterogeneity across Product Types and Shipment Methods (US Imports)
Changes in Import Values as a Percentage of Value in 2008, by Margin



Notes: Within each product grouping (e.g. animal products), the upper bar shows the effect on air shipments and the lower bar shows the effect on vessel shipments. The effects are percentage changes of the total effect within that shipment type. For instance, the price effect for animal products shipped by sea is divided by the total value in 2008 of animal products shipped by sea. Note that typically sea shipments were much larger in 2008, so the gross value changes for sea shipments are larger compared to those for air shipments than what is shown above. Entry and exit are not shown and represent less than 5% of the change in any given category. Continuing products with unobserved price and/or quantity are also not shown.

Figure 9: Product-by-Country Counts, US Imports
Vertical axis: number of product-by-country Imports

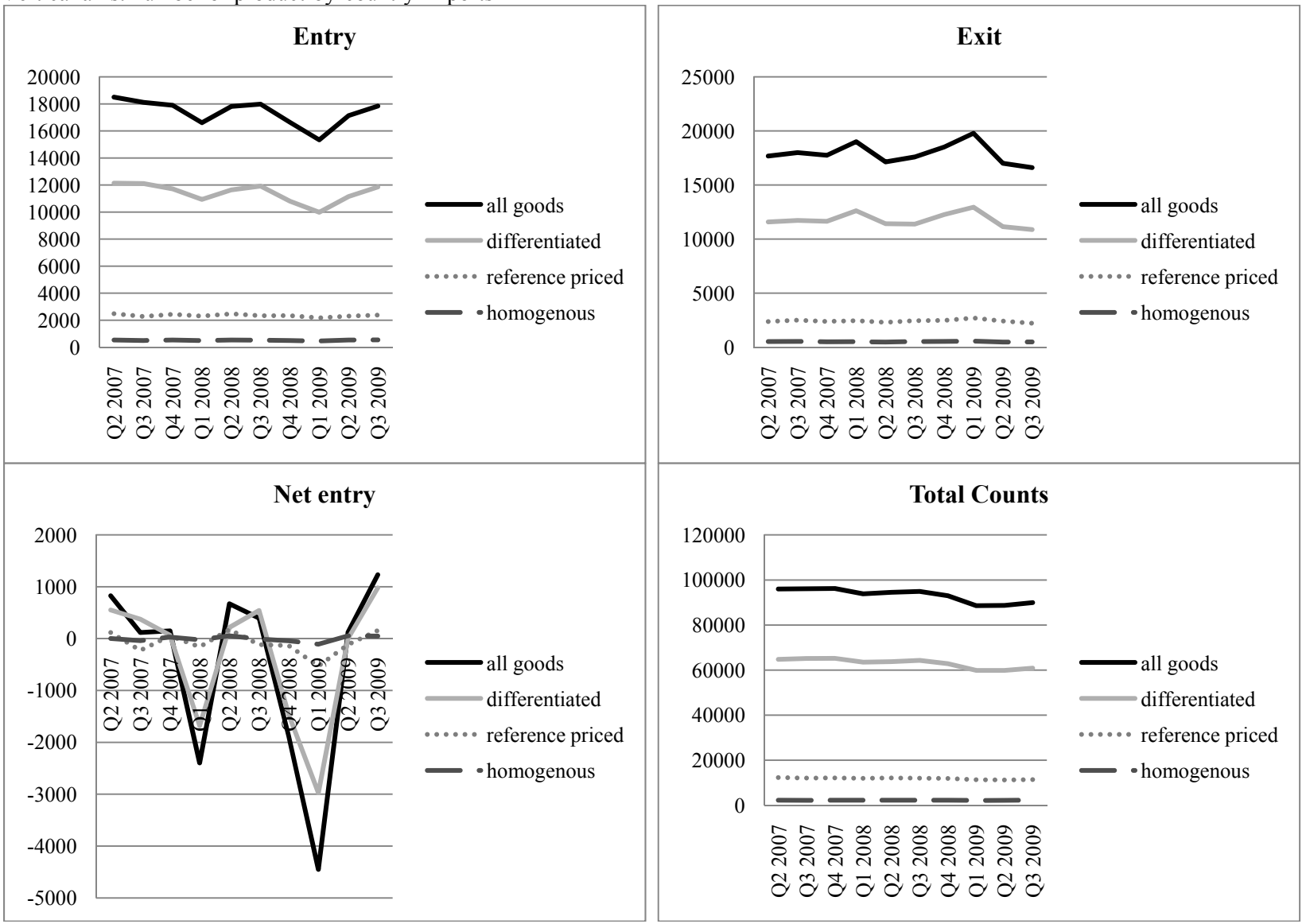


Figure 10: Product-by-Country Counts, Indonesian Imports
Vertical axis: number of product-by-country Imports

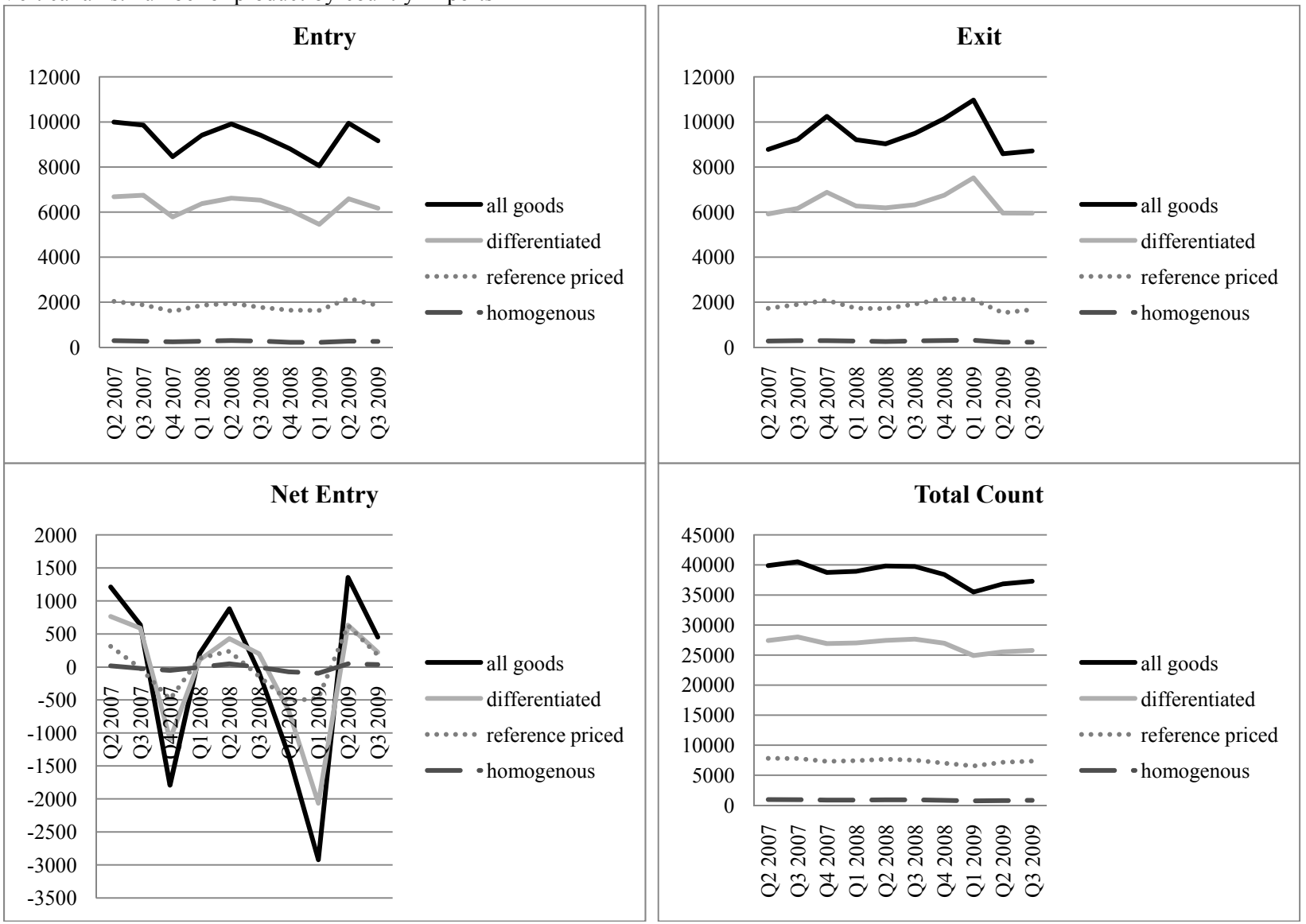


Figure 11: Intensive and Extensive Margins: Changes in Value, US Imports
Vertical Axis: Billions of US$

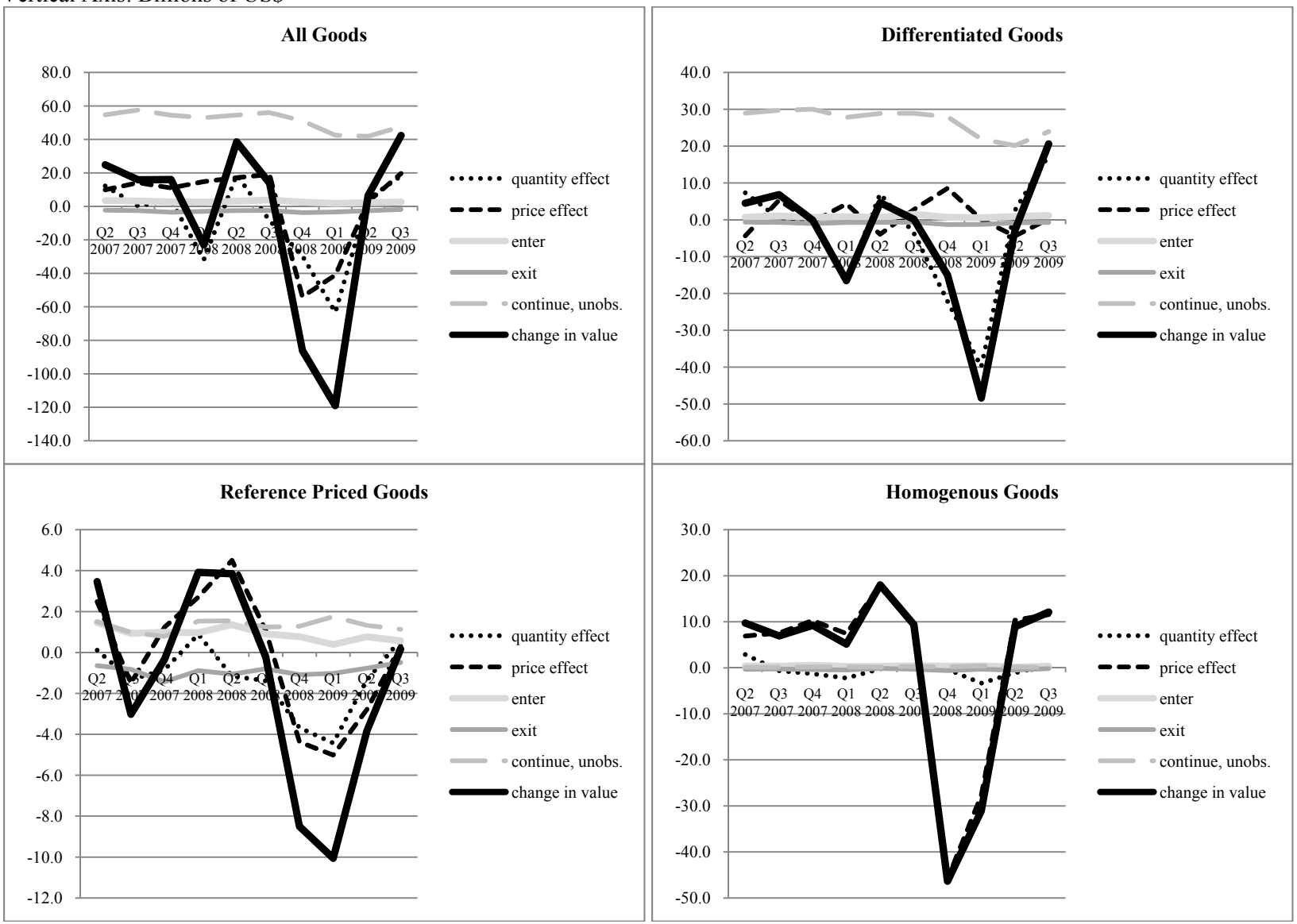


Figure 12: Intensive and Extensive Margins: Changes in Value, Indonesian Imports
Vertical Axis: Billions of US$

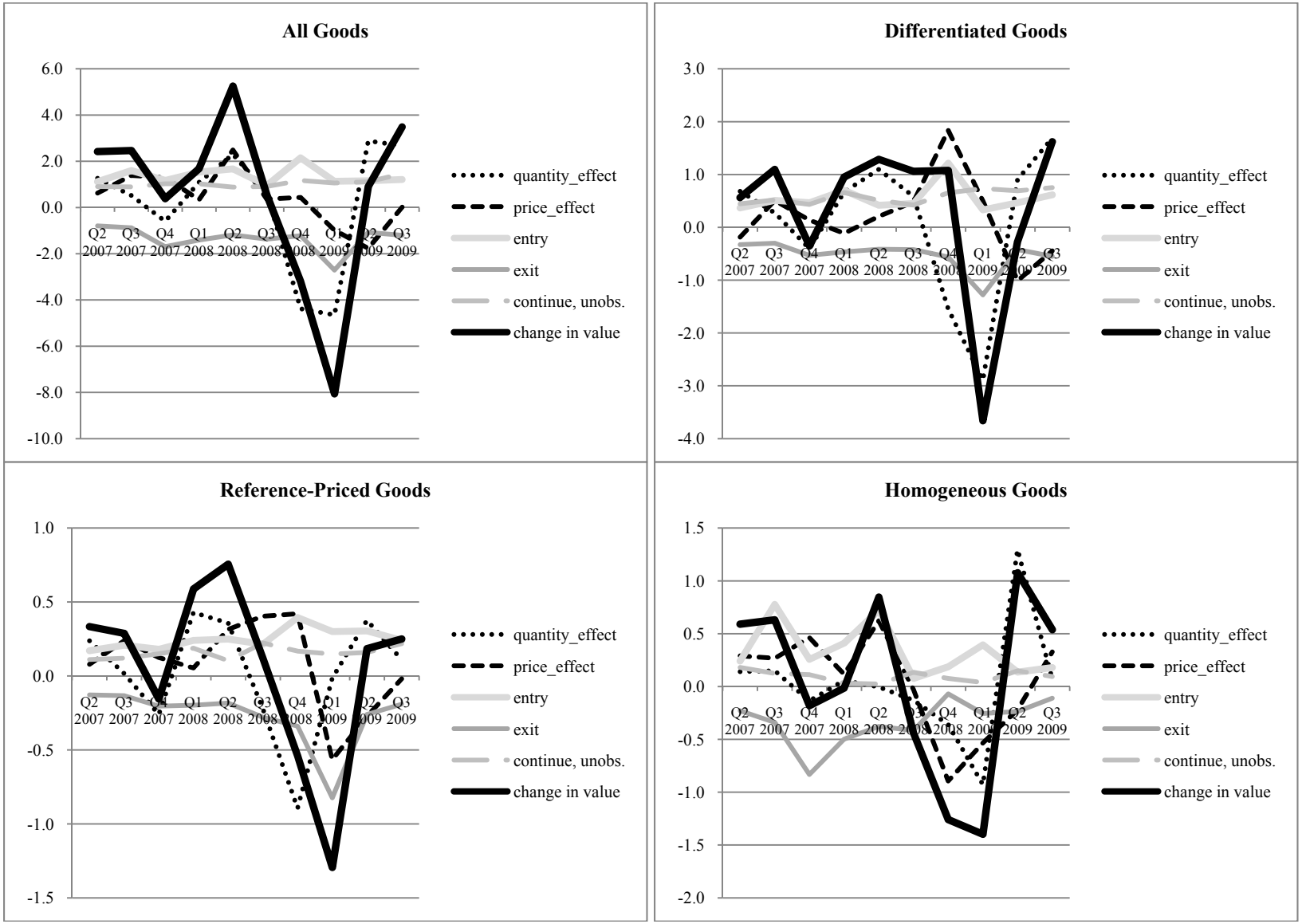


Table 1: Decomposition Along Extensive (Entry and Exit) and Intensive (Price and Quantity) Margins, Imports before and after the Global Economic Crisis

	number	average value change, millions of US$	total value change, billions of US$	% of value in 2008	% of value change
UNITED STATES & EUROPEAN UNION					
new products	383975	0.17	65.77	1.6	-6.5
exiting products	434448	-0.21	-90.00	-2.2	8.9
price effect	881780	-0.25	-219.79	-5.5	21.6
quantity effect	881780	-0.73	-642.43	-15.9	63.3
contin. prod., p and q unobs.	538289	-0.24	-128.80	-3.2	12.7
Total			-1015.25	-25.2	100.0
BRAZIL & INDONESIA					
new products	22626	0.21	4.75	3.5	-18.7
exiting products	27219	-0.22	-6.09	-4.5	24.0
price effect	59253	0.06	3.33	2.5	-13.1
quantity effect	59253	-0.42	-24.95	-18.5	98.4
contin. prod., p and q unobs.	18126	-0.13	-2.41	-1.8	9.5
Total			-25.36	-18.9	100.0

Notes: The time period represented is from the first half of 2008 (pre-crisis) to the first half of 2009 (mid-crisis). To avoid issues with seasonally-traded products, we do not include the second half of 2008. The final row for each region shows the value change for continuing products for which we are unable to observe either price or quantity.

Table 2: OLS Regression Decomposition of the Change in Imports across Trading Partners, Before and During the Global Economic Crisis

	All products				Manufactures only			
	US	EU	Brazil	Indo-nesia	US	EU	Brazil	Indo-nesia
new products	-0.0008	-0.01	-0.02	-0.02	-0.0007	-0.0051	0.07	-0.04
	(0.0003)	(0.002)	(0.012)	(0.004)	(0.0002)	.0008)	(0.018)	(0.009)
exiting products	0.0023	0.17	0.14	0.04	0.0014	0.0093	-0.02	0.16
	(0.0006)	(0.005)	(0.017)	(0.007)	(0.0008)	.0007)	(0.007)	(0.025)
price effect	0.36	0.19	0.48	0.43	-0.09	-0.11	1.41	-0.25
	(0.018)	(0.006)	(0.105)	(0.031)	(0.008)	.006)	(0.119)	(0.098)
quantity effect	0.57	0.50	0.30	0.51	0.99	0.86	-0.60	1.05
	(0.017)	(0.007)	(0.103)	(0.026)	(0.009)	.007)	(0.123)	(0.092)
contin. prod., p and q unobs.	0.07	0.14	0.10	0.03	0.09	0.25	0.13	0.07
	(0.004)	(0.002)	(0.013)	(0.007)	(0.004)	.003)	(0.012)	(0.014)
N	230	5237	225	242	228	4959	216	205
value in 2008, billions of US$	1062.1	2966.4	80.5	54.1	451.0	1457.9	32.5	18.0
value in 2009, billions of US$	724.7	2288.6	70.3	38.8	326.3	1182.0	33.9	16.0
% change from 2008 to 2009	-0.32	-0.23	-0.13	-0.28	-0.28	-0.19	0.04	-0.11

Notes: The time period represented is from the first half of 2008 (pre-crisis) to the first half of 2009 (mid-crisis). To avoid issues with seasonally-traded products, we do not include the second half of 2008. The final row for each region shows the value change for continuing products for which we are unable to observe either price or quantity. N represents the number of trading partners. For the European Union, this is tallied by importing country (eg, an average of 194 trading partners for each of the EU's 27 members).

Table 3: Alternative Decomposition of Intensive (Average Value) and Extensive (Countries and Products) Margins

	2007	2008	2009	% change, 08-09
US				
Countries	230	230	230	0.0
Products	5020	5021	5020	0.0
country-products	113645	111652	105706	-5.3
Density	0.098	0.097	0.092	-5.3
average value, millions of US$	8.63	9.51	6.86	-27.9
total value, billions of US$	981	1062	725	-31.8
EU				
Countries	240	241	240	-0.4
Products	5050	5049	5048	0.0
country-products	1722493	1740935	1696182	-2.6
Density	0.053	0.053	0.052	-2.1
average value, millions of US$	1.67	1.70	1.35	-20.8
total value, billions of US$	2879	2966	2289	-22.9
Brazil				
Countries	195	203	195	-3.9
Products	4728	4577	4538	-0.9
country-products	52802	55322	54199	-2.0
Density	0.057	0.060	0.061	2.9
average value, millions of US$	1.28	1.45	1.30	-10.9
total value, billions of US$	68	80	70	-12.7
Indonesia				
Countries	194	195	196	0.5
Products	4536	4465	4435	-0.7
country-products	48675	48556	45185	-6.9
Density	0.055	0.056	0.052	-6.8
average value, millions of US$	0.77	1.11	0.86	-22.8
total value, billions of US$	37	54	39	-28.2

Notes: The time period represented is the first half of each year. Here we include territories, such as Taiwan and Gibraltar. Results are fairly similar if these are excluded. Density equals the total number of country/product pairs, divided by the number of import partners times the number of imported products.

Table 4: Heterogeneity Across Exporter Income

UNITED STATES & EUROPEAN UNION	% of value change			
	High income	Upper middle income	Lower middle income	Low income
new products	-0.05	-0.12	-0.06	-1.28
exiting products	0.05	0.09	0.10	1.05
price effect	0.11	0.57	0.29	-0.35
quantity effect	0.74	0.38	0.57	1.42
contin. prod., p and q unobserved	0.15	0.08	0.10	0.16
total	1.00	1.00	1.00	1.00
total value in 2008, billions of US$	2779.4	624.2	561.4	29.7
total value in 2009, billions of US$	2100.6	429.1	449.1	28.4
% change from 2008 to 2009	-0.24	-0.31	-0.20	-0.04

BRAZIL & INDONESIA	% of value change			
	High income	Upper middle income	Lower middle income	Low income
new products	-0.25	-0.13	-0.11	-1.50
exiting products	0.22	0.28	0.19	2.54
price effect	-0.28	0.24	-0.31	0.37
quantity effect	1.23	0.54	1.04	-0.02
contin. prod., p and q unobserved	0.07	0.07	0.19	-0.38
total	1.00	1.00	1.00	1.00
total value in 2008, billions of US$	76.6	25.3	31.9	0.7
total value in 2009, billions of US$	64.5	17.7	26.2	0.6
% change from 2008 to 2009	-0.16	-0.30	-0.18	-0.07

Notes: The time period represented is from the first half of 2008 (pre-crisis) to the first half of 2009 (mid-crisis). To avoid issues with seasonally-traded products, we do not include the second half of 2008. The final row for each region shows the value change for continuing products for which we are unable to observe either price or quantity.

Table 5: Heterogeneity across Product Type, US Imports

	% of value change						
US	new products	exiting products	price effect	quantity effect	p and q unob	total	total value change, millions of US$
Animal	-0.06	0.09	0.54	0.42	0.00	1.00	-712
Chemicals	-0.04	0.12	-0.19	0.97	0.14	1.00	-11,941
Foodstuffs	-0.08	0.07	0.61	0.35	0.06	1.00	-1,284
Footwear	-0.01	0.01	-0.69	1.44	0.25	1.00	-1,135
Leather	0.00	0.01	-0.48	1.40	0.08	1.00	-963
Machinery, electrical	-0.01	0.01	0.06	0.76	0.18	1.00	-57,448
Metals	-0.02	0.08	0.22	0.63	0.09	1.00	-23,443
Mineral	-0.01	0.01	0.88	0.11	0.01	1.00	-133,931
Miscellaneous	-0.01	0.01	-0.05	0.60	0.46	1.00	-14,047
Plastics	-0.01	0.01	0.03	0.88	0.08	1.00	-6,824
Stone/glass	-0.01	0.02	0.31	0.52	0.16	1.00	-11,749
Textiles	-0.02	0.02	0.00	0.89	0.10	1.00	-6,531
Transportation	0.00	0.00	-0.03	1.01	0.01	1.00	-55,343
Vegetable	-0.06	0.05	0.57	0.40	0.05	1.00	-1,602
Wood	-0.01	0.02	0.09	0.86	0.05	1.00	-6,001

Notes: The time period represented is from the first half of 2008 (pre-crisis) to the first half of 2009 (mid-crisis). To avoid issues with seasonally-traded products, we do not include the second half of 2008. The "p and q unob" column shows the value change for continuing products for which we are unable to observe either price or quantity.

Table 6: Heterogeneity in Commodities versus Manufactures

UNITED STATES	% of value change			
	homogenous	reference priced	differentiated	unclassified
new products	-0.01	-0.02	-0.01	-0.01
exiting products	0.01	0.07	0.02	0.02
price effect	0.90	0.44	-0.06	0.36
quantity effect	0.10	0.47	0.92	0.47
contin. prod., p and q unobserved	0.00	0.04	0.14	0.17
Total	1.00	1.00	1.00	1.00
total value in 2008, billions of US$	212.0	109.4	451.0	289.7
total value in 2009, billions of US$	102.8	71.9	326.3	223.6
% change from 2008 to 2009	-0.51	-0.34	-0.28	-0.23
EUROPEAN UNION	% of value change			
	homogenous	reference priced	differentiated	unclassified
new products	-0.05	-0.19	-0.06	-0.11
exiting products	0.09	0.27	0.07	0.12
price effect	0.73	0.25	-0.24	0.09
quantity effect	0.20	0.54	1.01	0.76
contin. prod., p and q unobserved	0.03	0.13	0.22	0.14
Total	1.00	1.00	1.00	1.00
total value in 2008, billions of US$	368.9	479.6	1457.9	660.0
total value in 2009, billions of US$	216.3	346.2	1182.0	544.0
% change from 2008 to 2009	-0.41	-0.28	-0.19	-0.18
INDONESIA	% of value change			
	homogenous	reference priced	differentiated	unclassified
new products	-0.06	-0.25	-0.31	-0.08
exiting products	0.13	0.19	0.60	0.07
price effect	0.75	0.28	-1.58	0.50
quantity effect	0.14	0.54	2.07	0.47
contin. prod., p and q unobserved	0.05	0.24	0.23	0.04
Total	1.00	1.00	1.00	1.00
total value in 2008, billions of US$	10.3	9.5	18.0	16.2
total value in 2009, billions of US$	6.0	7.0	16.0	9.8
% change from 2008 to 2009	-0.42	-0.26	-0.11	-0.40
BRAZIL	% of value change			
	homogenous	reference priced	differentiated	unclassified
new products	-0.06	-0.13	0.87	-0.28
exiting products	0.12	0.25	-0.46	0.47
price effect	0.81	-0.39	5.04	-1.08
quantity effect	0.14	0.94	-4.81	1.84
contin. prod., p and q unobserved	0.00	0.33	0.36	0.05
Total	1.00	1.00	1.00	1.00
total value in 2008, billions of US$	12.1	15.8	32.5	20.1
total value in 2009, billions of US$	7.1	12.0	33.9	17.4
% change from 2008 to 2009	-0.41	-0.24	0.04	-0.13

Notes: The time period represented is from the first half of 2008 (pre-crisis) to the first half of 2009 (mid-crisis). To avoid issues with seasonally-traded products, we do not include the second half of 2008. The final row for each product type shows the value change for continuing products for which we are unable to observe either price or quantity.

Table 7: Heterogeneity across Trading Partner Income/Region, Manufactures Only

UNITED STATES & EUROPEAN UNION	% of value change					
	High income trading partner	Upper middle income trading partner	Lower middle income trading partner	Low income trading partner	China	Sub-Saharan Africa
new products	-0.03	-0.07	-0.11	0.66	-0.05	-0.97
exiting products	0.04	0.10	0.16	-0.22	0.06	0.32
price effect	-0.15	-0.07	-0.79	1.44	-1.16	0.40
quantity effect	0.95	0.91	1.54	-0.90	1.89	1.17
contin. prod., p and q unobserved	0.20	0.14	0.21	0.02	0.26	0.08
Total	1.00	1.00	1.00	1.00	1.00	1.00
total value in 2008, billions of US$	1454.3	175.9	257.8	17.3	187.2	7.9
total value in 2009, billions of US$	1121.5	132.8	233.6	18.5	172.8	6.6
% change from 2008 to 2009	-0.23	-0.24	-0.09	0.07	-0.08	-0.16
BRAZIL & INDONESIA	% of value change					
	High income trading partner	Upper middle income trading partner	Lower middle income trading partner	Low income trading partner	China	Sub-Saharan Africa
new products	-2.19	-2.83	-1.29	0.53	0.18	-0.31
exiting products	1.66	6.99	1.77	-0.47	-0.31	0.59
price effect	-11.28	-14.43	-14.70	0.69	5.04	-0.54
quantity effect	12.98	11.51	14.61	0.12	-3.71	1.24
contin. prod., p and q unobserved	-0.18	-0.24	0.61	0.12	-0.21	0.02
Total	1.00	1.00	1.00	1.00	1.00	1.00
total value in 2008, billions of US$	32.3	6.3	11.7	0.2	8.0	0.2
total value in 2009, billions of US$	31.7	6.2	11.5	0.3	8.4	0.1
% change from 2008 to 2009	-0.02	-0.01	-0.01	0.29	0.05	-0.27

Notes: The time period represented is from the first half of 2008 (pre-crisis) to the first half of 2009 (mid-crisis). To avoid issues with seasonally-traded products, we do not include the second half of 2008. The European Union and Brazil report quantities in various units, and accordingly cannot be evaluated with the above decomposition. Data for the US is based on value and weight of air and vessel shipments, and accordingly does not sum to total imports.

Table 8: OLS Regression Decomposition, by Dependence on External Finance (High versus Low)

	United States			European Union		
	high	low	t-values	high	low	t-values
new	-0.0009 (0.0005)	-0.0003 (0.0002)	-1.1	-0.0051 (0.0006)	-0.0017 (0.001)	-1.74
exit	0.0028 (0.003)	0.0009 (0.0002)	0.98	0.0059 (0.0005)	0.0106 (0.0009)	-3.01
price effect	-0.272 (0.010)	-0.029 (0.008)	-14.12	-0.017 (0.010)	-0.131 (0.006)	8.87
quantity effect	1.01 (0.010)	1.00 (0.009)	0.59	0.80 (0.010)	0.83 (0.008)	-2.07
continuing, unobserved	0.264 (0.007)	0.033 (0.003)	28.64	0.218 (0.004)	0.293 (0.004)	-9.40
n	224	225		4604	4462	
total value in 2008, billions of US$	194.4	252.4		566.4	880.0	
total value in 2009, billions of US$	153.2	169.5		478.3	694.6	
% change from 2008 to 2009	-0.21	-0.33		-0.16	-0.21	

	Brazil			Indonesia		
	high	low	t-values	high	low	t-values
new	0.0285 (0.014)	0.0974 (0.019)	-2.10	-0.0079 (0.010)	-0.0273 (0.009)	1.42
exit	0.0156 (0.006)	-0.0151 (0.007)	2.52	0.4566 (0.031)	-0.0309 (0.012)	15.46
price effect	0.490 (0.159)	1.258 (0.091)	-3.89	-0.045 (0.074)	-0.314 (0.091)	2.18
quantity effect	0.46 (0.163)	-0.47 (0.095)	4.55	0.52 (0.069)	1.28 (0.089)	-6.35
continuing, unobserved	0.007 (0.014)	0.131 (0.016)	-4.3	0.077 (0.020)	0.093 (0.012)	-0.73
n	202	177		189	177	
total value in 2008, billions of US$	12.4	19.8		7.5	10.4	
total value in 2009, billions of US$	12.0	21.6		6.1	9.8	
% change from 2008 to 2009	-0.03	0.09		-0.19	-0.06	

Notes: The time period represented is from the first half of 2008 (pre-crisis) to the first half of 2009 (mid-crisis). To avoid issues with seasonally-traded products, we do not include the second half of 2008. N represents the number of trading partners. For the European Union, this is tallied by importing country (eg, an average of 194 trading partners for each of the EU's 27 members). T-values are for the hypothesis that the coefficient in the "high" equation is equal to the coefficient in the "low" equation.

Appendix A: Country Groupings by Income

HIGH
Andorra
Antigua and Barbuda
Aruba
Australia
Austria
Bahamas, The
Bahrain
Barbados
Belgium
Bermuda
Brunei Darussalam
Canada
Cayman Islands
Channel Islands
Croatia
Cyprus
Czech Republic
Denmark
Equatorial Guinea
Estonia
Faeroe Islands
Finland
France
French Polynesia
Germany
Greece
Greenland
Guam
Hong Kong, China
Hungary
Iceland
Ireland
Isle of Man
Israel
Italy
Japan
Korea, Rep.
Kuwait
Liechtenstein
Luxembourg
Macao, China
Malta
Monaco
Netherlands
Netherlands Antilles
New Caledonia
New Zealand
Northern Mariana Isl.
Norway
Oman
Portugal
Puerto Rico
Qatar
San Marino
Saudi Arabia
Singapore
Slovak Republic
Slovenia
Spain
Sweden
Switzerland
Trinidad and Tobago
United Arab Emirates
United Kingdom
United States
Virgin Islands (U.S.)

UPPER MIDDLE
Algeria
American Samoa
Argentina
Belarus
Bosnia & Herzegovina
Botswana
Brazil
Bulgaria
Chile
Colombia
Costa Rica
Cuba
Dominica
Dominican Republic
Fiji
Gabon
Grenada
Jamaica
Kazakhstan
Latvia
Lebanon
Libya
Lithuania
Macedonia, FYR
Malaysia
Mauritius
Mayotte
Mexico
Montenegro
Namibia
Palau
Panama
Peru
Poland
Romania
Russian Federation
Serbia
Seychelles
South Africa
St. Kitts and Nevis
St. Lucia
St. Vincent & the Grenadines
Suriname
Turkey
Uruguay
Venezuela, RB

LOWER MIDDLE
Albania
Angola
Armenia
Azerbaijan
Belize
Bhutan
Bolivia
Cameroon
Cape Verde
China
Congo, Rep.
Côte d'Ivoire
Djibouti
Ecuador
Egypt, Arab Rep.
El Salvador
Georgia
Guatemala
Guyana
Honduras
India
Indonesia
Iran, Islamic Rep.
Iraq
Jordan
Kiribati
Kosovo
Lesotho
Maldives
Marshall Islands
Micronesia, Fed. Sts.
Moldova
Mongolia
Morocco
Nicaragua
Nigeria
Pakistan
Papua New Guinea
Paraguay
Philippines
Samoa
São Tomé & Principe
Solomon Islands
Sri Lanka
Sudan
Swaziland
Syrian Arab Republic
Thailand
Timor-Leste
Tonga
Tunisia
Turkmenistan
Ukraine
Vanuatu
West Bank and Gaza

LOW
Afghanistan
Bangladesh
Benin
Burkina Faso
Burundi
Cambodia
Central African Republic
Chad
Comoros
Congo, Dem. Rep.
Eritrea
Ethiopia
Gambia, The
Ghana
Guinea
Guinea-Bissau
Haiti
Kenya
Korea, Dem. Rep.
Kyrgyz Republic
Lao PDR
Liberia
Madagascar
Malawi
Mali
Mauritania
Mozambique
Myanmar
Nepal
Niger
Rwanda
Senegal
Sierra Leone
Somalia
Tajikistan
Tanzania
Togo
Uganda
Uzbekistan
Vietnam
Yemen, Rep.
Zambia
Zimbabwe

Appendix B: Groupings by Product Section

ANIMAL: Live animals, animal products
HS 1 Live animals
HS 2 Meat and edible meat offal
HS 3 Fish and crustaceans, molluscs and other aquatic invertebrates
HS 4 Dairy produce; birds eggs; natural honey; edible products of animal origin, not elsewhere specified or included
HS 5 Products of animal origin, not elsewhere specified or included

VEGETABLE: Vegetable products, animal or vegetable fats and oils and waxes
HS 6 Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage
HS 7 Edible vegetables and certain roots and tubers
HS 8 Edible fruit and nuts; peel of citrus fruit or melons
HS 9 Coffee, tea, maté and spices
HS 10 Cereals
HS 11 Products of the milling industry; malt; starches; inulin; wheat gluten
HS 12 Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruits; industrial or medicinal plants; straw and fodder
HS 13 Lac; gums, resins and other vegetable saps and extracts
HS 14 Vegetable plaiting materials; vegetable products not elsewhere specified or included
HS 15 Animal or vegetable fats and oils and their cleavage products prepared edible fats; animal or vegetable waxes

FOODSTUFFS: Prepared foodstuffs, beverages, vinegar, tobacco and substitutes
HS 16 Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates
HS 17 Sugars and sugar confectionery
HS 18 Cocoa and cocoa preparations
HS 19 Preparations of cereals, flour, starch or milk; bakers' wares
HS 20 Preparations of vegetables, fruit, nuts or other parts of plants
HS 21 Miscellaneous edible preparations
HS 22 Beverages, spirits and vinegar
HS 23 Residues and waste from the food industries; prepared animal feed
HS 24 Tobacco and manufactured tobacco substitutes

MINERALS: Mineral products
HS 25 Salt; sulfur; earths and stone; plastering materials, lime and cement
HS 26 Ores, slag and ash
HS 27 Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes

CHEMICALS: Products of the chemical or allied industries
HS 28 Inorganic chemicals; organic or inorgani c compounds of precious metals, of rare-earth metals,of radioactive elements or of isotopes
HS 29 Organic chemicals
HS 30 Pharmaceutical products
HS 31 Fertilizers
HS 32 Tanning or dyeing extracts; dyes, pigments, paints, varnishes, putty and mastics
HS 33 Essential oils and resinoids; perfumery, cosmetic or toilet preparations
HS 34 Soap, organic surface-active agents, washing preparations, lubricating preparations, artificial waxes, prepared waxes, polishing or scouring preparations, candles and similar articles, modeling pastes, "dental waxes" and dental preparations with a basis of plaster
HS 35 Albuminoidal substances; modified starches; glues; enzymes
HS 36 Explosives; pyrotechnic products; matches; pyrophoric alloys; certain combustible preparations
HS 37 Photographic or cinematographic goods
HS 38 Miscellaneous chemical products

PLASTICS: Plastics and rubber and articles thereof

HS 39 Plastics and articles thereof
HS 40 Rubber and articles thereof

LEATHER: Raw hides and skins, leather, furskins, articles thereof
HS 41 Raw hides and skins (other than furskins) and leather
HS 42 Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silkworm gut)
HS 43 Furskins and artificial fur; manufactures thereof

WOOD: Wood and articles thereof, charcoal, cork and articles thereof, basketware, pulp, paper, printing
HS 44 Wood and articles of wood; wood charcoal
HS 45 Cork and articles of cork
HS 46 Manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork
HS 47 Pulp of wood or of other fibrous cellulosic material; waste and scrap of paper or paperboard
HS 48 Paper and paperboard; articles of paper pulp, of paper or of paperboard
HS 49 Printed books, newspapers, pictures and other products of the printing industry; manuscripts, typescripts and plans

TEXILTES: Textile and textile articles
HS 50 Silk
HS 51 Wool, fine or coarse animal hair; horsehair yarn and woven fabric
HS 52 Cotton
HS 53 Other vegetable textile fibers; paper yarn and woven fabric of paper yarn
HS 54 Man-made filaments
HS 55 Man-made staple fibers
HS 56 Wadding, felt and nonwovens; special yarns, twine, cordage, ropes and cables and articles thereof
HS 57 Carpets and other textile floor coverings
HS 58 Special woven fabrics; tufted textile fabrics; lace, tapestries; trimmings; embroidery
HS 59 Impregnated, coated, covered or laminated textile fabrics; textile articles of a kind suitable for industrial use
HS 60 Knitted or crocheted fabrics
HS 61 Articles of apparel and clothing accessories, knitted or crocheted
HS 62 Articles of apparel and clothing accessories, not knitted or crocheted
HS 63 Other made up textile articles; sets; worn clothing and worn textile articles; rags

FOOTWEAR/HEADGEAR: Footwear, headgear, umbrellas
HS 64 Footwear, gaiters and the like; parts of such articles
HS 65 Headgear and parts thereof
HS 66 Umbrellas, sun umbrellas, walking sticks, seatsticks, whips, riding-crops and parts thereof
HS 67 Prepared feathers and down and articles made of feathers or of down; artificial flowers; articles of human hair

STONE/GLASS: Articles of stone, plaster cement, asbestos, mica, ceramics, glass
HS 68 Articles of stone, plaster, cement, asbestos, mica or similar materials
HS 69 Ceramic products
HS 70 Glass and glassware
HS 71 Natural or cultured pearls, precious or semi-precious stones,precious metals, metals clad with precious metal and articles thereof; imitation jewelry; coin

METALS: Base metals and articles thereof
HS 72 Iron and steel
HS 73 Articles of iron or steel
HS 74 Copper and articles thereof
HS 75 Nickel and articles thereof
HS 76 Aluminum and articles thereof
HS 77 (Reserved for possible future use)
HS 78 Lead and articles thereof

HS 79 Zinc and articles thereof
HS 80 Tin and articles thereof
HS 81 Other base metals; cermets; articles thereof
HS 82 Tools, implements, cutlery, spoons and forks, of base metal; parts thereof of base metal
HS 83 Miscellaneous articles of base metal

MACHINERY/ELECTRICAL: Machinery, mechanical appliances, electrical equipment and parts
HS 84 Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof
HS 85 Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles

TRANSPORTATION: vehicles, aircraft, vessels, transport equipment
HS 86 Railway or tramway locomotives, rolling-stock and parts thereof; railway or tramway track fixtures and fittings and parts thereof; mechanical (including electro-mechanical) traffic signalling equipment of all kinds
HS 87 Vehicles other than railway or tramway rolling stock, and parts and accessories thereof
HS 88 Aircraft, spacecraft, and parts thereof
HS 89 Ships, boats and floating structures

MISCELLANEOUS
HS 90 Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof
HS 91 Clocks and watches and parts thereof
HS 92 Musical instruments; parts and accessories of such articles
HS 93 Arms and ammunition; parts and accessories thereof
HS 94 Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; lamps and lighting fittings, not elsewhere specified or included; illuminated sign illuminated nameplates and the like; prefabricated buildings
HS 95 Toys, games and sports requisites; parts and accessories thereof
HS 96 Miscellaneous manufactured articles
HS 97 Works of art, collectors' pieces and antiques
HS 98 Special classification provisions
HS 99 Temporary legislation; temporary modifications proclaimed pursuant to trade agreements legislation; additional import restrictions proclaimed pursuant to section 22 of the Agricultural Adjustment Act, as amended