1. Macroeconomic volatility of developing economies

Macroeconomic volatility is bad for development because it can reduce economic growth, make it difficult for households to smooth their consumption and adversely affect the distribution of income. Macroeconomic volatility is defined here as volatility in the cyclical component of GDP, i.e. volatility around the trend growth of GDP.[1]

Beginning with the pioneering work by Ramey and Ramey (1995), a significant stream of literature has showed a negative relationship between macroeconomic volatility and

relationship between openness and macroeconomic volatility although, as discussed below, one must be careful about this relationship.

However, there is also evidence that trade openness can reduce volatility. If country-wide shocks are dominant, the impact of trade on volatility can be negative because trade becomes a source of diversification (Tenreyro et al., 2012). For example, trade allows domestic goods producers to respond to shocks to the domestic supply chain by shifting sourcing abroad. Similarly, when a country has multiple trading partners, a domestic recession or a recession in any one of the trading partners translates into a smaller demand shock for its producers than when trade is more limited. The effect of openness also interacts with the underlying structure of exports, which is noted by Haddad et al. (2012). They show that, for a significant proportion of countries that have relatively diversified exports, the effect of openness on volatility is negative.

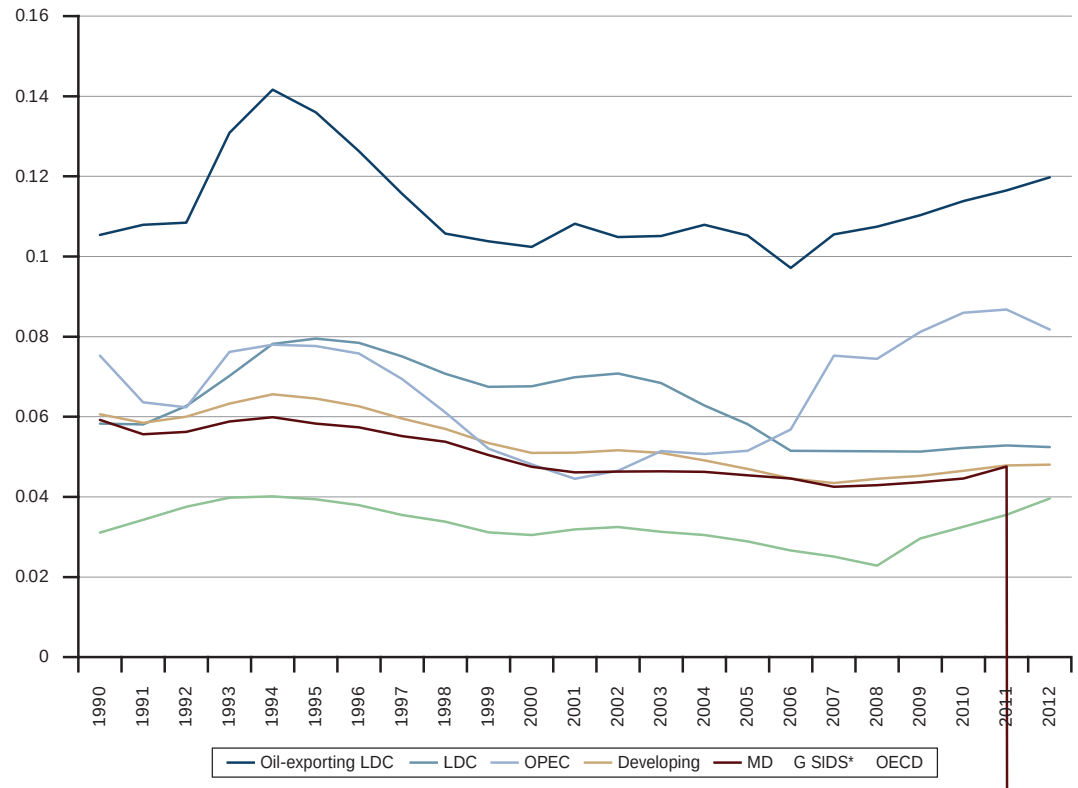
(b) Export structure matters

The link between macroeconomic volatility and the structure of a country's export basket has been examined in a number of studies. In the case of African countries, Kose and Riezman (2001) find that, because a significant proportion of their exports are concentrated in a narrow range of primary commodities, terms-of-trade shocks account for 45 per cent of the volatility in their aggregate output. Moreover, adverse trade shocks cause prolonged recessions since they lead to a significant decrease in aggregate investment. In the context of the recent global crisis, commodity exporters faced demand and price declines that translated into greater output volatility. For developing countries that are part of manufacturing global value chains, producers of durable goods were badly affected by the global crisis because long-term investments were postponed (Baldwin, 2009). This translated into GDP volatility due to the large role of capital expenditures in aggregate demand.

(c) Declining volatility over time

Another feature of macroeconomic volatility in developing

Figure E.3: e- e-



Source: Authors' calculations using data from WDI.

Notes: Volatility in any given year is measured as the moving average of the last ten years of the standard deviation of real GDP per capita. The standard deviation is the most conventional way to measure volatility (e.g. Aizenmann and Pinto (2005)).

*MDG SIDS stands for Millennium Development Goals in Small Island Developing States.

members but there is a clear downward trend for all the groupings beginning around 1995.

This picture is consistent with the "great moderation", the term used to describe the long-term decline in output and inflation volatility in the G-7 group of industrial countries that began at about this time (Kim and Nelson (1999); Blanchard and Simon (2001); Stock and Watson (2003); Stock and Watson (2005); Del Negro and Otrok (2008)). Figure E.3 suggests that the great moderation extended to developing countries as well. This may not be all that surprising given how developed countries are major export markets and principal sources of finance for developing countries. The moderation in volatility in industrial countries may have been transmitted through these channels to developing countries. Equally important, structural transformations occurring as part of the development process – Koren and Tenreyro (2007) refer to diversifying away from volatile sectors – contributed to make them less volatile over time.

To summarize, while developing countries are subject to more macroeconomic volatility than developed countries, this has been declining over time. More trade openness does not necessarily mean greater volatility as openness could also provide a source of diversification. However, concentration in a small number of exported goods, particularly if they involve commodities or natural resources, is associated with more volatility. As explained in great detail in Section C, participation in global value chains bring great economic opportunities but it may also increase exposure to economic shocks.

2. Developing economies in the 2008–09 crisis

(a) More intertwined business cycles under the influence of global trade, finance and production

The 2008–09 trade collapse illustrated the dependency of developing economies on cyclical economic developments in developed countries, and vice versa (see Box E.1). Trade has been the transmission belt, at a global level, of the fall in the United States' and Europe's demand to producers in developing economies. The fall in US demand would have remained typical in its macroeconomic effects had it not been amplified by complex financial and microeconomic links. As noted by some authors (e.g., Baldwin, 2009), traditional demand models failed to explain the magnitude of the trade collapse as a result of the standard demand slump; other potential factors, partly on the supply side, are

examined below (the drying up of trade credit, workings of modern supply chains and the wait-and-see attitude among consumers throughout the world).

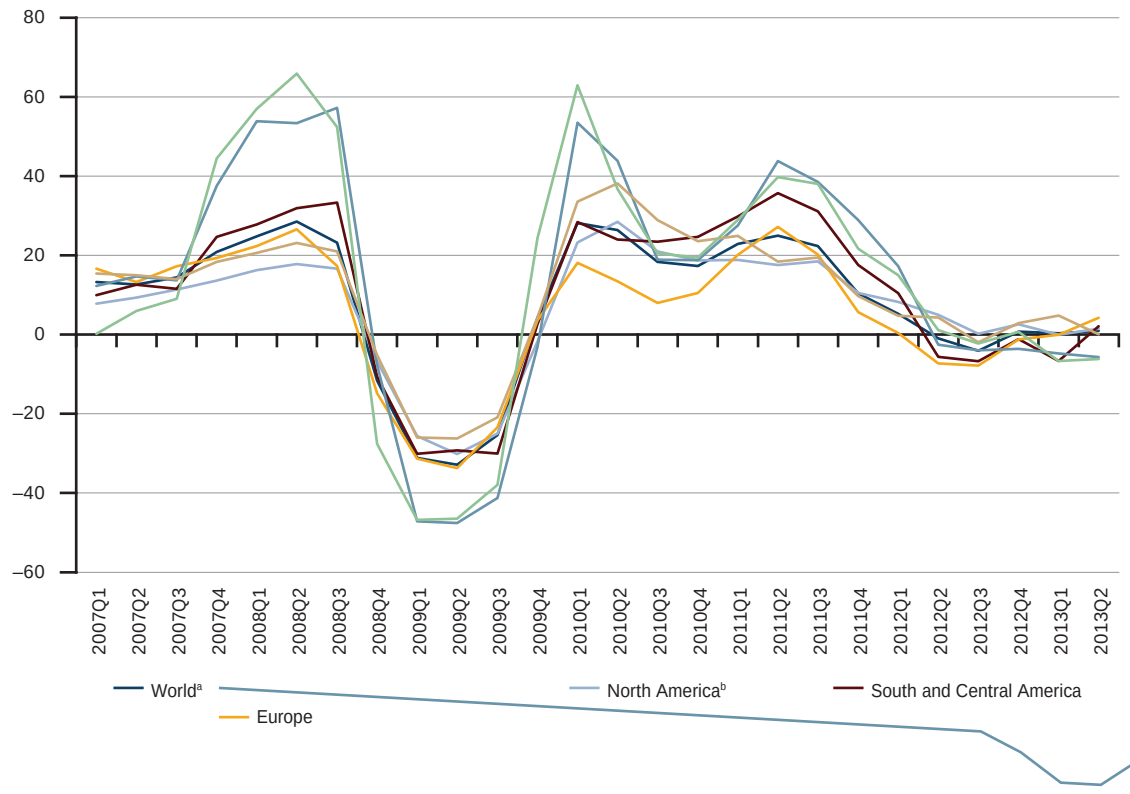
The macroeconomic outcome of this crisis propagation has been the synchronization of business cycles across regions, including between developed and developing countries – during both the downswing and the upswing (see Figure E.4), in a mutually reinforcing manner.

As indicated in Table E.1 and by Baldwin (2009), the "compositional" and "synchronized" nature of this dramatic fluctuation in demand explains, in part, its peculiar nature. The compositional effect is linked to the fact that the demand shock was large but very concentrated in a narrow category of goods (machinery, electronic and telecommunications equipment, automotive products) and intermediate products which are key components of today's supply chains for the production of durable goods. During the crisis, global trade proved to be more cyclical than GDP because of the high density of such products (60 per cent of trade) in total trade. The trade collapse spread from downstream to upstream production as large developing countries, in which demand for manufactured goods had fallen, reduced their purchases of commodities and raw material, often exported by low-income countries.

As noted above, research has suggested that only a share of the "great trade collapse" could be attributed to the drop in aggregate demand – 70 per cent, according to Eaton et al. (2011), leaving some 30 per cent to be attributed to other factors.

Among the other factors is the contraction of trade finance, linked to the credit crunch that resulted from the wider crisis of the international financial sector. Trade finance is the life-blood of trade as most trade transactions are financed by some form of credit, guarantee and/or insurance. The role

Figure E.4: e- e- e-e- e- e- 200 1 2013 2
(Year-on-year percentage change in US$ values)



their suppliers in developing countries, which, in turn, could not rely on the local banking sector to support them (Auboin, 2009). Shortages of trade finance in some developing countries prompted the G-20 to provide US$ 250 billion in trade finance liquidity and guarantees over two years.[4]

A consensus has also developed about the role of the "supply-chain" channel, which accounts for another important cause of the "great trade collapse". With the unbundling of production, the "just-in-time nature" of vertically integrated production networks (as described by Baldwin) tends to lead to the spread of demand shocks more rapidly through "factory online". Better information flows between links in the supply chain was another reason for the trade collapse, with real-time information on sales by retailers quickly becoming known to upstream producers. Di Giovanni and Levchenko (2010) and Li and Lu (2009) have described the process of vertical integration of production across countries.

Engel and Wang (2011) have documented the role of the composition of trade, notably that of durable goods, in the volatility of trade. Alessandria et al. (2012) have focused on the movement of trade that cannot be accounted for by composition. They have found that inventories account for a sizable fraction of import collapses in the recent global recession. Partly because international trade takes time and is costly, firms engaging in it tend to hold larger stocks of inventories. These movements in inventories generate larger fluctuation in international trade than in GDP. Inventory movements among suppliers may actually be larger than for producers of final goods – inventory movements may be less optimal too.

Trade protectionism has had a much smaller influence than any of the factors mentioned above. Section E.3 analyses in depth the patterns of trade-restrictive measures taken since the economic crisis. The response appears to be muted given the severity of the crisis. Thanks to governments' heightened awareness of the economic risks of protectionism, the existence of multilateral trade rules, which have made resorting to "open" protectionism more difficult, and the WTO's commitment to increase trade monitoring, the rise of protectionism has been of limited intensity. Using product level data, Henn and McDonald (2011) show that protectionist measures on aggregate may have reduced global trade by only 0.2 per cent but they also highlight that backdoor or "murky" protectionism, through the use of behind-the-border non-tariff measures rather than tariff increases, as witnessed since 2009, still remains possible.

(b) Developing economies are part of the policy response

To be effective, a coordinated policy response requires the participation not only of developed economies but also of developing economies, given their weight in world output and trade. At the G-20 summit meeting in London (April 2009), G-20 developing countries agreed to participate with developed countries in the announced programme of fiscal and monetary stimulus to boost domestic demand (by some 2 per cent of GDP). They also committed to respecting the "stand-still" clause on protectionism, thereby refraining from using policy space allowed by their WTO commitments (such as raising tariffs to their "bound" limits and using flexibilities in the area of non-tariff measures). By keeping their markets open and allowing some predictability of market access in difficult times, G-20 developing countries have played their part in the resolution of the crisis (see Section F.3(d)).

Low-income countries have been on the receiving end of the global economic shock, despite having little or no responsibility for its origins. They have suffered from knock-on effects such as reduced trade finance availability (Auboin, 2013), reduced remittances from workers living abroad, and lower demand for raw materials and commodities. Dabla-Norris and Gündèz (2012) have showed that the amplitude and frequency of economic shocks tend to be higher in low-income countries than in advanced and developing country G-20 members. The authors argue that standard models in which negative shocks result in a quick bounce back to earlier levels of income do not apply to low-income countries, which do not have the policy instruments, adequate reserves and diversified economic structures to mitigate the impact of such large external crises.

(c) Low-income countries

Thanks to macroeconomic stabilization achieved in the decade leading up to the economic crisis, coupled with improved fiscal control and debt relief received under the Heavily Indebted Poor Countries Initiative set up by the International Monetary Fund (IMF) and the World Bank in 1996, low-income countries have been in a better position to use fiscal space and stimulate their economies in the face of falling international demand than in previous downturns. Also, the long period of commodity price increases, peaking in late 2007, has allowed many low-income countries relying on such resources to substantially improve balance of payments positions and foreign exchange reserves and, in certain cases, build up fiscal funds to cushion against future crises.

However, in the face of strong macroeconomic stress in 2009, it was clear that a prolongation of the crisis would threaten the remarkable achievements of low-income countries. In asking for additional resources to support them, the IMF argued that the "financial crisis, coupled with the sharp rise of food and fuel prices in 2007, has (already) created much higher financing needs (for low-income countries) that the international community has to meet" (International Monetary Fund (IMF), 2009).

(d) Faster recovery for developing economies in the wake of the crisis

Developing economies have been able to recover appreciable rates of growth since 2010. This is due in part to the continuation of their internationalization and the fact that their exports have rebounded, on average, faster than those of developed countries thanks to the higher demand from other developing countries. As indicated by Figure E.5, India and Indonesia benefited from higher export growth than the United States and the European Union in the recovery period immediately after the crisis – i.e. 2010. China represents the average as demand for its exports is shared between the US and EU markets, on the one hand, and other G-20 developing countries, on the other hand. During 2010 and until mid-2011, Brazil's exports recovered at roughly the same pace as the best performers.

There is little doubt that the combination of strong internal growth (including domestic demand), the growing share of G-20 developing countries in global trade and particularly

to continue to do so, the long-term gains of partners keeping to their commitments are substantial and so countries have a strong incentive to maintain open trade policies. However, when economic growth is slow or contracting, future benefits will be much lower. Under these circumstances, countries tend to shift towards protectionism, since retaliation from trading partners for disregarding commitments does not impose as much of a cost. Put another way, the ability of a trade agreement to constrain countries from taking protectionist actions diminishes as a downturn deepens. Evidence of this behaviour – particularly the use of trade remedies such as anti-dumping, countervailing and safeguard measures – can be found in Takacs (1981), Grilli (1988), Knetter and Prusa (2003), Feinberg (2005), and Bown and Crowley (2013a; 2013b). The most notable dissent to this hypothesis comes from Rose (2012), who claims to find no such pattern in a panel of data covering over 60 countries and three decades.

Given the presumption of the counter-cyclicality of trade protectionism, it is striking that the Great Recession of 2008–09 did not trigger a protectionist surge similar to what was experienced in the Great Depression of the 1930s or even to what could have been predicted based on countries' past experience. Instead, developing (and developed) countries adopted a coordinated response characterized by strong macroeconomic stimulus programmes and low levels of trade restrictions.

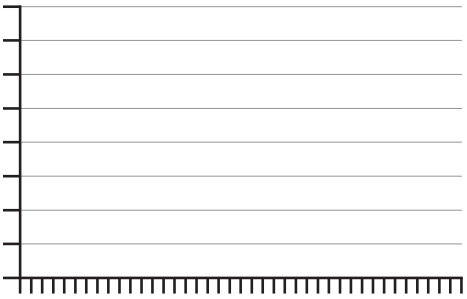
(a) Trade policy response

As indicated above, the trade policy response to the economic crisis was marked by the absence of a surge of protectionism. Box E.2 illustrates the potential risks involved if wide-scale protectionism had erupted. Some developing countries took trade-restrictive measures, but not to the extent that past behaviour would have suggested. Furthermore, data show that developing countries also took trade-opening measures. The focus of the analysis below is on the developing countries in the G-20, not only because they are economically important but also because a lot more information is available on their trade actions.

(i) Pattern of trade-restrictive measures

We begin by looking at recent empirical research on the trade policy response of developing countries in the wake of the crisis. The study by Bown and Crowley (2013a) focuses on the trade remedy actions (anti-dumping, countervailing and safeguard measures) taken by a group of

Figure E.6: A w e- e- e- e- 200 12



Box E.2:

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been able to better maintain their level of exports, thus potentially displacing exports from developing countries.

The monetary response to the crisis was more pronounced, particularly in developed countries. Short-term interest rates were reduced as expected. In addition, central banks in advanced countries turned to unconventional monetary instruments – "quantitative easing". This involved purchases not only of long-term government securities but of more risky and illiquid assets such as mortgages and mortgage-backed securities held by troubled financial institutions. The chief reason for using unconventional policy was that the traditional instrument of monetary policy, the short-term interest rate, had already been reduced to its lowest limit. Some understanding of the magnitude of this unconventional monetary response can be gleaned from the expansion in the size of the balance sheets of the Federal Reserve and the Bank of England.

One side of the balance sheet reflects the assets owned by the bank – government securities, mortgages, mortgage-backed assets, etc. – while the other side reflect its liabilities, the monetary base and equity. The expansion of the central bank's balance sheet therefore reflects an increase in its asset holding (and a corresponding increase in monetary creation). Based on the information available between the end of July 2007 and early 2013, this expansion was enormous as the balance sheets of the Federal Reserve and the Bank of England grew nearly fourfold (from US$ 877 billion to US$ 3.2 trillion) and five-fold (from £82 billion to £404 billion) respectively.

(c) Why was there no increase in trade protectionism?

In the Bagwell-Staiger (2003) model of counter-cyclical trade policy, there are no other instruments apart from trade policy for countries to manage the business cycle. This suggests a way to reconcile the theory with the facts. What the coordinated macroeconomic response did was to mitigate the downturn in the business cycle. The fact that nearly all the G-20 countries ramped up fiscal spending and cut interest rates meant that the stimulus was global and coordinated, thus helping to mitigate more effectively global economic weakness. Box E.3 discusses the role of global policy coordination and trade reform in addressing current account imbalances, which has been identified as one of the possible factors that contributed to the global crisis. In the context of the Bagwell-Staiger model, this means that the long-term benefits from trade cooperation remain substantial so the incentives remained tilted towards cooperation and against short-term opportunism.

An alternative explanation for the limited trade protectionism in response to the crisis is provided by Limão and Maggi (2013). In their view, the usual terms-of-trade motivation of countries to deviate from a trade agreement is counteracted by an aversion to risk or uncertainty. This uncertainty is greater during times of economic volatility and made worse if there are no restraints on the behaviour of trade partners. Since trade agreements place constraints on that behaviour, agreements become more valuable during periods of economic volatility when uncertainty rises. The implication is that governments have more to gain by sticking to a trade agreement as the economic environment becomes more volatile.

At the height of the crisis in 2008, G-20 leaders made a commitment ("standstill commitment") to "refrain from raising new barriers to investment or to trade in goods and services, imposing new export restrictions, or implementing World Trade Organization (WTO) inconsistent measures to stimulate exports".[9] There is some empirical work that finds support for the role of trade agreements in containing protectionism during the crisis. Gawande et al. (2011) find that WTO membership curbed increases in the tariffs applied by several large G-20 developing countries during the crisis and may even have been responsible for actual declines.[10] Baccini and Kim (2012) show that countries which shared membership in the WTO as well as preferential trade agreements had a lower number or frequency of trade-restrictive measures taken during the economic crisis.

Another issue taken up in the Gawande et al. (2011) study is the role that global value chains may have played in limiting the extent of the protectionist response to the crisis. The operation of global value chains requires upstream firms that are participating in the production network to have access to imported intermediate goods. Home governments keen to advance the interests of these exporters will not want to increase tariffs on the imported inputs that they use. Furthermore, in global value chains, a country's exports are also inputs to producers in foreign countries. These foreign producers will have an interest in seeing low or zero tariffs in the source country as this will keep their input costs low and so will lobby against trade restrictions. The Gawande et al. study finds strong empirical evidence that the demand for cheap inputs by downstream users and the demand for a country's exports by vertically specialized exporters in partner countries exerted countervailing pressure against increases in applied tariffs.

Finally, another perspective on the muted protectionist response by developing countries is whether protectionism would have been helpful in promoting economic recovery. If it would not, this would provide another explanation for why we have not seen a reincarnation of Depression-era protectionism. The crisis has still to run its full course so any conclusions will be preliminary in nature.

One measure of economic recovery is the growth in trade. The relationship between export performance and G-20 developing countries' trade policy stances, represented by the number of trade-restrictive measures, is shown

Box E.3:

Large and enduring current account[11] imbalances (both surpluses and deficits) have been observed in many leading economies since the 1980s. The evolution of global imbalances since 1990 is illustrated by Figure E.11, which shows current account surpluses and deficits as a percentage of global GDP for large developed and developing economies, including Brazil, China, the European Union, India, Japan, Russia, Saudi Arabia and the United States.[12]

Figure E.11: C
(in per cent of world GDP)082066 re221.764 58 0375 603.259t.38 60 664 527.38 ea9.01 68sc58 re.7321 8p702 re396.08

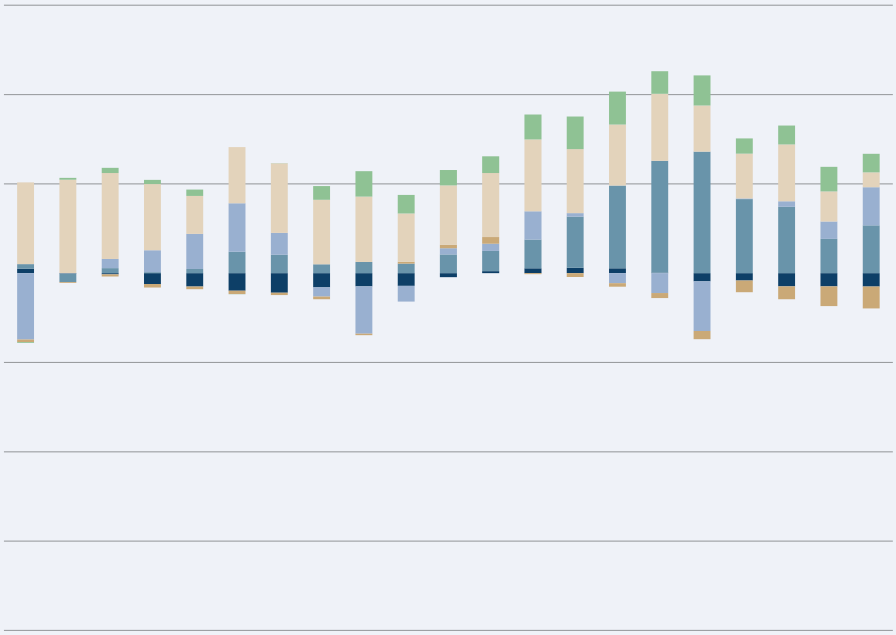
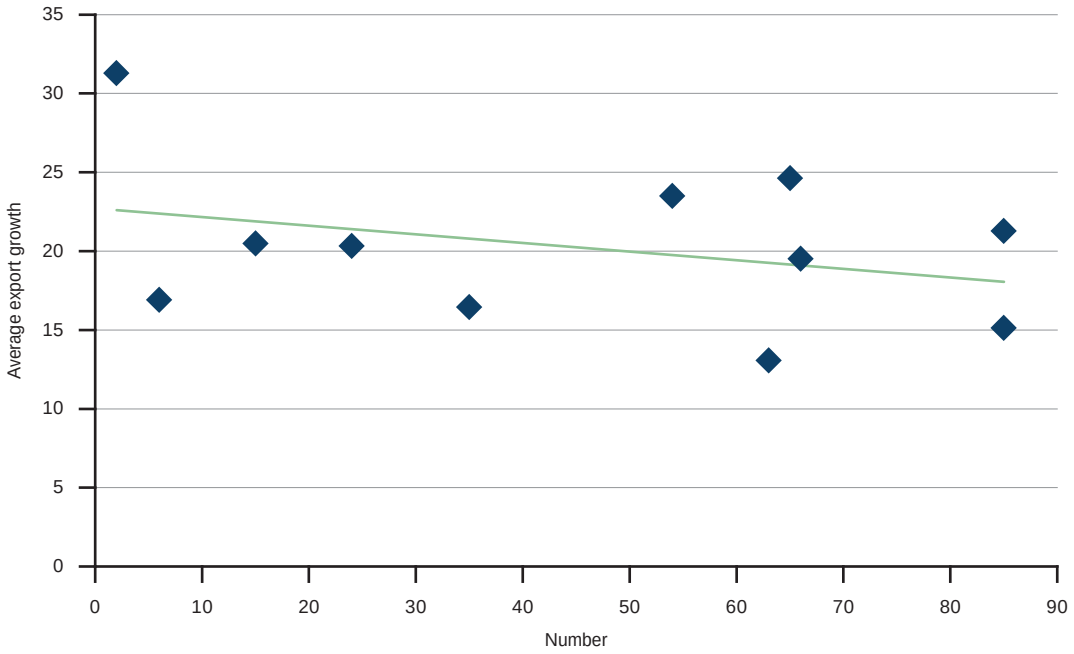


Figure E.12: e- e- e- e- e- e- e- e- e- 200 12



Source: Authors' own calculations using data from WTO monitoring database and UN Comtrade.

Note: Includes all restrictive measures that were implemented and which include information about country of origin and date of implementation. Data only include measures which were not withdrawn in the same year. Missing export data are mirrored. The number of measures is plotted against average export growth between 2009 and 2012.

in Figure E.12. Judging by the negative slope of the line plotting export performance against the number of trade-restrictive measures applied by a country, there is no evidence that G-20 developing countries which took a more restrictive stance performed better than countries which took less restrictive measures.

4. Conclusions

Trade openness in itself has ambiguous effects on the macroeconomic volatility of developing countries. Nevertheless, in the 2008–09 crisis, trade proved to be a transmission mechanism of economic shocks originating in developed markets to producers and traders in developing economies. The dramatic reduction in international trade in the wake of the crisis would have been a lot worse if trade protectionism of the scale experienced in the Great Depression had been seen. For developing countries, this could have erased a big part of the development gains from the last decade.

On the whole, there was no large-scale outbreak of trade protectionism during the crisis, particularly in comparison with the experience during the Great Depression. With respect to developing countries, four reasons may explain why these countries did not systematically raise trade barriers during the crisis. If governments are risk averse, they have more to gain by sticking to a trade agreement, i.e. abiding by their WTO commitments, when the economic environment becomes more volatile. Empirical evidence suggests that being a member of the WTO acted as a restraint to the use of trade-restrictive actions during the crisis.

Secondly, other policy instruments better suited to managing falling demand and macroeconomic volatility were available to developing countries. There was a coordinated response by the G-20 countries on macroeconomic policy and on trade with their commitment to refrain from erecting new trade barriers. Thirdly, the spread of global value chains increased linkages among countries, creating a common interest in preventing the spread of protectionism. Finally, raising trade barriers would have proven to be ineffective in promoting economic recovery in the medium to longer term.

Despite the positive role of the WTO and its trade monitoring exercise in keeping traditional instruments of protectionism at bay, the possibility of using other measures unconstrained by WTO rules – or policy substitution – suggests that the world should remain vigilant.