

Interpreting the world trade collapse

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World trade's dramatic collapse from the end of 2008 was emblematic of a globally synchronised recession that threatened to become a depression and of a financial crisis painfully transmitted to the real economy. The extent of the fall in world trade relative to that in world GDP and the subsequent strength of the trade recovery so far suggests particular factors have been affecting global trade flows. This article considers the possible reasons for the pronounced fall and recovery in world trade relative to world GDP, focusing on UK export demand. At its core, the extraordinary decline in trade stemmed from the combination of a shock to global demand skewed towards highly tradable sectors and the ever-more globalised production process for these goods. The encouraging improvement in world trade from the second half of 2009 can also be attributed to some of these factors, as well as suggesting that permanent damage to the global marketplace may be less extensive than first feared.

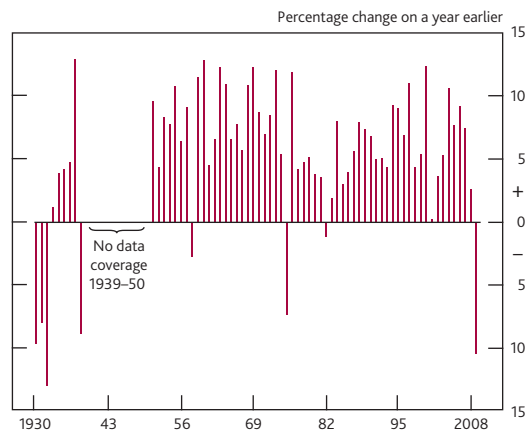
Introduction

World trade⁽²⁾ fell three times between World War II and 2008 (1958, 1975 and 1982), but the speed and severity of 2009's collapse was much more dramatic (**Chart 1**).⁽³⁾ World trade started to fall at the end of 2008 and by the first quarter of 2009 the pace of decline was fast enough to allow worrying comparisons with the collapse in trade during the Great Depression.⁽⁴⁾ Fortunately, the second half of 2009 saw enough of a recovery in world trade to allay the worst fears. But even by April 2010 trade remained 5% below its April 2008 peak and 17% below what it would have been had it continued to grow at its pre-crisis average rate.⁽⁵⁾

The trade collapse is more remarkable when compared with the, nonetheless, significant declines seen in both world GDP and world industrial production. By the second quarter of 2009, world GDP had fallen by around 3% on a year earlier and world industrial production had fallen by around 10%, while world trade had fallen by over 18% (**Chart 2**). Although world trade has tended to be more cyclical than world output in the past, the past relationship would suggest a fall in trade of around two times more than GDP rather than the six times larger fall seen in 2009. And it is this extent of the trade decline that has been the focus of debate.

Of the causes used to explain the trade collapse, most fall into one of two broad groups. First are those explanations focusing on how global trade patterns and global production processes have changed over time, arguably making world trade today

Chart 1 World trade volumes^{(a)(b)}



Sources: Eichengreen and O'Rourke (2009) for 1930–38, World Trade Organisation for 1951–79, IMF for 1980–2009 and Bank calculations.

- (a) Market exchange rate weighted export volumes. IMF series covers goods and services, other series cover goods only. Final data point refers to 2009.
 (b) 1930 growth rate covers June–December 1930 relative to June–December 1929. 1938 growth rate covers January–August 1938 relative to January–August 1937.

inherently more volatile than world GDP, relative to the past. Second are the arguments focusing on how the specific nature of the global recession, following the financial crisis of 2008, may have had an especially large impact on world trade.

(1) The authors would like to thank Marco Stringa and Merxe Tudela for their help in producing this article.

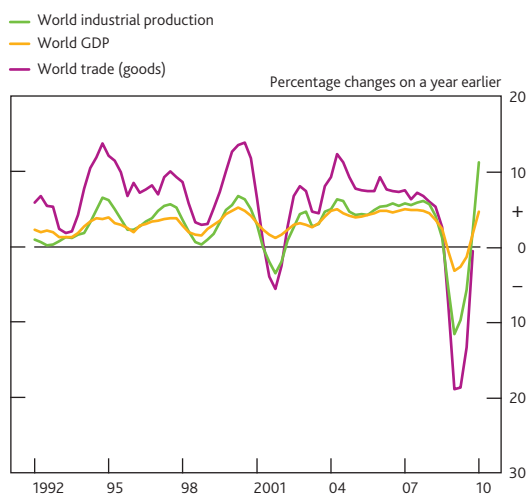
(2) Defined in this article as world imports, unless stated otherwise.

(3) A rare few studies, such as Benassy-Quere *et al* (2009), have argued that estimated real trade declines may be overstated because of the use of inappropriate price deflators. But others, such as Francois and Woertz (2009), show that even with detailed analysis of real and nominal numbers, real trade falls were very large.

(4) Eichengreen and O'Rourke (2009).

(5) Based on monthly world goods imports data produced by CPB Netherlands, August 2010 vintage. Pre-crisis period defined as the ten years before April 2008.

Chart 2 World economic activity^(a)



Sources: CPB Netherlands, IMF, Thomson Reuters Datastream and Bank calculations.

(a) The world industrial production and goods trade series are constructed by the CPB Netherlands, aggregating national data using world production shares and market exchange rates respectively. The world GDP series was constructed by the authors, aggregating national-level data using IMF-calculated purchasing power parity (PPP) shares, based in 2006, and covers at least 70% of world activity.

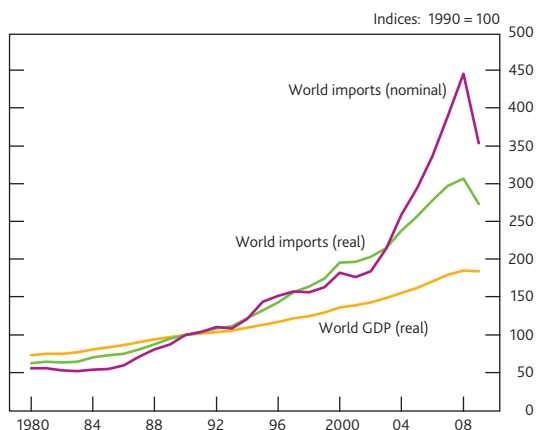
This article discusses the possible explanations for the severity of the fall in world trade put forward by the recent literature and Bank staff analysis. It then uses a quantitative approach to assess the importance of some of those explanations in understanding the pattern of world trade recently, concentrating on demand in the United Kingdom’s major export markets.

What might be possible explanations for the large fall in world trade relative to GDP?

(i) The changing structure of world trade

World trade has grown faster than world GDP in both real and nominal terms, at least since the end of the Second World War and even more rapidly since the 1980s (Chart 3). A basic

Chart 3 World trade and world GDP^(a)



Sources: IMF (April 2010 *World Economic Outlook*).

(a) Trade series are aggregated by the IMF using market exchange rates at constant and current prices. GDP series is aggregated by the IMF using PPP shares.

measure of the elasticity of trade relative to GDP, following from the work of Irwin (2002),⁽¹⁾ shows that since the late 1980s changes in OECD GDP have been associated with larger changes in OECD trade, than in earlier decades (Table A).

Table A Elasticity of OECD trade with respect to OECD GDP^(a)

Period	Estimated elasticity
1961–2008	1.83
1989–2008	2.50

Sources: OECD and Bank calculations.

(a) Based on an OLS regression of OECD imports relative to OECD GDP.

A previous *Bulletin* article⁽²⁾ identified two main reasons behind the faster growth in world trade relative to GDP between 1980 and 2000. First, prices of tradable goods had tended to fall by more than the prices of non-tradable goods, primarily as a result of faster productivity growth in the tradable goods sector. And second, declining trade tariff rates reduced the cost of international trade and increased the returns to production specialisation. Together, these factors were thought to account for over 60% of the secular increase in world trade relative to world GDP between 1980 and 2000.

Part of the faster productivity growth in the tradable goods sector could itself be a result of increased production specialisation. And of particular importance for trade flows may have been not only specialisation by sector or product type in the old-fashioned sense, but also through specialisation in stages of production or ‘vertical specialisation’. For example, businesses in country A specialise in producing parts of cars and businesses in country B specialise in assembling those parts. Cross-country differences in resources, wages and productivity mean that businesses can benefit from sourcing inputs from abroad and from fragmenting their production process.

A lack of definitive data on vertical specialisation does limit comprehensive study of this topic. There are though a number of partial empirical studies that do suggest increasing vertical specialisation in recent decades. A study by Brooks and Hua (2008) finds that the share of components in world machinery and transport imports rose by 3 percentage points (to 44%) between 1990 and 2006. In South Asia, the increase was much more pronounced, from 47% to 63%. Amador and Cabral (2009) construct an index of world vertical supply integration for 79 countries. This measure identifies vertical trade for each country by examining exports and related intermediate imports for individual goods categories, relative

(1) Irwin (2002) examined the long-run relationship between world trade and world income since the 19th century and found that since the mid-1980s trade has become more responsive to income than in previous periods.

(2) Dean and Sebastia-Barriel (2004).

to thresholds based upon world averages. This metric shows an even faster increase in vertical specialisation: from less than 20% in 1995 to over 30% in 2005.

The proliferation of global supply chains, created by vertical specialisation, leads to more trade flows for a given increase in final demand for goods and services, in absolute terms. For example, once, a product in its lifetime might have begun as raw materials from one or two countries, exported to another for manufacture, and then exported once more for sale. Now, as global supply chains have grown, a final product might start as raw materials exported to various countries for manufacture into component parts, before being exported again for assembly elsewhere, and then finally being shipped to the purchaser — requiring more trade transactions for the same final purchase. And so, as final demand for goods has grown, as measured by GDP, the gross trade flows associated with that final demand have risen by more in absolute terms. In turn, when demand falls the accompanying fall in trade flows is larger too.

Having a larger number of intermediate trade flows for every unit of final demand explains why the absolute fall in trade flows is larger than that in demand, but it does not explain why the fall is *proportionately* larger (such that the percentage declines in trade would be larger than the percentage declines in GDP). World trade did not just fall more than GDP in absolute terms; it fell more in proportionate terms too.

To explain proportionately larger falls in trade, there would need to be some aspect of the concentration of global supply chains that makes these trade flows especially sensitive to the fall in demand. O'Rourke (2009)⁽¹⁾ used a stylised example to reveal that trade flows can fall proportionately more than GDP if some sectors have seen more growth in supply chains than others, and if the shock to demand is skewed towards those longer supply chains.

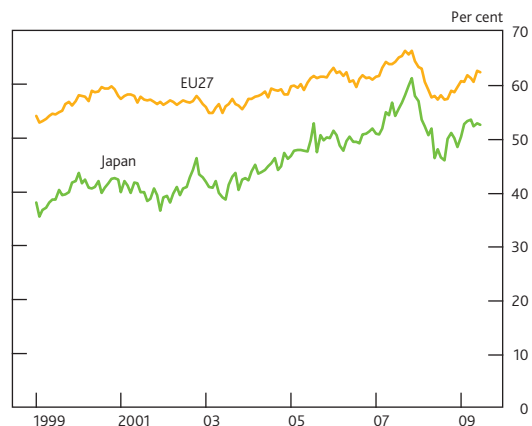
Another related argument for the role of vertical specialisation in intensifying the trade collapse is that vertical supply chains may have been important in transmitting the fall in demand between countries (Yi (2009)). All 104 nations for which the WTO reports data experienced a drop in trade during the second half of 2008 and the first half of 2009.⁽²⁾

This synchronised trade collapse also raised concerns about a permanent reduction in global trade integration. For example, Yi (2009) suggested that the transmission of production and demand shocks between countries might be more sensitive to downturns because of factors such as home bias in production, which could take a long time to reverse. Indeed, as trade collapsed, concerns mounted over a permanent reduction in global trade integration. However, the quick rebound in world trade (Chart 2) suggests that those links

have not been broken to the extent that was feared. Studies of supply chains in France, Germany and Italy also indicate that these chains may have been more resilient than anticipated. Bricongne *et al* (2009) observe that large French firms absorbed the demand shock mostly by reducing the volume of their exports rather than ceasing trade relationships. Altomonte and Ottaviano (2009) find similar results in their study of supply chains between Germany, Italy and Eastern Europe.

There is some evidence that the growth in vertical specialisation did play at least some role in the collapse and subsequent recovery in world trade. Intermediate components, which had been increasing as a share of imports in Japan and Europe in recent decades, saw their share fall substantially in 2009 (Chart 4). Cheung and Guichard (2009) find that vertical specialisation and supply chains, among other factors, can help explain the trade collapse by incorporating indices of vertical supply chain growth in a world trade equation.

Chart 4 Shares of intermediate components in goods imports (values)^(a)



Sources: Eurostat and Japan's Ministry of Finance.

(a) Intermediate components are industrial supplies for Japan and intermediate goods for EU27. Imports for EU27 exclude trade among the EU27 members. Data as at 14 August 2010.

It is not clear though that the development of vertical specialisation alone is enough to explain all of the unusually large fall in world trade. The development of vertical specialisation has been ongoing for a number of decades, and so should arguably be partly captured in pre-2009 trade models. And little analysis has been put forward to suggest that vertical specialisation spread even more rapidly in very recent years. But, as discussed in section (iii), when considered alongside other features of the trade collapse, such as the concentration of falls in manufactured goods, the extent of

(1) O'Rourke uses a stylised example involving Barbie dolls produced via supply chains and Ken dolls produced in one step. With a demand shock skewed towards Barbie dolls rather than Ken dolls, then not only does trade fall more in absolute terms, it also falls more proportionately.

(2) Baldwin (2009).

global supply chains may have been a force exacerbating the world trade collapse.

(ii) A collapse in trade credit supply

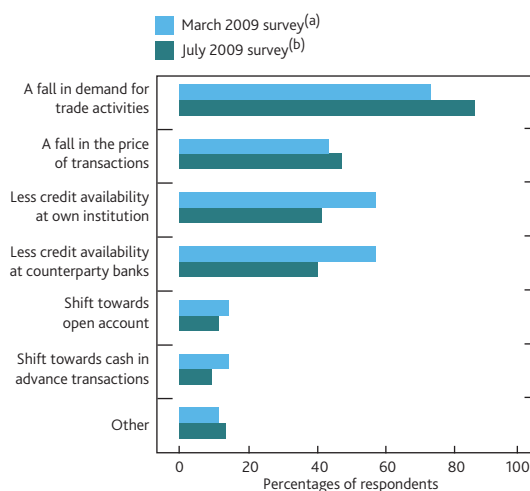
As world trade collapsed, the availability of the specialist trade finance that accompanied it also received a lot of attention. Much international trade requires some form of specific financing given the nature of cross-border exchange and the varying time delays between payment and receipt of goods and services. It is an idiosyncratic type of credit, where the financing can take alternative forms, from letters of guarantee provided by banks, to intra or inter-business financing, to loans from public sector export-import banks.

If international trade relies more on credit compared with domestic transactions, then trade may have been more vulnerable to the dislocation in financial markets during the crisis at the end of 2008. There were a number of pressures that may have caused both a fall in trade finance supply and an increase in demand for it given trade flows. In some cases, increased risk aversion reportedly led to a rise in demand for trade finance instruments intermediated by financial institutions in place of open account-based operations, where credit is extended by the seller to the buyer. At the same time, financial institutions tightened lending conditions, including for trade finance, as a consequence of the crisis.

Whereas there is some consensus that tight credit conditions played some role in the collapse of world trade (see section (iii)), there is less of a consensus that trade finance itself was a primary factor globally, even if anecdotal evidence suggests that it did play a relatively larger role in some regions. This lack of consensus is partly a result of limited data availability.

Some information has been provided by the trade finance survey developed by the IMF and the Bankers' Association for Finance and Trade (BAFT), which was first released in early 2009. It asked banks in various countries questions about the demand for and supply of trade finance instruments. The results suggested that the primary reason for the decline in trade credit was reduced demand for trade activities and not the supply of credit. And although reduced credit availability was cited by a majority of respondents in the first survey, this percentage fell in the subsequent release, which covered the period where trade fell the most (**Chart 5**). In line with the IMF-BAFT findings, a World Bank survey in developing countries⁽¹⁾ concluded that although constrained trade finance played a substantial role for small and medium-sized enterprises, weak demand was the major reason behind the decline in exports during the bulk of the world trade collapse, between September 2008 and March 2009. One caveat to these conclusions is that these surveys have only partial coverage, which could possibly introduce biases to the results.⁽²⁾ But they are scarce sources of timely information about trade finance on a global level.

Chart 5 Key reasons behind the decline in trade finance business (values)



Source: IMF-BAFT Trade Finance surveys.

(a) For the period between October 2008 and January 2009. Not seasonally adjusted.
(b) For the period between 2008 Q4 and 2009 Q2. Not seasonally adjusted.

It is possible that these surveys do not suggest that trade credit conditions had a large impact on world trade, in part, because of successful public policy intervention. At their London meeting in April 2009, the G20 agreed on a \$250 billion support framework to expand trade finance supply via export credit agencies and multilateral development banks. The average utilisation rate for this support facility was initially high, at around 70% and it fell to 40% in the second half of 2009, as supply of trade credit from private sources increased.⁽³⁾

(iii) A fall in demand skewed towards tradable goods

Another explanation for the collapse in world trade is that the restriction in credit availability and loss of economic confidence by households and businesses, triggered by the financial crisis, may have led to a fall in global demand that was unusually skewed towards tradable goods. Cheung and Guichard (2009) show that the tightening in overall credit conditions can, in part, help explain the collapse in trade because of a relatively larger impact on trade-intensive sectors.

One starting point for considering whether the fall in demand was skewed towards tradables is to consider how trade relates to different types of expenditure. Estimates of the correlation between imports and different expenditure components of final domestic demand using OECD data since 1961 suggest that investment (or gross fixed capital formation) moves most closely with imports (**Table B**).

(1) Malouche (2009).

(2) These surveys are partial in their coverage of world regions and relevant banks. Also, to the extent that the respondent banks only observe actual demand given the price being charged (rather than potential demand), it could be that the reported contribution of weak demand is overstated if part of this weakness is actually because of tighter credit conditions.

(3) For further details see www.g20.org/exp_03.aspx.

Table B Correlation between imports and final domestic demand expenditure components in the OECD^(a)

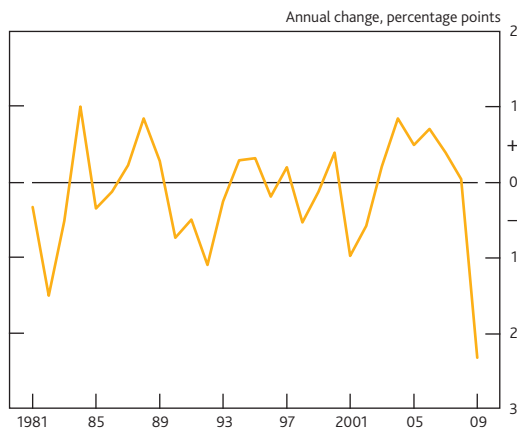
Final domestic demand component	1961–2008
Private consumption expenditure	0.49
Government consumption expenditure	-0.04
Gross fixed capital formation	0.71

Sources: OECD and Bank calculations.

(a) Correlation coefficient on the growth rate of imports with the growth rate of domestic demand components.

In 2009, world investment fell as a share of world GDP by over 2 percentage points, from 24% of GDP in 2008 to 21% of GDP, compared to a long-run average of 23% of world GDP (Chart 6). That represented a fall of 9% in investment compared with a fall in world GDP of 2% in 2009. And this fall in investment can be linked to the fall in the demand for, and trade of, manufactured goods and machinery, which form a large share of investment expenditure,⁽¹⁾ and contributed to over half of the fall in imports in the OECD (Chart 7). That pattern is also consistent with the large falls in industrial production, also dominated by manufactured goods, relative to GDP seen during the downturn (Chart 2).

Chart 6 Investment as a percentage of GDP

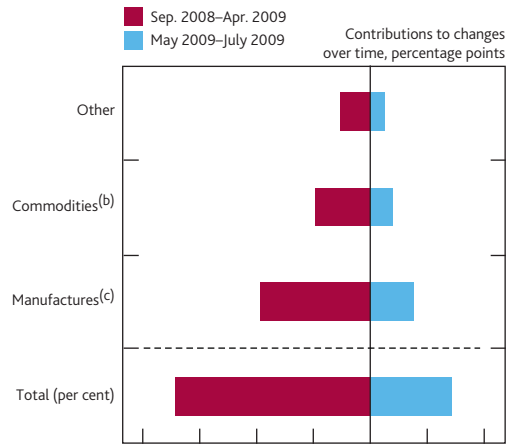


Source: IMF (April 2010 *World Economic Outlook*).

In addition to the large decline in investment, a second characteristic of the downturn in world activity was the presence of widespread de-stocking by businesses. De-stocking is a normal feature of business cycles but it is possible that the globally synchronised nature of the downturn, and factors such as a desire by businesses to raise cash holdings in the face of disrupted credit markets, may have led to a particularly intense global inventory correction. And stocks tend to have a high import content.⁽²⁾

Falling demand for manufactured goods might have extra potency for trade flows because of the relatively high prevalence of cross-border supply chains in manufactured goods as opposed to services or commodities. Every unit fall in

Chart 7 OECD import values by goods type^(a)



Source: OECD.

- (a) This OECD aggregate does not include data for Canada, Chile, Greece, Mexico and Slovenia.
- (b) Commodities refers to 'mineral fuels, lubricants and related materials' and 'commodities and transactions'.
- (c) Manufactures includes 'manufactured goods', 'machinery and transport equipment' and 'miscellaneous manufactured articles'.

final demand for manufactures leads to a greater decline in trade on two counts: (i) because manufactures form a high share of tradables and (ii) because of the gross flows associated with vertical specialisation in some manufacturing production.

The importance of the nature of the shock to global demand in explaining the collapse and subsequent rebound in world trade can be demonstrated with a simple quantitative exercise. There are a number of ways in which to consider world trade. For this exercise, we focus directly on imports in the United Kingdom's main trade partners, to account for the share of the world that is relevant for the United Kingdom.⁽³⁾ We do that by constructing a measure for world imports which weights individual country imports by their importance in UK exports.

In this exercise, the explanatory factors considered to explain the path of world trade (weighted by UK export demand) were:

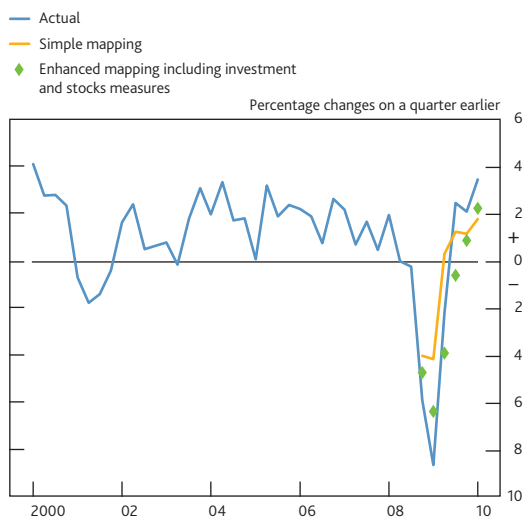
- World GDP, weighted by the share of each country in UK export markets.
- Investment in the United Kingdom's major trading partners, the United States, euro area and Japan (which account for 70% of UK export markets) to proxy for the composition of demand effect.

(1) For example, spending on business equipment formed over 50% of US private fixed investment and UK capital expenditure in 2008.
 (2) Taking the United Kingdom as an example, stockbuilding is one of the most trade-intensive expenditure components of GDP.
 (3) We do not, however, examine the subsequent implications for UK exports or net trade.

- Aggregate of the change in stocks (private inventories) in the United States and Germany.⁽¹⁾ This was also included to proxy for the composition of demand effect.

As a starting point, we construct a simple mapping equation from UK export demand to world GDP growth alone. This mapping captures the average relationship between trade and GDP from the start of 1980 to the third quarter of 2008. But this mapping can only explain half of the fall in trade seen between 2008 Q4 and 2009 Q2 (**Chart 8**).⁽²⁾

Chart 8 Explaining UK export demand^(a)



Sources: ONS, Thomson Reuters Datastream and Bank calculations.

(a) UK export demand is calculated by aggregating the volume of national imports weighted by country share in UK exports (based in 2006), and covers at least 80% of UK export markets.

Two combined changes improve the results substantially. First, the addition of investment and stocks measures to capture the composition of global demand. Second, shortening the sample period, to cover 1995 Q1 to 2008 Q3, to reflect the growth in vertical specialisation in recent years. From this enhanced mapping (**Chart 8**), the positive coefficients found on the stocks and investment terms suggest that the composition of demand can help to explain the fall in world trade and its subsequent rapid recovery.⁽³⁾

Conclusion

The fall in world trade from the end of 2008 into 2009 was abnormally large even compared with the substantial fall in world activity over the same period. And those declines were reflected directly in UK export demand. This article has explored the possible explanations for this collapse, considering the interaction between the nature of the demand shock following the financial crisis and the underlying change in global trade patterns stemming from increasingly globalised production processes.

Our analysis suggests that the collapse of export demand from UK trade partners was driven largely by the effect of a fall in demand that was particularly acute for investment expenditure and inventories. That investment expenditure included considerable volumes of highly tradable capital and durable goods; goods that are also increasingly produced in international supply chains. The existence and proliferation of these supply chains has increased trade in intermediate goods for each unit of final demand. This means that when there was a fall in final demand for capital and durable goods, trade fell by more than GDP, both because those goods form a greater share of value added in trade than they do in GDP, and because the intermediate components used in their production are captured in trade flows but not in GDP. Trade finance conditions deteriorated sharply during the crisis, but survey evidence suggests they played a less important role when compared with the impact of the overall fall in demand.

The recovery in global trade from the second half of 2009 has been encouraging, and so far stronger than that in GDP. This signals that even though the trade flows within global supply chains may have fallen off rapidly during the crisis, the chains themselves were not permanently broken. That indicates that world trade integration may not have been severely damaged in the recent recession.

(1) Aggregated in US dollars at constant (2005) prices.

(2) Based on an out-of-sample forecast. Simple equation (*t*-statistics):

$$D(\text{Log}(\text{UK export demand})) = -0.01 + 2.0 * D(\text{Log}(\text{World GDP}))$$
 (-0.1) (10.4).

(3) Long-run equation (*t*-statistics):

$$\text{Log}(\text{UK export demand}) = -5.0 + 1.6 * \text{Log}(\text{World GDP}) + 0.5 * \text{Log}(\text{G3 investment})$$
 (-81) (25) (7)

Short-run equation (*t*-statistics):

$$D(\text{Log}(\text{UK export demand})) = 0.94 * D(\text{Log}(\text{World GDP})) + 0.21 * D(\text{Log}(\text{G3INVESTMENT})) - 0.40 * (\text{Long-run residual})$$

(-1) + 0.40 * D(Log(World GDP(-1))) + 0.11 * (World stocks)
 (2.9), (1.5), (-3.7), (1.5), (3.1).

References

- Altomonte, C J and Ottaviano, G (2009)**, 'Resilient to the crisis? Cross-border value chains in the enlarged Europe', VoxEU.org, November, available at www.voxeu.org/index.php?q=node/4289.
- Amador, J and Cabral, S (2009)**, 'Vertical specialisation across the world: a relative measure', *North American Journal of Economics and Finance*, Vol. 20, Issue 3, pages 267–80.
- Baldwin, R (2009)**, 'The great trade collapse: what caused it and what does it mean?', VoxEU.org, November.
- Benassy-Quere, A, Decreux, Y, Fontagné, L and Khoudour-Casteras, D (2009)**, 'Economic crisis and global supply chains', *Centre D'Etudes Prospectives et D'Informations Internationales Working paper no. 2009-15*, July.
- Bricongne, J, Fontagné, L, Gaulier, G, Taglioni, D and Vicard, V (2009)**, 'Firms and the global crisis: French exports in the turmoil', *Working Paper no. 265*, Banque de France.
- Brooks, D and Hua, C (2008)**, 'Asian trade and global linkages', *Asian Development Bank Institute Working Paper no. 122*.
- Cheung, C and Guichard, S (2009)**, 'Understanding the world trade collapse', *OECD Economics Department Working Paper no. 729*.
- Dean, M and Sebastia-Barriel, M (2004)**, 'Why has world trade grown faster than world output?', *Bank of England Quarterly Bulletin*, Autumn, pages 310–20.
- Eichengreen, B and O'Rourke, K (2009)**, 'A tale of two depressions', column on VoxEU.org, March, available at www.voxeu.org/index.php?q=node/3421.
- Francois, J and Woerz, J (2009)**, 'The big drop: trade and the great recession', in Baldwin, R (ed), *The great trade collapse: causes, consequences and prospects*, VoxEU.org.
- Irwin, D (2002)**, 'Long-run trends in world trade and income', *World Trade Review*, Vol. 1, Issue 1.
- Malouche, M (2009)**, 'Trade and trade finance developments in 14 developing countries post September 2008, a World Bank survey', *World Bank Policy Research Working Paper no. 5138*, OECD Publishing.
- O'Rourke, K (2009)**, 'Collapsing trade in a Barbie world', June, available at www.irisheconomy.ie/index.php/2009/06/18/collapsing-trade-in-a-barbie-world/.
- Yi, K (2009)**, 'The collapse of global trade: the role of vertical specialization', in Baldwin, R and Evenett, S (eds), *The collapse of global trade, murky protectionism, and the crisis: recommendations for the G20*, VoxEU.org, March, pages 45–48, available at www.voxeu.org/reports/Murky_Protectionism.pdf.