

The Trade Response to Global Downturns

Historical Evidence

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Abstract

The author examines the impact of historical global downturns on trade flows. The results provide insight into why trade has dropped so dramatically in the current crisis, what is likely to happen in the coming years, how global imbalances are affected, and which regions and industries suffer most heavily. The author finds that the elasticity of global trade volumes to real world GDP has increased gradually from around 2 in the 1960s to above 3 now. The author also finds that trade is more responsive to GDP during global downturns than in tranquil times.

The results suggest that the overall drop in real trade this year is likely to exceed 15 percent. There is significant variation across industries, with food and beverages the least affected and crude materials and fuels the most affected. On the positive side, trade tends to rebound very rapidly when the outlook brightens. The author also finds evidence that global downturns often lead to persistent improvements in the ratio of the trade balance to GDP in borrower countries.

This paper—a product of the Trade and Integration Team, Development Research Group—is part of a larger effort in the department to understand the implications of the global economic crisis for international trade flows. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The author may be contacted at cfreund@worldbank.org.

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

The Trade Response to Global Downturns: Historical Evidence

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I. Introduction

The financial crisis is wreaking havoc on the global economy. In the first quarter of 2009, nominal trade fell by 30 percent on average since last year. The world trade volume is estimated to have fallen by over 15 percent during this period (*World Trade Monitor & League of Nations*). The declines have been widespread across countries and products, largely reflecting the sharp drop in global demand.

We examine historical data on global slowdowns to look for similarities that may offer insights into the large decline in trade that has already begun. There are four such events in recent history: 1975, 1982, 1991, and 2001. While these events were on average modest as compared with the current crisis, they may offer some guidance for what to expect in the coming months. We focus on global downturns, as opposed to financial crises, because these share the key characteristic (for international trade) of low global demand with the current environment. In contrast, during regional financial crises, demand in the rest of the world tends to remain strong, limiting the trade impact of the crisis. We also examine a handful of countries, which experienced financial crises during the 1991 global downturn, to determine whether banking crises significantly exacerbate weak trade performance during slowdowns.

The first issue we address is how much does trade contract when the global economy falters? We find that the trade contraction follows the GDP decline and that the trade volume declines by about 1 percent on average in first year of its contraction. The decline in the growth rate of trade (from historical average to trough) is sudden and is on average more than 4 times as large as that of income. On average, trade growth returns

as quickly as it disappears and contemporaneously with the rebound in GDP growth. Still, it takes more than three years for pre-downturn levels of openness to be reached.

As a result of the collapse in trade, crises moderate global imbalances. Since trade contracts by more than GDP, a country's trade balance as a share of GDP (whether surplus or deficit) typically declines in absolute value. Moreover, because of falling commodity prices during downturns, the deceleration in trade value tends to be far greater than in trade volumes. We show that the reversal of trade deficits tends to persist for Asia, Europe, Latin America, and the Middle East. In North America, the improvement in the trade balance has been temporary, with deficits worsening following the downturn. In contrast, surplus regions tend to see only a temporary reversal.

We also examine characteristics across industries and regions during the slowdown. While all industries tend to decline, it is least severe in food and beverages. Growth returns after one year in most products, though iron and steel and commodities exhibit more protracted slowdowns. By region, countries in Europe and Central Asia were relatively less affected during previous downturns; while those in the Middle East and North Africa were the most affected. By income level, the high income OECD countries were least affected; while middle income countries were the most affected.

The results have important implications for trade during the current financial crisis. Given current GDP forecasts and trade data available through June, our results imply that the decline in real trade in 2009 could well exceed 15 percent. In addition, global imbalances are likely to be mitigated during the crisis, and this may persist even after the crisis is resolved. Finally, food and beverages are likely to be the least affected products in the coming months.

This paper is similar in spirit to Reinhart and Rogoff (2008). They examine previous financial crises for information on the macroeconomic implications of the current crisis. They find that banking crises are associated with severe declines in asset prices, output, and employment—though the decline in output tends to be relatively less protracted as compared with asset prices and employment. They also find that government debt balloons as a result of collapsing tax revenues and countercyclical policies. While our focus on global downturns and international trade is quite different from theirs, there is one important similarity in our results. Our results point to a sharp but relatively short-lived decline in trade, akin to what they find for output. A significant difference is that unlike the expanding government debt they observe, we find that international borrowers often reduce international debt following global downturns.

II. Methodology

Following Milesi-Ferretti and Razin (1998) and Freund (2005) on current account reversals, we use a filter to identify episodes of global downturns. Specifically, a global downturn must satisfy the following criteria:

- (a) World real GDP growth below 2 percent.
- (b) A drop of more than 1.5 percentage points in world real GDP growth from previous 5 year average to current rate.
- (c) Considering the previous 2 years and the following 2 years, growth is at a minimum.

The first two conditions ensure growth is low and has dropped sharply. If the first two conditions identify consecutive years, i.e. prolonged recessions, the final condition chooses the minimum growth rate as the event year. Using data on real GDP (in constant

\$US, base year 2000) and real imports (in constant \$US, base year 2000) from the World Development Indicators since 1960, four events are identified: 1975, 1982, 1991, and 2001. These events are readily seen as the sharp downturns in Figure 1. In the remainder of this note, the downturn year is denoted as year zero.

III. What Happens to Trade During Downturns?

To estimate trade effects of recessions, we need an estimate of the elasticity of trade to income—the percentage by which trade falls for a one percent change in income. A number of papers have estimated income elasticities of imports or exports for individual countries and generally find them to lie between 1 and 3½ (see, for example, Hooper et. Al 2000 and Kwack et. Al. 2007). Most forecasters use an elasticity of about 2: real trade growth is expected to slow by 2 percentage points for each 1 percentage point deceleration in real income growth. This leads to relatively small estimates of the decline in trade relative to what we have seen. For example, the IMF¹ predicts a 2.8 percent decline in real trade. In June, the World Bank² revised its March forecast from a 6.1 percent decline in real trade to a 9.7 percent contraction, only after reducing sharply the forecast for global growth. The World Bank estimates are larger in magnitude than the IMF estimate because the predicted declines in income growth are greater. In addition, the Bank's estimate is augmented with potential effects from trade finance problems.

In Table 1, we reexamine the relationship between trade growth and income growth. Specifically, we estimate a very simple regression of world real trade growth on

¹ See <http://www.imf.org/external/pubs/ft/weo/2009/update/01/index.htm>.

² See <http://web.worldbank.org/external/default/main?theSitePK=659149&pagePK=2470434&contentMDK=20370063&menuPK=659159&piPK=2470429>.

world real GDP growth. We find that the elasticity of trade to income has increased over time, from under 2 in the 1960s to over 3½. These results are very similar to Irwin (2002). Using a slightly different methodology, he estimates that the elasticity of world trade to income has grown over time, and was also about 3.4 in the 1990s. Overall, the results imply that trade should fall (in percent) about 3½ times as much as GDP, assuming crises are not special.

The significant increase in the elasticity of trade to income may be attributed to the fragmentation of production and/or lean retailing. Because many new goods use small inputs that are nearly costless to trade (eg cell phones and digital cameras), the production process of these goods has become fragmented across countries. Many traditional goods such as shoes and cars are also increasingly incorporating imported inputs. The elasticity of trade to GDP will rise if there is more incentive to outsource part of the production chain when demand is high. This is because GDP is measured in value added while trade is a gross measure. So an increase in GDP may lead to more outsourcing and much more measured trade, as an increasing number of parts travel around the globe to be assembled, and again to their final consumer.

The expansion of lean retailing in recent years implies that supply responds almost immediately to changes in demand. Rapid technological advances make computers and other electronics almost perishable, and many companies have started selling directly to the consumer and producing for demand. For example, Dell sells directly to its customers and builds a made-to-order computer as orders arrive.³ This type of retailing implies that a drop in demand will show up immediately in trade statistics.

³ Arthur, J. (2006), Chapter 2 p. 25.

Table 2 examines the elasticity of a region's exports to global income. The intuition for looking at regional trade and global income (instead of regional income) is to see how tied a region's exports are to the global economy. To the extent that the increase in the world elasticity of trade to income is a result of greater fragmentation we should see especially large numbers for East Asia. Indeed, East Asia records the largest elasticity in the recent period, as well as the largest change in elasticity, suggesting that fragmentation is in part responsible. It also implies that East Asia may be the most affected region as a result of trade linkages during the current downturn. The growth in the elasticity in this region is also likely connected to China's phenomenal growth in assembly of manufactures over the period. Still, as the OECD is responsible for the bulk of world trade, the global elasticity also closely mirrors that of the OECD. In contrast trade in the low income countries does not significantly respond to world income.

Trade may respond differently to GDP during global downturns. Figure 2 shows real trade growth and real GDP growth in the years around the previous global crises. We report the mean and the median to ensure that results are not driven by an outlier. While income growth falls to 1.5 percent, trade growth becomes negative, declining by about one percent. (Real trade growth was negative only in 1975 and 1982.) In addition, the decline in growth from the previous year to the crisis year is much larger for trade. GDP growth declines on average by 1.5 percentage points from previous year, while real trade declines on average by 7.2 percentage points, nearly 4.7 times as much. If during this downturn, we see a similar ratio there would be a decline of about nearly 20 percent in real trade this year, given the World Bank's current GDP forecast.⁴

⁴ Using an elasticity of trade to income during the downturn of between 4.7 and a deceleration in real world income growth of 4.8 percentage points (the World Bank estimate), the deceleration is real trade growth

These results imply that trade responds more sharply to GDP during global slowdowns than during tranquil times. There are a number of potential explanations: (i) firms may draw down accumulated inventories sharply when the forecast worsens in an unexpected and dramatic way. (ii) When global GDP drops sharply, protectionist policies kick in which exacerbate the decline in trade. (iii) During downturns, goods decline by more than services and services make up the bulk of GDP, while goods make up the bulk of trade. Moreover, the share of services in GDP has increased over time magnifying this distinction. (iv) Trade is measured in gross value and GDP in value added. A large decline in trade could reflect a much smaller decline in the value added if production is done across countries at the margin, and as demand falls international production chains break down.⁵ And (v) people may tend to source relatively more from home country suppliers during downturns because of trust or financing problems.

On the positive side, we find that trade tends to achieve most of its adjustment in one year also when it rebounds. The quick rebound likely reflects the reversal of many of the conditions above. Figure 3 looks at trade's share of income over the episodes to see how global openness changes over time. We find that it takes about 4 years for trade to pass pre-downturn levels.

Finally, we examine whether countries with banking crises are affected more severely or differently during a downturn. We focus on three countries, Finland, Sweden,

would be 23 percentage points. World real trade growth in 2008 was about 4 percent, yielding a contraction this year of 19 percent.

⁵ An example of this is Porsche which is cutting outsourcing to Finland during the crisis, while maintaining German production (New York Times, April 4, 2009). In a related point, Yi (2009) argues that vertical specialization leads to a more synchronized transmission of shocks across countries, because trade is directly linked to the production chain. Note that *increasing* vertical specialization can explain why trade has *expanded* faster than income in recent years, but a higher *level* of vertical specialization cannot explain why the elasticity of trade to income is higher.

and Japan that experienced severe banking crises around 1991, when there was also an episode of slow world income growth.⁶

Figures 4, 5 and 6 show real GDP, real exports, and real imports, respectively, for the three countries and the world during this episode. Income and imports fell much more sharply for the crisis countries than for the rest of the world. Exports fell by just about the same amount as world trade, suggesting that the aggregate exports of the crisis countries were no more affected by the global downturn than exports in the rest of the world.⁷ Exports rebounded far more rapidly than income, rejoining world growth rates after just one year. Even imports expanded more than one-third of the full amount in the first year after the downturn began, despite negative income growth. All three variables, exports, imports, and GDP, returned to average world growth levels after 3 years. This suggests that financial crises do exacerbate trade effects during downturns, but the relatively quick rebound in trade remains intact in these countries.

IV. How Are Trade Balances Affected?

Given that trade falls more than income, it is likely that global imbalances as a share of GDP improve. This will be true unless exports fall by much more than imports in deficit countries and imports fall by much more than exports in surplus countries. In this section, we examine whether there is an improvement in global imbalances and whether it is shortlived or persistent.

⁶ Finland (1991) Sweden(1991), and Japan(1992) are included in the “big five” crises, the other two are Spain (1977) and Norway (1987).

⁷ Iacovone and Zavacka (forthcoming) find that there are compositional effects of banking crises on exports. Export growth in sectors that depend relatively more on external finance declines relative to growth in other sectors in the aftermath of the crisis.

To evaluate global imbalances we examine the trade balance as a share of GDP across regions and income groups, and also whether the countries tend to be surplus or deficit countries. Figure 7 and 8 show movements in the aggregate trade deficit and surplus for international borrowers and lenders, respectively. Specifically, Figure 7 is the aggregate trade deficit relative to GDP over time of all the countries that had a deficit before the downturn.⁸ Similarly, Figure 8 is the aggregate trade surplus relative to GDP over time of all the countries that had a surplus before the downturn. On aggregate, there is only a temporary improvement, and the position quickly returns to where it was before the episode. This suggests that there is not an overall rebalancing between pre-downturn surplus countries and pre-downturn deficit countries.

However, the pictures are very different when we look across regions (Figures 9 and 10) or income groups (Figures 11 and 12). We find that in Latin America, East Asia, Europe and the Middle East and North Africa there is a tendency to reduce sharp deficits following downturns. These are regions where the imbalances were deemed dangerous, and the government put policies in place to ensure they did not reemerge. These included savings incentives and maintaining an undervalued exchange rate to strengthen the BOP position. In addition, weakened firm fundamentals during a global downturn may induce a drop in investment.

In contrast, North America tends to show a relatively stable account that improves slightly during the downturn, but worsens in its aftermath. This may reflect the flexibility of the U.S. economy and the safety of dollar assets. This may also be related to the

⁸ Specifically, we use the value of deficit or surplus four years before the episode to characterize country as a surplus or deficit country. Data are from the IMF BOP Statistics for a balanced sample of countries reporting.

downturns not having been severe enough to change U.S. government policies and firm fundamentals, as happened in middle-income and developing borrower countries.

Surplus countries, by contrast, in general show only temporary reversals. Unlike deficit countries where there may be pressure to change policies and investment behavior following a costly recession and capital outflow, surplus countries do not experience such an impetus for change.

V. Which Products Are Most Affected?

To examine product level data, we use trade value data reported by Comtrade and convert data to constant dollars using the US CPI index (base year 2000). Figure 13 shows trade growth across the episodes. We see on average a 5 percent decline real merchandise trade as compared with the 1 percent decline in aggregate trade volume.⁹ This largely reflects the effect of exchange rates and commodity prices, both of which are better accounted for in the real trade in goods and services, as measured above. In addition, the shape is different, with a more gradual improvement, in part reflected the protracted decline in commodity prices.

Figure 14 shows export growth by product. While all industries exhibit a slowdown, it is least severe in food and beverages. In addition, trade in some durable goods, such as washing machines, driers and refrigerators, drop less sharply though take much longer to recover. In part, this could reflect a slower decline and recovery, as orders need to be placed in advance. Trade in automobiles shows a slow dip and a quick

⁹ The aggregate real trade figures above are converted from real local currency series using one exchange rate into dollars and then summed—this means that these series will be different. The real local series take into account price fluctuations in imports. In addition, the aggregate figures include services trade.

recovery. While growth returns after one year in most products, iron and steel and commodities tend to exhibit more protracted slowdowns.

Already some similar patterns are emerging in current data. Data at the industry level for the United States and Japan through March show foodstuffs among the least affected, with metals and mineral products the most affected.

VI. What Regions Are Most Affected?

Figure 15 shows export value growth by region. In previous crises, the Middle East and North Africa has been most affected and Europe and Central Asia has been least affected; while other regions show remarkably similar patterns. Europe may be less affected because in-built social safety nets ensure against a sharp drop in spending and most exports are within the region. By income group, the least affected are the high income OECD and the low income countries (Figure 16).

The results from Section III suggest that exports from Asia are likely to fall relatively more rapidly during downturns because of the high elasticity of trade to income, however, we do not find this to be the case. This may be because downturns are different. First, they tend to affect petroleum and commodities exporters most heavily, which Asia does not export. Second, while expanding world income has facilitated greater fragmentation of production and rapid trade growth in Asia, it is unclear that a *temporary* decline in income would reverse this trend, as there are large sunk investment costs to building production chains.

VII. Conclusion and Looking Forward

Trade has fallen dramatically since the onset of the financial crisis in the fall. Figure 17 compares trade growth (month over same month the previous year) in this crisis and in the previous downturns, using monthly data in constant \$US, for a balanced sample of 31 countries that report data from January 1960-March 2009.¹⁰ While growth leading up to the crisis was a bit higher in this episode, it still looked quite similar to the previous downturns. What is most evident from the picture is that the trade drop over the last few months has been much steeper and more severe than other recent episodes.

This note has offered some background on why the trade drop has been so large. We argue that the elasticity of trade to income has been increasing over time and that during recessions trade is especially responsive to income. On the positive side, we note that trade tends to rebound sharply when growth picks up. This is similar to the result in Reinhart and Rogoff (2008) that output declines resulting from a financial crises last only two years, as compared with about 4 years for employment and equity drops.

We have also seen that downturns tend to moderate global imbalances. However, the moderation tends to be temporary unless the downturn alters investment attitudes and/or government policies. Given that the downturn will get the process started, we hope that governments can use the transition to install policies that will ensure that imbalances do not revert to pre-crisis trends. This will include policies to encourage saving in the United States and prevent an overvalued dollar, and policies to stimulate spending in China and other parts of Asia and prevent undervalued currencies.

¹⁰ Month zero is the minimum trade growth during previous downturns. The series for the current period is matched to previous downturns using the maximum in trade growth. Specifically, the maximum trade growth before this downturn began is superimposed over the maximum trade growth on average before the previous downturns (month -20).

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Table 1: Elasticity of World Trade to World Income

	<i>dependent variable=dltrade</i>					
	Full (1)	1960s (2)	1970s (3)	1980a (4)	1990s (5)	2000s (6)
dlngdp	1.77*** [0.25]	1.94** [0.81]	2.13** [0.78]	2.75*** [0.19]	3.36*** [0.47]	3.69*** [0.40]
Observations	45	9	10	10	10	6
R-squared	0.58	0.43	0.66	0.94	0.77	0.96

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

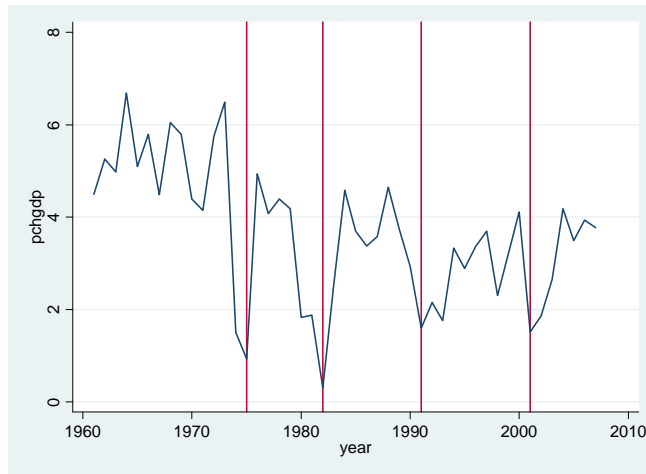
Table 2: Elasticity of Exports to World Income, by Region

	<i>dependent variable: dltrade</i>	
	1982-1994	1995-2007
World	1.74*** [0.25]	3.35*** [0.37]
OECD	1.75*** [0.31]	3.40*** [0.43]
Low Income	0.06 [1.44]	1.93 [1.21]
Middle Income	1.59** [0.55]	3.29*** [1.06]
East Asia	0.984 [1.32]	4.45** [1.90]
Latin America	0.64 [0.56]	2.88*** [0.79]
Middle East	-1.89 [1.27]	1.71* [0.81]
South Asia	-0.48 [1.17]	1.51 [1.94]

Robust standard errors in brackets

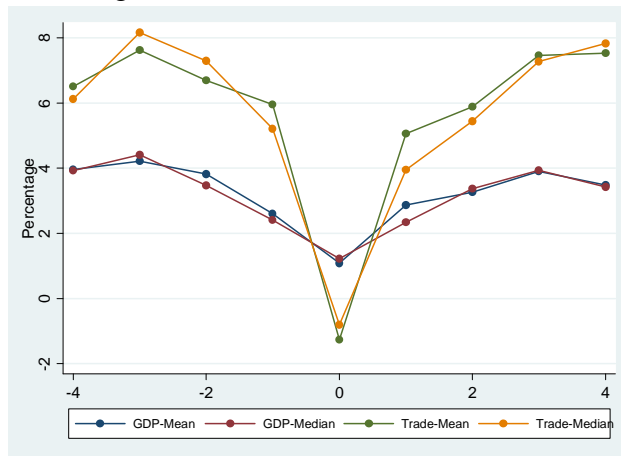
*** p<0.01, ** p<0.05, * p<0.1

Figure 1: Real GDP Growth



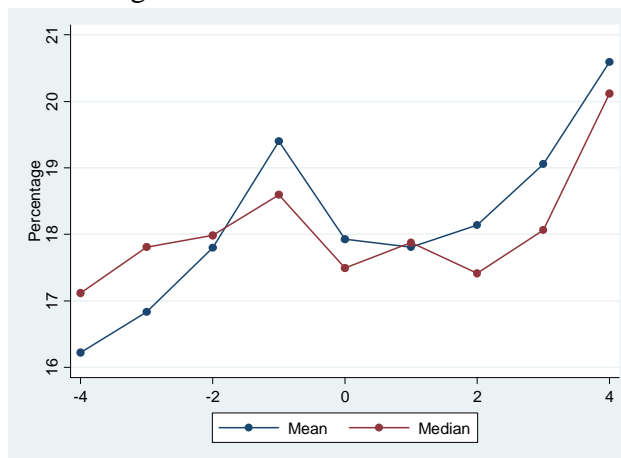
Source: World Bank, World Development Indicators.

Figure 2: Real Trade and Real GDP



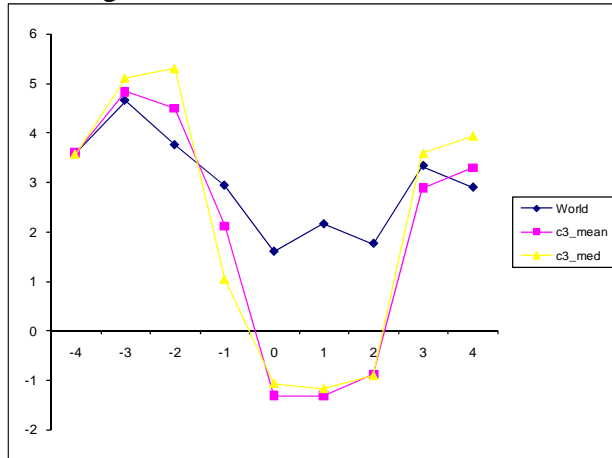
Source: World Bank, World Development Indicators.

Figure 3: World Trade over GDP



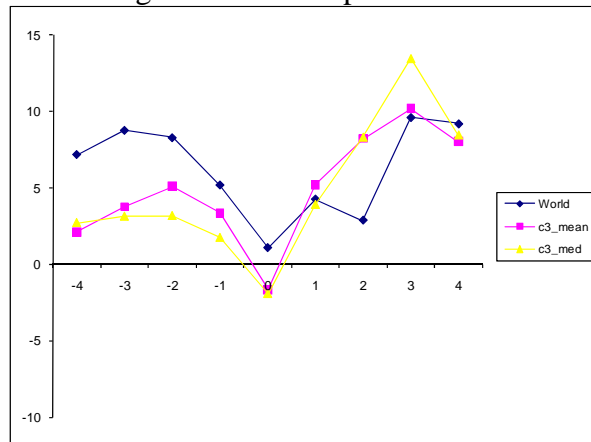
Source: World Bank, World Development Indicators.

Figure 4: Real GDP Growth in 1991



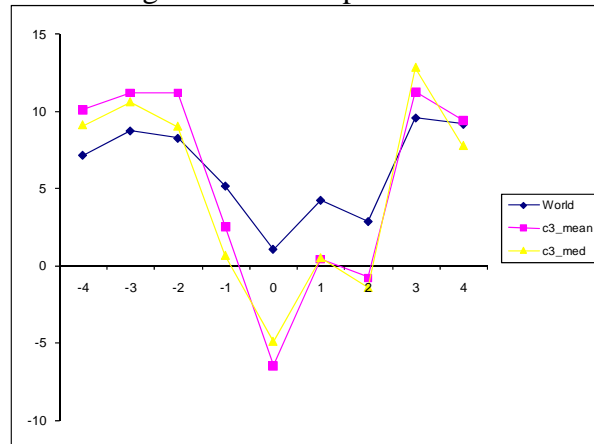
Source: World Bank, World Development Indicators. C3 are the three countries, Finland Japan and Sweden that had extensive banking crises at the same time.

Figure 5: Real Export Growth



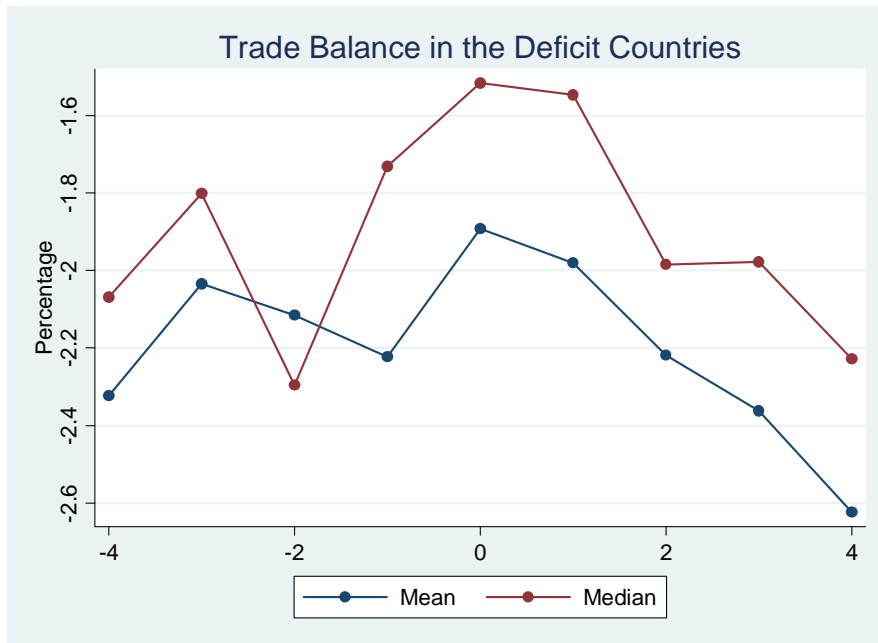
See notes to Figure 4.

Figure 6: Real Import Growth



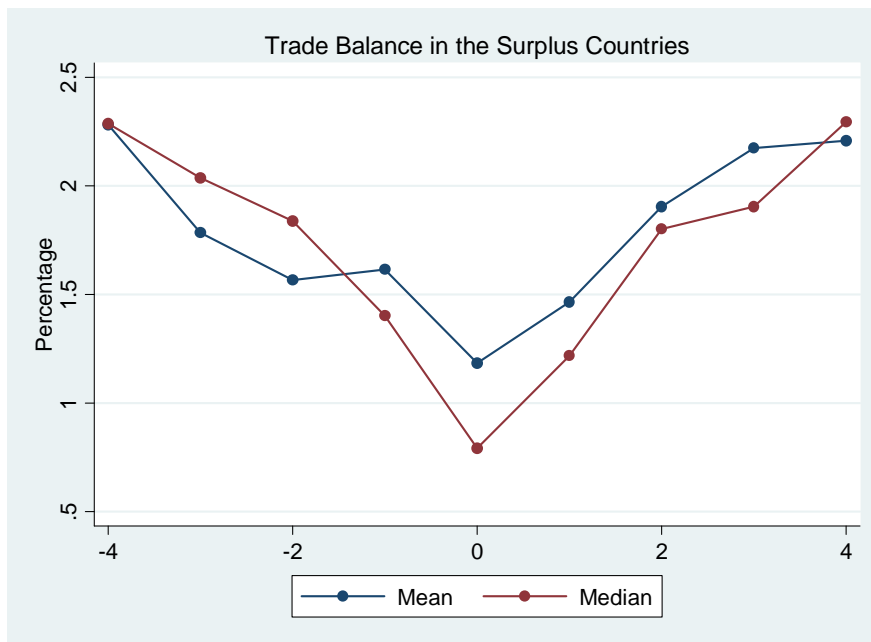
See notes to Figure 4.

Figure 7: Aggregate Trade Balance—Deficit countries



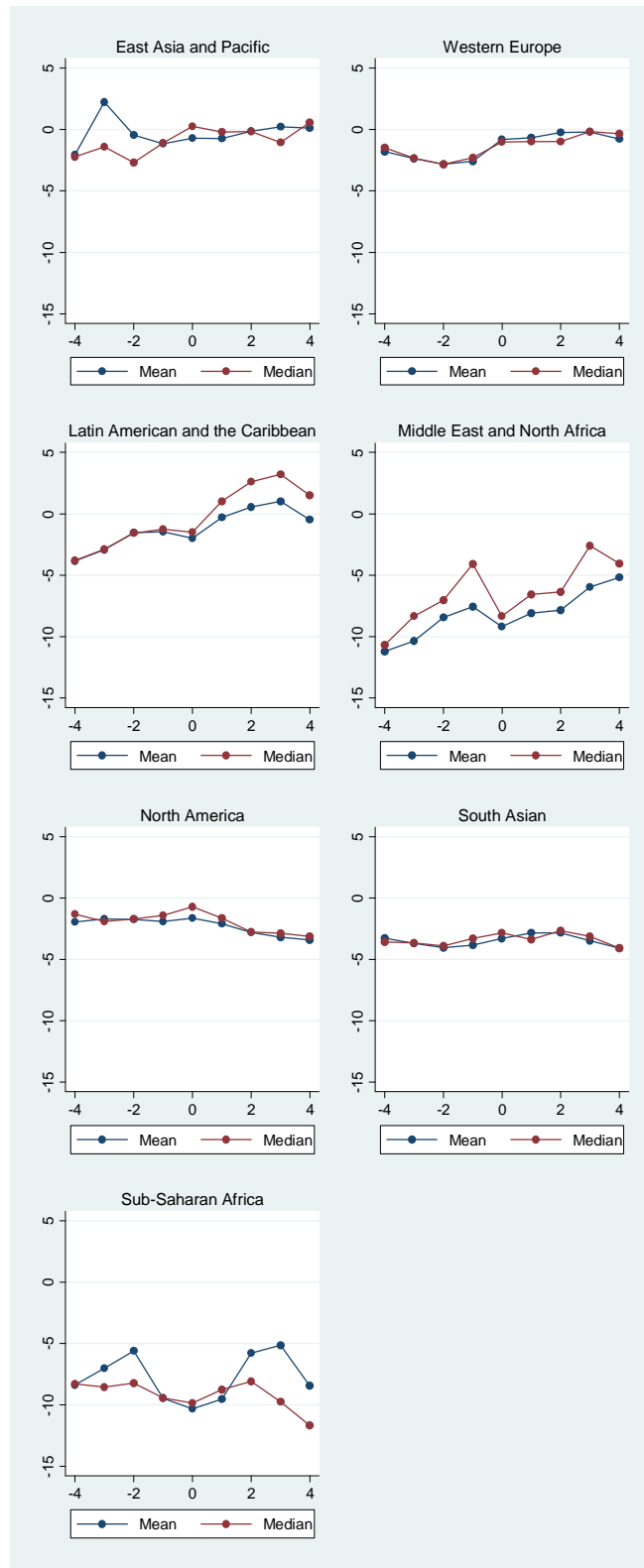
Source: World Bank, World Development Indicators.

Figure 8: Aggregate Trade Balance – Surplus Countries



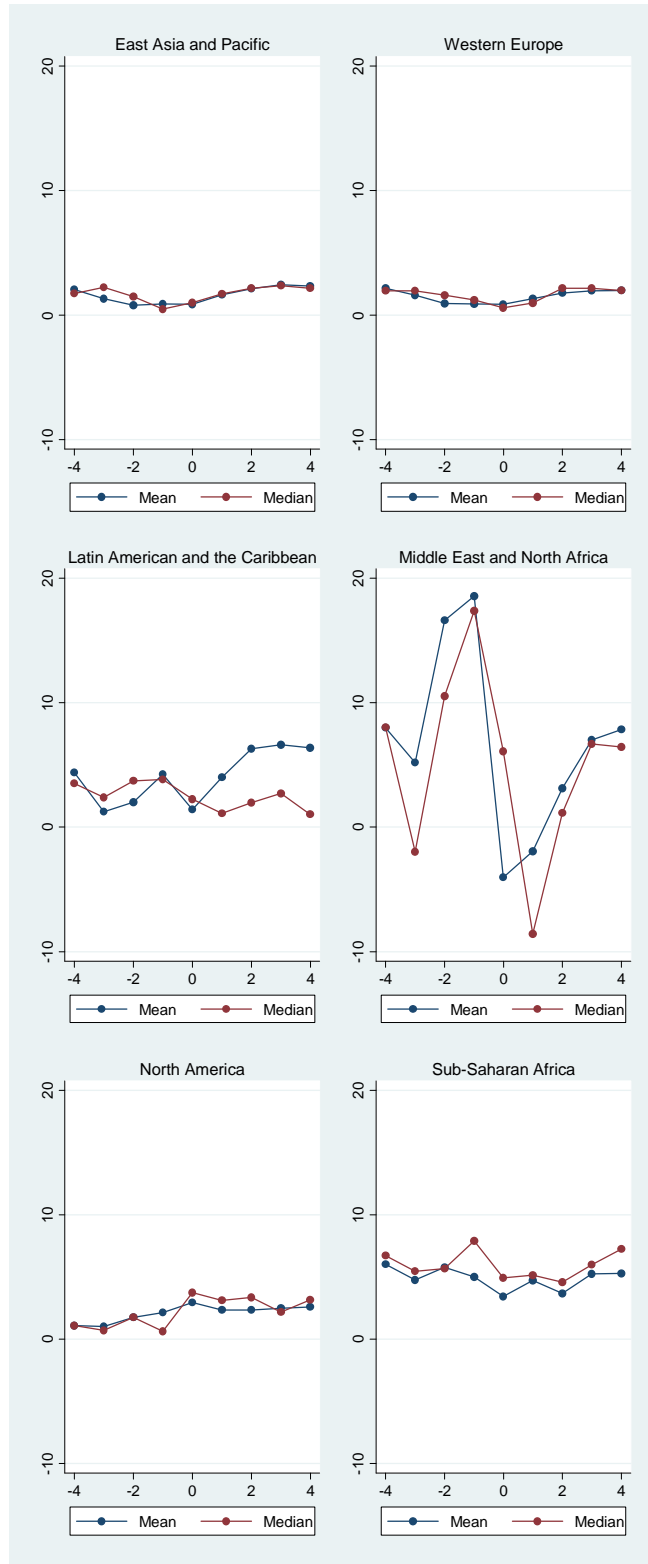
Source: World Bank, World Development Indicators.

Figure 9: Aggregate Trade Balance—Deficit Countries by Region



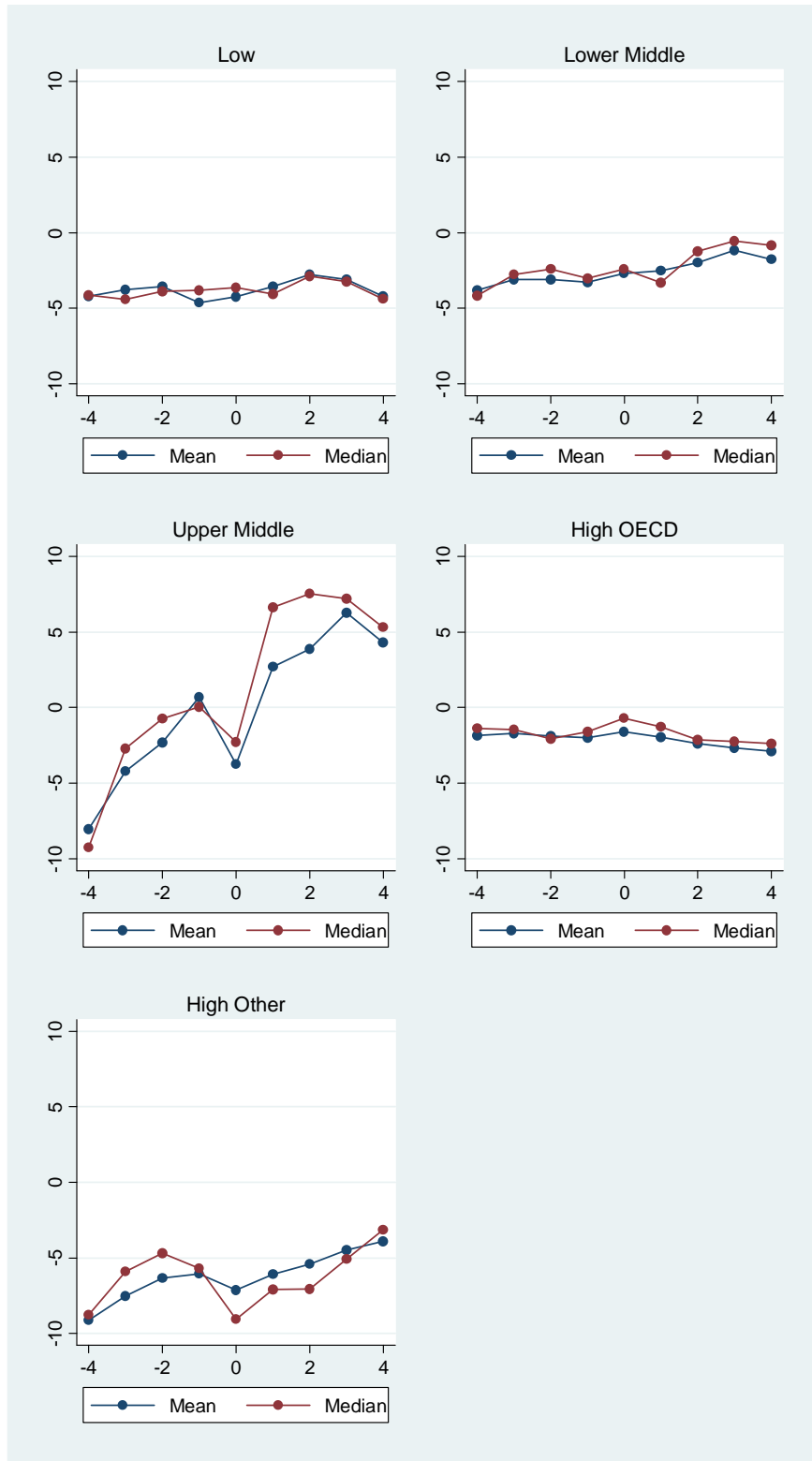
Source: World Bank, World Development Indicators.

Figure 10: Aggregate Trade Balance—Surplus Countries by Region



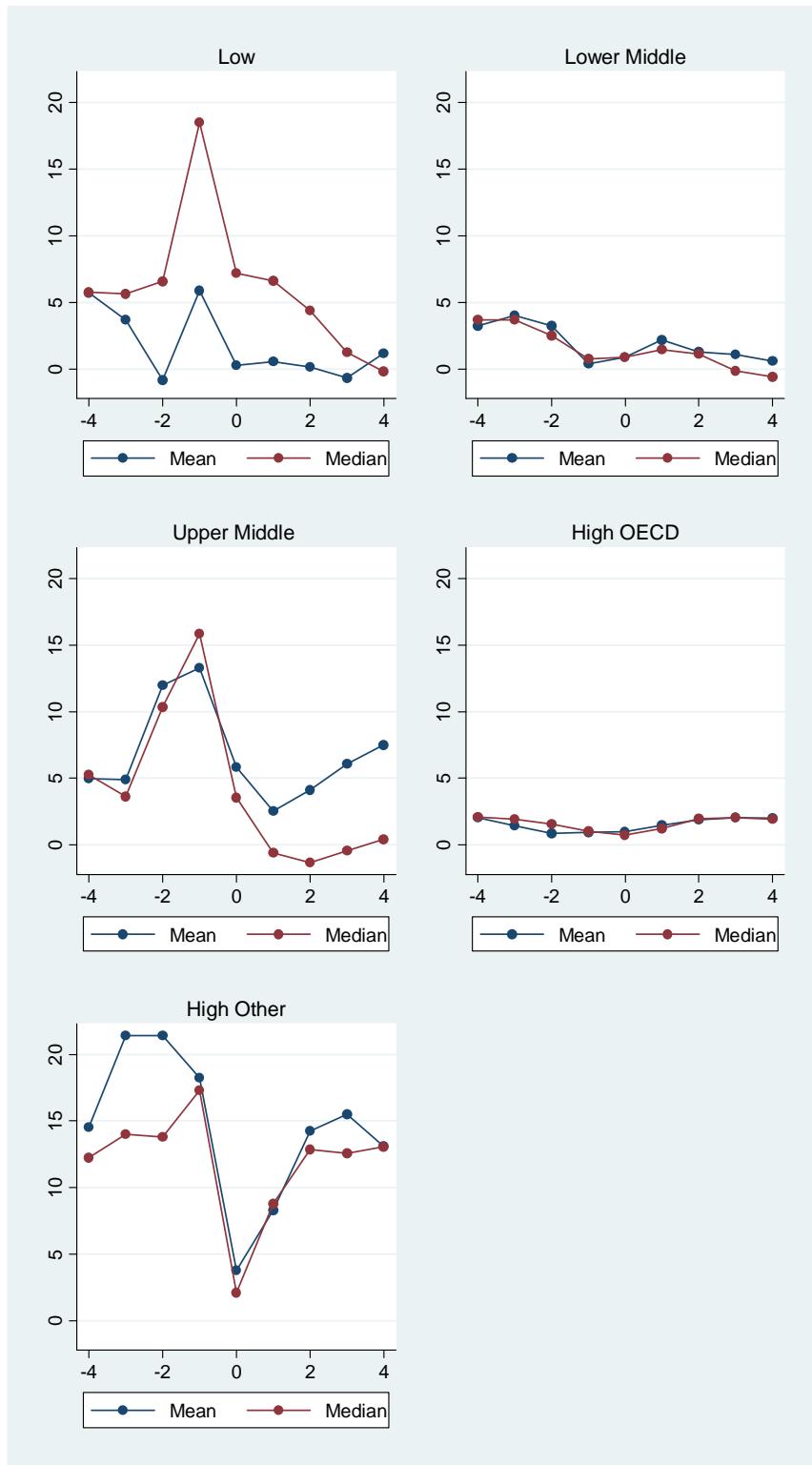
Source: World Bank, World Development Indicators.

Figure 11: Aggregate Trade Balance—Deficit Countries by Income Level



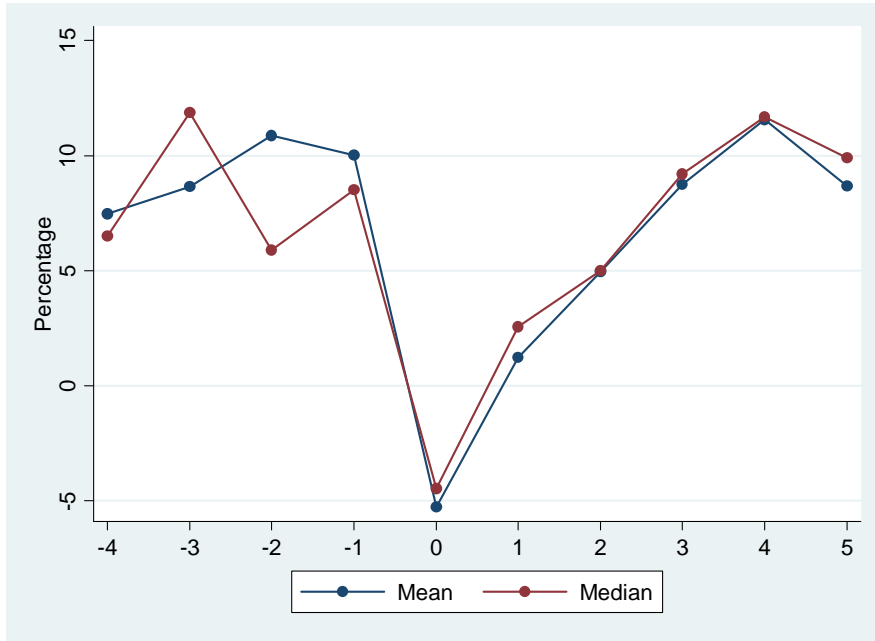
Source: World Bank, World Development Indicators.

Figure 12: Aggregate Trade Balance—Surplus Countries by Income Level



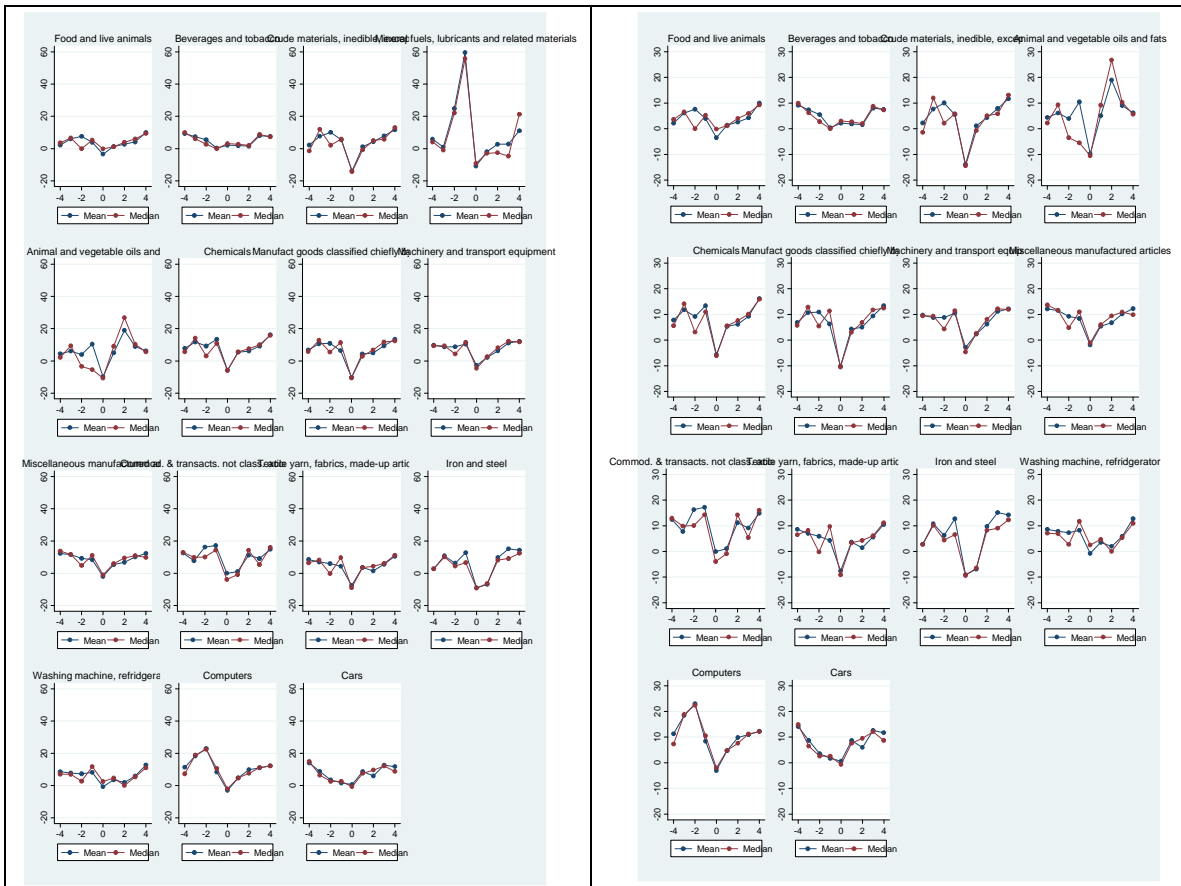
Source: World Bank, World Development Indicators.

Figure 13: Real Merchandise Trade Growth
(Calculated from exports in constant 2000 \$US)



Source: Comtrade and Bureau of Economic Analysis.

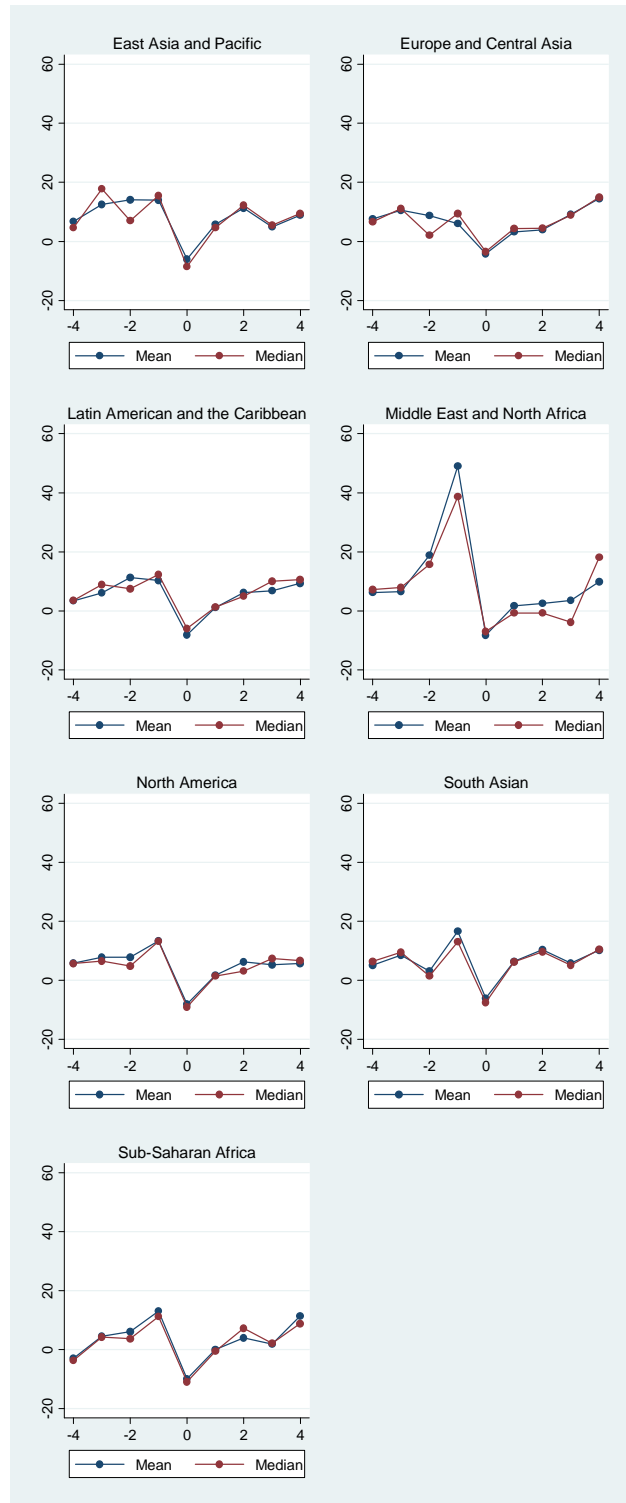
Figure 14: Export Growth by Industry
 (Calculated from exports in constant 2000 \$US)



Note: Left and right panels are the same except the right excludes fuels, which changes the scale to make movements in other sectors more visible.

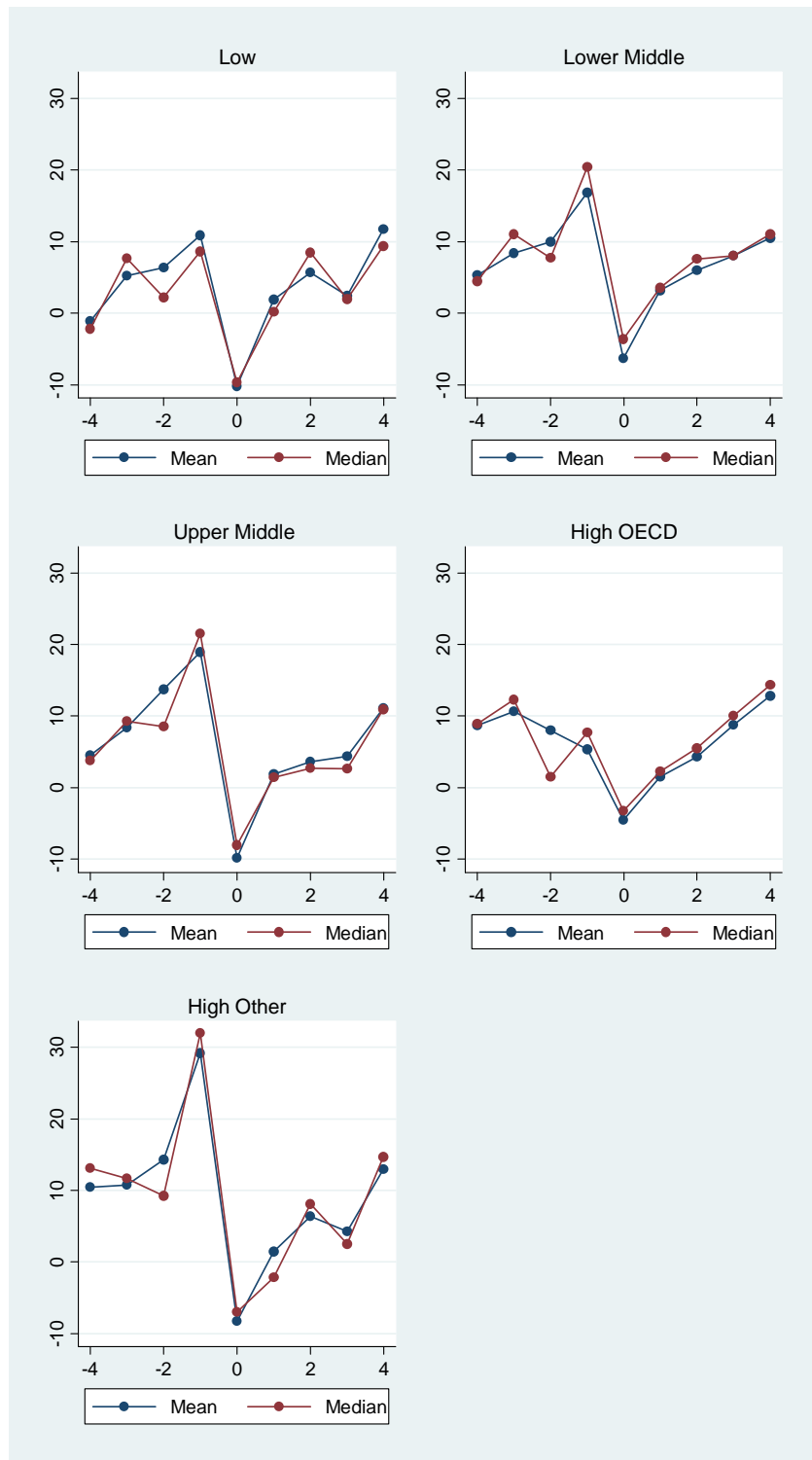
Source: Comtrade and Bureau of Economic Analysis.

Figure 15: Export Growth by Region
 (Calculated from exports in constant 2000 \$US)



Source: Comtrade and Bureau of Economic Analysis.

Figure 16: Export Growth by Income Group
 (Calculated from exports in constant 2000 \$US)



Source: Comtrade and Bureau of Economic Analysis.

Figure 17: The Decline in Trade Now and Then



Source: Datastream. Data in \$US for a balanced sample of 31 countries, deflated using the US CPI.