

Understanding the Great Trade Collapse of 2008–09 and the subsequent trade recovery

Meredith A. Crowley and Xi Luo

Introduction and summary

In April 2009, the world economy appeared to be in a free fall. Global trade in goods and services had fallen 15.8 percent over the final two quarters of 2008 and the first quarter of 2009.¹ This world trade collapse had been the largest three-quarter decline of the past 40 years. Five months earlier, in November 2008, leaders of the Group of Twenty (G-20)—20 large economies that make up roughly 85 percent of the world’s economic activity²—had met in Washington, DC, and pledged to stabilize the world financial system and improve coordination of macroeconomic responses to the global financial crisis.³

Despite monetary easing and fiscal stimulus in many economies, real economic activity continued to deteriorate over the next few months. Reconvening in April 2009 in London, the G-20 leaders had a full agenda, which included the following topics: the role of fiscal stimulus to promote recovery; the reform of banking and financial regulation; and the strengthening of the International Monetary Fund and the multilateral development banks (MDBs), such as the World Bank Group. In addition, even though the world was in the midst of an unprecedented global *financial* crisis, the problem of international trade was unusually prominent on the agenda.

Among the commitments made by the G-20 in London, two directly addressed international trade. First, leaders promised to “ensure availability of at least \$250 billion over the next two years to support trade finance through our export credit and investment agencies and through the MDBs.”⁴ Second, they reaffirmed a commitment made at the earlier Washington, DC, summit to refrain from raising new barriers to trade in goods and services. Finally, as part of the general strategy to restore economic growth, they pointed out that “an unprecedented and concerted fiscal expansion” among the member economies would total \$5 trillion

by the end of 2010.⁵ If declining trade simply reflected declining economic activity, this fiscal expansion would be expected to have an important impact on global trade.

Previous work⁶ has documented what many economists now refer to as the Great Trade Collapse of 2008–09, and has analyzed its potential causes. In this article, we review not only the unprecedented collapse of world trade in 2008–09, but also the equally dramatic trade recovery that took place in 2009–10. We look at these events in a historical context, by comparing them to previous trade contractions and recoveries. To gain a better understanding of the links between trade and broader economic conditions, we look at changes in the trade-to-gross-domestic-product (GDP) ratios of major economies across the globe before, during, and after the Great Trade Collapse. Then, we discuss three primary hypotheses that explain the trade collapse: 1) a decline in aggregate demand for all goods; 2) difficulties in obtaining trade finance; and 3) rising trade barriers. We consider how three distinct policy actions—fiscal stimulus, funding for trade finance, and a commitment to refrain from trade barriers—might have affected both the collapse and the subsequent recovery. Finally, we review four prominent examples from the large literature examining the contributing factors to the recent collapse of global trade.

Determining the relative degree to which the various demand- and supply-side factors contributed to the Great Trade Collapse is important for formulating the optimal policy response. Economists would like to determine if there are market failures or counterproductive

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policies specific to trade that the government can or should correct. If research finds that weak domestic demand (resulting from falling consumer income, stronger preferences for saving over consumption, or high unemployment) is the prime cause of the sharp fall in trade, then there is not a clear mandate for government intervention except, perhaps, actions to address the overall recession. In contrast, if research shows that trade finance problems are slowing down world trade, the appropriate policy response might be interventions by the government or nongovernmental organizations in certain financial or insurance markets. For example, governments could subsidize the price of payment instruments, export credit insurance, or even working capital loans. Finally, if analysis shows that the government's tariffs on imports or nontariff barriers to trade are behind a sharp decline in trade, then the best policy solution would be the removal of these government interventions from international goods markets.

According to the literature, the global collapse in economic activity explains between 35 percent and 80 percent of the Great Trade Collapse. The analysis we perform in this article estimates that declining aggregate demand explains 35–50 percent of the Great Trade Collapse. With regard to the recovery, our analysis finds a quantitatively larger puzzle; rising aggregate demand explains only 25–40 percent of the recovery in imports. The findings of the literature on the role of trade finance in the collapse are mixed, with one paper finding that tighter financial conditions likely had a moderate negative effect on trade volumes during the financial crisis of 2008–09. Further, in this article, we document the evolution of antidumping trade restrictions imposed by the United States and Canada over the past 40 years and conclude that there was no significant increase in border restrictions by these two countries in 2008 or 2009. Thus, trade protection by these countries was not a cause of the collapse. In terms of the dramatic recovery in trade, the absence of explicit border barriers at least allowed the recovery to progress unhindered. The conclusion that changing aggregate demand was the major cause of both the dramatic collapse in trade volumes in 2008–09 and the spectacular recovery in 2009–10 suggests that of all the policy actions, fiscal stimulus likely had the largest impact on the trade recovery.

What was the Great Trade Collapse?

In this section, we document some stylized facts about the Great Trade Collapse of 2008–09 and the subsequent recovery. Panel A of figure 1 documents the timing and magnitude of the Great Trade Collapse.

The plotted series is the seasonally adjusted quarterly level of world trade measured in trillions of 2005 U.S. dollars. World trade of goods and services is defined as $(X + M)/2$, where X is world exports of goods and services and M is world imports of goods and services. The V-shaped path toward the end of panel A corresponds to the collapse in world trade during the period 2008:Q2–2009:Q2 and the equally rapid recovery from 2009:Q2 onward. This world trade series from the Organisation for Economic Co-operation and Development (OECD), which starts in 1968:Q2, demonstrates a clear upward trend. The level of world trade in 2010:Q3 is more than 15 times the level in 1968:Q2. While international trade has been trending upward for more than four decades, with an annual growth rate of 6.48 percent, episodes of contraction have not been uncommon. Between 1974:Q2 and 1975:Q2, the world trade level declined by 7.65 percent; between 1980:Q1 and 1980:Q3, it slid by 3.34 percent; between 1981:Q4 and 1982:Q4, it slipped by 3.12 percent; and between 2000:Q4 and 2001:Q4, it decreased by 3.51 percent. The Great Trade Collapse, which occurred between 2008:Q2 and 2009:Q2, was more severe than all the previous tumbles—the volume of world trade plummeted by 17.20 percent from peak to trough.

In panel B of figure 1, the log of world trade in trillions of 2005 U.S. dollars is plotted. This series displays a clear linear trend. Notice that during the 2000s, trade growth stood above the trend line until the collapse of 2008–09. Although a rapid recovery began after 2009:Q2, world trade has yet to return to its long-run linear trend.

Next, we turn to the United States. Panel A of figure 2 shows real seasonally adjusted U.S. imports and exports. Like the rest of the world, the United States has seen fast growth in trade over the past few decades. From 1965 through 2010, U.S. imports grew at an annual rate of 6.03 percent and U.S. exports grew at an annual rate of 5.92 percent. During the Great Trade Collapse (2008:Q2–2009:Q2), U.S. real imports declined by 18.3 percent while U.S. real exports dropped by 14.7 percent. Given the rapid growth in trade over the previous five decades, the magnitude of the collapse in exports and imports was truly astonishing.

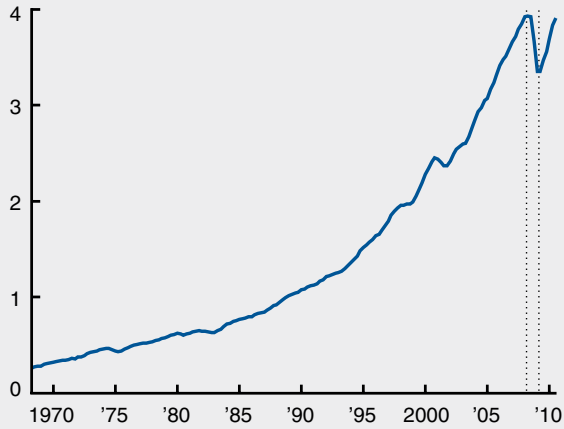
Panel B of figure 2 shows the log levels of U.S. real imports and exports, which both display linear upward trends over time. Notice that the bumps and wiggles in the series for the United States are more apparent than in their counterparts for world trade in panel B of figure 1. These differences between world trade and U.S. trade measures are due to the fact that in world trade flows, a decline in one country's trade volume is often offset by growth in another's.

FIGURE 1

World trade, 1968–2010

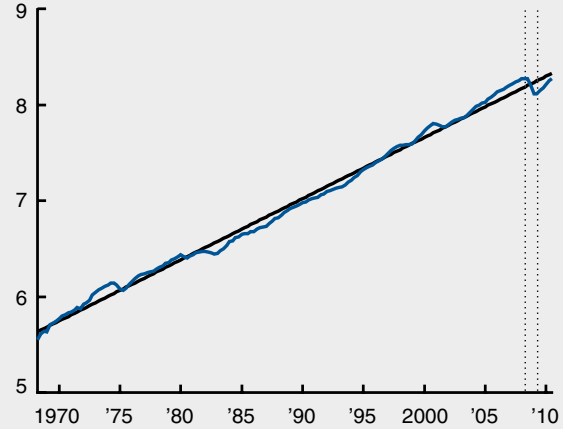
A. World trade

trillions of 2005 U.S. dollars, seasonally adjusted



B. Log of world trade

log scale



Notes: World trade is the sum of world exports in goods and services and world imports in goods and services divided by two. In each panel, the two dashed vertical lines indicate the peak and trough of the Great Trade Collapse (2008:Q2–2009:Q2). In panel B, the straight black line indicates the long-run linear trend.

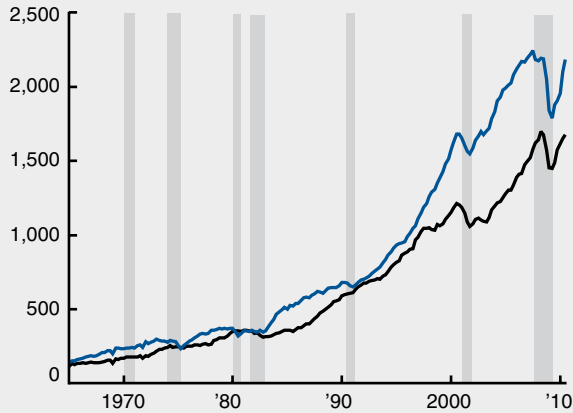
Source: Authors' calculations based on data from the Organisation for Economic Co-operation and Development, *Main Economic Indicators*, from Haver Analytics.

FIGURE 2

U.S. trade, 1965–2010

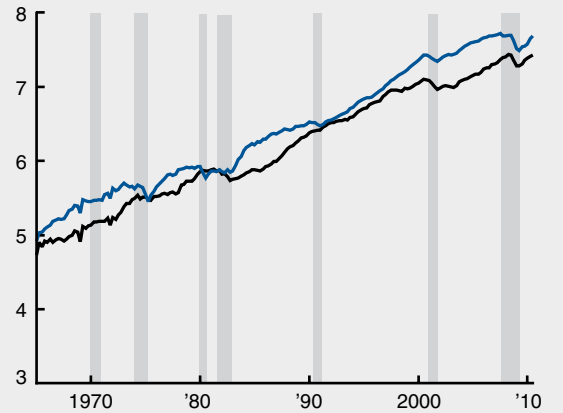
A. U.S. trade

billions of chained 2005 U.S. dollars, seasonally adjusted



B. Log of U.S. trade

log scale

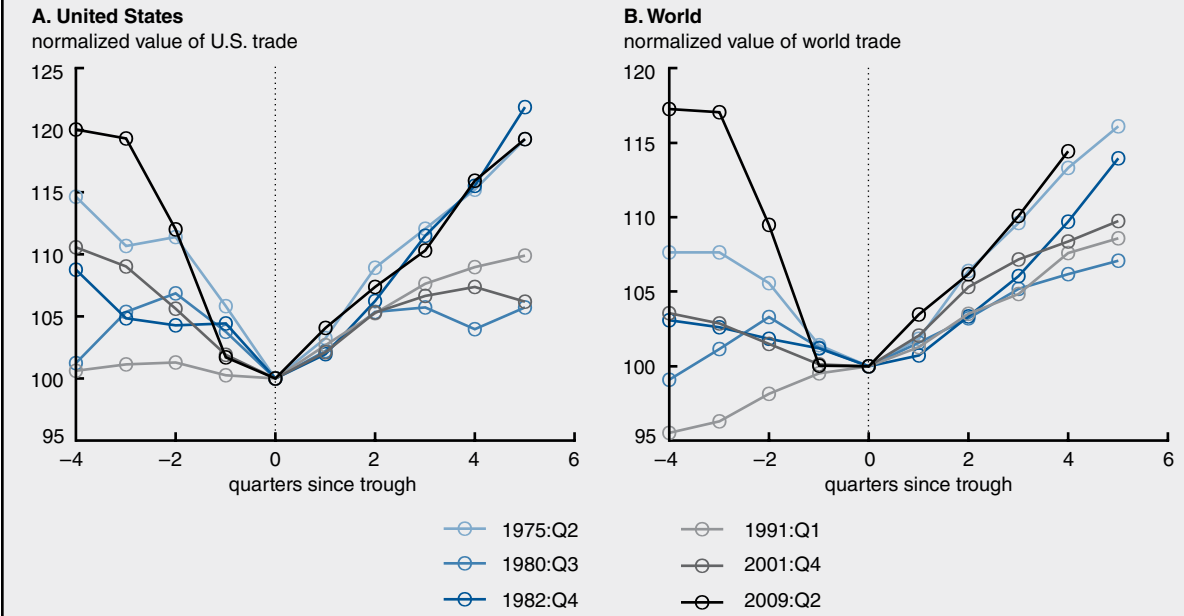


Note: The shaded areas indicate official U.S. periods of recession as identified by the National Bureau of Economic Research.

Source: Authors' calculations based on data from the U.S. Bureau of Economic Analysis, *National Income and Product Accounts of the United States*, from Haver Analytics.

FIGURE 3

Trade contractions and recoveries



Notes: Episodes of trade contraction and recovery for both the United States and the world are indicated by their trough dates. Panel A is based on U.S. trade data in figure 2. Panel B is based on world trade data in figure 1. For each panel's vertical axis, the data are normalized to be equal to 100 for the indicated year and quarter.

Sources: Authors' calculations based on data from the U.S. Bureau of Economic Analysis, *National Income and Product Accounts of the United States*, and Organisation for Economic Co-operation and Development, *Main Economic Indicators*, from Haver Analytics.

Trade contractions and recoveries in historical perspective

How does the most recent trade collapse compare with previous episodes of trade contraction? And how does the current recovery in trade compare with previous recoveries? In figure 3, we present “spider graphs” that allow us to compare the magnitude and speed of different trade contractions and recoveries. Panel A of figure 3 presents several U.S. trade contractions and recoveries, while panel B of figure 3 presents trade contractions and recoveries for the world. In both panels A and B of figure 3, we normalize real, seasonally adjusted, quarterly data on trade, defined as $(X + M)/2$, to be equal to 100 in the quarter identified as the trough of each U.S. trade contraction. We identified the following quarters as the troughs of U.S. episodes of trade contraction and recovery: 1975:Q2, 1980:Q3, 1982:Q4, 1991:Q1, 2001:Q4, and 2009:Q2. Next, we investigate what happened to the volume of U.S. and world trade four quarters before and five quarters after these identified nadirs for U.S. trade. Numbers on the horizontal axes represent the number of quarters before and after the trough date; therefore, the number zero corresponds to the troughs. Numbers to the left of zero generally

correspond to a period of decline in trade volume. Analogously, numbers to the right of zero generally correspond to a period of recovery in trade volume. We refer to each episode of trade contraction and recovery by its trough date.

In both panels, the solid black line stands out. The black lines (representing the 2009:Q2 episode) depict the changes in trade volume during the Great Trade Collapse of 2008–09 (and the subsequent recovery) for the United States and the world in panels A and B, respectively. A closer look at these spider graphs reveals the following facts.

First, for both the United States and the world, the recent trade collapse is the most severe decline in trade since the late 1960s, in terms of both magnitude and speed. Notice that for both the United States and the world, sustained trade declines do not last more than four quarters. For the United States, the 1975:Q2, 1982:Q4, and 2001:Q4 episodes all have four quarters of contraction. In contrast, for the 1980:Q3 and 1991:Q1 episodes in the United States, contractions lasted for only two quarters. The patterns of contraction in world trade are almost identical to those in the U.S. trade. An exception is the 1991:Q1 episode in which world trade never experienced a decline.

Second, despite its huge magnitude, the Great Trade Collapse does not stand out as more protracted than previous episodes. Thus, a greater amount of trade destruction occurred in a period of typical duration for trade decline. One way to see this point is to compare the averages of the annualized quarterly growth rates of trade during the four quarters before the identified trough dates (see table 1). During the Great Trade Collapse (the 2009:Q2 episode in table 1), U.S. trade fell, at an average annualized quarterly rate of -15.8 percent, and world trade dropped, at an average annualized quarterly rate of -13.6 percent. The trade contraction following in the wake of the oil crisis of 1973 (the 1975:Q2 episode in table 1), the most similar in terms of magnitude, saw U.S. trade fall, at an average annualized rate of -12.3 percent.

Third, let us take a look at the right-hand side of each panel in figure 3 and examine the recovery that followed each collapse. We notice that following the nadir of the Great Trade Collapse (2009:Q2), despite a remarkably fast recovery rate, as of 2010:Q2, both U.S. and world trade have yet to return to their pre-collapse levels. For world trade, in all previous contractions, trade volumes rebounded to their pre-collapse levels within four quarters.

For the United States, a slow recovery in trade is not unprecedented. After the trade contraction associated with the dot-com recession of 2001 (that is, the 2001:Q4 episode in figure 3), it took eight quarters for trade to rebound to its pre-contraction level. The trade recovery following the Great Trade Collapse has been faster than that following the dot-com bust. Five quarters after the nadir in 2009:Q2, U.S. trade volume had returned to 99.3 percent of its 2008:Q2 level. Given the severity of the decline, this five-quarter rally has been impressive.

Finally, figure 3 suggests that there may be a synchronicity between U.S. and world trade. The U.S. trough dates are identical with the world trough dates on most occasions. However, it is not clear from this figure if this synchronicity is due to the United States' large share of world trade or due to changes in foreign trade flows that are truly synchronous with U.S. trade flows. We return to this issue later.

We now shift gears to examine U.S. imports and exports in order to understand the Great Trade Collapse and the subsequent recovery from another angle.

TABLE 1				
Averages of annualized quarterly growth rates of trade				
Episode by trough date	United States		World	
	Contraction	Recovery	Contraction	Recovery
(----- percent -----)				
1975:Q2	-12.3	15.3	-6.9	13.4
1980:Q3	-0.4	4.3	1.1	6.3
1982:Q4	-7.8	15.7	-2.9	9.8
1991:Q1	-0.6	9.0	4.7	7.7
2001:Q4	-9.5	7.4	-3.4	8.4
2009:Q2	-15.8	16.0	-13.6	14.4

Notes: Trade is $(X + M)/2$, where X is exports of goods and services and M is imports of goods and services. The underlying U.S. data series is reported in billions of 2005 chained U.S. dollars, seasonally adjusted. The underlying world data are reported in billions of 2005 U.S. dollars, seasonally adjusted. The averages of the annualized quarterly growth rates of trade are calculated during each trade episode's contraction (four quarters before the trough) and recovery (five quarters after the trough). For the world's 2009:Q2 episode, the recovery rate is calculated for four quarters after the trough.

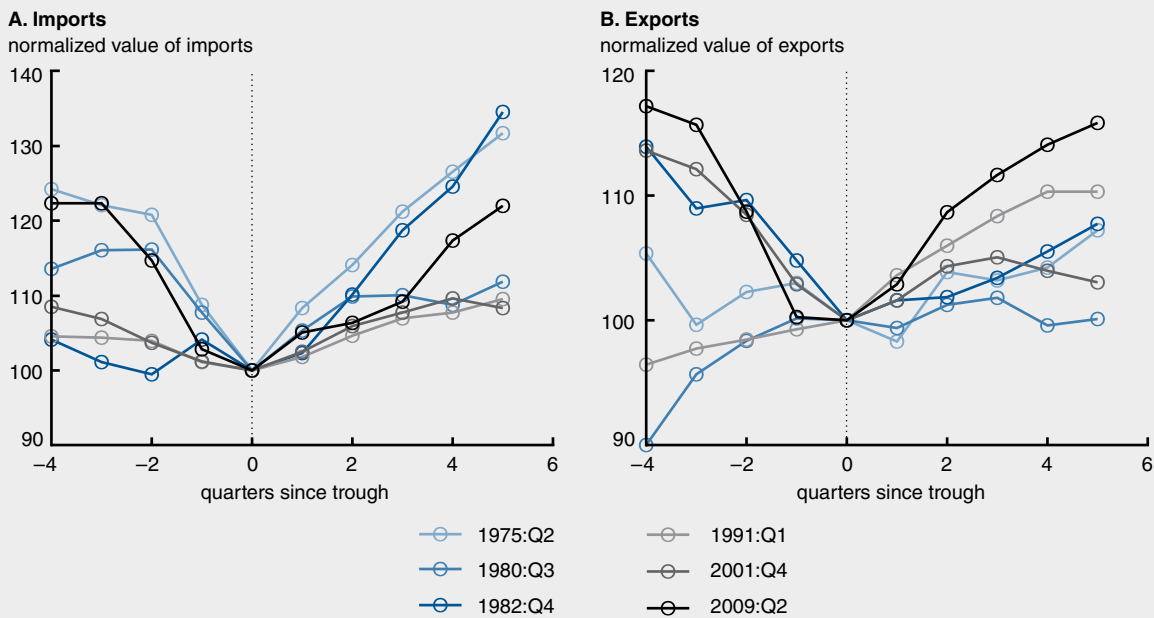
Sources: Authors' calculations based on data from the U.S. Bureau of Economic Analysis, *National Income and Product Accounts of the United States*, and Organisation for Economic Co-operation and Development, *Main Economic Indicators*, from Haver Analytics.

Figure 4 disentangles the U.S. episodes of trade contraction and recovery into spider graphs of imports (panel A) and exports (panel B). All import episodes have a V-shaped path, while not all export episodes display this pattern. Apparently, imports played the more significant role in shaping the U.S. trade contraction episodes displayed in figure 3.

Let us first focus on U.S. imports in panel A of figure 4. Interestingly, with respect to imports, the Great Trade Collapse (the 2009:Q2 episode) looks similar to the trade contraction associated with the oil shock of 1973 (the 1975:Q2 episode). The magnitudes of the contractions over the four quarters before the trough date are similar. In fact, the average of the annualized quarterly growth rates of U.S. imports was -18.4 percent during the 1975:Q2 episode versus -17.2 percent during the 2009:Q2 episode. The magnitudes of the rebounds over the five quarters after the trough date are not too far off from each other. The average of the annualized quarterly growth rates of U.S. imports was 24.9 percent for the 1975:Q2 episode versus 17.8 percent for the 2009:Q2 episode. Still, compared with the previous episodes of trade contraction, the collapse in U.S. imports in 2008-09 was among the most severe. When examining the rebounds in imports of the various episodes, we see that imports grew firmly, but not stunningly, after the Great Trade Collapse. On the one hand, a recovery of 17.8 percent for the 2009:Q2 episode has been much

FIGURE 4

U.S. trade contractions and recoveries: Imports and exports



Notes: Episodes of trade contraction and recovery for the United States are indicated by their trough dates, as in figure 3. Panel A is based on the import volume series and panel B is based on the export volume series in figure 2. For each panel's vertical axis, the data are normalized to be equal to 100 for the indicated year and quarter.
 Source: Authors' calculations based on data from the U.S. Bureau of Economic Analysis, *National Income and Product Accounts of the United States*, from Haver Analytics.

faster than those of the 1980:Q3, 1991:Q1, and 2001:Q4 episodes; on the other hand, the recovery speed for the 2009:Q2 episode has not been as fast as those for the 1975:Q2 and 1982:Q4 episodes.

Next we turn to the export side in panel B of figure 4. Note that the Great Trade Collapse and the recovery following it (the 2009:Q2 episode) had the steepest and most symmetric V-shaped path around the trough date relative to all previous episodes. This makes the Great Trade Collapse and subsequent recovery look unique. Over the four quarters before the 2009:Q2 trough date, the average of the annualized quarterly growth rates of exports was -13.9 percent, the largest rate of decline seen over the past four decades. The recovery over the five quarters after the 2009:Q2 trough date has been fast, with an average of the annualized quarterly growth rates of 12.7 percent. The momentum of the export recovery was rapid in the beginning but gradually faded. The export series during the Great Trade Collapse and subsequent recovery features a quick collapse and a quick rebound.

The export contractions in the 2001:Q4 and 1982:Q4 episodes look similar to that of the 2009:Q2 episode, although both of the earlier episodes feature slow

recoveries. In contrast, the 1975:Q2, 1980:Q3, and 1991:Q1 episodes do not have V-shaped paths. Take the 1975:Q2 episode, for example. During the collapse period, exports slid for a quarter, rebounded for two consecutive quarters, and then declined for two more quarters (past the trough date of imports for that episode). One quarter into the recovery, a brief reversal set in before a two-quarter rally that finally brought the export volume back to the level of 1974:Q2. Exports in the 1980:Q3 and 1991:Q1 episodes experienced little or no decline. Therefore, the brief trade contractions in the 1980:Q3 and 1991:Q1 episodes can be attributed almost exclusively to contractions in imports.

To summarize, the behavior for U.S. imports during the Great Trade Collapse and the subsequent recovery look similar to that of previous episodes. However, the V-shaped pattern of U.S. exports during the Great Trade Collapse and the subsequent recovery bears little resemblance to the behavior of exports in previous episodes. The unique path of exports during the 2009:Q2 episode appears to be driven by the strength of the 2008-09 global recession, which we explore in more detail in the next section.

Changes in trade and GDP

Trade volume usually rises or falls in accordance with the direction of the general economy, so we want to examine this interaction. For U.S. trade levels, if we refer to figure 2 (on p. 46), for example, we see that trade contractions usually occur during recessions. How do we think of a trade contraction in the context of broader economic conditions? For any country, by summing up imports and exports and then dividing this quantity by GDP, we obtain that country's trade-to-GDP ratio. Multiplying by 100 allows us to express this ratio as a percent. Figure 5 shows the nominal trade-to-GDP ratios of the United States, France, Japan, and Germany over the past few decades.

Let us focus on the U.S. experience plotted in panel A of figure 5. This ratio was 8.85 percent in 1965:Q1 and peaked in 2008:Q3 at 31.88 percent. The upward trend in the evolution of this ratio indicates that the growth in trade volume has outpaced the growth in GDP over the past few decades; trade's role in the broader economy has expanded steadily. The trade-to-GDP ratio can be thought of as a measure of the openness of an economy to trade. The fact that the trade-to-GDP ratios for the United States, France, Japan, and Germany have all been trending upward over time shows that these countries have become more and more open to trade as part of their economic activities. This rise in openness is often referred to as globalization.

Each country's path to globalization is subject to its own historical idiosyncrasies. For example, the declines in the United States' trade-to-GDP ratio occur close to U.S. recessions. During the period 1974:Q4–1975:Q3, around the time of the first oil crisis, the trade-to-GDP ratio decreased from 17.6 percent to 15.4 percent. Around the time that the dot-com bubble burst, in the period 2000:Q3–2001:Q4, the trade-to-GDP ratio decreased from 26.3 percent to 22.0 percent. Finally, around the time of the global financial crisis, during the period 2008:Q3–2009:Q2, the trade-to-GDP ratio plummeted from 31.9 percent to 24.1 percent.

For France (figure 5, panel B), fluctuations in the trade-to-GDP ratio follow a similar pattern to that observed for the United States. Starting at 26.3 percent in 1965:Q1, France's trade-to-GDP ratio increased steadily over time, reaching 43.7 percent in 1974:Q3. When the oil shock set in, the trade-to-GDP ratio slid to 35.9 percent in 1975:Q3, and it did not surpass the pre-collapse level until 1980:Q1—five and a quarter years after the trough. For France, whenever there is a drop in the trade-to-GDP ratio, it takes a relatively long time to recover. France experienced a plodding recovery from the trade contraction of the early 2000s. In 2008:Q3, France's trade-to-GDP ratio stood at

56.6 percent, but it was crushed to 47.3 percent within three quarters. For France, the Great Trade Collapse appears to have precipitated a dip in the trade-to-GDP ratio following a relatively weak recovery from the earlier decline that coincided with the United States' dot-com recession.

Turning to Japan (figure 5, panel C), we see that the nominal trade-to-GDP ratio started from almost 30 percent in the early 1980s. This ratio dropped drastically following the 1985 Plaza Accord, under which the Japanese yen started to appreciate against other major world currencies. Japan's trade-to-GDP ratio dropped from 27.3 percent in 1984:Q4 to 16.8 percent in 1988:Q1. After rising for a few years, this ratio took another dip in the early 1990s, when it declined to a low of 15.6 percent in 1993:Q4. Following that dip, the trade-to-GDP ratio recovered steadily. Since 2001:Q4, Japan's trade-to-GDP ratio had risen quickly, to a peak in 2008:Q3 of 38.6 percent. During the Great Trade Collapse, the trade-to-GDP ratio took a nose dive. Four quarters after the trough in 2009:Q2, Japan's trade-to-GDP ratio had recovered only about half of the lost ground, standing at 30.0 percent.

Germany's trade-to-GDP ratio (figure 5, panel D) has trended upward, starting from 39.5 percent in 1968:Q1 to reach a peak of 90.9 percent in 2008:Q3. The reunification of Germany in the early 1990s knocked this ratio down from 63.1 percent in 1990:Q4 to 44.3 percent in 1993:Q4. Since then, the openness of Germany's economy to trade had increased significantly until the Great Trade Collapse. After peaking in 2008:Q3, Germany's trade-to-GDP ratio fell to 74.6 percent in 2009:Q2, before beginning a sharp recovery.

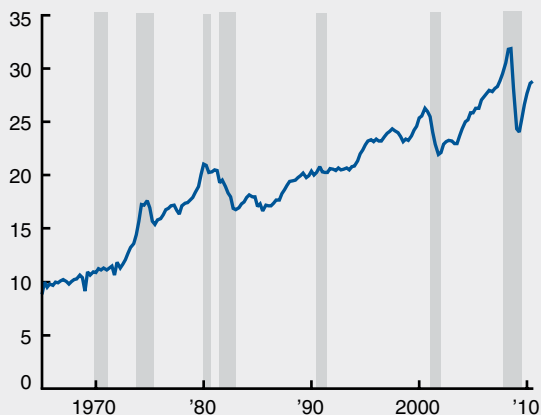
Examining the experiences of four major world economies displayed in figure 5, we conclude that international trade has become more and more important to the global economy over time. What caused international trade to grow so explosively? In the post-World War II era, several factors have facilitated this meteoric growth in international trade: 1) the decline in tariffs under the General Agreement on Tariffs and Trade/World Trade Organization (GATT/WTO) system⁷ (Crowley, 2003; and Subramanian and Wei, 2007), as well as a number of preferential trade agreements; 2) the decline in transportation costs (Hummels, 2001, 2007; and Levinson, 2006); 3) the rise of vertical specialization⁸ facilitated by the first two factors (Yi, 2003); and 4) the decline in communication costs (Freund and Weinhold, 2000).

Given the rising openness to trade around the world depicted in figure 5, the Great Trade Collapse stands out not only because of its magnitude, but also because it appears to have been highly synchronized across countries.

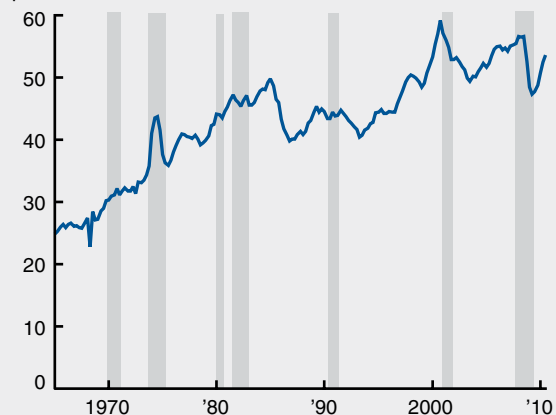
FIGURE 5

The ratio of trade to gross domestic product (GDP) for selected countries

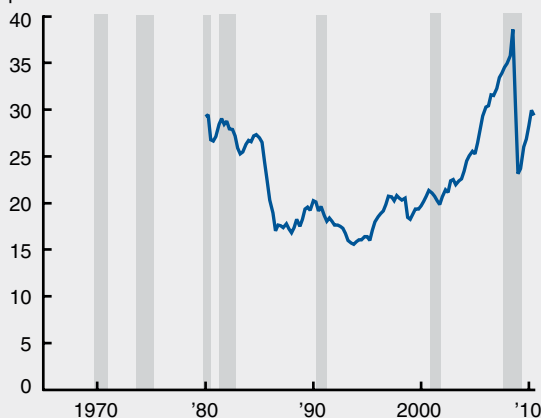
A. United States
percent



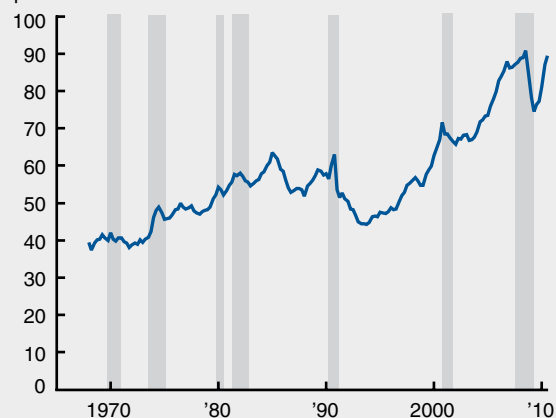
B. France
percent



C. Japan
percent



D. Germany
percent



Notes: In each panel, the trade-to-GDP ratio is defined as the sum of nominal imports and nominal exports divided by nominal GDP. Also, in each panel, the shaded areas indicate official U.S. periods of recession as identified by the National Bureau of Economic Research. Sources: Authors' calculations based on data from the U.S. Bureau of Economic Analysis, Institut National de la Statistique et des Études Économiques of France, Cabinet Office of Japan, and Deutsche Bundesbank of Germany, from Haver Analytics.

Let us now examine the synchronicity of the Great Trade Collapse and the subsequent recovery by reviewing the experience of a broader range of countries. Figure 6 is a scatter plot of the percentage change in trade versus the percentage change in real GDP over the period 2008:Q2–2009:Q2 for 29 countries.⁹ Three important facts emerge from this picture.

First, the decline in trade was broadly spread across this entire set of countries. During this period, the least affected country plotted, that is, Brazil, had a change in trade of more than –7.5 percent. The most affected country, that is, Mexico, had a change in trade of –26.1 percent. The United States' trade collapse,

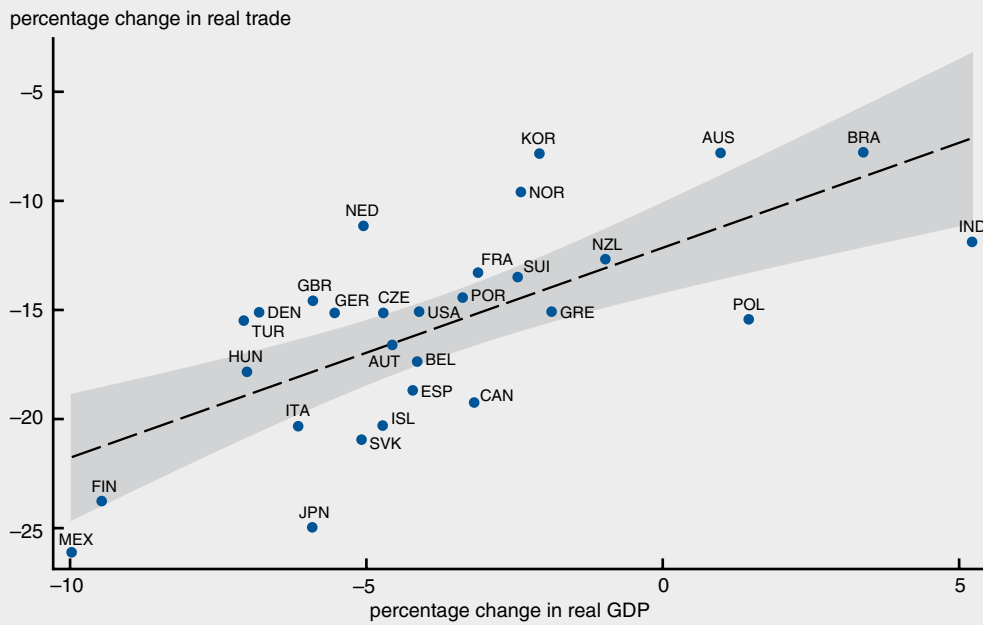
amounting to a change of –15.0 percent, fell right in the midrange of this cross section of countries.

Second, with the exception of Australia, Poland, India, and Brazil, all countries displayed here experienced declines in their GDP as well. Mexico again led the group, with a change of –10.0 percent. The United States experienced a –4.1 percent change in its GDP. Among the larger economies, Japan experienced a –5.9 percent change in GDP (as well as a –25.0 percent change in trade).

Third, a fitted line through this scatter plot has a slope of 0.96, which indicates that a 1 percent decline in GDP is associated with a 0.96 percent decline in

FIGURE 6

The change in real trade vs. the change in real GDP during the Great Trade Collapse



- | | | | | |
|--------------------|--------------------|-------------|-----------------|------------------------------|
| AUS—Australia | DEN—Denmark | GRE—Greece | KOR—South Korea | POR—Portugal |
| AUT—Austria | ESP—Spain | HUN—Hungary | MEX—Mexico | SVK—Slovakia |
| BRA—Brazil | FIN—Finland | IND—India | NED—Netherlands | SUI—Switzerland |
| BEL—Belgium | FRA—France | ISL—Iceland | NZL—New Zealand | TUR—Turkey |
| CAN—Canada | GBR—United Kingdom | ITA—Italy | NOR—Norway | USA—United States of America |
| CZE—Czech Republic | GER—Germany | JPN—Japan | POL—Poland | |

Notes: Both the changes in real trade and real gross domestic product (GDP) are measured over the period 2008:Q2–2009:Q2. The dashed black line indicates the relationship between trade and GDP over this period; the shaded region indicates the 95 percent confidence band around the regression line.
 Source: Authors' calculations based on data from the Organisation for Economic Co-operation and Development, *Main Economic Indicators*, from Haver Analytics.

trade. This picture highlights the global synchronicity of both the Great Recession and the Great Trade Collapse.¹⁰

Figure 7 plots the recovery following the Great Trade Collapse, using data from 2009:Q2 through 2010:Q1. From this figure we see that most countries were recovering from the Great Recession during this period; only Spain, Greece, and Israel saw GDP decreasing over the period 2009:Q2–2010:Q1. India (omitted from the figure) was a strong outlier, with dramatic GDP growth of 21.8 percent over this period. The figure also demonstrates that the recovery of trade has been widespread and, for many countries, strong. Only Greece and Finland continued to experience declines in trade after 2009:Q2.

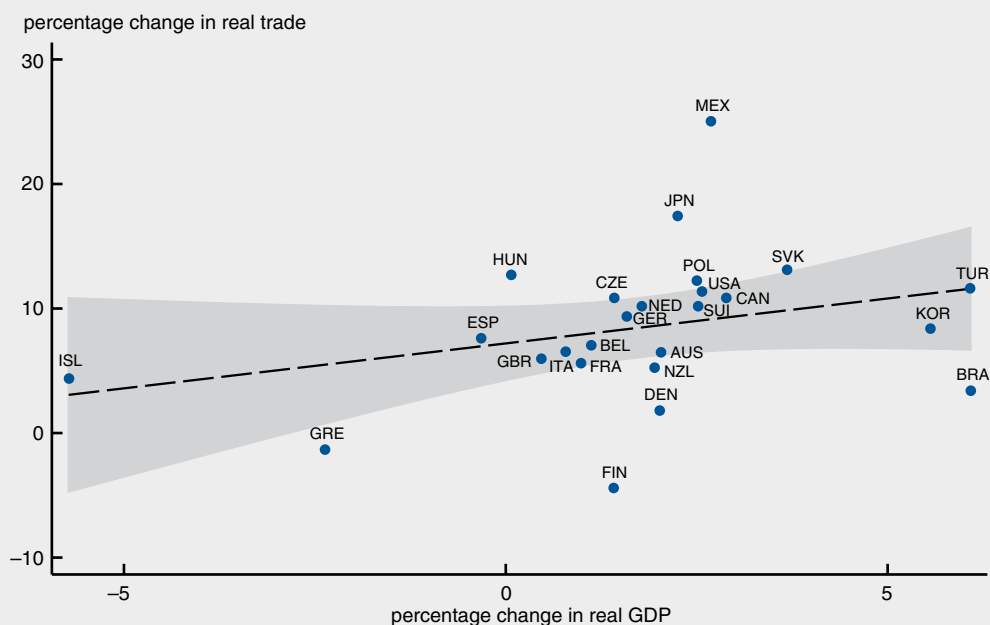
To conclude, the highly synchronized nature of the global trade collapse that occurred in 2008–09 and the subsequent recovery suggests that analytical models of the Great Trade Collapse should be global in nature.

What caused the Great Trade Collapse and the subsequent recovery?

What was behind the sharp decline in world trade that began in the second quarter of 2008? And what is behind the amazingly quick recovery in trade that we are experiencing today? The facts that we have gleaned from the data can help guide our analysis. First, we know that the Great Trade Collapse was extremely severe and steep by historical standards. Second, trade fell more dramatically than GDP around the world. Third, compared with previous episodes in which U.S. imports and exports fell, this trade collapse was much more highly synchronized around the world. In forming hypotheses to explain the causes of a phenomenon like the Great Trade Collapse, economists often begin with a simple supply-and-demand framework. If the quantity of imports falls during a recession, one likely culprit for this decrease is the decline in consumers' incomes, which reduces consumer demand for all goods,

FIGURE 7

The change in real trade vs. the change in real GDP after the Great Trade Collapse



Notes: For the legend explaining the country abbreviations, see figure 6. India (IND) is not featured here because it is an outlier. Data for Austria (AUT), Norway (NOR), and Portugal (POR) were not available. Both the changes in real trade and real gross domestic product (GDP) are measured over the period 2009:Q2–2010:Q1. The dashed black line indicates the relationship between trade and GDP over this period; the shaded region indicates the 95 percent confidence band around the regression line. Source: Authors' calculations based on data from the Organisation for Economic Co-operation and Development, *Main Economic Indicators*, from Haver Analytics.

including imports. In other words, as consumers tightened their belts and bought fewer domestically produced goods, they also chose to buy fewer imported goods. However, we know that during the Great Trade Collapse, imports fell much more rapidly than income.

Are there complicating factors behind a decline in consumer demand for imports? Possibly. As can be seen in figure 1 (p. 46), global trade began to take off in the mid-1990s. While there were many forces at work, a key element in this transition was the rise of global supply chains. Because companies now spread their production processes across multiple countries, the production of a specific good—for example, a car— involves multiple border crossings of a partially completed car that becomes more valuable with every step in the production process and every border crossing. Because customs agencies record the total value of every object that crosses the border and *not* the value added to the object during its most recent trip to a country, the value of trade recorded by national customs agencies has grown more rapidly than GDP as more and more companies and industries have spread their production processes across many countries. It is difficult

to precisely measure the importance of trade in intermediate goods (for example, an engine or brake for a car). That said, one OECD study¹¹ estimates that the average annual growth rate of trade in intermediate goods among OECD members was 6.20 percent over the period 1995–2006, whereas the average annual growth rate in the trade of final consumption goods was only 5.87 percent over the same period. This finding suggests that the share of intermediate goods in total trade flows has been increasing as global supply chains have spread.

In the Great Trade Collapse, we might have been observing the rapid unwinding of these global supply chains. Within a vertically integrated international economy,¹² a simple fall in consumer demand for imports would have been magnified through the global supply chains. For every car that is not produced and sold to a consumer, trade flows as measured by customs authorities fell by more than the final value of the car because that car, which would have crossed several borders during its production, did not cross any borders. So, in addition to falling consumer demand, this complication generated by various multicountry production

processes may have played a significant role in precipitating and/or exacerbating the Great Trade Collapse.

Another complicating feature of the demand side is that there are compositional differences between imports and national income, or GDP. Consider the United States' imports and national income. The vast majority of imports into the United States are goods—for example, food, clothing, cars, and electronics—but some of these imports are services—for example, education, travel, and business consulting services. Our national income consists largely of services—for example, health care and education—with goods playing a much smaller role in our economy today than they have in the past. We might expect that consumption of some domestically produced services like health care is more recession-proof than the consumption of typically imported goods like televisions and refrigerators. How much of the Great Trade Collapse (and the subsequent recovery) was due to a difference in the relative composition of tradable versus domestically produced goods and services?

Returning to our simple framework, we note that the other likely cause of the recent trade collapse would be some type of disruption on the supply side—that is, some factor that affects the firms that are producing goods and shipping them to consumers and retail outlets. During the recent global recession, which started with a global financial crisis, the costs associated with exporting were carefully monitored for their potential impact on trade flows. Because the crisis was a financial one, governments and international organizations, such as the WTO and World Bank, tried to collect information on the costs of financing trade. Given the tight financial environment during the crisis, did firms face difficulty in obtaining different types of financing for their international shipments? In addition, were there problems associated with rising trade protection during the recent recession? It is widely known that the United States increased import tariffs during the Great Depression and that this likely worsened the severity of the depression during the 1930s. Did something similar happen this time around to cause or exacerbate the Great Trade Collapse?

Demand-side explanations

Is it surprising that trade collapsed during the recent global recession? As we discussed previously, the Great Trade Collapse was coincident with the largest decline in world GDP in decades. Should we not have expected that consumers, who buy less of everything during a recession, would also buy fewer imported goods? How can economists assess this problem on the demand side quantitatively?

To predict how exports or imports will change in the future, economists routinely estimate trade elasticities. Trade elasticities with respect to income measure how much a country's imports or exports will change in response to changes in national income.¹³ For example, the import elasticity with respect to income is a number that specifies how much imports will increase in response to a 1 percent increase in the total income of a country. Economic theory posits that this elasticity is positive. That is, an increase in a country's income leads it to buy more from foreign countries. Moreover, an income elasticity of imports that is equal to one implies that imports increase proportionately with national income.

For the past several decades, estimates of the import elasticity with respect to income for the United States have ranged from 1.5 to slightly more than two.¹⁴ That is, in the United States, imports respond more than proportionately to changes in income. Precisely how much more depends on the exact value of the elasticity. In table 2, we list reported estimates of the import elasticity with respect to income for the United States by several different researchers. Using information on the decline in U.S. GDP over the period 2008:Q2–2009:Q2, we can predict how large the U.S. decline in imports must have been in order to be in line with historical norms. Specifically, the actual cumulative change in U.S. GDP over this time period was –4.1 percent. In table 2, we use import elasticities with respect to income to predict the decline in imports during the Great Trade Collapse (2008:Q2–2009:Q2). Predictions for the change in U.S. imports range from a low of –6.2 percent, using a historical estimate from Houthakker and Magee (1969), to a high of –9.4 percent, using the more recent estimate from Chinn (2004) (the fourth column of table 2). But the cumulative change in imports over the period 2008:Q2–2009:Q2 was actually –18.3 percent. Estimates of the import elasticity with respect to income indicate that the decline in U.S. national income during the Great Trade Collapse can explain only about 35 percent to 50 percent of the decline in U.S. imports (see the last column of table 2). This simple analysis of demand-side factors tells us that imports fell about twice as much as we would have expected!

How unusual is the Great Trade Collapse in this regard? That is, if we examine the other major contractions in U.S. imports since the 1970s, how do they compare? Table 3 compares the Great Trade Collapse with five previous import contraction episodes in the United States. The first column lists the trough date of each of the six major contractions in U.S. imports reported earlier in figures 3 and 4 (pp. 47 and 49). The second

TABLE 2

Predicted vs. actual change in U.S. imports, 2008:Q2–2009:Q2

Previous research	Sample period	Import elasticity with respect to income	Predicted percent change in imports	Predicted change in imports/actual change in imports
Houthakker and Magee (1969)	1951–66	1.51	–6.2	0.34
Hooper, Johnson, and Marquez (2000)	1961–94	1.79	–7.3	0.40
Chinn (2004)	1975–2003	2.29	–9.4	0.51
Cardarelli and Rebucci (2007)	1972–2006	2.03	–8.3	0.45
Crane, Crowley, and Quayyum (2007)	1960–2006	1.93	–7.9	0.43

Note: See the text for further details.

Source: Authors' calculations based on data from the U.S. Bureau of Economic Analysis, *National Income and Product Accounts of the United States*, from Haver Analytics.

TABLE 3

Predicted vs. actual change in U.S. imports during episodes of trade contraction

Trough date of the import contraction episode	Percent change in U.S. gross domestic product	Predicted percent change in imports	Actual percent change in imports	Predicted change in imports/actual change in imports
1975:Q2	–1.8	–3.5	–19.5	0.18
1980:Q3	–1.6	–3.1	–12.0	0.26
1982:Q4	–1.4	–2.7	–3.9	0.69
1991:Q1	–1.0	–1.9	–4.3	0.44
2001:Q4	0.4	0.8	–7.8	N.A.
2009:Q2	–4.1	–7.9	–18.3	0.43

Notes: N.A. indicates not applicable. See the text for further details.

Source: Authors' calculations based on data from the U.S. Bureau of Economic Analysis, *National Income and Product Accounts of the United States*, from Haver Analytics.

column presents the cumulative decline in U.S. real GDP over the four quarters before the trough date. The third column displays the implied change in U.S. real imports over the four quarters before the trough date; we derive these values by multiplying the change in real GDP in the second column with the estimate of the import elasticity with respect to income (1.93) from Crane, Crowley, and Quayyum (2007). In the fourth column, we report the actual percent change in U.S. real imports over the four quarters before the trough date. Interestingly, in almost all cases the actual changes in trade were substantially larger than the predicted changes in the third column. The last column lists the ratio of the predicted change in imports to the actual change in imports, which reveals how much of the decline in imports over the four quarters considered may be due to a decline in GDP over the same period. It appears that declining aggregate demand varies considerably in its importance as a cause for these trade declines. Thus, other factors, such as changing relative prices, trade barriers, or costs of

conducting international trade, must also contribute to these trade contractions.

An import elasticity analysis of the trade recovery from 2009:Q2 through 2010:Q2 leaves us with a quantitatively even larger puzzle. Over the period 2009:Q2–2010:Q2, U.S. GDP grew 3.0 percent, but U.S. imports of goods and services skyrocketed up 17.4 percent. Turning to table 4, we see that this dramatic increase in imports cannot be well explained simply by an improvement in aggregate demand. Table 4's final column indicates that the increase in U.S. national income can explain only about one-quarter to 40 percent of the recovery following the Great Trade Collapse.

As we stated before, during the Great Trade Collapse, a decline in U.S. aggregate income can explain only about half of the decline in imports. Similarly, when U.S. GDP began to recover after this collapse, U.S. imports surged well beyond the improvement predicted by the United States' import elasticity with respect to income. So what other forces account for

TABLE 4

Predicted vs. actual change in U.S. imports, 2009:Q2–2010:Q2

Previous research	Sample period	Import elasticity with respect to income	Predicted percent change in imports	Predicted change in imports/actual change in imports
Houthakker and Magee (1969)	1951–66	1.51	4.5	0.26
Hooper, Johnson, and Marquez (2000)	1961–94	1.79	5.4	0.31
Chinn (2004)	1975–2003	2.29	6.9	0.40
Cardarelli and Rebucci (2007)	1972–2006	2.03	6.1	0.35
Crane, Crowley, and Quayyum (2007)	1960–2006	1.93	5.8	0.33

Note: See the text for further details.

Source: Authors' calculations based on data from the U.S. Bureau of Economic Analysis, *National Income and Product Accounts of the United States*, from Haver Analytics.

the unexplained movements in U.S. imports during the collapse and the recovery?

To address this question, we next examine somewhat detailed data on U.S. imports in order to identify compositional changes in imports that occurred over the period 2008–10.

First, let us examine changes in U.S. imports of goods and services. Figure 8 plots real U.S. imports of goods versus services since the mid-1960s. A significant decline and recovery occurred for imports of goods over the period 2008–10. Although the services industry plays a large role in the U.S. economy today, goods cross borders more often than services and were hit harder during the Great Trade Collapse. Over the period 2008:Q2–2009:Q2, U.S. imports of goods fell by 21.1 percent, while U.S. imports of services fell by only 3.5 percent. On the recovery side, from 2009:Q2 through 2010:Q3, U.S. imports of goods increased 18.4 percent, while U.S. imports of services increased by only 6.2 percent. From these observations, we conclude that the Great Trade Collapse and the subsequent recovery were driven by changes in the trade of goods.

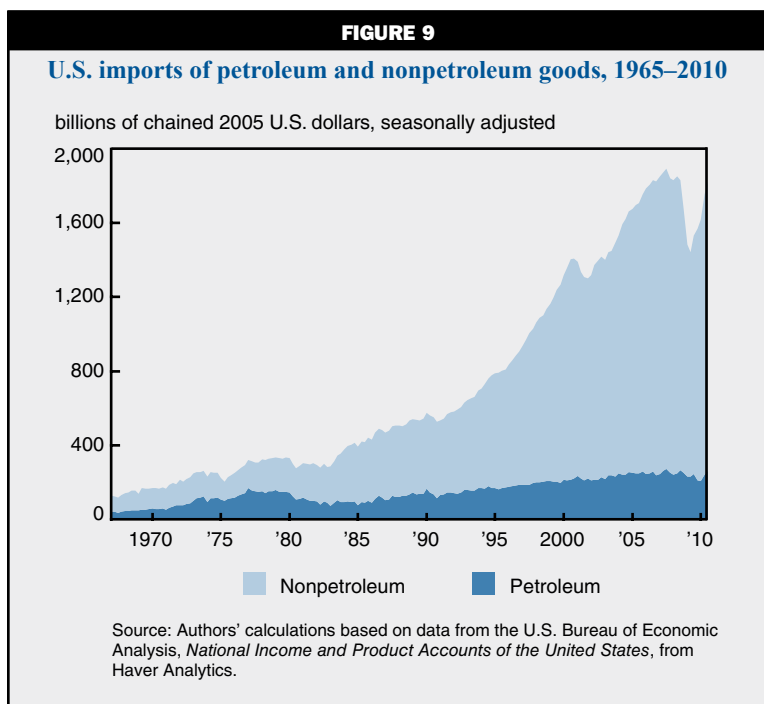
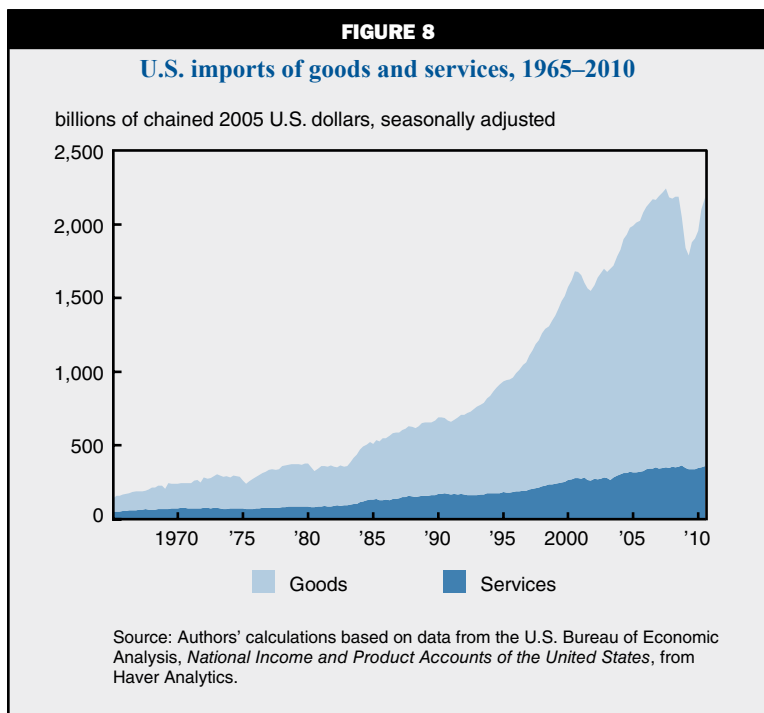
Naturally, oil is suspected as one large factor behind the Great Trade Collapse. Earlier we discussed the oil crisis of 1973 as a factor in a previous large trade contraction. How big a role did oil play in the most recent trade episode? Figure 9 plots real U.S. imports of petroleum and nonpetroleum goods in billions of chained 2005 dollars. We see that, although petroleum imports have grown over time, their importance as a share of all imports has declined. In 1974:Q2, oil represented 45.0 percent of U.S. goods imports, but by the time of the Great Trade Collapse in 2008:Q2, oil's share of U.S. goods imports had fallen to 13.4 percent. Moreover, the peak-to-trough decline in oil imports of 13.4 percent during the trade contraction of 1974:Q2–1975:Q2 was substantially larger than the

7.0 percent decline that occurred during the Great Trade Collapse (2008:Q2–2009:Q2). Taken together, these facts indicate that oil imports played a relatively modest role in the most recent U.S. trade contraction.

Having reviewed the role of trade in petroleum goods, we now focus on manufactured goods, which consist of durables and nondurables. In contrast to the modest decline in oil imports, U.S. imports of nonoil goods imports fell by 24.3 percent over the period 2008:Q2–2009:Q2. Figure 10 plots U.S. trade of nondurable and durable goods. The decline in trade of durable goods—for example, automobiles, washing machines, and industrial machinery—was more severe than the decline in trade of nondurable goods—for example, clothing and food. During the Great Trade Collapse (2008:Q2–2009:Q2), imports in nondurable goods declined by 10.98 percent, while imports in durable goods declined by 28.6 percent; over the same period, U.S. exports in nondurable goods declined by 6.8 percent, while exports of durable goods declined by 24.3 percent. These findings suggest that an economic model that hopes to successfully quantify the contributions of various factors to the Great Trade Collapse should be characterized by a unique role for trade in durable goods.

Supply-side explanations

At the start of the 2008 economic crisis, policymakers observed that trade was falling dramatically and began to question the cause. Anything that reduces trade by raising the cost of selling a good in a foreign market is considered a supply-side cause. Two problems immediately raised concern. First, given that the world was in the midst of a financial crisis, policymakers questioned whether there was difficulty in obtaining trade finance. Second, policymakers questioned whether there was a rise in trade protection—that is, increases in import taxes or other government-sponsored barriers to trade.



Financial difficulties associated with trade

Before discussing trade finance with respect to the Great Trade Collapse, it is useful to review the different types of trade finance. The payment methods for internationally traded goods differ from those used

that verify delivery of the merchandise. Different types of these payment methods involve different levels of verification. The cost of using these products generally increases as the level of verification becomes more stringent, with letters of credit being more stringent and

for goods that are bought and sold domestically because there is a higher risk of nonpayment. If a seller gives merchandise to a domestic purchaser and the purchaser does not pay, the seller can take the purchaser to court. However, when the seller and purchaser are in different countries and the purchaser does not pay, it can be costly for the seller to get what is owed from the purchaser. To mitigate this problem, banks can get involved in the payment process for international sales.

Most trade—80–85 percent—occurs without any formal financing and/or insurance arrangements with banks.¹⁵ Still, banks are involved in such international trading activity. An “open account” payment is made by the purchaser’s (importer’s) bank to the seller’s (exporter’s) bank after the purchaser receives the goods. However, banks are *not* extending loans or offering insurance under open account transactions. This is the least secure method of payment for a seller; hence, this method is most frequently used between parties that have a well-established, long-standing relationship. Because there is no guarantee, verification, or insurance supplied by a third party, payment for merchandise on an open account is the cheapest way to process a transaction.

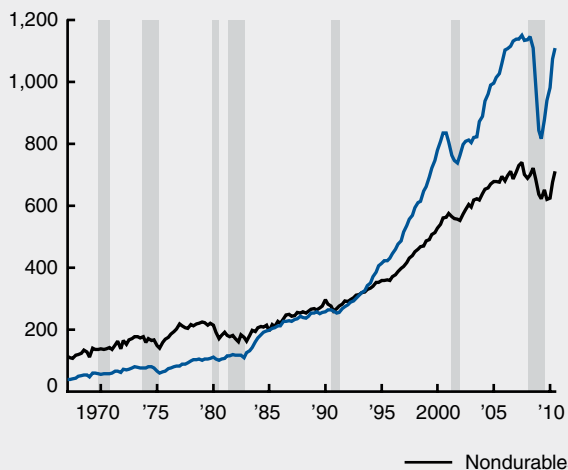
The remaining 15–20 percent of world trade is financed through “letters of credit,” “documentary collections,” and similar products provided by banks or other third parties.¹⁶ These instruments, which come in many varieties, are payment methods in which a payment is released from the buyer’s (importer’s) bank to the seller’s (exporter’s) bank after certain documents have been presented to the buyer’s bank

FIGURE 10

U.S. imports and exports of durables and nondurables

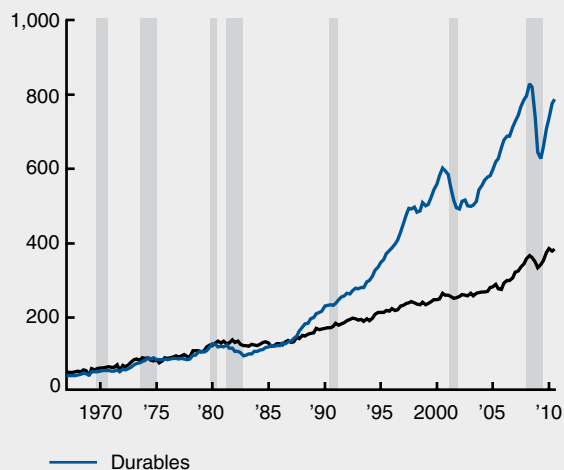
A. Imports

billions of chained 2005 U.S. dollars, seasonally adjusted



B. Exports

billions of chained 2005 U.S. dollars, seasonally adjusted



Note: The shaded areas indicate official U.S. periods of recession as identified by the National Bureau of Economic Research.
 Source: Authors' calculations based on data from the U.S. Bureau of Economic Analysis, *National Income and Product Accounts of the United States*, from Haver Analytics.

more costly than most other products. According to the International Chamber of Commerce Banking Commission (2010), the cost of commercial letters of credit had increased during the recent financial crisis. The price of a letter of credit varies according to factors like the country of origin, the destination country, and the industrial sector. The International Chamber of Commerce survey evidence shows that prices of such letters increased by as much as 300–400 basis points over interbank lending rates during the height of the financial crisis in the fall of 2008.¹⁷

To assess whether financing difficulties with these payment instruments were a likely cause of the Great Trade Collapse, we need information on the quantities of financial instruments sold, their prices, and the volume of trade. Two prominent surveys¹⁸ were undertaken in early 2009 to try to fill in the gaps in policymakers' knowledge about trade finance. While reports explaining both surveys inform our understanding of the trade finance situation during the crisis, both are thin on hard statistics. The reports indicate that in the uncertain environment of the financial crisis, there was a relative increase in demand for more secure methods of payment, such as letters of credit. However, because of the difficulty in obtaining data on the number of open account transactions involving merchandise trade,¹⁹ it is not possible to evaluate how the proportions of unsecured versus more secured methods of payment changed during the crisis. While the surveys show that exporters sought

out more secure payment methods as the crisis worsened, the total volume of letters of credit and documentary collections fell. Presumably, this occurred because trade fell. Lastly, according to the International Chamber of Commerce Banking Commission (2010), refusals of payments on minor technicalities increased throughout the crisis and remained high in early 2010. These refusals were possible because even though letters of credit promise payment when documents are presented, a bank can refuse to make a payment if there are small discrepancies in the paperwork that is filed.

To summarize, it appears that the cost of trading goods internationally likely increased during the Great Trade Collapse as exporters, worried about nonpayment, began to use more secure and expensive methods of payment. However, the precise magnitude of this cost increase is not known.

What about other areas of trade financing? Letters of credit and documentary collections are not the only method of insuring payment by a foreign buyer. Export credit insurance can be purchased by exporting firms so that they are paid in the event of nonpayment by a foreign purchaser. As the recent global recession worsened, it appears that the use of export credit insurance increased from roughly 9 percent of world trade in 2008 to 11 percent of world trade in 2009.²⁰ Claims paid to insured customers by members of the Berne Union, the leading international organization for export credit and investment insurance, doubled from 2008

to 2009—from \$1.1 billion to \$2.4 billion. While this is a substantial increase, it covers only a small percentage of world merchandise trade (exports) in 2008, which the World Trade Organization (2009) estimated at \$15.8 trillion.

A third way in which the financial system can affect international trade flows is through the provision of trade credit. Recall that transactions on an open account involve funds transfers between the buyer's bank and the seller's bank, but do not involve a loan from a bank. Rather, this type of sale is recorded as a positive "accounts receivable" for the exporter and, thus, is an informal loan from the exporter to the importer. The provision of trade credit is more common in some industries than in others. For example, Chor and Manova (2010) calculate the amount of trade credit provided to buyers by suppliers in North America from 1996 through 2005.²¹ Industries such as transportation equipment manufacturing, which has a North American Industry Classification System (NAICS) code of 336, and fabricated metal product manufacturing (NAICS 332) receive relatively more trade credit than industries such as textile product mills (NAICS 314) or chemical manufacturing (NAICS 325). During the financial crisis, as the cost of borrowing money from a bank rose, it would have become more expensive for exporting firms to extend trade credit to their purchasers.

While the rising cost of trade credit affects all firms that typically extend trade credit to their purchasers, there are reasons to believe that the problem could have been more severe for exporting firms. Domestic-market-oriented businesses as well as export-oriented businesses often obtain working capital loans from banks to cover the cost of purchasing inputs, paying workers, or renting equipment. They repay these loans after receiving payment from a buyer. For exported shipments, the time lag between the shipment of goods and payment receipt is 30–90 days longer than for domestic transactions.²² This means that working capital loans are especially important for export-oriented firms.

To reiterate, an analysis of international trade payment methods is not going to provide much important information about whether the financial crisis had a unique impact on trade. While survey data suggest that costs of payment methods and export credit insurance increased, precise quantitative data are not available for economists to analyze. Economic research on the role of finance in the Great Trade Collapse will likely be more fruitful if it focuses on traditional credit instruments—such as working capital loans and trade credit.

The role of trade protection in the Great Trade Collapse

Before diving into a description of how trade policy changed during the Great Trade Collapse, it is useful to review the general trends in trade protection leading up to September 2008. A dramatic reduction in tariff rates and other nontariff barriers to trade began with the end of World War II; this reduction, combined with reductions in transportation and communication costs, led to dramatic increases in global trade that outpaced the growth of global economic activity for the past few decades. Under the auspices of trade agreements like the World Trade Organization's GATT,²³ most countries around the world have, to a large degree, given up their unilateral authority to raise trade barriers. Members of the WTO agree to refrain from raising tariffs or imposing quotas above certain "bound" limits in exchange for the same courtesy from other countries.

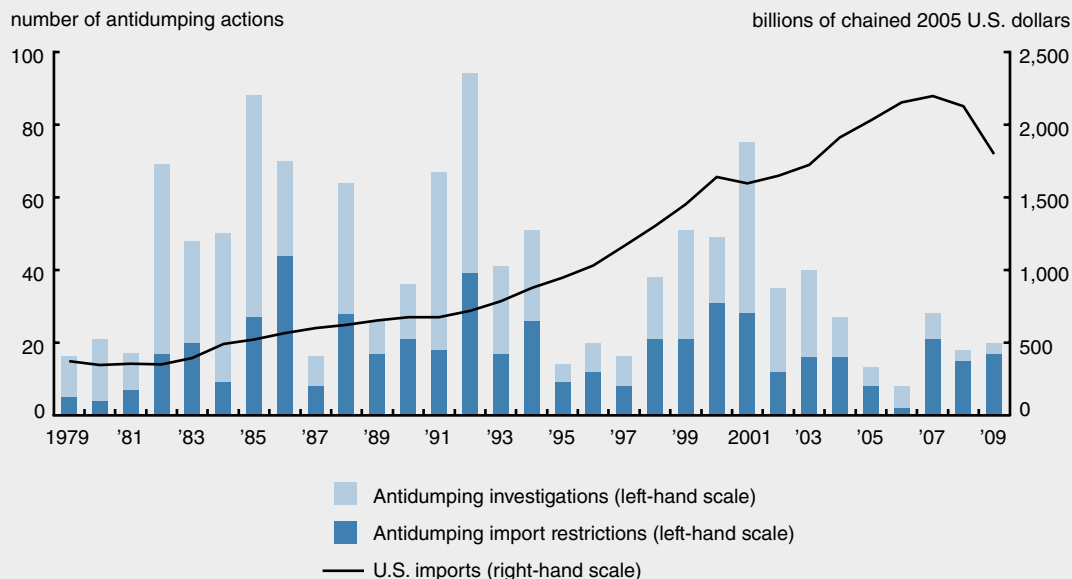
However, the GATT gives countries permission to use some forms of trade protection under a variety of special agreements or exceptional clauses. For example, a special tariff known as an antidumping duty can be imposed on specific products imported from a single country if a variety of economic criteria are met. However, this type of country-specific trade restriction has been found to be porous;²⁴ if the United States restricts imports of a product from Japan by using an antidumping duty, another country like Germany will simply increase its exports of that same product to the United States, leading to, at most, a small reduction in total U.S. imports of that product. Economists know less about the effects of nontariff forms of trade protection. Government intervention into markets, regulatory changes, and changes in administrative procedures or health or environmental policies can be subjected to GATT disciplines if their trade-distorting effects are large. These less transparent policies can be difficult to identify, but organizations that run efforts like the Global Trade Alert database²⁵ have begun the difficult task of compiling information about such policies and then analyzing their effects.

Did we observe dramatic increases in trade barriers at the time of the Great Trade Collapse? No. Growing evidence suggests that, to date, trade protection has been more muted than expected and its trade-distorting effect has been mild at best.²⁶

Figure 11 presents the recent state of U.S. trade protection activity under the antidumping duty. This is a special duty that the United States can use to restrict imports when a domestic industry is suffering injury—typically measured as reductions in employment and capacity utilization²⁷ as well as reduced profitability—by reason of "dumped," or unfairly priced, imports.

FIGURE 11

U.S. antidumping activity, 1979–2009



Source: Authors' calculations based on data from Bown (2010).

We plot the frequency of newly initiated antidumping investigations and new antidumping import restrictions in the United States from 1979 through 2009, as well as the level of U.S. imports in billions of chained 2005 U.S. dollars.

In figure 11, the height of the light blue bar measures the number of new investigations that the U.S. government conducted into allegations of unfairly priced imports, while the height of the dark blue bar records how many of these investigations ultimately resulted in trade-reducing antidumping duties. The unit of observation is an investigation held into or trade restriction imposed against an individual country that exports to the United States.²⁸ The tallest bar on the graph is in 1992; the light blue bar indicates that the U.S. government conducted 94 investigations into allegations of dumping, and the dark blue bar indicates that 39 of these investigations found evidence of dumping and, consequently, resulted in trade-restricting import duties.

Superimposed over this graph of antidumping activity, the black line indicates the real volume of U.S. imports, in billions of chained 2005 U.S. dollars. It shows a strong and steady increase in U.S. imports that declined quite dramatically in 2008 and 2009.

We can clearly see that for the United States, there were increases in both the number of antidumping investigations and the number of investigations that resulted in new antidumping duties in 2008 and 2009

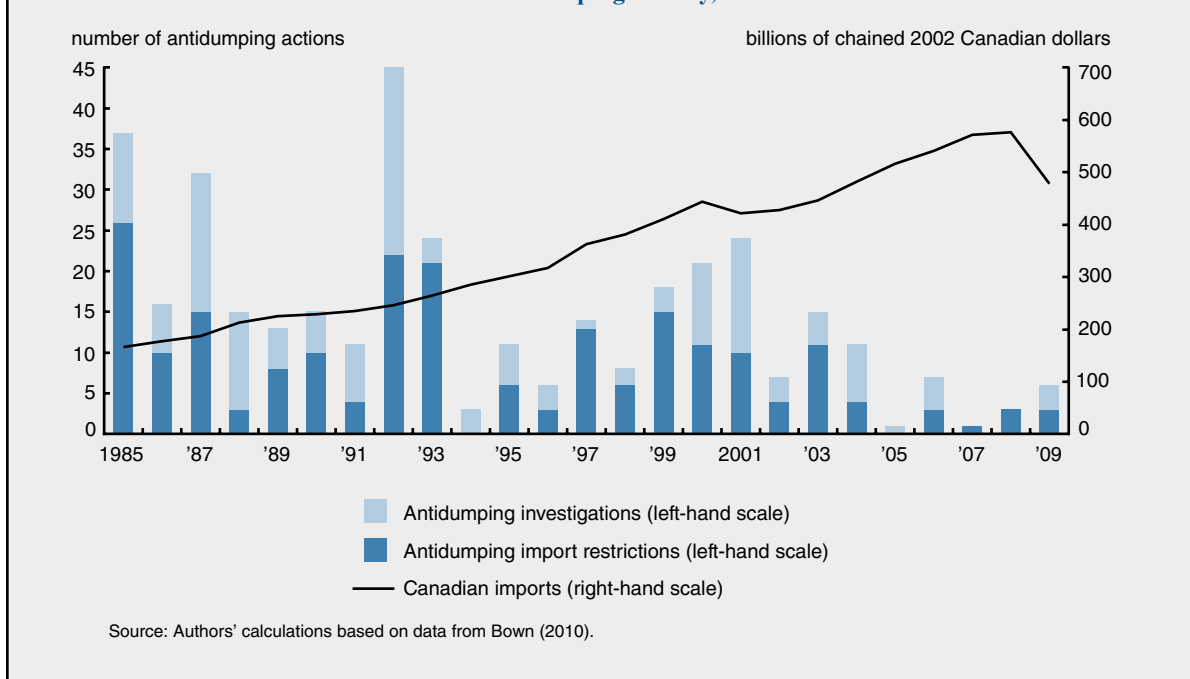
relative to the pre-crisis years of 2005 and 2006. Moreover, these did occur as U.S. imports were falling. However, this rise in antidumping protection is considerably smaller than the jumps in trade protection during earlier recessions. Previous spikes in antidumping activity coincided with the period of the strong U.S. dollar in the mid-1980s, the wake of the 1990–91 recession, and, most recently, the 2001 recession. Further, when we compare the number of antidumping investigations that resulted in duties to the total volume of U.S. imports, we see that the fraction of U.S. imports subject to antidumping duties appears to be quite low in 2008–09. Our principal observation here is that antidumping activity, which has been the most popular method of trade protection in the United States since 1980, did not increase significantly during the crisis.

Figure 12 depicts the same information for Canada over the period 1985–2009. The key observation is that the pattern is quite similar to that in the United States. There was a small uptick in activity in 2008 over 2007, but the use of antidumping trade restrictions was quite modest by recent historical standards. Further, when we compare the recent use of antidumping duties to the total volume of Canadian trade, it appears to be trivial.

How did trade protection evolve during the Great Recession? For most countries, there have not been substantial increases in explicit border measures like

FIGURE 12

Canadian antidumping activity, 1985–2009



tariffs or quotas. If countries are changing their domestic regulations, administrative procedures, or health and safety standards in ways that discriminate against imported goods (and thus have trade-restricting effects), these types of measures can be difficult for business people and policymakers to observe. Further, even when a potentially trade-distorting policy like the “Buy American” provision of the 2009 U.S. stimulus bill is well known, its trade impact can be difficult for economists to measure.

While nontariff barriers could have a negative effect on trade, existing evidence from initiatives like the Global Trade Alert project suggests that the use of these policies has been restrained. The effect of major industrial policy initiatives on trade (for example, the General Motors bailout in the United States) has yet to be formally analyzed by researchers.

Summarizing the hypotheses behind the Great Trade Collapse

To summarize, we posited three leading hypotheses for what caused the collapse: 1) a decline in aggregate demand for all goods, including imports; 2) difficulties in obtaining trade finance; and 3) rising trade barriers. A quick analysis has suggested that the fall in aggregate demand can explain about half of the decline of imports into the United States. Our review of the changing composition of imports suggests that to fully understand

how declining demand affected trade during the Great Recession, a richer economic analysis that examines the structure of production and the composition of consumption and trade is needed. With regard to trade finance, we explained why the lack of data on open account transactions makes it difficult to draw conclusions from the available data on payment methods for international trade. More fruitful avenues of research would examine how working capital loans and the provision of trade credit could have been mechanisms through which the recent global financial crisis reduced trade flows. Finally, with regard to trade protection, it seems that changes in traditional border barriers were not behind the trade collapse. In fact, governments’ willingness to refrain from trade restrictions allowed the trade recovery to progress swiftly. However, as high unemployment persists in much of the industrialized world, the calls for more trade protection and accusations of currency manipulation have been rising. Interestingly, in figure 11, the United States’ aggressive use of antidumping duties associated with the 1990–91 recession peaked not during the recession itself, but in 1992, as high unemployment persisted with the United States’ “job-less recovery.”

Recent research on the Great Trade Collapse

A large literature is emerging on the causes of the Great Trade Collapse. Here, we summarize and

review four important contributions. Each of these papers uses a different methodology and emphasizes different aspects of the trade collapse. From them, we can glean a composite picture of the collapse and begin to quantify the contributions of underlying causes. This, in turn, will guide us in assessing the policy actions undertaken by the G-20. Recall, as a starting point, that the simple trade elasticity analysis from table 2 (p. 55) indicates that the decline in U.S. aggregate demand explains around 35–50 percent of the United States’ import collapse. What have other researchers learned about the causes of the Great Trade Collapse?

Levchenko, Lewis, and Tesar (2010)

Levchenko, Lewis, and Tesar (2010) ask how important was declining aggregate demand in explaining the collapse of trade in the United States. Their analysis uses highly disaggregated data on trade flows and finds that the greatest declines occurred in sectors in which vertical production linkages²⁹ are most important. In contrast, they find little to no evidence that trade financial difficulties were behind the United States’ trade collapse.

Their paper proceeds in three distinct phases. First, they present data documenting the scale and industrial composition of the Great Trade Collapse in the United States. Second, they conduct a “trade wedge” analysis of macroeconomic data (which is discussed further in the next paragraph). Third, finding that a large portion of the United States’ trade collapse cannot be explained by declining aggregate demand, they examine other possible causes of the collapse. They undertake a cross-sectional industry analysis of 1) vertical linkages among firms, 2) financial constraints, and 3) differences in the composition of trade and domestic demand to identify the most important causes of the Great Trade Collapse outside of falling aggregate demand.

The “trade wedge” analysis is similar to the predictions made using trade elasticities, which we presented earlier. The idea is to determine the “wedge,” or difference, between the actual decline in trade and the decline in trade that is due to changes in demand and changes in relative prices. The authors begin with a standard import demand function that relates changes in imports to changes in the price of domestic goods relative to the price of imported goods and to changes in consumption and investment in the importing country. This function assumes that domestically produced and foreign goods are imperfect substitutes for one another and that the amount of imports increases as the price of domestically produced goods rises relative to the price of foreign goods. Further, imports increase as the total amount of domestic consumption and investment increase. Import demand is given by:

$$1) \hat{y}^f = \varepsilon(\hat{P} - \hat{p}^f) + (\hat{D}),$$

where $D = C + I$; \hat{y}^f is the change over time in the logged level of imports; ε is the elasticity of substitution between domestic and foreign goods; \hat{P} is the change in the log of domestic prices; \hat{p}^f is the change in the log of import prices; and \hat{D} is the change in the log of total consumption and investment in the importing country. Following previous research, the authors assume that ε is equal to 1.5. They use this equation to predict the magnitude of the decline in U.S. imports over the period 2008:Q2–2009:Q2, given the actual quarterly data on changes in relative prices and changes in U.S. consumption and investment from this period.

There are two important distinctions between this analysis and our analysis using trade elasticities. First, Levchenko, Lewis, and Tesar (2010) include a measure for relative prices. Inclusion of these price measures should increase the predictive power of their model relative to a trade elasticity analysis that only examines changes in demand. Second, they assume that the import elasticity with respect to income is one, roughly half the magnitude of the empirical estimates reported in table 2 (p. 55). From their analysis, Levchenko, Lewis, and Tesar find that their standard import demand equation explains 60 percent of the decline in imports. The wedge is a 40 percent difference between the actual decline in imports during this period and the decline in imports predicted by their import demand equation.

To demonstrate the uniqueness of the Great Trade Collapse as an economic phenomenon, Levchenko, Lewis, and Tesar (2010) calculate the size of the wedge for every year-over-year change³⁰ since 1968. They find that the average wedge has been 2.9 percent since then. More recently, this import demand equation has improved in its ability to explain the behavior of imports. Since 1984, the average wedge has been 1.6 percent. What this means is that, while changes in relative prices and in domestic demand can explain almost all of the change in U.S. imports in a typical year, the wedge of 40 percent during the Great Trade Collapse was an aberration that, at first blush, is hard to explain.

Faced with this puzzle, Levchenko, Lewis, and Tesar (2010) refine their analysis of the trade wedge to look at subsectors of the economy. They calculate the trade wedge for nonoil imports, durable goods, consumption goods, and investment/capital goods. The trade wedges for consumer goods (which represent around 20 percent of U.S. imports) and for investment/capital goods (which also represent around 20 percent of U.S. imports) are small, –6.4 percent and –10 percent,

respectively. For these sectors, the fall in demand and change in the relative prices explain almost all of the decline in imports. In contrast, the trade wedge for durable goods is a sizable –21 percent. While substantial, this is considerably smaller than the aggregate wedge of 40 percent. Thus, controlling for the composition of the trade flow can help explain some of the puzzle, and the authors conclude that the unusual behavior of trade in intermediate inputs and durable goods must be behind some of the unexplained portion of the Great Trade Collapse.

Using industry-level data on the percent change in the flow of imports into the United States from June 2008 through June 2009, Levchenko, Lewis, and Tesar (2010) explore three hypotheses for what caused the Great Trade Collapse. First, they study the role of vertical linkages in production. Did goods that are used intensively as intermediate inputs in production experience large percentage drops in exports and imports? Second, they ask how financial constraints affected trade. Specifically, they analyze whether sectors that extend or that intensively utilize trade credit experienced differential changes in their trade flows relative to sectors that do not. Finally, they investigate the role of trade’s industrial composition. Was the United States’ trade collapse unusually large because it was concentrated in goods purchased or sold by sectors that were especially hard hit during the Great Recession?

To test these hypotheses, Levchenko, Lewis, and Tesar (2010) use data on approximately 450 sectors in the United States to estimate the following equation:

$$2) \quad \gamma_i^{trade} = \alpha + \beta CHAR_i + \gamma X_i + \varepsilon_i.$$

In this equation, γ_i^{trade} is the percent change in a trade flow from June 2008 to June 2009, $CHAR_i$ is a measure of the industrial sector that will test one of the hypotheses (vertical linkages, trade credit, or sector-level industrial production), and X_i is a vector of industry-specific control variables.

To test the vertical linkages hypothesis, the authors create a measure that captures the intensity with which each good is used as an intermediate input in production. They use the input–output matrix from the U.S. Bureau of Economic Analysis to calculate the average amount of a commodity input, i , used to produce a U.S. dollar’s worth of output in all downstream industries, j . The authors find that goods used intensively as intermediate inputs experienced larger percentage drops in imports and exports.

Turning to the hypothesis that tight financial conditions contributed to the Great Trade Collapse, the authors calculate two measures of trade credit intensity

in an industry. Using data from the Compustat North America database, they calculate the amount of credit extended to a firm by its suppliers as the median ratio of accounts payable to cost of goods sold. A second measure captures the amount of credit a firm extends to its customers—specifically, this is measured as the median ratio of accounts receivable to sales.³¹ For example, if a firm that typically extended trade credit to its buyers had difficulty obtaining working capital from banks during the financial crisis, that firm might cease to offer trade credit. Consequently, that might have led to a decline in U.S. exports.

The authors find no evidence that trade flows fell more in sectors that typically either extend or receive trade credit. An examination of changes over time in the ratio of accounts payable to cost of goods sold and the ratio of accounts receivable to sales for firms in the Compustat database over the periods 2000–2009:Q1 and 2004:Q1–2009:Q1, respectively, reveals that the contractions in trade credit during the financial crisis were relatively small. This supports the authors’ conclusion that difficulties in obtaining trade credit were not a major factor behind the Great Trade Collapse. This analysis does not disprove the idea that tight financial conditions could have contributed to the trade collapse. Rather, the analysis indicates that, after controlling for other characteristics, sectors that regularly require upfront payments for inputs and sectors that regularly ship inputs to buyers in advance of payment experienced similar declines in trade.

Finally, to test the hypothesis that the Great Trade Collapse occurred because of compositional differences between domestic output and trade, the authors examine the relationship between the cross-sectional contraction in output and the cross-sectional contraction in trade. For this analysis, an industry-specific measure of industrial production is used as the variable $CHAR_i$ in equation 2. Compositional differences do account for some of the Great Trade Collapse, according to Levchenko, Lewis, and Tesar (2010). In an examination of cross-sectional differences, imports and exports contracted more in sectors in which U.S. industrial production contracted more. Imports in durable goods sectors contracted 9.2 percentage points more than imports in nondurable goods sectors.

In summary, Levchenko, Lewis, and Tesar (2010) first quantify that approximately 60 percent of the Great Trade Collapse is due to the contraction in domestic demand associated with the Great Recession and to changes in the relative price of imports to domestic goods. They then analyze cross-sectional changes in trade flows and conclude vertical linkages and compositional differences between domestic production and

trade were important contributing factors to the Great Trade Collapse. This partial equilibrium cross-sectional approach does not lend itself to quantification of the underlying causes of the collapse of aggregate U.S. imports. However, from this empirical analysis, we can see that a good economic model of the Great Trade Collapse must include a distinction between nondurable and durable goods and a careful modeling of inputs and final goods.

Eaton et al. (2011)

Eaton et al. (2011) take a different approach to studying the Great Trade Collapse. They complete an empirical analysis on the Great Trade Collapse as a global phenomenon. This paper begins with the observation that the ratio of global trade to GDP declined by about 30 percent from 2008:Q2 through 2009:Q2. In contrast to Levchenko, Lewis, and Tesar (2010), who are agnostic about the underlying structure of the economy, Eaton et al. (2011) build a structural model of the global economy. They then use their model to reproduce the Great Trade Collapse from possible causes. This methodological approach has the additional benefit of allowing the authors to quantify the contributions of different factors to the Great Trade Collapse.

Eaton et al. (2011) begin with a standard gravity model of trade among 23 countries. This workhorse model of the international trade literature relates the volume of trade between any two countries to the distance between them.³² To the gravity model, they add three production sectors—durable manufacturing, nondurable manufacturing, and nonmanufacturing—and a detailed input–output structure for each country. The possible causes of the trade collapse are included in the model as “shocks,” variables subject to exogenous changes in their value that can then propagate throughout the model economy. In the Eaton et al. (2011) model, there are four distinct types of shocks: demand shocks, trade deficit shocks, productivity shocks, and trade friction shocks.

In this paper, a demand shock, which is country-specific, is a change in the share of final demand that is spent on goods from each sector—durables, nondurables, or nonmanufacturing. In this setup, changes in final investment activity or changes in durable inventories are captured by demand shocks. The equilibrium in this model is a function of each country’s aggregate trade deficit and its nonmanufacturing deficit. Because the model is static, these trade deficits are treated as exogenous shocks. Productivity shocks—which measure how much of an output change cannot be explained by changes in inputs of capital, labor, and materials—and trade friction shocks—which capture all kinds of changes in barriers to trade—are estimated from data

on sectoral producer price indexes and bilateral trade shares at the sectoral level. The trade friction shocks capture anything that changes individuals’ home bias³³ in consumption, such as 1) changes in shipping costs, 2) changes in tariffs, 3) changes in nontariff barriers, and 4) difficulties in obtaining trade finance. Further, any reduction in imported inventories associated with a large fixed cost of importing—as in Alessandria, Kaboski, and Midrigan (2010) discussed later—would also be captured by the trade friction shock.

The authors find that a decline in the demand for durable manufactured goods explains 65 percent of the decline in the global trade-to-GDP ratio during this period. The decline in total demand for durable and nondurable manufactured goods explains about 80 percent of the fall in the global trade-to-GDP ratio. Finally, they find that increases in trade frictions (difficulties with trade finance and rising trade protection) reduced trade for China and Japan but had little or no impact on other countries. How is it that Eaton et al. (2011) find that 80 percent of the trade collapse is due to the decline in demand, while a simple import demand analysis implies that declining demand can explain only about half of the collapse? A key difference between Eaton et al.’s (2011) analysis and the import demand analysis in this article or that conducted by Levchenko, Lewis, and Tesar (2010) is that Eaton et al. (2011) develop a richer model that incorporates important features of the vertical structure of trade and production. In their richer framework, a final demand shock in one country can fully propagate itself through the demand for traded inputs into production of both durables and nondurables.

Chor and Manova (2010)

Both Levchenko, Lewis, and Tesar (2010) and Eaton et al. (2011) examined demand and supply factors as possible causes of the Great Trade Collapse, and found that weak demand was quantitatively the most important factor. A study by Chor and Manova (2010) focuses on a supply-side cause by looking at the availability of trade financing during the financial crisis. When global credit markets froze, the market for trade credit tightened, but not nearly as severely as other markets. The paper concludes that tighter trade financing conditions contributed to the collapse, but this contribution was modest.

Chor and Manova (2010) ask how tight credit affected trade volumes. Their empirical analysis of the Great Trade Collapse focuses on whether countries with higher borrowing costs exported less to the United States during the crisis. Their paper exploits cross-country and intertemporal variation in the interbank rate, the interest rate at which banks lend to one another,

to identify if tight financial conditions differentially affected different countries' monthly exports to the United States. While the global nature of the financial crisis meant that interest rates in different countries followed a similar path throughout the crisis, Chor and Manova use high-frequency data to capture small differences in borrowing costs across countries and over time. They hypothesize that countries with lower interest rates should have experienced smaller declines in the volume of their exports to the United States.

Consider Chor and Manova's (2010) simplest model—the relationship between U.S. imports from different countries, designated i , in different three-digit NAICS industrial sectors, designated k , at a monthly frequency, t , as a function of the interbank lending rate in country i over time.

$$3) \ln Y_{ikt} = \gamma_1 IBRATE_{it} + \gamma_2 D_{crisis} \times IBRATE_{it} + D_{kt} + \varepsilon_{ikt},$$

where Y_{ikt} is U.S. imports from country i in sector k in month t , $IBRATE_{it}$ is the interbank rate in country i and month t , the variable D_{crisis} is a 0–1 indicator variable equal to 1 in every month from September 2008 through August 2009, the variable D_{kt} is a full set of sector–month fixed effects, and ε_{ikt} is an error term. The coefficient γ_1 captures the effect of a change in the interbank rate on a country's exports to the United States, whereas the coefficient γ_2 captures the additional effect of the interbank rate on a country's exports to the United States during the financial crisis. This formulation allows for the possibility that the interbank rate might have affected trade flows during the crisis in an unusual way.

From this simple model, Chor and Manova (2010) find (in a specification that omits the crisis dummy) that a 1 percent increase in the cost of bank financing is associated with a 16 percent fall in that country's exports to the United States. However, after controlling for industrial production in the exporting country, the effect of the interbank rate on exports is generally not significant. Thus, while there is some evidence that tighter financial conditions, measured as a higher economy-wide borrowing rate, was associated with a lower level of exports to the United States, it is not clear whether this decline in exports was caused by tighter borrowing conditions or whether the tighter borrowing conditions were simply correlated with other adverse changes occurring in these exporting economies during the crisis.

Chor and Manova (2010) then turn to a more refined question of whether sectors that are more reliant on financing exported less to the United States during the crisis. They exploit cross-sector dependence on different types of external financing, together with

intertemporal changes in the interbank rate, to learn how the financial crisis affected trade flows of different types of goods. They estimate the following empirical model on monthly imports into the United States:

$$4) \ln Y_{ikt} = D_{it} + D_{kt} + D_{ik} + \beta_1 IBRATE_{it} \times FIN_k + \beta_2 D_{crisis} \times IBRATE_{it} \times FIN_k + \varepsilon_{ikt}.$$

Again, i indexes a foreign country, k indexes a three-digit NAICS sector, and t indexes time in months. The key innovation in this expression, relative to equation 3, is the inclusion of the variable, FIN_k , one of three time-invariant measures of financial vulnerability. All measures of financial vulnerability are constructed from all publicly traded firms in the Compustat North America database.³⁴ The authors first calculate the average value of the financial vulnerability variable for each firm over the period 1996–2005. They then use the median value of this average within a sector as the sector's time-invariant measure, FIN_k .

The first measure of financial vulnerability that Chor and Manova (2010) analyze is the external financial dependence of a sector. External finance dependence is the fraction of total capital expenditures not financed by internal cash flows from operations. Thus, we might expect that sectors with high levels of this variable would experience greater declines in trade flows. The next measure they explore is asset tangibility—that is, the share of net plant, property, and equipment in total book value. Because a firm with lots of tangible assets can easily provide collateral for a loan, one might expect that it is easier for these firms to obtain loans on advantageous terms. Finally, in a setup similar to that of Levchenko, Lewis, and Tesar (2010), Chor and Manova (2010) examine how access to buyer-supplied trade credit affects cross-country exports at the sectoral level. In their analysis, the change in accounts payable relative to the change in total assets measures a sector's access to buyer-supplied trade credit.

Chor and Manova (2010) find evidence that supports the idea that financial difficulties contributed to the Great Trade Collapse in the United States, but the empirical support for this conclusion is not robust across all specifications of their models. Overall, they find that 1) sectors that are more reliant on external finance had a slightly weaker export performance, 2) sectors with relatively more tangible assets exported relatively more, and 3) sectors that routinely receive trade credit from buyers experienced smaller declines in their exports to the United States.

More specifically, when the fraction of total capital not financed by internal cash is used as the measure

of financial vulnerability in equation 4, the coefficient β_1 is identified from the variation in financial dependence across industries within a given country-month, the variation in the cost of credit across exporting countries in a given sector-month, and the variation in the cost of credit over time within a given country's sector. The coefficient β_2 relies on the same sources of variation in the data for the months of the worldwide financial crisis. Empirically, the authors found that β_2 was negative and precisely estimated in almost all specifications, but that estimates of β_1 were not statistically different from zero. This suggests that during the financial crisis, high interest rates tended to depress U.S. imports in financially vulnerable sectors.

With regard to the specifications that used the level of tangible assets as the financial variable, recall that a sector with more tangible assets should be less sensitive to worsening credit conditions because any loan it requests can be collateralized by its tangible assets. Thus, the authors hypothesize that both β_1 and β_2 should be positive. In fact, they find that β_1 is positive in all specifications, but statistically significant in only the regression that omits the crisis dummy interaction term. Further, β_2 is positive in almost all specifications, indicating that this effect was stronger during the financial crisis. Thus, exporting firms that faced high borrowing costs performed better if they were in sectors with relatively high levels of tangible assets.

Lastly, Chor and Manova (2010) consider the role of trade credit in explaining the Great Trade Collapse. These results are most directly comparable to those of Levchenko, Lewis, and Tesar (2010), but the two papers use different measures of trade credit.³⁵ As stated previously, one measure of financial vulnerability used by Chor and Manova (2010), buyer-supplied trade credit, is the change in accounts payable divided by the change in total assets. This ratio measures how much credit American purchasers in these sectors extend to foreign exporters. The positive coefficient estimate on β_1 indicates that countries with high interbank rates exported relatively more in sectors in which American buyers typically extend high levels of trade credit. The positive coefficient estimate on β_2 indicates that this effect became more pronounced during the crisis. This suggests that financial constraints did exacerbate the collapse of trade.

But how do we reconcile the different findings on trade credit in Chor and Manova (2010) and Levchenko, Lewis, and Tesar (2010)? The two papers exploit different sources of variation in trade flows. Levchenko, Lewis, and Tesar (2010) look at differences in the provision of trade credit across sectors within the United States. Their analysis looks for differences in

import growth across sectors that are systematically linked to differences in trade credit, but does not find significant changes in imports that coincide with the trade credit measure. In contrast, Chor and Manova (2010) exploit cross-country variation in the cost of financing within a sector. They compare sectors A and B in countries 1 and 2, all of which export to the United States. Their analysis finds that if sector A receives a relatively high level of trade credit and the interbank rate is relatively higher in country 1 than in country 2, then the relative exports of sector A to sector B in country 1 will be larger than the relative exports of sector A to sector B in country 2. This more refined analysis is able to capture the subtle effects of financial difficulties that varied across countries and over time.

Finally, Chor and Manova (2010) conduct counterfactual simulations with their model to try to quantify how severe the Great Trade Collapse would have been if central banks and national governments had not intervened to lower borrowing costs around the world. They estimate that U.S. imports in the most financially vulnerable sectors would have been substantially lower after September 2008 without the aggressive reduction in interbank lending rates that occurred.

Alessandria, Kaboski, and Midrigan (2010)

A final important contribution exploring the causes for the Great Trade Collapse is Alessandria, Kaboski, and Midrigan (2010). They develop a quantitative dynamic model of trade and production to analyze the Great Trade Collapse in the United States. Their approach is unique in that it focuses on a new channel of trade dynamics—namely, the behavior of inventory investment over the business cycle.

Consider the following stylized example that Alessandria, Kaboski, and Midrigan (2010) present. Suppose a firm would ideally hold three units of a good in inventory for each unit that it sells. In other words, the firm's ideal inventory to sales ratio is three. If a recession causes the firm's sales to fall, its inventory-to-sales ratio will increase above its ideal level. This would lead the firm to purchase fewer goods from its supplier to hold in inventory in the next period. If the supplier is a foreign firm and the domestic firm's inventories are all imported goods, then a decline in the domestic firm's final sales in one period will lead to a more than proportionate reduction in its purchase of imported inventory in the following period.

Alessandria, Kaboski, and Midrigan (2010) formally assess the role of inventory investment during the Great Trade Collapse by integrating a partial equilibrium model of trade and inventory adjustment into a two-country general equilibrium model of trade. The key

feature of this model is that if transaction frictions are higher for imported inventories than domestic inventories (that is, those purchased from domestic partners) so that domestic producers with imported inventories target a higher inventories-to-sales ratio, then any shock that causes final sales to fall will have a larger effect on imported inventories than on domestic inventories. Alessandria, Kaboski, and Midrigan calibrate their model to U.S. data and find that their model with inventory decumulation generates dynamic patterns for production, trade, and inventories that are quantitatively similar to those observed during the Great Trade Collapse. A particularly good feature of this model is that the dramatic collapse in imports is followed by a sharp recovery, similar to what we have observed for the recovery following the Great Trade Collapse.

Conclusion

The collapse in international trade between the second quarter of 2008 and the second quarter of 2009 is one of the most dramatic features of the Great Recession. This collapse in world trade of over 17 percent from peak to trough was massive, not only in terms of its U.S. dollar value but also by historical standards. The G-20 leaders responded to this dramatic decline in trade with three distinct policy initiatives—1) fiscal stimulus to support aggregate demand, 2) trade finance initiatives, and 3) promises to refrain from new trade barriers. To assess the likely impact of these policies, we explored in this article three main possible causes of the Great Trade Collapse—namely, 1) declining demand, 2) financing difficulties, and 3) rising trade barriers. Economists have proposed several hypotheses to explain the Great Trade Collapse; in addition to the three already mentioned, some have posited the following as possible contributing factors: differences in the composition of trade and domestic output and the behavior of imported inventories.

Research suggests that declining demand can explain between 35 percent and 80 percent of the decline in trade over the period 2008:Q2–2009:Q2. The analysis we perform in this article estimates that declining aggregate demand explains 35–50 percent of the Great Trade Collapse. With regard to the recovery, our analysis finds a quantitatively larger puzzle; rising aggregate demand explains only 25–40 percent of the recovery in imports. The decline in aggregate income is able to explain a larger fraction of the decline in trade in a more sophisticated model that accounts for differences between durable, nondurable, and non-manufacturing output, as well as the vertical structure of production. The conclusion that declining demand was the major cause suggests that of all the policy actions, fiscal stimulus likely had the largest impact on the trade recovery.

There is some evidence that financing difficulties contributed to the Great Trade Collapse, but the precise quantitative significance of financial factors is difficult to assess. The G-20's announcement in the second quarter of 2009 that it would ensure the availability of \$250 billion for trade finance coincided with the nadir of the Great Trade Collapse. However, we cannot conclude from the coincidence in timing that government aid with trade finance caused the trade recovery. It likely had a positive impact that was dwarfed by the positive impact of the economic recovery.

There is almost no evidence that trade policy barriers rose during the period of trade collapse and recovery. Historical experience with trade protectionism teaches us that the trade collapse would almost certainly have been worse if policymakers had responded to the crisis by erecting new barriers to trade. Further, it seems that the dramatic demand-driven trade recovery was only possible because there were no trade barriers in place to impede it.

NOTES

¹Our calculation is based on data from the Organisation for Economic Co-operation and Development's *Main Economic Indicators*, in which world trade in goods and services is defined as the sum of world exports in goods and services and world imports in goods and services divided by two; data are from Haver Analytics.

²For a complete list of G-20 nations, see www.g20.org/about_what_is_g20.aspx.

³Group of Twenty (2008).

⁴Group of Twenty (2009), paragraph 22.

⁵*Ibid.*, paragraph 6.

⁶See, for example, Alessandria, Kaboski, and Midrigan (2010); Chor and Manova (2010); Eaton et al. (2011); and Levchenko, Lewis, and Tesar (2010).

⁷For more on the GATT/WTO system, see www.wto.org/english/thewto_e/whatis_e/tif_e/fact4_e.htm.

⁸*Deardorff's Glossary of International Economics* refers to this phenomenon as "fragmentation." Both vertical specialization and fragmentation refer to "the splitting of production processes into separate parts that can be done in different locations, including in different countries" (Deardorff, 2010).

⁹We include all countries that have real quarterly trade and GDP data series available—27 OECD countries, Brazil, and India meet our criteria (see figure 6 for a complete listing).

¹⁰According to the National Bureau of Economic Analysis, the Great Recession occurred in the United States in 2007:Q4–2009:Q2.

¹¹See Miroudot, Lanz, and Ragoussis (2009), table 7, p. 48.

¹²A vertically integrated international economy is one in which supply chains cross international borders.

¹³Economists also estimate the responsiveness of trade to changes in the prices of imported goods and services relative to domestically produced ones. These estimates are referred to as trade elasticities with respect to prices.

¹⁴See Crane, Crowley, and Quayyum (2007) for a detailed discussion of trade elasticities.

¹⁵International Chamber of Commerce Banking Commission (2010), p. 18.

¹⁶The U.S. Department of Commerce, International Trade Administration (2008) provides a clear introduction to the payment methods used in international trade.

¹⁷International Chamber of Commerce Banking Commission (2010), p. 42.

¹⁸The findings from these two surveys are reported and analyzed in the International Chamber of Commerce Banking Commission (2009) and the International Monetary Fund and Bankers' Association for Finance and Trade (2009).

¹⁹Data on the number of transactions that took place using letters of credit or documentary collections can be obtained

from SWIFT (Society for Worldwide Interbank Financial Telecommunication)—a private provider of electronic financial messaging services. However, it is not possible to identify open account transactions for merchandise trade by using SWIFT data because there is no SWIFT message code uniquely specified for payment for a sale of goods or services. Open account transactions for goods are classified under the same SWIFT code as foreign exchange sales. For more on SWIFT, see www.swift.com/about_swift/press_room/SWIFT_for_media_July_2010.pdf.

²⁰International Chamber of Commerce Banking Commission (2010), p. 46.

²¹Chor and Manova (2010) use data on all publicly traded firms in the Compustat North America database to calculate the average measure of the ratio of the change in accounts payable to the change in total assets for each firm from 1996 through 2005. They then take the median value across all firms in a three-digit North American Industry Classification System (NAICS) industry as the industry's measure of trade credit.

²²See Chor and Manova (2010), p. 3. Djankov, Freund, and Pham (2010) present survey data from 98 countries, indicating that the average time for a standardized container of merchandise to be transported from a factory floor and cleared for export from a country is 30 days.

²³See note 7 for more on the GATT and WTO.

²⁴Prusa (2001).

²⁵For more on this database, which is coordinated by the Centre for Economic Policy Research based in London, see www.globaltradealert.org.

²⁶See Evenett (2010).

²⁷"Capacity utilization is a ratio of a manufacturer's actual production to their full production capability during [a specific time period]," states the U.S. Census Bureau; see www.census.gov/manufacturing/capacity/definitions/index.html.

²⁸The amount of trade covered by each unit of observation varies considerably—with some investigations covering only a portion of a specific tariff line and others covering hundreds of tariff lines. That said, this legally defined unit of observation has been used consistently since 1980 and is a useful measure for looking at long-term trends.

²⁹Measures of an industry's downstream vertical linkages capture the intensity with which the output of an industry is used as an intermediate input by other sectors. Measures of an industry's upstream vertical linkages capture the intensity with which that industry uses intermediate inputs. (See Levchenko, Lewis, and Tesar, 2010, p. 14.) *Deardorff's Glossary of International Economics* defines an intermediate input as "an input to production that has itself been produced and that, unlike capital, is used up in production" (Deardorff, 2010).

³⁰For example, they calculate the change between the first quarter of year t and the first quarter of year $t - 1$, the second quarter of year t and the second quarter of year $t - 1$, and so on.

³¹Both measures in Levchenko, Lewis, and Tesar (2010) first take the median value of the variable for each firm in the sample between 2000 and 2008. Next, they take the median of the value across all firms to use as the industry's measure of trade credit intensity.

³²The term *gravity model* comes from the observation that trade volumes tend to increase as the distance between any two countries decreases, similar to the force of gravity between two objects increasing as the distance between the objects decreases. In addition, this term is also based on the observation that the trade volume for an economy grows larger as the size of an economy increases, analogous to the gravitational pull of an object becoming larger as its mass increases.

³³From *Deardorff's Glossary of International Economics*: Home bias is “a preference, by consumers or other demanders, for products produced in their own country compared to otherwise identical imports” (Deardorff, 2010).

³⁴Note that Chor and Manova (2010) are assuming that the financial vulnerability in foreign industrial sectors is identical to that of the same sectors in North America.

³⁵The measures used in Levchenko, Lewis, and Tesar (2010) are described in detail on p. 63 and in note 31.

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