OECD Trade Policy Studies

Trade and Economic Effects of Responses to the Economic Crisis

OECD

Trade and Economic Effects of Responses to the Economic Crisis

OECD

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The OECD is a unique forum where governments work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns, such as corporate governance, the information economy and the challenges of an ageing population. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

The OECD member countries are: Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The European Commission takes part in the work of the OECD.

OECD Publishing disseminates widely the results of the Organisation's statistics gathering and research on economic, social and environmental issues, as well as the conventions, guidelines and standards agreed by its members.

Foreword

This study was undertaken in response to the dramatic fall in trade flows that occurred during the height of the economic crisis and amid fears that trade-specific factors might be at work, including protectionist measures. It was found, however, that resort to such measures has been relatively muted and that a more important role in the trade crisis was played by collapsing demand, the drying up of trade finance, and the vertically integrated nature of global supply chains.

A whole range of measures taken during the crisis by governments of OECD countries and major emerging economies is investigated, with a series of stylised experiments estimating the potential impact of such measures on trade and GDP of the countries taking the measures and their trading partners. New light is shed on how the design and implementation of measures in stimulus packages can affect outcomes, which can be of importance as governments reflect on exit strategies that continue to be supportive of trade, jobs and growth. The analysis undertaken here suggests that governments should first roll back the most direct protectionist measures, those that discriminate between domestic and foreign firms, and those that target specific sectors as these have all proven to be detrimental to growth and trade in the long run. On the contrary, it is found that general demand stimulus measures and active labour market policies are preferable under current conditions, as would an ambitious and balanced conclusion to the Doha Development Agenda negotiations to give much-needed impetus to the recovery.

This study was prepared by a team comprised of Carmel Cahill, who was also co-ordinator, Jane Korinek, Przemyslaw Kowalski, Jean Le Cocquic, Sebastien Miroudot, Hildegunn Nordas, Alexandros Ragoussis, Ron Steenblik, and Frank van Tongeren. Ken Ash, Raed Safadi, Ken Heydon, and Joanna Hewitt provided valuable commentary and input, as did colleagues in OECD's Economics Department and the Directorate for Financial and Entreprise Affairs. Jennifer Griffin and Gillian Nelson provided secretarial assistance and editorial assistance was provided by Michèle Patterson.

The report was declassified by the OECD Working Party of the Trade Committee in May 2010.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This study was undertaken by the OECD's Trade Committee in response to the financial and economic crisis that started in 2008.

The 12.5% fall in global trade in 2009 is explained by several factors: the collapse in demand, the drying up of trade finance, a larger fall in demand for highly traded goods (such as machinery and transport equipment) relative to less traded goods and services, and the vertically integrated nature of global supply chains.

Early resort to protectionist measures has been relatively muted and does not play a significant part in explaining the fall in trade – only about 1% of world imports were affected by new trade restricting measures. The rapid and coordinated G20 response to ensure adequate trade finance was available for viable transactions seems to have been effective.

Given their sheer size, stimulus measures taken to rescue sectors of systemic importance (such as banking) or to preserve jobs (as in the automobile industries) or to stimulate growth (such as consumption tax reductions) or "buy national" measures may be more significant in terms of their potential impact on trade than direct trade policy measures.

But dollar for dollar, direct trade restricting measures have the most strongly negative impacts on both trade and growth: simulations suggest a USD 1 increase in tariff revenues results in a USD 2.16 drop in world exports and a USD 0.73 drop in world income. Simulations also suggest that USD 1 of stimulus spending behind the border can increase a country's own GDP by USD 0.64 on average while world trade could increase by USD 0.08, but the effects on the real GDP of other economies are mixed. These estimated overall impacts depend critically on the nature of the stimulus. Stimulus measures that discriminate between domestic and foreign goods and firms and sector specific measures are clearly less effective. Measures that are most supportive of both trade and growth are non-discriminatory demand stimulus and labour support. Coordination of stimulus measures ensures that benefits are larger and more widely shared.

Open markets and the restoration of a level playing field will be a necessary condition for a sustained recovery; this means addressing policies with both direct and indirect impacts on trade. This report recommends:

- An immediate roll-back of the most trade distorting measures, continued resistance to protectionist pressures, and an ambitious and balanced conclusion of the DDA that will deliver further market opening.

- that governments step back from the exceptional measures taken to support trade finance as conditions normalise.

- Removal of discriminatory provisions from all stimulus measures.

- Restoration of competition policy disciplines and withdrawal from the banking sector when the time is judged right with the international coordination needed to avoid regulatory arbitrage.

- Under current conditions economy-wide demand-side measures to address demand shortfalls and active labour market policies to address unemployment are preferred.

- International coordination of 'exit' from extraordinary measures as economic conditions permit; further attention is required both to address specific needs in less developed countries and persistent global macroeconomic imbalances.

Chapter 1.

Summary, Conclusions and Recommendations

This chapter summarises the main findings of this report and draws out the main conclusions. While the report finds that protectionist responses to the crisis were relatively muted and protectionism does not explain a major part of the fall in trade that occurred, vigilance is nevertheless needed. Stimulus measures taken behind borders may have very significant effects on trade, especially if they target specific sectors or only domestic goods or firms. Analysis of the stimulus measures generates some insights into exit strategies that could be supportive of growth, employment and trade. It is expected that protectionist sentiment will increase as unemployment remains high and governments are increasingly under fiscal pressure. Concluding the Doha Development Agenda negotiations could prevent backsliding and provide a much needed impetus to growth.

The sharp and synchronised drop in economic activity that began in late 2008 and spread quickly across the globe has had a deleterious impact on international trade. In the first quarter of 2009, the volume of OECD imports and exports was down by about 15% compared to the same quarter in the previous year and GDP by almost 5%. In the second quarter, imports and exports were still sharply down (exports by 15% and imports by 13%) and real GDP by more than 3%. Overall, world trade declined by 12.5% in volume terms in 2009 compared to 2008. The latest OECD forecast is for an increase of 6% in 2010.

Governments have responded to the crisis by introducing deep monetary easing and large fiscal stimulus packages with the objective of supporting economic activity and jobs. Inter-governmental forums, such as the G8 and the G20, are providing the platforms to coordinate the responses, including in the area of international trade where leaders have committed to maintaining markets open as an integral part of getting the world economy out of the crisis; leaders have also committed to providing short-term credit facilities to mitigate against sharp increases in risk premiums. Looking ahead, the immediate challenge for trade policy makers is to ensure that the crisis that has impaired world trade does not spill over to the trade policy agenda.

The disproportionate collapse in trade can be explained by a combination of three main factors: (1) The collapse in domestic demand; (2) the disproportionate fall in outputs and trade of capital goods that make up a larger share of trade than of GDP; (3) the temporary drying up (and subsequently lower availability and higher cost) of short-term trade finance. The drop in demand has significantly contributed to the drop in trade but it cannot explain it fully. Compositional differences between trade and GDP also contributed to the severity of the trade collapse; sectors hit hardest by the crisis (*e.g.* fuels, machinery and transport equipment or manufactured goods) have a relatively higher share in trade than in GDP. Our findings also suggest that

trade finance becomes more important during times of crisis; and this was a contributing factor to the drop in trade. Structural factors related to vertical specialisation and global supply chains explain, as least in part, the highly synchronised nature of the trade collapse

There is no evidence that would suggest that protectionism was a major factor behind the trade collapse. This is the case despite many examples of individual countries taking specific measures to increase tariffs or otherwise increase protection through non-tariff measures or increased resort to trade remedies.

The majority of the new measures affect already highly protected sectors such as agriculture, textiles, and metal industries thus reversing some of the hard won gains that were realised during more than five decades of trade diplomacy. These sectors are also relatively labour intensive, and as such are sectors in which some less developed countries have a comparative advantage. These sectors are clearly in need of more market opening, not further restrictions.

In its July 2009 report, the WTO Secretariat stated that contrary to 2008, "the number of new trade-restricting or distorting measures announced or implemented since 1 March 2009 exceeds the number of new trade-liberalizing or facilitating measures by a factor of more than two." A closer examination of the measures reveals that they have principally been introduced in specific sectors, and very rarely have general applicability. In most cases restrictions also target products from specific sources. According to one estimate, the new trade restricting measures affect less than 1% of the pre-crisis level of imports. Indeed, there have been a significant number of trade opening measures.

Complacency is not justified. While the scale of the measures taken has been relatively modest, the simulations carried out for this study show that among the different types of measures studied, direct trade restricting measures generate the worst outcomes in terms of trade and growth both of the country implementing the measure and of its trading partners. Governments therefore need more than ever, to be vigilant and to avoid protectionist actions that may be politically expedient in the short term but that could have devastating long term consequences. The danger is that restrictions could build up incrementally, slowly stifling trade and ultimately weakening the effectiveness of all the anti-cyclical measures that have been introduced. Protectionist sentiments are likely to increase with persistent unemployment and mounting pressure on government finances. Moreover, once put in place protection becomes entrenched and is increasingly difficult to undo. Retaliation may occur compounding the effects of unilateral measures. Continued attention and vigilance are therefore needed.

Of immediate concern is the impact on trade of behind-the-border measures that are found in the crisis-induced fiscal stimulus packages. We generally think of protectionism in terms of measures at the border – tariffs, quotas or other mechanisms that restrict trade or make imported products more expensive. But there is a wide array of measures that governments can take behind their borders that will have very similar effects – including various forms of direct subsidies. Support to one sector in one country, whatever the motivation, disadvantages competing sectors in other countries. As other countries then move "to level the playing field", a subsidy competition is launched that in the end benefits no country. But those that receive subsidies may be better off than otherwise, and will vigorously defend their

new entitlements; this explains in large part why subsidies to deal with a short term problem often prove almost impossible to remove.

Countries that do not have the fiscal resources to compete on the basis of subsidies will be major losers in this situation, finding themselves excluded from protected markets. There is an enormous danger that the important advances made in recent years by some developing countries whose economies were lifted by aid and by trade, will be lost.

Various domestic regulatory measures that operate behind-the-border can also act as a form of protectionism. Although harder to document, there have also been reports of more restrictive implementation of regulatory measures, both at and behind borders. Stricter implementation of SPS or TBT measures, more complicated border procedures, or other less transparent devices will slow down imports and carry the same threat of corrosive retaliation that could lead to an escalation of trade tensions.

The objective of the measures included in the stimulus packages was to prevent collapse in sectors of systemic importance to the economy – such as banking and finance, to support sectors particularly severely hit by the effect of the drying up of credit, such as automobiles or consumer durables, or to generally support growth and employment – such as consumer tax reductions or labour market measures. These measures did not target trade as such, but they often have significant effects on trade through various indirect channels. The purpose in exploring them here, along with their effects on GDP, is to generate insights into how stimulus measures can be designed to meet their declared objectives while also supporting trade or being as minimally disruptive of trade as possible. These insights in turn are relevant to the design and sequencing of exit strategies, it being again recognised that the timing and manner of the exit strategies to be adopted will be determined by many factors and not mainly by trade-related considerations

Simulations carried out on the impact of some of these behind-the-border measures highlight the critical need to properly target policy interventions. If the intervention is seeking to remedy a shortfall in demand, demand-side measures are a more appropriate response than supply-side measures. But the specific design characteristics of demand-side measures determine their effectiveness in terms of their impact on GDP and on trade. Policies that bias demand towards specific sectors, and those that are biased towards domestic products are inferior to those that are more generic in design.

Sector-specific supply-side measures are found to yield mainly negative effects on the economy taking the measure, through maintaining or creating inefficiencies, and they yield negative spillovers on partner countries, through lowering production costs in one country relative to the world market.

Sector-specific supply-side subsidies can have an anti-export bias. Although they may increase exports of the industry subsidised they draw resources away from other sectors so that total exports may fall. Their positive effect on own GDP is strongest when the subsidy is given to labour rather than to capital (in a situation of unemployment).

General consumption subsidies such as tax reductions or payments to households are relatively trade-friendly. Partner exports can rise following a domestic demand stimulus, and own country exports can rise as well, provided the demand stimulus

does not lead to an appreciation of the real exchange rate. GDP impacts are also generally positive.

Sectoral consumption subsidies may also be trade friendly, at least in the short term, boosting exports and GDP in both the country taking the measure and in partner countries. When countries take similar measures (as in the incentives provided to consumers to purchase cars in many countries) leakages are less of a problem and everyone gains, except where the consumption subsidy is restricted to domestically produced goods. In this case there are negative own-country export effects and negative third-country GDP effects.

All sector specific interventions, by retaining additional resources in the sectors concerned, will have a dampening effect on growth in the longer term. This is why it is critical that support be restricted to activities whose failure may carry systemic risks with a clear timetable for restructuring and eventual withdrawal of support.

The implications for trade of increased government spending depend crucially on the composition of the increased spending. Business as usual — that is, maintaining the composition of existing spending — may contain some anti-trade bias as government expenditures tend to be dominated by non-tradeables. On the other hand, shifting expenditure towards investment in infrastructure, and provided that no "buy national" or other discriminatory provisions are incorporated, may prove supportive of trade.

Almost all measures, if taken unilaterally, have a beggar-thy-neighbour effect — that is, they reduce third-country GDP. Co-ordination offsets the depressing effect in the case of demand push measures but compounds it in the case of sector-specific, supply-side measures. The latter are largely self-defeating when taken by several countries in the same sector. These findings suggest that international coordination could be important as governments move to unwind certain measures.

With respect to supply-side measures, design features are crucial to the outcomes. A subsidy to labour, whether generic or specific to an industry, will generate better outcomes in terms of trade and own GDP effects than a capital subsidy, particularly in a situation of unemployment.

Two main factors have combined to prevent the proliferation of the kind of beggar-thy-neighbour protectionist policies of the 1930s. An increasing number of firms are global; they have organised their sourcing activities across different countries in order to reduce costs and improve their capacity to react to new technologies and changing tastes. These firms need open markets and any intervention that would break links in the global supply chain would undermine their competitiveness.

The second factor relates to the continuous fight against protectionism that the WTO, with its arsenal of internationally binding rules and disciplines, has been waging. Many of the more worrying or less transparent measures that are explicitly protectionist in intent or effect have been in areas where WTO rules are either weak or non-existent. This is perhaps most obvious in the case of the WTO Government Procurement Agreement that does not forbid a signatory country from having measures that impose "buy local" requirements on government spending. Scrutiny of stimulus packages has also focussed attention on the extent to which government procurement in many economies has escaped meaningful discipline in the past.

Closing this gap in the multilateral trading system would offer a further guarantee against the risk of sliding towards greater protectionism.

Another area of concern in the current environment is the temptation to raise tariffs from their applied rates to their legally bound ceilings. While this is a WTO-consistent action, a recent study by Bouet and Laborde (2009) shows that if all countries were to follow on this path, global trade would suffer a loss of USD 809 billion, and global GDP would shrink by 0.65%. One sure way of preventing this loss from actually occurring is to seek in the DDA the reduction or total elimination of the "water in the tariff" that is found in a large number of countries' tariff schedules.

The WTO is entrusted with monitoring trade policy developments in member countries, thus furthering its constructive role in managing the crisis and contributing to the restoration of healthy trade. The OECD is complementing the WTO efforts in this area by examining the impact of the trade-related policy responses to the crisis. This project is but one manifestation of the OECD-WTO co-operation.

What should governments do next?

The most urgent action would be to roll back the most obvious trade-restricting measures that have been taken such as tariff increases and import licensing, and to show restraint in initiating any further trade restricting actions. Taxing production and growth through new trade restrictions will only serve to offset the benefits of the stimulus policies that have been introduced. Mindful of this contradiction, several countries have taken steps to further open their markets. Many more could follow their example.

In order to ensure that the trade recovery is not interrupted by a further series of restrictive measures, it is of the utmost importance that the DDA be brought to an ambitious and balanced conclusion. This would have the benefit of preventing backsliding, bringing much needed stability and predictability to international markets, and would, through further opening, give impetus to the recovery. If, as many commentators suggest, the temptation to resort to protectionist measures will increase as governments begin to unwind the fiscal stimulus measures but unemployment remains persistently high, the "locking in" and market opening effects of a successful DDA conclusion could be crucial.

Consideration also needs to be given at an early date to trade policy issues related to climate change. Pressure in many OECD countries to offset or "countervail" through subsidies or import restrictions the higher production costs that may arise following the anticipated introduction of carbon taxes and other regulatory changes is bound to mount. Multilateral co-operation in this area would serve to reduce trade tension.

During the current crisis most governments have provided support to their financial sector to limit the economic effects of the crisis and reduce systemic risk. These have been necessary steps taken under extraordinary circumstances where information on the nature and distribution of risk was far from perfect. As financial markets return to normal, well designed and internationally coordinated exit strategies will be needed to ensure financial markets are both open and supported by adequate regulation.

On trade finance, careful monitoring will be needed so that governments can begin to step back from the exceptional measures taken in the crisis so that as

markets normalise, the level playing field can be ensured and the creation of subsidies avoided. The key here will be to remove measures once it can be established that there is no longer a need for them: Issues of crowding out are important.

Explicitly discriminating provisions of fiscal stimulus measures should be removed. There is still time to do this in programmes that involve continuing investment over the medium term. Procurement provisions can be made more neutral in infrastructure projects that are still on-going. This would also help to avoid an escalation of retaliatory measures. Where there is suspicion of informal (and non-transparent) pressure to discriminate in favour of national or local suppliers, governments should disavow such suspicions. More generally, scrutiny of stimulus packages has revealed the extent to which government procurement in many economies has escaped meaningful discipline in the past. It has also revealed how difficult it is to monitor or discipline buy local or national provisions at different levels of government. Public procurement needs to be brought forward as a priority issue for multilateral discussion in the post-crisis period.

Timing and sequencing of actions to dismantle stimulus measures will be important. A return to a more disciplined fiscal stance is imperative, but governments also need to be sure that the incipient recovery is not stifled. These considerations will determine the appropriate exit strategy. With respect to trade-related aspects, withdrawal of sectoral stimulus measures may prove to be particularly problematic. Demand has been stimulated in the automobile industry to the extent that consumers have brought forward purchases. There is therefore a danger of an imminent period of slack demand and therefore slack trade in this important "trade intensive" sector. Previously existing problems in these industries might re-surface.

Amid signs that recovery is underway, governments are now beginning to reflect on how best to return to pre-crisis levels of intervention and spending. The way in which governments exit from the extraordinary measures taken in the past year and the pace of that exit will have impacts on employment, growth, real interest rates and exchange rates. Trade flows will be affected directly and indirectly. Particular attention will need to be paid to sectoral measures. They create rents and vested interests and are very difficult to dismantle. But the longer measures are left in place, the greater the damage in terms of efficiency and competitiveness (and therefore trade) of the economy as a whole. On the other hand, governments do not want to take steps that could delay recovery by exiting prematurely.

It is important that trade and investment continue to flow freely reflecting comparative advantage and responding to economic opportunity. Globalisation and increasing market openness did not cause the crisis that emerged in mid-2008, but certainly contributed to the speed and scale of the contagion. The perception that globalisation was somehow the cause may persist and mean that there is less appetite for rolling back protectionist measures taken in the context of the crisis, or for concluding the Doha Development Agenda. This must be resisted. There are many countries that have not yet joined the club of emerging economies whose rapid growth is due to a large extent to the way they have engaged in international specialization through open trade and investment regimes. The important long term goal should remain focused on the preservation and strengthening of the international trading system. This will allow these countries to catch up, even if growth in trade is slowing elsewhere.

Box 1.1. Business as usual or a "new normal"

There is a newly quoted phrase in international financial circles that speaks of an eventual return to a "new normal" where growth will be subdued and unemployment will remain high. What is the likelihood of a return to the previously observed growth rates in trade?

Macro-economic factors

The US federal budget deficit is estimated to have reached more than 11% of GDP in 2009, and to remain around that level in 2010. Other OECD countries have also introduced fiscal stimulus packages that eventually need to be scaled back. The short-run effect of the stimulus is higher demand, including more import demand and a widening current account balance in the countries where stimulus packages are introduced. Thus, some of the stimulus "leaks" to trading partners. An interesting question is then whether the scenario will be reversed as the stimulus packages unwind; i.e. narrowing current account deficits and less trade.

The answer depends on the nature and speed of the exit strategy. It is clear that governments can run fiscal deficits for long periods of time without increasing the debt burden as long as the nominal rate of GDP growth is higher than the interest rate of government debt. Therefore, adjustments can be done gradually as private sector growth picks up. In the current situation, the fiscal stimulus packages may be scaled back relatively soon, both because of their scale and because government debt is already high in many OECD countries. In this scenario a narrowing of the current account balance and less trade could result.

Rebalancing could also go in the opposite direction. The countries that have been running perennial trade surpluses could in principle increase their imports. But that assumes that consumers in surplus countries would have to expand spending. To give an example, China's final consumption expenditure accounted for only 51% of its GDP in 2008 as compared to 75% on average in middle income countries. If China were to increase the share of final consumption in GDP towards the average for middle income countries, say to around 60% in the first instance, consumption would increase by about USD 355 billion (based on 2008 figures). If this increased demand were entirely satisfied by imports, trade would obviously increase by USD 355 billion.

The policy shifts required to raise domestic consumption would be multifaceted. First, the need for households to save would have to be reduced through better social insurance coverage. Second, access to credit for financing consumer durables or other expensive items would be needed. An adjustment of the exchange rate can also help narrowing global imbalances. There are, however, dangers related to a sharp appreciation of the currency of surplus countries, *e.g.* the Chinese remninbi. First, as experience from Japan in the 1970s and 1980s shows, a sharp appreciation need not significantly narrow the current account surplus by itself. Instead, if the intended structural shifts in domestic demand failed to materialise, growth could slow down. Furthermore, the structural changes needed may be easier to engineer within a fixed exchange rate regime, as it is well known that fiscal policies do not have much of an impact in a floating currency regime.

In the longer term, real interest rates are expected to rise as governments lean on capital markets to finance continuing high deficits. Higher interest rates tend to reduce the demand for durable consumption goods and investment goods, while demand for non-durables tends to increase – this will have commensurate effects on trade patterns.

Micro-economic factors

Will trade growth continue to be driven by vertical fragmentation? The extent of international fragmentation observed at its peak cannot be sustained in a downturn, but what about in its aftermath? The marginal return to further fragmentation may diminish for at least two reasons. First, fragmentation requires more co-ordination, and rising co-ordination costs will sooner or later offset the lower cost of outsourced parts, components and tasks, first at the firm level and later at the macro level as well. Second, the leaner and more effective the supply chain the more vulnerable it becomes to delays in delivery of parts can components, and the risk of delays increases with distance to the market (Harrigan and Venables, 2006).

Another long-term trend that could affect future developments in world trade is the growing share of services in GDP and consumption. Services are less traded than goods, which should by itself moderate growth in trade relative to GDP growth. Furthermore, even within the services sector, demographic factors may shift demand from tradable transport, ICT, financial and travel services to less tradable health care and other personal services.

Chapter 2.

Explaining the 2008-09 "Trade Collapse"

The collapse in trade during late 2008 and early 2009 has been severe both in absolute terms and relative to the fall in GDP. This triggered concerns that there might be particular factors affecting trade during the crisis, including worries about protectionism. Evidence presented here shows that the severity of the 2008-09 trade "collapse" was not unprecedented after all. To a large extent the collapse in trade was a consequence of: (1) The collapse in domestic demand though the consequences of falling demand reached some economies because of their trade links; (2) the disproportionate fall in output and trade of capital goods that make up a larger share of trade than of GDP; and, (3) the temporary drying up (and subsequently lower availability and higher cost) of short-term trade finance. The paper argues that the increasing importance of intermediate inputs in world trade flows cannot explain why the fall in trade was much larger than the fall in GDP, though it can explain why the share of trade in GDP has increased. It also explains, at least in part, the highly synchronised nature of the trade collapse.

The collapse in trade during late 2008 and early 2009 has been severe both in absolute terms and relative to the fall in GDP. As shown in Figure 2.1, the OECD area as a whole recorded a 2.4% year-on-year reduction in real GDP in 2008q4 while the corresponding reductions in volumes of exports and imports were, respectively, 6.2 and 3.5%. In 2009q1, real GDP was down by 4.8% and volumes of exports and imports by respectively 15.7 and 15.3%. In 2009q2, the crisis started easing and real GDP in the OECD area was down by 3.2 and the volumes of exports and imports were down by respectively 14.7 and 12.8%. The easing continued during the third and fourth quarters of 2009. For the OECD area as a whole percentage year-on-year reductions in volumes of exports and imports exceeded those in real GDP by approximately a factor of 3.

The fact that proportional reductions in trade flows have been much deeper than reductions in output — dubbed as the "trade collapse" — has triggered concerns that there might be particular factors affecting trade during the crisis, including worries about protectionism. This chapter uses available trade and national accounts data to identify these factors. The findings here set the scene for the analysis in the next chapter of policy responses to the crisis and their economic effects.

The evidence presented shows that the severity of the 2008-09 trade "collapse" was not unprecedented. To a large extent, the collapse in trade was a consequence of falling final demand, although the consequences of falling demand reached some economies because of their trade links. Contrary to what is stated in some commentaries, the increasing importance of intermediate inputs in world trade flows cannot explain why the fall in trade was much larger than the fall in GDP, though it

can explain why the share of trade in GDP has increased. It also explains, at least in part, the highly synchronised nature of the trade collapse.

Overall, the severity of the 2008-09 collapse in trade can be explained by a combination of three main factors: (1) the collapse in domestic demand; (2) the disproportionate fall in output and trade of capital goods that make up a larger share of trade than of GDP; and, (3) the temporary drying up (and subsequently lower availability and higher cost) of short-term trade finance. The drop in demand has significantly contributed to the drop in trade but it cannot explain it fully. Compositional differences between trade and GDP also contributed to the severity of the trade collapse; sectors hit hardest by the crisis (*e.g.* fuels, machinery and transport equipment or manufactured goods) have a relatively higher share in trade than in GDP.

The evidence presented also suggests that protectionism was not a factor behind the trade collapse. These findings are consistent with the findings presented in Chapter 3. While the possibility of protectionist forces gathering strength cannot be ignored, the immediate task at this stage is to ensure that behind-the-border measures that are found in the crisis-induced stimulus and support packages are identified and their trade impact properly understood. This is taken up in Chapter 4.

Figure 2.1. Year-on-year percentage change in GDP, exports and imports of goods and services in the OECD area (volume)
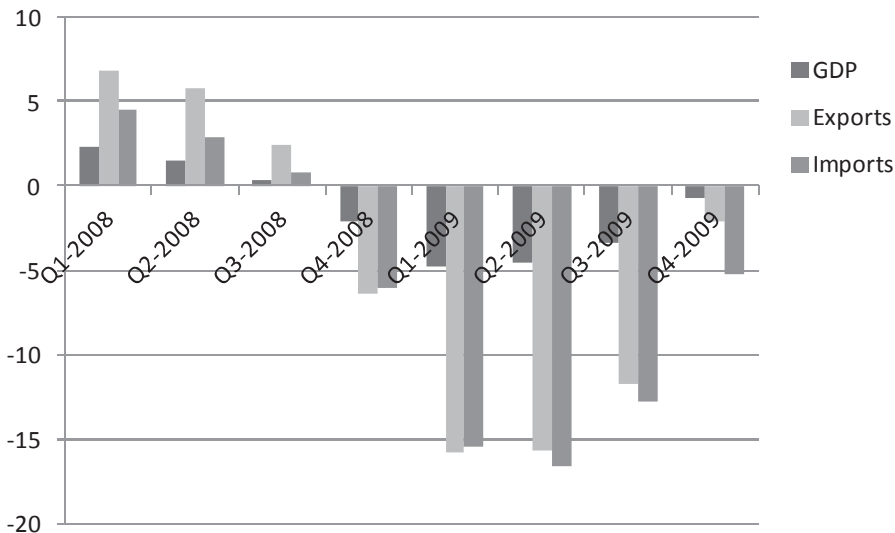
Source: *OECD National Accounts Database*, year-on-year change in volume estimates, fixed PPPs, OECD reference year, annual levels, seasonally adjusted.

Exports-GDP and imports-GDP elasticities

Examination of national accounts and production data reveals that other recent economic downturns have also been associated with steep falls in trade. Elasticities of exports and imports with respect to industrial production[1] and of imports and exports with respect to GDP have been higher in the past, including during the early 1980s crisis, the ERM crisis at the beginning of the 1990s as well as the downturn immediately following the events of 11 September 2001. Figure 2.2 shows year-on-

year growth rates of OECD area exports and industrial production for the period 1976-2008. The ratio between the two, *i.e.* the elasticity of exports with respect to production, is shown for clarity for the periods of the current and recent crises.[2] Dotted lines mark the mean elasticity for the 1976-2009 period as well as one standard deviation bands around the mean. In addition, Figure 2.3 presents the ratio of imports and GDP year-on-year growth rates or the elasticity of imports with respect to GDP, for the period 1961-2009 for the OECD area.

**Figure 2.2. Exports and industrial production 1976-2009
(year-on-year percentage changes), OECD area**

Elasticity is shown only for quarters with negative year-on-year growth in industrial production, industrial production data refer to total industry.
Source: *OECD Main Economic Indicators*, authors' calculations.

Figure 2.3. Import-GDP elasticity for the OECD area
(1961-2009, year-on-year change, quarterly data)
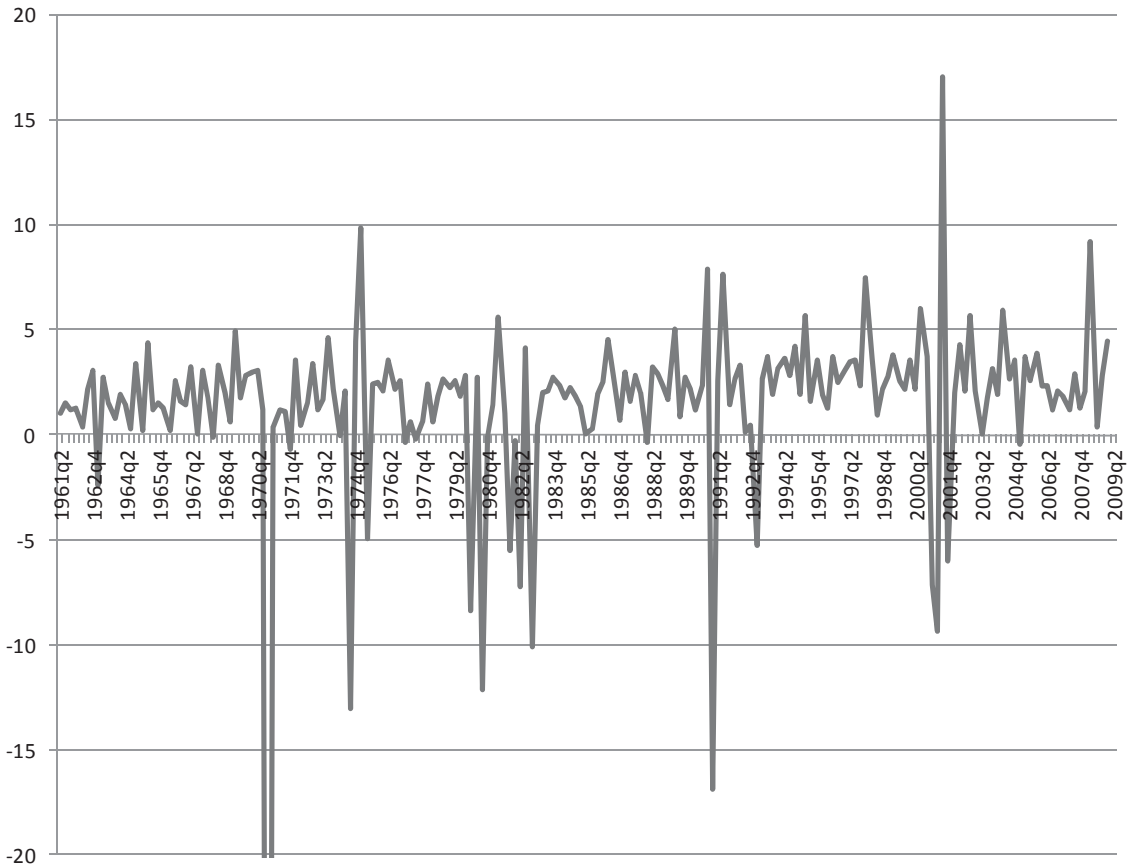
The import elasticity is the growth rate of imports of goods and services divided by the growth rate of GDP. Growth rates are calculated with quarterly data in volumes, USD, seasonally adjusted, annual levels.

Source: *OECD National accounts database*, year-on-year change in volume estimates, fixed PPPs, OECD reference year, annual levels, seasonally adjusted.

Overall, these figures do not suggest that there was anything unusual about the fall in trade during the 2008-09 down turn. In fact, the elasticities observed in the fourth quarter of 2008 and first three quarters of 2009 seem "reasonable" compared to more extreme values observed in the past, both during past crises as well as in times of growth. As far as the elasticity of industrial exports to industrial production is concerned (Figure 2.2) past crises of the early 1980s, the ERM crisis of the early 1990s and the crisis following the events of 11 September 2001 had very similar features to the most recent crisis. In particular, in these periods exports to output elasticity lingered remarkably close to the average 1976-2009 elasticity of 1.8. Moreover, with the exception of the 11 September 2001 related downturn, trade collapses followed reductions in industrial production with a lag, resulting in initially large negative elasticities. Finally, trade to production elasticities observed during these crises periods were not nearly as high as the ones observed, for instance, during the recovery from the 11 September downturn when for several quarters trade grew five (and more) times faster than industrial production. The trade to GDP elasticity (Figure 2.3) shows similar degree of variation. Moreover, on a casual inspection

neither of them displays any clear tendency to increase over time though certainly some clustering and differences between individual periods can be observed.

The first question to ask then is what are the "normal" values of export and import elasticities with respect to GDP?[3] Basic economic theory tells us about the relationship between GDP, exports and imports by looking at the income accounting identity in the Keynesian model of an open economy (Equation 1.1 in Annex A). In a simple version of this model imports are assumed to be proportional to income, the proportion being captured by the (constant) marginal propensity to import (Equation 1.2). Thus, the proportional change in imports is equal to the proportional change in income yielding an imports-GDP elasticity equal to one.

In the same framework, exports are often assumed to be independent of a country's income and, under the assumption that all other expenditures remain unchanged, the exports to GDP elasticity depends on the size of exports relative to other categories of expenditure that are assumed independent of income and is normally larger than one (Equation 1.5 in Annex A). Certainly, exports are not the only expenditure category that contributes to income and the actually observed elasticity between trade and income will be influenced by changes to other expenditure categories. Note also that if imports were assumed to be exogenously determined in the same analytical framework, a similar reasoning would apply, with the difference that imports enter the expenditure accounting with a negative sign. Hence, the absolute value of the imports to GDP elasticity would also be typically larger than one. In this sense this simple expenditure accounting exercise provides a ready explanation for why the imports to GDP and export to GDP elasticities may be larger than one and why the proportional fall in trade has been more pronounced than the fall in GDP in the current crisis.

Equation 1.5 implies also that the higher the share of exports in expenditure the lower the exports to GDP elasticity. Similar reasoning can also be conducted for the imports to GDP elasticity. This is quite intuitive: if export demand falls by 10%, the percentage impact on GDP is going to be smaller the lower the initial share of exports in expenditure.[4] For this reason the historically increasing trade-to-GDP or openness ratios that have been identified as a potential explanation of the severity of the 2008-09 trade fall (*e.g.* Cheung and Guichard, 2009) could actually have a negative impact on exports-GDP and imports-GDP elasticities. Figure 2.4 illustrates the relationship between GDP and trade since 1961 in the OECD area. At the beginning of the period, the volume of trade was about 23% of the volume of output. The share has doubled and reaches 47% just before the economic crisis in 2008.[5] These trends and the above analysis would suggest that exports to GDP and imports to GDP elasticities should fall over time. In other words, the higher the share of trade in GDP the smaller the expected disparity between the proportional fall in GDP and the proportional fall in trade, other things being equal.

Figure 2.4. The ratio of trade to GDP and trade to final consumption
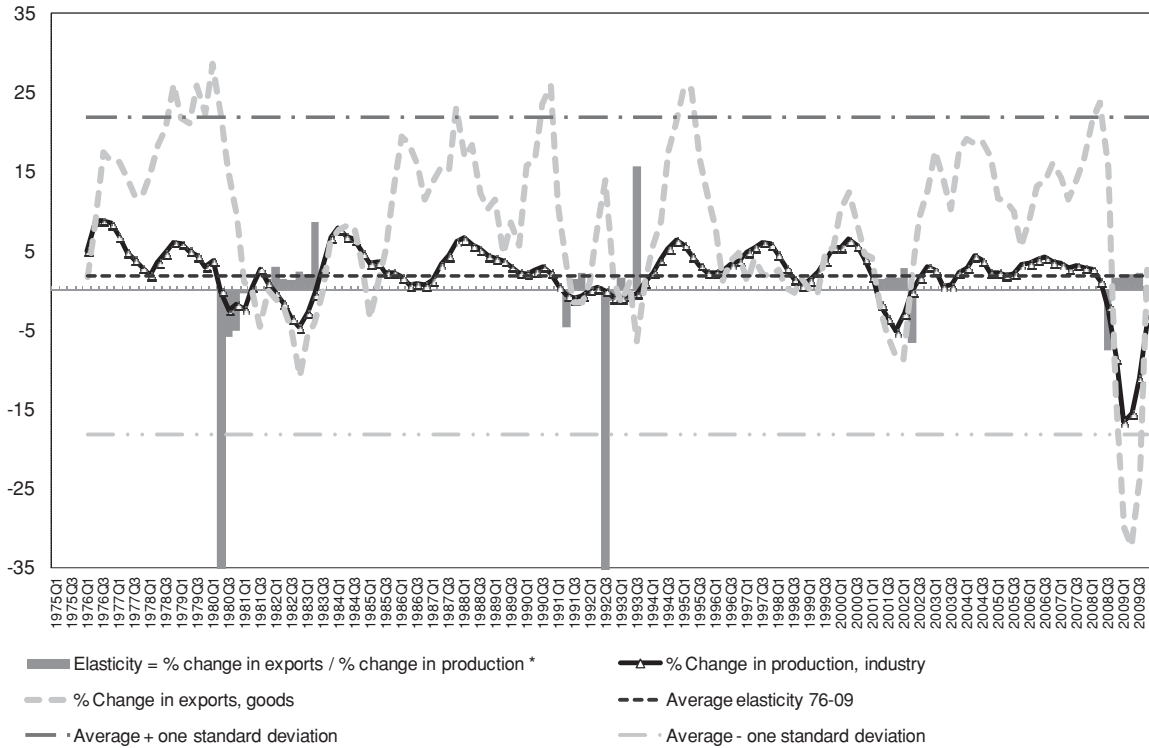**(quarterly data, 1961-2009)**
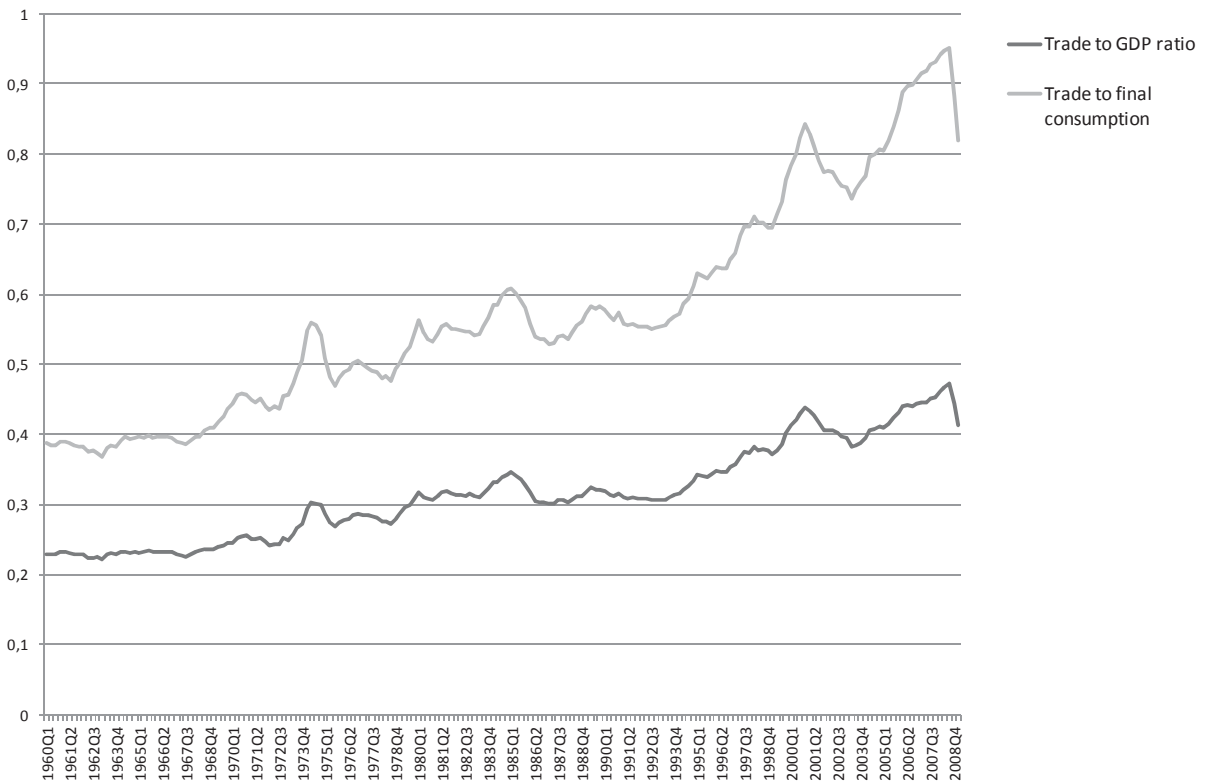
Source: *OECD National accounts database*, year-on-year change in volume estimates, fixed PPPs, OECD reference year, annual levels, seasonally adjusted.

Imports-GDP elasticity in the long run and during the 2008-09 crisis

What is then the normal elasticity of trade to GDP and to what extent could the drop in demand have contributed to the drop in trade? The elasticities that are shown in Figures 2.2 and 2.3 and that display such strong variation are calculated with data relating to the same quarter; they can be called "instantaneous" elasticities. The observed variation, especially during economic crises, suggests that there might be lags between changes in GDP and changes in imports or exports (and vice-versa). There might be a long-run equilibrium relationship between the growth of imports and the growth of GDP around which there are stochastic fluctuations. Annex A and Annex Tables B.1–3 present the results of estimation of an Error Correction Model (ECM) that aims to account for the short-run and long-run fluctuations. Annex Table B.1 indicates that the implied long-run trade elasticity over the period 1961-2009 is 2.3; a 10% increase in income will, in the long run result in approximately a 23% increase in imports. Also, the long-run multiplier seems to have increased overtime, though it was higher in the 1990s than in the most recent period.[6] Overall, these results suggest that the 2008-09 imports collapse was indeed somewhat deeper than would be expected from the trends in GDP based on historical data.[7]

This estimate seems rather conservative compared to estimates that do not distinguish between short-term and long-term variations. Irwin (2002) estimates that the elasticity of real world trade to real world income increased from around 2 in the 1960s and 1970s to 3.4 in the 1990s. Freund (2009) finds that it has increased from

around 2 in the 1960s to 3.5 in the 2000s. Freund also compared real trade growth and real GDP growth in the years around previous global downturns and produced an estimate of the trade to real GDP elasticity of 5. Using an elasticity of between 3.5 and 5, and the most recent OECD estimate of a fall of 3.5% in real GDP in the OECD area in 2009, the deceleration in real trade would be between 12 and 17% in 2009 - in the range of estimates actually reported so far.

To further explore the relationship between trade and income during the current crisis it is worth asking how various expenditure categories (such as private or government consumption or investment) contributed to the collapse of imports and whether the actual collapse was deeper than what would be predicted from trends for these other expenditure categories. The so-called import adjusted decomposition of GDP growth (*e.g.* Kranendonk and Verbruggen, 2008) is used. Import demand is decomposed into smaller categories related to individual expenditure categories so that the total import is divided into subcomponents: imports for private consumption, imports for investment needs, imports for government consumption and for export needs (Annex A).

This approach first explicitly assumes that the rates of growth of domestic and imported goods are the same, so that purchases of domestically produced goods for private consumption grow at the same rate as the purchases of imported goods for private consumption, etc. This assumption allows an estimation of a composition of imports by these different expenditure categories; such a composition is not normally reported in national accounts. This, in turn, enables a calculation of the fall in imports that would be consistent with the actually observed behaviour of consumption, investment, government expenditure and exports. In reality, rates of growth of purchases of domestically produced and imported categories may well not be equal (*e.g.* because of a trade finance problem). In fact, this is an indirect way of finding out whether trade-specific factors were at work.

Annex Table B.4 presents the predicted proportional change in imports derived from point estimates of the estimated model[8] and the actually observed changes in imports in 2008q4, 2009q1 and, for France and the United States in 2009q2. One finding is that falling exports are the largest contributor to falling import demand across all G7 countries — a large part of the predicted trade collapse is associated with trade in intermediate inputs that are later exported. Other important contributors are private consumption and investment while government expenditure is not. This is partially due to the fact that government expenditure kept growing in the 2008q4 – 2009q2 period and partially the fact that imported products account for a small share of this category of expenditure.

In the group of countries where falling exports were observed before falling imports (Germany, France, Japan and to some extent Italy) the predicted reductions in imports are much closer to what actually occurred, compared to the group of countries where imports fell first (United States, United Kingdom). Notably, for Germany and Japan the actual collapse in imports was smaller than expected relative to trends in final demand. This means that in these countries, imports fell less than what would be predicted by this quarter's fall in final demand (in fact they were still growing at a positive rate) while, especially in Germany, the fall in 2009q1 was more or less consistent with what would be predicted if purchases of domestic products were falling at the same rate as purchases of foreign products.

For France, up to 40% of the import collapse in 2008q4 can be explained and progressively less so in the first two quarters of 2009 (29 and 21%, respectively). For Italy up to 30% of the import collapse in 2008q4 and 29% in 2009q1 is explained. For Canada and the United Kingdom we are able to explain up to, respectively, 22 and 26% of the import collapse in 2009q1, an improvement from the 2008q4.

In the United States, no more than 8% of the reduction in imports in 2008q4 can be explained by falling final demand and this share decreases to around 3-4% in 2009q1 and q2. In the United Kingdom and Canada the model is able to explain a small, but growing share of the actual import collapse

These results do not conclusively answer the question of what caused trade to fall. They do, however, point to considerable differences across countries and suggest that in some G7 countries the collapse in imports has been more pronounced than expected given the fall in domestic demand. This means that purchases of foreign products and services were falling faster than purchases of domestic products and services, especially in the United States. Albeit to a smaller extent (and with the exception of Germany), this has been the case in the European G7 countries and Canada. This suggests that other factors may have been at work. First, differences in the composition of trade and final demand could play a role. During downturns goods are found to be more vulnerable than services and services account for the bulk of final demand in high income economies. Second, analysis suggests that both the availability of trade finance and the cost of financing impacted trade flows during the 2008-09 crisis.

The rise in trade in intermediate inputs *per se* cannot explain the magnitude of the 2008-09 trade collapse

It has been hypothesised that trade has fallen so steeply in the current crisis because of the increasing fragmentation of production and the increasing role of imported intermediate inputs (*e.g.* Freund, 2009). Annex A addresses the role of intermediate inputs in world trade and explores the direct and indirect impact of increased demand on imports. In a given sector of the economy, the direct impact can be measured by looking at the share of imports in total output. An increase in demand generates additional output that leads to direct imports of goods and services as in the simple Keynesian model described in Annex A. However, there is also an indirect impact as additional output leads to an increase in the use of domestic inputs that also incorporate foreign inputs. The indirect effect summarises these additional imports. Annex Table B.5 presents the direct and indirect import requirements of OECD countries at the sector level.

The ratios in Annex Table B.5 indicate how many units of imports are induced by a 1-unit increase in final demand. For example, in the *agriculture and fishing* sector (the first industry in Annex Table B.5) an increase of USD 1 in final demand was associated in 1995 with a direct import requirement of USD 0.036 and an indirect import requirement of USD 0.089. Together, USD 0.125 of imports of agriculture and fishing products are generated with an additional dollar of final demand. The table shows that import requirements have increased for all industries between 1995 and 2005, with the exception of computer activities and other business activities. The combined direct and indirect effects can be quite high as in *Office Machinery and Computers*, *Refined Petroleum Sectors*, or in *Mining and Quarrying* activities. These sectors are particularly dependent on imports. Such high figures are

also explained by vertical specialisation and the fact that increased demand triggers a chain of additional imports from these sectors.

This analysis essentially relates the marginal propensity to import in the Keynesian framework (Annex A) to increasing vertical specialisation. It explains why the multiplier between the level of imports and the level of income increased over time but it cannot explain why the imports or exports to GDP elasticity would be higher during the 2008-09 crisis as compared to previous crises. In fact, the analysis provides a potentially important explanation as to why the ratio of imports to income has increased over recent decades, but as demonstrated below an increase in the imports-to-GDP ratio implies a fall in the imports-GDP elasticity.

Consequently, any mid-to-long-term process that changes the share of intermediate inputs in world trade can only influence the ratio of trade to income but not the elasticity between the two. However, short term events, such as a breaking up of supply chains during a crisis, could explain why the instantaneous elasticity of trade-to-GDP would be particularly high during a crisis. Small shocks on intermediate inputs can lead to a large drop in output because of the disruption in the vertical supply chain (Blanchard and Kremer, 1997). A slow-down in the activity of firms producing final goods can also have a higher impact on producers of intermediate inputs. As explained in Escaith and Gonguet (2009), a drop in final demand reduces the activity of downstream firms. In the context of a credit crunch, their first reaction will be to reduce inventories. The slow-down of activity in downstream industries can translate into a complete stand-still in upstream firms. When vertical supply chains are split across countries, these mechanisms explain the transmission of supply shocks and an amplification effect between the drop in demand and the drop in trade. These discrepancies are, however, temporary as at some point inventories have to be rebuilt and inputs provided by upstream firms have to match final output.

Events such as breaking up of supply chains are very erratic in nature and thus difficult to model in a systematic way; their contribution to the severity of the current crisis is ultimately an empirical matter and empirical evidence is, so far, quite mixed. Levchenko *et al.* (2009) investigated US trade data and found that trade fell systematically more in sectors that are used intensively as intermediate inputs. They interpreted this result as evidence in favour of the vertical linkages explanation of the trade collapse.[9] Three other studies summarised by Baldwin (2009) (Schott, 2009 for the United States, Fontagné and Gaulier, 2009 for France and Wakasugi, 2009 for Japan) looked at disaggregated trade data and decomposed changes in trade across existing trade relations (intensive margin of trade) and changes in the number of such relations (extensive margin of trade). They found that disruptions to supply chains did not occur during the current crisis and that the reduction in trade had been primarily driven by the fact that trading firms shipped less of the same products, not because trade relationships had been destroyed.

The impact of vertical specialisation on the severity of the trade collapse in the current crisis is therefore not unequivocal and may be in fact indirect. There are, for example, important compositional effects that are related to the functioning of global supply chains and vertical specialisation and that can explain the high observed trade to GDP elasticities. This issue is taken up in more detail below. How vertical specialisation undoubtedly contributed to the synchronisation and spread of the crisis across individual countries is also addressed.

Differences in the composition of trade and final demand can account for high trade GDP elasticities

The previous sections argued that the depth of the 2008-09 trade collapse was in fact not unprecedented nor entirely unexpected given the historical experience and the nature of accounting relationships between exports, imports and GDP. Compositional differences between trade and GDP can also explain the sharp fall in trade during the 2008-09 crisis. A steep proportional fall in trade is consistent with a less steep fall in final demand if the crisis causes stronger demand reductions for products that have a higher share in trade than in output. This can be illustrated with a simple example based on data for Germany which indicate that *Transport Equipment* accounts for 5.2% of GDP and for 20.2% of exports. If output of this product category drops by 50%, this would, other things equal, imply a roughly 2.6% reduction in GDP, but a reduction in trade of 10.1% (Francois and Woerz, 2009).

Because of vertical specialisation and the emergence of global supply chains, sectors such as fuels, machinery and transport equipment or other manufactured goods tend to have a higher share in trade than in GDP and these sectors are the ones with the deepest drops in trade and output following the crisis Annex Figures B.2 show the average share of vertical specialisation in OECD economies for 29 sectors. *Fuels, Machinery and Transport Equipment* have the highest shares. This is how we can link the reorganisation of world production to the "trade collapse" but these compositional effects are not limited to differences in the use of foreign inputs

Services activities are traditionally less vertically specialised and exports incorporate fewer imports (Annex Figure B.2.). This fact and the "resilience" of services trade to the financial crisis (Borchert and Mattoo, 2009) could be another explanation for the seeming disproportionate fall of trade. The year-on-year drop in imports or exports of services in the United States at the beginning of 2009 was 7% compared to 33% for imports of goods and 21% for exports of goods. These findings are supported by Araújo and Oliveira Martins (2009) who find that in most OECD countries the decline in trade in goods has been sharper than the decline in trade in services. If these trends are not a result of measurement problems[10] they could help explain the disproportionate fall in trade since the share of goods in trade for the OECD countries is in the range of 80% while their share in GDP is around one third. Indeed, year-on-year percentage reductions in goods exports and imports during the period 2008q4-2009q2 have been close to the reduction in manufacturing production in Japan and Germany, although in the United States, the drop in goods trade was twice as deep as the fall in production. For the OECD area as a whole, both exports and imports of goods fell by approximately 30% in 2009q1 while manufacturing production fell by approximately 19% (Annex Table B.6).[11]

Could the steep fall in trade be explained by an exceptionally steep fall in trade (and production) of certain crisis-stricken products such as *Machinery and Transport Equipment* of which motor vehicles and parts are a large part? This product category has been reported to have been hit particularly hard by the crisis and has been at the centre of the government stimulus packages in the United States and the European Union. The simplest verification of this hypothesis can be performed by comparing trade trends at product level. Annex Table B.7 presents monthly export and import performance by broad product category for individual G7 countries for the period up to May 2009. *Machinery and Transport Equipment* is the largest traded category of goods in the largest OECD economies and its overall contribution to the

reduction in total exports in the period January-March 2009 reaches up to 71% in Japan, 52% in Germany, and 45% in the United States. The high contribution is driven by both steeper than average falls in trade in this category and by the high share of this category in total trade.

Japan's exports in the category *Machinery and Transport Equipment* recorded the sharpest reduction across product categories (Annex Table B.7) (45% year-on-year fall in the value of exports),[12] but the falls have been steeper than average across all G7 countries for both exports and imports. In addition to accounting for large shares of trade *Machinery and Transport Equipment* also tends to have a higher share in exports and imports than in output or value added. In the United States, the shares in 2006 of *Machinery and Equipment* and *Transport Equipment* in exports were 39% and 20% while the corresponding shares of these product categories in value added were 19% and 11%. These shares vary by country, but for both of these product categories the shares in trade are higher than shares in value added (Annex Table B.8). This suggests that broad differences in the structure of trade and output can indeed be an explanation of their diverging rates of change. One estimate by Levchenko *et al.* (2009) is that the compositional effect accounts for between 50% and 100% of the fall in US trade.

The drop in "world trade" captures the synchronisation, but also masks important country heterogeneity

As Araújo and Oliveira Martins (2009) explained, the principal factor driving the exceptionally steep fall in world trade was the synchronisation of individual country reductions. Indeed, while for individual countries reductions in trade registered during the current crisis are of magnitudes similar to those recorded during past downturns,[13] when aggregated across the OECD or the world, they are unprecedented. In fact, high synchronisation seems to be the only feature that unambiguously distinguished the 2008-09 crisis from the past ones: suddenly more than 90% of OECD countries simultaneously recorded a year-on-year decline in exports and imports exceeding 10%.

While exports and imports were falling more quickly than final demand by 2009q1 in most OECD countries, there were some notable differences in the sequence of events and in the product composition of these changes. These differences suggest that it is very important to distinguish between exports and imports rather than talk about trade in general. Notably, in some countries (*e.g.* United States, United Kingdom) imports started falling earlier, sometimes preceding reductions in GDP, and they were falling more quickly than exports. In some other countries (*e.g.* Germany, Japan, France) reductions in imports were preceded by falling exports (Annex Figure B.3).

In the United States, year-on-year real GDP growth rates had been falling gradually since the last quarter of 2007. However, import growth rates had been falling gradually since mid-2006, more than a year before real GDP growth rates became negative in 2008q4 (Annex Figure B.3). Growth in imports had become negative three quarters prior to the crisis (2008q1) and imports fell progressively by -6.8% in 2008q4 and by -16.2 and by -18.6% in, respectively, 2009q1 and 2009q2. Growth in exports started falling only in 2008q3 and became negative in 2008q4, two-quarters after the beginning of the collapse in imports.

In Germany, real GDP and exports growth rates were falling gradually together since the end of 2006 (with a spike around 2008q1). Moreover, there was a tendency for exports to level off faster than imports. Indeed, German exports already recorded a year-on-year reduction in 2008q4 while imports were still slightly up. In 2009q1, exports were 17.5% lower than in 2008q1 while imports were only lower by 7.3%.

In Japan, as in Germany, real GDP growth rates started decreasing around the same time as exports growth rates. In 2008q4 Japanese exports were already lower by 13% as compared to 2007q4 and by a striking 36% in 2009q1. In 2008q4, imports were still up by 2.6% while in 2009q1 they were down by 15.3%. France can also be broadly compared to Germany in that exports growth rates started falling earlier and quicker, and fell below those of imports. In the United Kingdom, as in the United States, imports started falling earlier and quicker than exports.

These disparities across the world's largest economies suggest that a degree of caution is needed in seeking to identify a single cause of the 2008-09 trade collapse or any single explanation for the observed high elasticity of trade to GDP. In particular, these disparities may indicate that in some countries falling imports were the result of falling final demand while in some other countries falling exports could have been the cause.

Cross-country heterogeneity suggests a link with the unwinding of global imbalances

The differences in dynamics of exports, imports and GDP across OECD countries (Annex Table B.9) could be related to the process of unwinding of global imbalances identified in the literature as one of the root causes of the 2008 crisis. In any open economy, domestic macroeconomic imbalances between investment and savings are reflected in trade imbalances (recall the I-S=M-X relationship). Hence, a correction of such an imbalance can by definition happen either by a reduction of imports or an increase in exports. When the unwinding is particularly rapid, as during the 2008-09 crisis, falling imports are more likely to be the adjustment mechanism. This is indeed what seems to have happened in the United States (and to a lesser extent, in the United Kingdom) where the initial reduction in imports started early in 2008 and deepened dramatically towards the end of the year. These reductions in imports (and later in GDP) of important world traders must have had an impact on the exports of their trading partners. In fact, in Japan and European G7 countries' exports started falling earlier and quicker than imports and this came before falls in GDP which triggered falls in imports. These trends suggest that in some countries (*e.g.* United States, United Kingdom) the collapse of imports seems to have been more of an initial shock rather than a consequence of falling demand while in others reductions in imports were triggered by falling incomes.

Prices matter

Food, raw materials and oil experienced a steep run up in prices during 2008 and then fell sharply. These product categories account for high shares of world trade (*e.g.* fuels and lubricants and food products account for close to 50% of OECD exports). Consequently, distinguishing between values and volumes is important in the analysis of growth and trade trends. Price and volume data are not available in as timely a fashion as are value data and there are methodological problems with devising appropriate price deflators. Nevertheless, available OECD data suggest that

while the drop in trade volumes is not as dramatic as in values, the downward trend is nonetheless general (Araújo and Gonnard, 2009). In some cases the fluctuations in trade values were mainly price related (*e.g.* Norway and Italy), while in some other countries volumes dropped just as sharply as values (*e.g.* the United States and Turkey).

Another study (Francois and Woerz, 2009) estimates that roughly half of the drop in nominal US imports over the 12 months ending in February 2009 was due to a drop in raw materials (*e.g.* oil) which was in turn driven mainly by the collapse in commodity prices.[14] When trade flows are deflated by world GDP prices and PPP weights, changes in relative prices are not taken into account. The drop in world trade could for this reason be lower than what it appears to be. According to Bénassy-Quéré *et al.* (2009), deflating each trade flow by its specific price would lead to a predicted drop in trade of 2.4% in 2009 as compared to 8.9% when using GDP prices. Such a decline would be proportional to the drop in GDP measured with current exchange rate parities rather than purchasing power parities (-2.6%).

The availability of short-term trade finance provides a partial explanation for the 2008-09 trade collapse

The systemic nature of the economic crisis has precipitated a general and synchronised drop in activity on the interbank market, contaminating most banks in almost all regions. The synchronization and symmetry of the interbank market crisis has had two simultaneous effects. A price effect meant that the virtual absence of interbank and secondary markets pushed spreads to historic highs. Existing indicators of the price effect, *i.e.* the rising cost of financing through banks, during the crisis indicate that the increase was unprecedented in recent years. One common indicator of the cost of short-term financing in general (*i.e.* not just financing for trade) is the TED spread.[15] The TED spread, which has been climbing since mid-2007, rose sharply in 2008q3 to attain 233 basis points (2.33%) in 2008q4. This indicates an increase in the cost of funds which is unprecedented since the indicator began to be calculated.

A volume effect meant that banks reacted to perceived increased risk and higher liquidity costs by limiting their overall exposure. Furthermore, due to the collapse of some institutions and the financial constraints imposed on almost all banks, fewer banks remained active in the trade finance market. The volume effect, or the perceived fall in trade finance activity, has been sharp. Short-term trade finance[16] started falling in 2008q3 and continued to fall sharply through 2009q1, the period covered here (Figure 2.5). In 2009q1, short term finance fell by 11.5% overall compared with the previous quarter.[17] Trade finance to non-OECD countries fell more sharply than that to OECD countries. In 2009q1, short-term lending for trade by international banks to countries outside the OECD area fell by 14% compared to a drop of 10% on average to OECD. Trade finance to OECD countries fell earlier than to developing countries with some countries' level of financing decreasing already in 2008q2 (*e.g.* United States, United Kingdom).

Figure 2.5. Changes in short-term trade finance, quarter-on-quarter
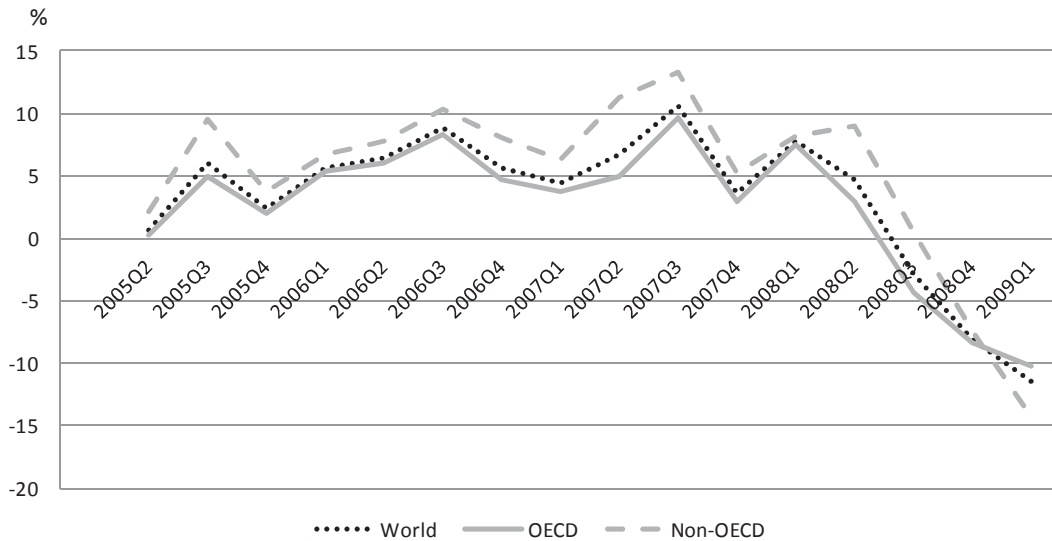
Data refer to changes in short-term export credit exposures that are insured by Berne Union member insurers.
Source: Berne Union.

It is difficult to determine with certainty whether trade finance activity has been hit more severely than other forms of bank financing (such as domestic financing, housing loans, etc.) due to a lack of strict compatibility among data sources. According to information presently available, the amount of short-term trade financing put into motion through insurers fell later, and less, than general short-term financing flows during the present crisis. One reason that trade finance may have fallen less than short-term finance more generally is that as perceived risk has grown, firms have turned more massively to bank-intermediated finance as opposed to intra-firm financing which has traditionally been a large part of trade finance. Over the last ten years, the financing of international trade has moved from letters of credit to open account and buyer/supplier relationships. In the current crisis, however, trading firms have moved back to letters of credit, bringing the banks back into the system. The numbers of SWIFT transfers through letters of credit or guarantees, which are more costly but also less risky forms of financing, fell slightly at the end of 2008 and beginning of 2009, but not nearly as much as indicators examined for trade finance more generally and for overall short-term finance.

Econometric results (Annex C) show a differentiated picture in terms of the impact of trade finance on trade pre-and post-crisis onset, pointing to a threshold effect. Indeed, trade finance availability seems to have a limited impact on exports under "normal" circumstances, *i.e.* outside crisis periods. According to model results, a 1% decrease in trade finance extended to a given country implies a 0.12% decrease in its imports in the period prior to the onset of the financial crisis, a relatively small effect. Once the crisis hit, however, the effect was multiplied by more than three. A 1% drop in trade finance during the crisis period implies a 0.39% drop in imports.[18] This is a significant effect and may explain some of the sharp fall in trade observed since 2008q2. The proxy for trade finance used here fell during the crisis (defined here as 2008q2 to 2009q1) by 25%. According to the model results, and keeping in mind all the caveats of data availability and estimation in times of crisis outlined

above, the drop in financing can be associated with up to one third of the observed fall in trade, a 10% drop in imports, other things being equal. The model furthermore suggests that about 36% of the drop in imports during the same period can be explained by the decline in GDP. This leaves close to one third of the fall in imports that can be ascribed to other factors such as the break in globally fragmented supply chains (see previous paragraphs in this section for a full discussion of this issue).

The analysis undertaken in this study suggests that both the availability of trade finance and the cost of financing impacted trade flows. The cost of financing, proxied here by high-yield spreads generally had no significant impact on trade prior to the onset of the crisis. In the crisis period, however, a one percentage point change in the high-yield spread can be associated with a 0.8% drop in imports and a 0.5-0.7% drop in total trade. Although this result implies a small effect on trade overall due to an increase in spreads,[19] it indicates that financing was probably prohibitively expensive for some traders.

Box 2.1. What is trade finance?

The exchange of goods and services between two firms can be paid for in different ways, primarily by cash payment at delivery- or by deferred payments. In the former case, the exporter extends credit to the importer during the delivery time of the goods. In the latter case some form of financing is put in place to enable the buyer to pay the seller according to a scheduled payment. Such financing of trade can take many different technical forms, and may or may not, involve financial institutions. For example, a seller can extend credit to the buyer and accept a deferred payment over a certain period of time, in one sum or in instalments, with or without the intervention of a bank.

Trade finance products typically include intra-firm financing, inter-firm financing or more dedicated tools such as letters of credit, advance payment guarantees, performance bonds, and export credits insurance or guarantees.[a] Among these products a traditional distinction is made between short-term trade finance products, which enable in various ways a deferred payment over a period of less than one year, and medium and long-term export financing/guarantees, which can be extended with repayment terms reaching or even exceeding ten years. Whilst the former financing facilities are typically used for trade in commodities, intermediate or consumer goods, the medium and long-term financing techniques are preferred in the case of exports of capital goods or goods with a longer useful life, and are sometimes part of projects which generate their own revenues and can service the debt incurred by the importer (project finance). Short-term trade finance is supplied primarily by private banks (bank-intermediated trade financing) and by firms (firm to firm or intra-firm credit).[b]

Methods of Payment in International Trade

International trade presents a spectrum of risk, which causes uncertainty over the timing of payments between the exporter (seller) and importer (foreign buyer). For exporters, any sale is a gift until payment is received. Therefore, exporters want to receive payment as soon as possible, preferably as soon as an order is placed or before the goods are sent to the importer. For importers, however, any payment is a donation until the goods are received. Therefore, importers want to receive the goods as soon as possible but to delay payment as long as possible, preferably until after the goods are resold to generate enough income to pay the exporter.

Selected types of Trade Finance credit mechanisms

Cash-in-advance

With cash-in-advance payment terms, the exporter can avoid credit risk because payment is received before the ownership of the goods is transferred. Wire transfers and credit cards are the most commonly used cash-in-advance options. However, requiring payment in advance is the least attractive option for the buyer, because it creates cash-flow problems. Foreign buyers are also concerned that the goods may not be sent if payment is made in advance. Thus, exporters who insist on this payment method as their sole manner of doing business may lose to competitors who offer more attractive payment terms.

Letters of credit

Letters of credit (LCs) are one of the most secure instruments available to international traders. An LC is a commitment by a bank on behalf of the buyer that payment will be made to the exporter, provided that the terms and conditions stated in the LC have been met, as verified through the presentation of all required documents. The buyer pays his or her bank to render this service. An LC is useful when reliable credit information about a foreign buyer is difficult to obtain, but the exporter is satisfied with the creditworthiness of the buyer's foreign bank. An LC also protects the buyer because no payment obligation arises until the goods have been shipped or delivered as promised.

Documentary collections

A documentary collection (D/C) is a transaction whereby the exporter entrusts the collection of a payment to the remitting bank (exporter's bank), which sends documents to a collecting bank (importer's bank), along with instructions for payment. Funds are received from the importer and remitted to the exporter through the banks involved in the collection in exchange for those documents. D/Cs involve using a draft that requires the importer to pay the face amount either at sight (document against payment) or on a specified date (document against acceptance). The draft gives instructions that specify the documents required for the transfer of title to the goods. Although banks act as facilitators for their clients, D/Cs offer no verification process and limited recourse in the event of non-payment. Drafts are generally less expensive than LCs.

Open account

An open account transaction is a sale where the goods are shipped and delivered before payment is due, which is usually in 30 to 90 days. This option is the most advantageous option to the importer in terms of cash flow and cost, but it is consequently the highest risk option for an exporter. Because of intense competition in export markets, foreign buyers often press exporters for open account terms since the extension of credit by the seller to the buyer is common. However, the exporter can offer competitive open account terms while substantially mitigating the risk of non-payment by using of one or more of the appropriate trade finance techniques, such as export credit insurance.

Payment Risk Diagram

_____
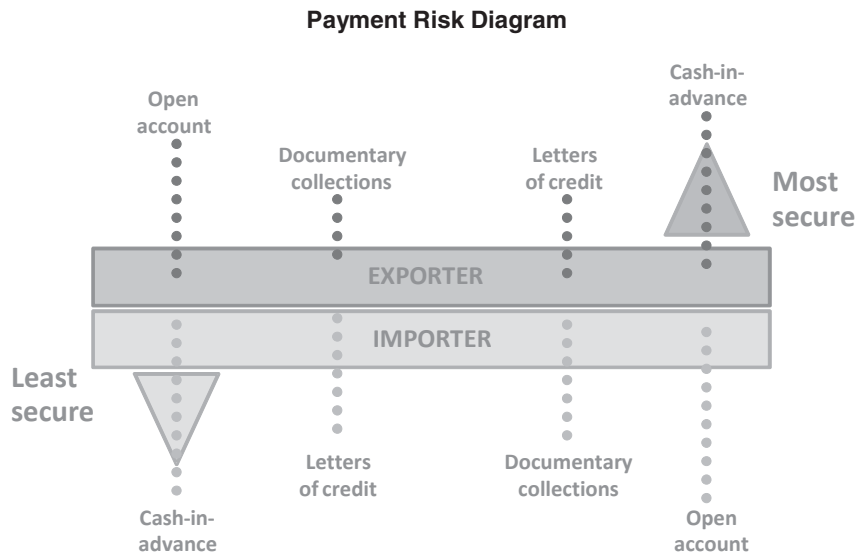
a. For a comprehensive description of these instruments, see Chauffour and Farole (2009).

b. One of the most distinguishing characteristics of trade finance as compared to other forms of credit is that it is offered and obtained not only through third-party financial institutions but also through inter-firm transactions. That inter-firm trade finance is so prevalent is typically explained by certain advantages that enable trading partners to better assess and mitigate risk than third parties (Chauffour and Farole, 2009).

Conclusions

At the end of 2008 and early 2009, world output experienced its sharpest drop since the Great Depression of the 1930s and global trade fell more sharply than during the Great Depression. Many commentators emphasised that fact that proportional reductions in trade flows have been much deeper than reductions in output. This phenomenon, dubbed the "trade collapse", triggered concerns that there might be particular factors affecting trade during the crisis, including worries about export credit shortfalls or protectionism. This introductory chapter has demonstrated that, in fact, other economic downturns have also been associated with steep falls in trade and that there are a number of reasons why trade can fall more sharply than output, even in the absence of a trade-related set of problems. These need to be addressed before the conclusion is drawn that the 2008-09 trade collapse itself is something that trade policy makers should be concerned about. This chapter used available trade and national accounts data to address some of these issues with a view to setting the scene for the analysis of policy responses to the crisis and their economic effects.

In several respects the severity of the 2008-09 trade reductions was not unprecedented after all and can be explained by a combination of three main factors: A collapse in demand, the disproportionate fall in outputs and trade of goods that make up a larger share of trade than of GDP, and the drying up of short-term trade finance. High synchronisation seems to be the only feature that unambiguously distinguished the 2008-09 crisis from the past ones.

The drop in demand has significantly contributed to the drop in trade but it cannot explain it fully. For example, in some countries the collapse of imports seems to have been more of an initial shock rather than a consequence of falling demand while in others reductions in imports were triggered by falling incomes. The differences in dynamics of exports, imports and GDP across OECD countries could be related to the process of unwinding of global imbalances identified in the literature as one of the root causes of the crisis. At the very least, they call for a clear distinction to be made by analysts between exports and imports, instead of considering "trade" in general.

Contrary to what is stated in some commentaries, the increasing importance of intermediate inputs in world trade flows cannot explain the high elasticity of trade with respect to GDP, though it can explain the observed increase in trade-to-GDP ratios and the high degree of synchronisation of output and trade collapse. On the other hand, compositional differences between trade and GDP did contribute to the severity of the 2008-09 trade collapse. They pertain to trade and output shares of goods and services, different shares in trade and final demand of various categories of expenditure or the product composition of trade and output of goods. For example, sectors hit hardest by the crisis such as fuels, machinery and transport equipment or manufactured goods tend to have a higher share in trade than in GDP.

Trade finance availability seems to have a limited impact on imports under "normal" circumstances but becomes more important during a crisis. The econometric analysis presented here suggests that both the availability of trade finance and the cost of financing impacted trade flows and could have together accounted for up to one third of the observed trade collapse.

These findings are consistent with findings of Chapter 3 which demonstrate that to date that there is no evidence to suggest that protectionism was a factor behind the trade collapse. While the possibility of protectionist forces gathering strength cannot be ignored, the immediate challenge at this stage is to ensure that behind-the-border measures that are found in the crisis-induced fiscal stimulus and support packages are identified and their trade impact properly understood. This is taken up in Chapter 4.

Notes

1. This elasticity is defined as a ratio of the year-on-year growth rate in imports to the year-on-year growth rate of industrial production.

2. The trade-output elasticity can be different from the trade-GDP elasticity since output includes intermediate inputs.

3. A more formal treatment of this issue is continued in Annex A. Additional tables and figures in support of the analysis in this chapter are contained in Annex B.

4. This is again based on the assumption that other expenditure categories do not change.

5. The relationship between trade and final consumption (also shown in Figure 2.4) is similar with wider variation as final consumption is only one component of GDP.

6. However, in the regression for the 2000s, the lags of imports and GDP are not significant and therefore some caution should be exercised.

7. To examine differences across countries, Annex Table 2.2 reports the results of similar regressions at the country level.

8. Annex Table 2.4 presents the results of estimations for each of the individual G7 countries for the period 1981q1 – 2008q2. The cut off at the second quarter of 2008 is intentional but the inclusion of data from the second half of 2008 and the beginning of 2009 does not significantly change the results. They reveal relatively similar import-adjusted contributions of individual expenditure categories to GDP across the G7 members, which is reassuring. Certainly there are some differences such as for example the relatively larger contribution of fixed capital formation to GDP and a relatively smaller contribution of exports in the United States or relatively higher contributions of private consumption in the United Kingdom and Japan but, overall, the structure of contributions is rather homogenous across the G7. Another property of these estimations is their relatively high explanatory power (with the exception of Italy) and high statistical significance of estimated coefficients.

9. These authors attributed this result to the possibility that "a dollar drop in imported final-goods purchases can lead to more than a one dollar drop in total trade".

10 What is currently measured as *services trade in balance of payments* data is different from what is measured as *services output or value added* in industrial data.

11. Because of lags in adjustment and the role of inventories, an exactly proportional relationship would not be expected.

12. Exports of *Crude materials* and *Mineral fuels, lubricants and related materials* generally experienced steeper reductions but their contribution to the overall drop was rather limited given their small initial shares in trade.

13. France in 1993, Japan in 2001 or the United States in 1965 had monthly growth rates of trade with negative values of 20% and more, similar to the figures observed in 2009. For more information, see Araújo and Oliveira Martins (2009).

14 Commodity prices, particularly in agriculture and natural resources sector, themselves explain some of what happened. Between 2008 and 2009, there were several factors specific to those markets and more or less independent of the crisis.

15. The TED spread is the difference between the interest rates on interbank loans and short-term United States government debt. The TED spread is calculated as the difference between the three-month T-bill interest rate and three-month LIBOR. The TED spread fluctuates over time, but historically has often remained within the range of 10 and 50 bps (0.1% and 0.5%). A rising TED spread indicates that liquidity is being withdrawn.

16. Short-term trade finance is proxied here by data made available by the Berne Union International Union of Credit and Investment Insurers. It refers to Berne Union members' direct insurance or lending. Short-term refers to insured export credits with credit terms up to and including 12 months; but typically transactions take place over 2-3 months. Insurance is contracted by private or public reinsurers. Short-term insurers generally insure firms that are extending credit to other firms, often using their working capital (*i.e.* credit has not necessarily been extended by banks for the transaction). The series refer to commitments, *i.e.* a limit extended by insurers. The limit can be utilised or not but since the cost of insurance is due in any case, there is an incentive to adjust the limit to close to the value of the traded goods. The actual limit may, however, be used more than once in the course of a year. Both goods and services are included although the majority of insured trade refers to trade in goods. Data are stocks at the end of each quarter.

17. It should be kept in mind that the proxy used here, short-term export credit exposures by Berne Union insurers, is incomplete. Much of trade finance takes place through other channels that are not captured in this proxy. This is, therefore, a best estimate given the lack of available data sources that would provide a more comprehensive picture of short-term trade finance, and should be regarded as such.

18. It should be underlined that these results are only indicative. Mathematical models oversimplify interactions and shocks in the global economy even during periods of relative stability. During a crisis period, the situation is never "other things equal", the condition sine qua non for interpretation of model coefficients. In the present model, we have the added difficulty of using a proxy for trade finance that in fact covers only one segment of the trade finance market. All other forms of trade finance, had they been covered, may have reacted differently in the current crisis, and may have had a different effect on trade than the proxy that was used here. These coefficients can therefore be regarded as the best estimates that exist in the context of a challenging exercise and should be used with caution.

19. High yield spreads increased from a low of 3-4% pre-crisis to a high of 16% after the onset of the crisis.

Chapter 3.

Policy Responses to the Economic Crisis

This chapter reviews policy measures that have been taken in OECD countries and other major economies in response to the crisis. The chapter is constructed around two axes. First, it provides an overview of policy responses directly affecting trade. Second, it reviews all behind-the-border developments observed after September 2008 that have had an indirect effect on world trade. Our analysis reveals that both measures facilitating and restricting trade have been introduced, but no strong pattern emerges concerning the profile of countries choosing one direction over the other. The frequency of measures has nevertheless been higher in sectors such as agro-industries, metal, chemical industries, and products originating from Asia. The amount of imports directly targeted by all new trade measures is relatively small, yet government intervention behind the borders has been extensive; so a priori, that is where the impact on trade could be the greatest. Lastly, a brief discussion of the trade impact of government procurement policies and interventions to support the financial sector has also been included in this chapter.

This chapter is presented in two parts. It presents a taxonomy and a conceptual framework to understand the possible effects on trade of policy responses made in the context of the financial and economic crisis. It then describes the main measures actually taken in OECD and major emerging economies, following the same general classification of measures. The conceptual framework and categorisation of measures will also serve as the basis for the policy simulations reported in Chapter 3.

It is necessary to first define what is meant by a trade effect. It should be noted that trade is not an objective in itself. What is important is to keep markets open such that recovery and rebalancing can take place in the most efficient way possible, ensuring that consumers and businesses have all the choices and opportunities that an integrated world economy brings.

There is a whole set of possible policy responses that, by definition, are negative for trade because by design and intent they restrict or distort trade or increase trade costs. Increases in tariffs, import bans, quantitative restrictions on imports or exports, and behind-the-border measures that explicitly discriminate against foreign goods or foreign firms all fall under this category. There is another set of measures that is difficult to evaluate. In the absence of a crisis such as the world has recently experienced they would be judged as distorting, but in the current environment, can be interpreted as correcting for a market failure. But even this type of measure, if left in place too long, may crowd out market measures and constitute a distorting subsidy.

Finally, there is a broad set of measures the intent of which was to rescue sectors considered of systemic importance to the economy (finance and banking), and monetary

and fiscal measures intended to boost growth and employment but which also affect trade. The scale of monetary and fiscal interventions is such as to change interest rates and the real exchange rate and these changes affect trade. The financial and banking interventions may also have implications for international financial flows, and for competition in the sector. These potential effects are described and acknowledged here but are not studied in any depth.

Individual components of the fiscal stimuli will also impact on trade in different and sometimes unexpected ways depending on the underlying structure of the economy, design features of the measures and on the import and export propensities of the sectors affected. A mercantilist view of what constitutes a trade-friendly policy response is entirely inappropriate in the current environment. Therefore, both the conceptual analysis to follow and the simulation analysis reported in Chapter 2, comment both on the impact on own growth and exports of the country taking the measure, and on the growth and exports of third countries. Short run effects may be quite different from long run effects and, in many cases, the boost to growth and trade from stimulus measures is quite transient or short-lived. This is also commented on where appropriate.

The conceptual framework

The typology we use here first divides measures into those with a direct impact on trade, and those that impact trade indirectly. The latter measures are divided into supply and demand side measures, which are then further divided into measures that are generic or economy-wide and those that are sector-specific.

The category of measures that impact trade directly includes all classical trade policy instruments ranging from tariffs, to trade remedies (safeguards, anti-dumping), export restrictions or distorting incentives (subsidies), quantitative non-tariff barriers (quotas, bans, licensing) and other regulations that increase trade costs. On the other hand, the category of measures with an indirect bearing on trade includes: (i) supply side measures which can broadly speaking target factors of production (capital, labour, intermediate goods and services), the fiscal burden on firm's operations (corporate taxation) as well as firms' access to credit; and (ii) demand side measures which target consumers and may be delivered in the form of tax reductions, direct grants (lump sum payments) or increases in social security spending. Increases in government expenditure involve adjustment of public rather than private demand, and therefore are also included in the category of demand side measures.

Measures with direct bearing on trade

Types of instruments

Import tariffs

A tariff is the most common instrument of trade policy corresponding to a tax on units of goods imported. Tariffs may be *ad valorem* or specific, and their impact on imports is negative. Tariffs generate government revenue but increase the price at which products become available to the consumer and reduce imports in favour of domestic production.

Low to moderate tariffs on final products are in most studies found to have relatively small effects on the economy as a whole.[1] However, the sectors that have been subject to increasing tariffs in the recent past are already highly protected sectors exacerbating already severe distortions in these markets. In most cases countries increasing tariffs have

used the margin between their bound and applied rates. Developing and emerging countries generally have more scope to increase tariffs in this way because the gap between their bound and applied tariffs tends to be greater. By creating uncertainty such moves may be more detrimental for trade than the standard welfare analysis would suggest. To the extent that countries have resorted to increasing specific tariffs or complex tariffs (with fixed and *ad valorem* components), the measures will be more damaging for trade.

About half of world merchandise trade and as much as three quarters of world services trade is in intermediate inputs (Miroudot *et al*., 2009). The incidence of direct trade instruments such as tariffs may be disproportionately felt in sectors characterised by highly integrated global supply chains, where vertical specialisation means that final goods contain a large number of intermediate components. First, since intermediate inputs typically cross borders several times, tariffs are additive.[2] Second, if tariffs on imported intermediate inputs are sufficiently high relative to tariffs on final products, the local industry is subject to a negative effective rate of protection. Tariffs on steel, for instance, hurt the competitiveness of downstream industries such as the car industry, and may destroy more jobs in that sector than they save in the steel industry.[3]

Export duties

An export duty is a more rarely used instrument, corresponding to a tax on units of goods exported. The purpose is to reduce the price of a good for domestic consumers and firms. The instrument is more commonly used in raw materials sectors or intermediate goods, with the purpose of lowering costs to firms using them as inputs. .

Export restrictions are by definition distorting for trade. While they artificially lower prices to consumers or domestic processing industries, they also distort the price signals to domestic producers and result in inefficient global allocation of resources. In general, they are used most frequently in emerging or newly industrialising countries, although their use is not widespread and recently they have tended to be removed or diluted. They are not at all or only weakly disciplined by WTO rules.

Non-tariff barriers

The non-tariff barriers' category includes a large variety of other instruments: Quantitative limits on imports or exports; licensing requirements; or safeguard restrictions all of which increase trade costs and create uncertainty. There is also the possibility that countries may resort to using technical or sanitary and phyto-sanitary measures in unnecessarily restrictive ways that can also increase trade costs and uncertainty.

Trade remedies

Trade remedies (*i.e.* anti-dumping and countervailing duties), are also mentioned in this report. While it should not be assumed that such measures are protectionist in intent, they are referred to because an increase in resort to such measures (for example, in the number of investigations initiated at the WTO) may be considered as an indicator of a rise in the general level of trade tension.

Access to trade finance

Trade finance products typically include intra-firm financing, inter-firm financing or more dedicated tools such as letters of credit, advance payment guarantees, performance bonds, and export credits insurance or guarantees. Short term trade finance has been significantly affected in the current crisis. Normally, a large and sudden increase in government involvement in these markets might lead to a suspicion of trade distorting subsidies and of crowding out of the normal market activities. In the recent environment, however, increased government involvement is more likely to have been with a view to remedying market failures, as trade between otherwise viable trade partners could not take place without such interventions.

Box 3.1. Vertical specialisation and the impact of direct trade policy measures

A simple stylised example presented in the figure below illustrates the distorting effect of tariffs on intermediate goods and services. It depicts four relatively high-technology sectors that are subject to vertical specialization, and that have been particularly hard hit by the crisis. The first bar for each sector shows the actual cost structure calculated from the input-output table of France in 2005. The two scenarios show the impact of an increase in lead time for imports by three weeks, assuming that one day extra is equivalent to a 0.8% increase in tariffs (Hummels, 2001).

Changes in cost structure, selected industries
if lead time for imports increased by three weeks
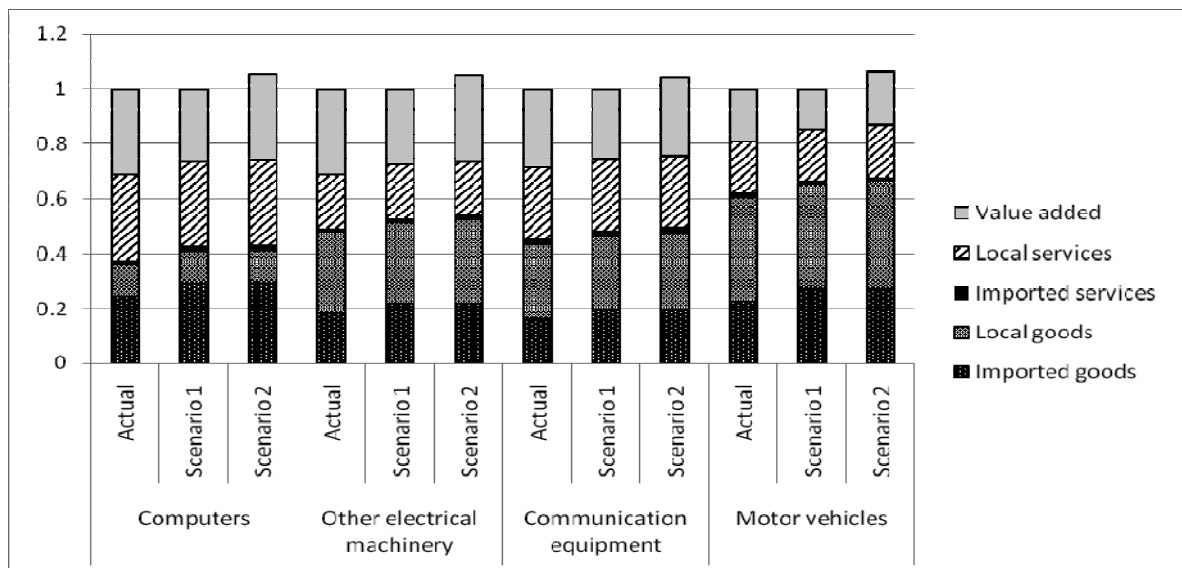
In the first scenario, it is assumed for each sector that the manufacturer absorbs the extra cost and does not raise the price of output. This would lead to a significant reduction in the profit margin and/or the wage bill. The figure shows the change in percentage points of total costs, where computers are the hardest hit, followed by motor vehicles. The largest change in value is however observed for motor vehicles because this is the most vertically fragmented of the four sectors, with the lowest value added share of costs. In the example, value added would fall by more than 20% if manufacturers could not pass the costs on to consumers.

In the second scenario, it is assumed that manufacturers pass on the full additional costs to consumers, which would add to the cost of locally sourced intermediate inputs as well. Prices would increase the most for motor vehicles, by about 6%, and could be a serious blow for the competitiveness of local manufacturers. This is of course a stylised example, but it does pick up the mechanisms through which trade barriers and additional regulatory burdens related to cross-border trade can be self-defeating.

Measures with indirect bearing on trade

There is an established literature on the trade impact of policy initiatives at the micro-level, as well as their impact on the economy as a whole. Economists generally evaluate such interventions in terms of the efficiency of resulting production patterns, and the cost of measures relative to the benefit they are designed to bring, using often the perfectly competitive market equilibrium as a starting point. Subsidies or taxes create a deadweight loss and can artificially move trade away from efficient market outcomes. Such policies are shown have a disproportionately high cost relative to the benefit they bring in terms of consumer and producer surplus. This type of analysis is undertaken in Chapter 4 for selected measures.

That type of welfare analysis may omit important dimensions related to the current circumstances. The crisis has created a number of new market failures, such as the drying-up of credit or uncertainty hindering the survival of otherwise efficient and well structured firms. It is important to acknowledge the benefits of measures that correct for these market failures.

It can be argued from first principles that the risk to allocative efficiency in an economy is much smaller if incentives are distributed in ways that are neutral as to the sector affected and as between foreign and domestic interests. A priori, broad-based incentives or general income support will also be less trade-distorting than expenditure targeted at particular industries or products. Indeed, government policies that support domestic production of specific products or services tend to be relatively trade distorting over all time periods. These general precepts form the background to much of the more detailed discussion of measures that follows. Important also is the fact that particular types of measures create rents which makes them much more difficult to phase out, so that negative impacts on efficiency or trade will be more prolonged over time.

Similarly support linked to investment or to research and development (R&D), if not encumbered by domestic-content obligations, is generally less distorting of the market for the output of the recipient industry than is support for production or the consumption of intermediate inputs, at least in the short term. By boosting demand for capital goods or for R&D services, however, it may stimulate trade in those goods while the support remains in place. Such support is generally easier for countries to bring to an end than are other forms of support.

As indicated at the outset of this chapter, for the purposes of describing possible trade effects, measures with an indirect bearing on trade are first divided into those whose incidence is on the supply or the demand side. Measures are then further divided according to whether they are generic (economy-wide) or sector-specific. Attention is also drawn to the impact on trade if measures in any of these categories also contain provisions that discriminate specifically against foreign goods or firms.

Demand-side interventions

Private Consumption — generic

Governments stimulate consumer spending by putting more money in consumers' pockets, typically by reducing income tax (or providing rebates) or increasing welfare payments. The effects of these measures on consumption of goods and services can vary. A large amount of the value of these types of transfers may simply be used by consumers to pay off debts, or be saved. There is less risk of leakage to savings if the stimulus to

consumption is given in the form of a reduction of sales or VAT tax, as goods or services have to be purchased in order to avail of the incentive. All such measures should boost trade (if the demand response is neutral in terms of domestic and foreign goods and services) and these types of measures are the least distorting in terms of trade effects.

Private consumption – sector or product specific

Sector or product-specific measures are much less trade neutral in their impacts. Typical product specific measures operate through grants to consumers who are willing to turn in an older version of an item to be scrapped (cars or household appliances). There is little danger of leakage into savings or debt reduction with this kind of measure as goods or services must be purchased in order to benefit from the measure although there may be substitution effects. Moreover, the effects of such schemes on demand for the subsidised goods are almost always positive in the short run. The extent to which they stimulate trade in the short run will depend in part on design features of the measure. Even without explicit discrimination against foreign goods there may be a risk arising from technical specifications determining which new products qualify for the subsidies. These may indirectly steer customers more towards domestically manufactured than imported models. If only domestically produced goods are covered, the effects on trade are highly distorting and there is a risk that any short term gains to the economy will be offset if retaliation occurs.

Consumer subsidies for the purchase of consumer durables, like vehicles, that discriminate against imported items have negative trade impacts both in the short and the longer term. In the short term, such subsidies may increase the overall demand for the subsidised products, and divert some domestic production to serving the domestic market that might otherwise have been exported, but likely the dominant effect is to steer consumers — not only buyers of new goods who would otherwise have postponed purchasing the good in the absence of the subsidy, but also buyers of new goods who were planning to make such a purchase in any case — towards goods made in the country and away from imports. Moreover, by reducing demand for the subsidised durable goods for several years after the subsidy has ended, it may reduce imports of the good even after the "buy locally made" preference has expired.

Government expenditure

Government expenditure is made up of different components with different trade intensity. A very large share of government expenditure relates to services such as social security, health and education which tend to have relatively low trade intensity. If government expenditure is increased proportionally across the different sectors of government activity, or indeed if it becomes more skewed towards these low trade intensity types of expenditures, at best there will be no boost to trade from the measures. On the other hand, if the emphasis is on investment type measures to improve infrastructure, trade impacts may be more or less positive depending on design features and composition of the programmes

Support for infrastructure is considered a form of demand stimulus, and therefore positive for trade. However, governments may seek to blunt the extent to which goods used in constructing the infrastructure are imported through restrictions on government procurement. Such restrictions are designed to favour domestic over imported goods, and therefore are likely to reduce trade in those goods, but they may also lead to inefficient

outcomes in the country applying the restriction. Supplying industries costs may be increased and the technical efficiency of the goods lower than if they had been sourced on the open market. Bottlenecks may be created because companies simply cannot source the intermediate goods they need from a domestic supplier. There is a danger of escalation if countries retaliate. Finally, there are transparency issues involved in such measures that make them difficult to track and evaluate. This is because implementation may be at sub-federal or sub-national levels of government but also because such provisions may be informal and not officially recorded.

Supply-side interventions

Generic corporate tax relief, or subsidies

Countries may seek to boost the after-tax income of industry by reducing the burden of corporate taxation — *e.g.* by reducing rates of corporate income tax. Ignoring the macro-economic effects of reducing tax revenues, and assuming that taxes are not increased elsewhere to compensate for cuts in corporate income tax, the effect of such a policy should be to enable more firms to stay in business than otherwise. In the current circumstances such measures may be solving market failures, assisting the survival of otherwise efficient firms. Trade impacts are ambiguous. The measures could boost economic activity and therefore act positively on exports and imports

Any attempt to favour only particular sectors will have negative impacts on trade and the economy generally. If such measures are confined to domestic firms only, even if there is a short lived boost to production and trade in the industry targeted, negative impacts on growth and trade will be even greater.

Labour market interventions

Interventions in the labour market can take three forms. They can consist of benefits to firms (wage or other forms of subsidies); income benefits to the unemployed (also mentioned under demand side measures); or investment in human capital (through programs for re-training) open to both employed and unemployed.

The effects of wage subsidies on trade will vary with a country's macroeconomic situation. Depending on conditions in the labour market at the time that a wage subsidy is introduced, for example, it may simply increase the wage rate compared with the market-clearing price. In the absence of the subsidy, some workers might withhold their labour and fall back on government assistance rather than work for a wage that would be low enough to keep firms from shedding labour. In that case, more workers will be producing more goods than would be the case in the benchmark situation. Assuming that the distribution of subsidised jobs is similar to that of unsubsidised jobs, more economic activity will translate to some increased trade.

One possible policy response is to increase spending on benefits for the unemployed. Such measures have the same impact in the economy as those targeting private consumption on the demand side. They are rarely related to the operation of firms. They can act as a disincentive to job searching. The impact of such measures in correcting for unemployment may therefore not be positive.

One the other hand, measures for investment in human capital do have an impact on the productivity of domestic firms and therefore an indirect positive effect on trade. Such

interventions are similar to investment in capital or R&D which are more extensively analysed below.

Incentives affecting capital

Measures in the direction of easing the supply of capital can take many forms – from government grants, investment tax credits, subsidised loans, to loan guarantees linked to investment in capital. Additionally investment incentives (notably tax concessions and subsidies in kind) may be provided, often by sub-national governments to entice capital investment to their jurisdictions. Their main effect is to lower the cost of investing in the targeted sector, and to increase the amount of productive capacity beyond that which would have been created in the absence of the measures.

Such subsidies are likely to affect both trade in the capital goods stimulated by the investment incentives and, over the longer term, in the goods or services produced by the subsidised industries. As demand for capital goods increases, the likelihood is that some of those goods will be produced domestically, and some in other countries. Exports of those goods by domestic suppliers will perhaps decline, and imports to the subsidizing country will increase. If demand is increased to the extent that it strains existing foreign capacity, the subsidizing country may end up diverting trade to itself, and decreasing exports by those foreign suppliers to other countries. After the investment is made, production in the subsidizing country will increase, possibly displacing imports or increasing exports.

An explicitly discriminatory provision in favour of the local content can complicate the trade incidence of such measures. The trade effect of such a subsidy tied to a local-purchase obligation will depend on a number of factors. If the recipient industries would not have purchased the machinery in the absence of the subsidy, then the subsidy may serve to increase their capacity. This would eventually reduce imports (or increase exports) of the end product, generally at the expense of exporters of that product. However, for the end-product producers to receive a net economic benefit from the subsidy will depend on whether the domestic-made machinery is no more expensive than the gross value of the subsidy — otherwise, the subsidy just becomes a transfer to the domestic machinery manufacturers, with the subsidy recipient simply serving as an intermediary. If the initial subsidy recipients increase their purchases of domestic-made capital goods as a result, then foreign suppliers of the same goods (and, ultimately, of parts) could see a decline in their exports to that country.

One advantage of government policies to stimulate capital investment is that they can be more easily withdrawn than assistance that reduces the operating costs or increases directly the income of producers. Firms in the subsidised sector suffer no losses from withdrawal of the subsidy, and although suppliers of the capital goods may experience a drop in sales, that decline may be mitigated by normal growth.

Measures targeting foreign capital flows will have very direct trade impacts. Through various complex interactions, commercial presence of foreign firms in a market stimulates trade strongly. Therefore all measures taken in the direction of facilitating the entry, and operation of foreign capital can be considered as positive for trade. On the other hand, measures that discriminate against foreign capital movements (FDI) could be extremely detrimental to trade in the longer run.

Research and development

This is perhaps a special case of governments providing incentives to investment – in this case in the form of technological assets of firms. Such programmes seek to stimulate research programmes, in order to replace declining expenditure on R&D from the private sector, and thus to stem a rupture in research and to reduce the risk that top researchers will migrate elsewhere; to address pressing social priorities, especially related to public health; and to invest in knowledge creation that, governments hope, will help in the economic recovery.

In the short run, the trade effects of general government expenditure on research are likely to be small, leading to slightly increased demand for goods like laboratory materials, some of which may be imported. Over longer-term periods, it is the fruits of such R&D that will increasingly affect trade flows. If the R&D leads to the development of new or improved production processes, then certain sectors may benefit from reduced costs or enhanced product quality, which may stimulate demand for those products, both at home and abroad. New knowledge tends over time to leak out from the countries that create it, however, other producers may also benefit from the R&D, making the effect on trade difficult to predict. That is even more likely to be the case where R&D is channelled into projects involving international collaboration.

A crucial question is who benefits from the intellectual property generated from the R&D. Most basic research, unless it is conducted in secret, produces knowledge that spills over to other users. It is one of the justifications for government expenditure on research. The closer government-funded R&D projects target specific products; however, the easier it is for the (usually mainly domestic) private participants in such projects to appropriate a greater share of the economic benefit of their inventions or innovations.

The advantages for producers of government expenditure on R&D normally are realised only over the medium to long term. This implies that trade effects become evident only over similar time horizons.

Other cost-reducing measures

Governments could attempt to reduce industry costs by subsidizing the markets for intermediate inputs such as energy. In general, input subsidies are typically provided through administrative pricing decisions in countries that regulate the prices of electricity or fertilisers.

Measuring the subsidy element in administrative pricing decisions is not simple. Generally, a subsidy tied to the use of a particular input distorts the market for the intermediate good in question. Whether it actually causes trade distortions depends on the elasticities of supply and derived demand for the good in question. A subsidy for an intermediate good in limited supply may simply drive up the price of the good, leaving the subsidy recipient with no net benefit. However, it is more likely that governments will subsidise intermediate inputs in surplus relative to demand. In that case, the subsidy may reduce the operating costs of producers that use the intermediate input, to the disadvantage of foreign competitors.

Measures taken in response to the crisis

This section provides a highly summarised account of the policy measures that have been taken in OECD countries and other major economies in response to the crisis. The description of measures follows the general structure of the previous section. First, policy responses that are directly trade-related are reviewed; that is, those that involved instruments directly affecting imports and exports of goods and services. Then "behind the border" measures, most if not all of which have been shown to also potentially bear on trade more indirectly, are reviewed.

It is not the intention to duplicate the monitoring efforts of international organisations with already well established (or newly strengthened) monitoring mechanisms, in particular the WTO which has reported frequently and in detail throughout the crisis on trade and trade-related measures taken by countries. Rather, this section gives a very brief summary of what has been reported elsewhere (including in OECD), highlighting generic categories of measures and giving broad indications of their relative significance.

Several international organisations report on recovery measures taken by governments during the period September 2008 through to August 2009. The main sources of information for the measures discussed in this report are the following:

- OECD Directorate for Financial and Enterprise Affairs, *Report on Investment Policy Measures Taken in the Period November 2008-June 2009*.

- OECD Economics Department, *Outlook Reports, Going for Growth, 2010* and informal reports.

- OECD, Directorate for Employment, Labour and Social Affairs, *2009 Employment Outlook – Tackling the Jobs Crisis*.

- World Trade Organisation (WTO), three reports (26/01, 14/04 and 13/07) from the Director General on the Financial Crisis and Trade-related Developments, covering the period September 2008-June 2009 and one report *Annual Report to the TPRB* Trade-related developments during the twelve months from October 2008-October 2009.

- OECD, WTO, UNCTAD, *Report on G20 Trade and Investment Measures* covering the period up to August 2009 (A second report is available covering the period up to February 2010, but was released too late for measures reported to be included here).

- European Commission, *Assessing Progress with the European Economic Recovery Plan*, report covering the period December 2008-May 2009.

- International Labour Organisation (ILO), *Trade and Employment in the Global Crisis*.

- United Nations Conference on Trade and Development (UNCTAD), *Report on Investment Policy Developments in G20 Countries*, covering the period October 2008-June 2009.

- Centre for Economic Policy Research (CEPR), *The Global Trade Alert Report*.

The press is a valuable source of information for recovery measures providing policy information that has not yet found its way into official monitoring efforts. This type of information is used with appropriate caution. Policy responses can take various forms which will not necessarily be mentioned in official documents, for example a change in an existing social policy. Also, expenditure will increase on many programmes of an

entitlement nature as automatic stabilisers are triggered. Here, the description of measures is limited to those of a concrete regulatory nature, which have been both confirmed (by international organisations or the governments) and implemented.

A number of general remarks can be made about the analysis that follows. First, the world's largest economies have been the most active in implementing recovery measures. This may be simply because they were the economies hardest hit by the crisis, but it could also be explained in terms of their capacity to implement measures during periods of difficulty. Small countries, took more limited action. Moreover, countries that were particularly severely hit by the crisis (including two OECD members that received external support from the International Monetary Fund: Iceland and Hungary) took measures in the direction of fiscal consolidation and monetary tightening as part of austerity programs to stabilise their economies (IMF, 2008a and IMF, 2008b).

Second, direct trade policy instruments have not dominated the policy responses to the crisis; rather, commitments to stay open to foreign products and services have been taken and seem to have helped countries to resist protectionist pressure, alongside the constraints stemming from the WTO's rules-based system. On the other hand, government intervention behind the borders in order to restore economic growth has been extensive; *a priori*, this is where we might expect the impact on trade to be the greatest.

Measures both facilitating and restricting trade have been introduced, but no strong pattern emerges concerning the profile of countries choosing one direction over the other. A pattern can be observed, however, in the sectors and the partner countries on which some of the trade restricting measures were focused. For instance, following a pattern observed in previous years, there has been an increase of measures specific to products from China, Thailand and Indonesia. Measures targeting products from OECD countries were rarer.

In what follows, we explain the rationale behind the measures taken as documented in government and international organisations' reports. We then describe the actual instruments used along the two lines previously mentioned: of measures directly or indirectly related to trade. Apart from fiscal responses and regulatory measures, countries have also used monetary policy instruments in order to accelerate the recovery from the crisis. Exchange rate adjustments were substantial, and all major central banks cut interest rates in order to ease the flow of credit and investment in the markets. Although those instruments have an indirect impact on trade flows, they will not be covered in any depth here since they are less subject to choices made by governments. The analysis is completed with examples of recorded policies, as well as tables illustrating the fields in which each country has been active.

Rationale behind these measures

This crisis has been marked by an unprecedented level of international co-operation. The spread of the crisis across many economies in a short time period, as well as similarities in both drivers and effects across markets has brought the necessity for a synchronised response into sharp focus. The G20 meetings held in November 2008, April and September 2009 produced firm commitments (for example, in the area of trade finance) and anti-protectionist pledges, in a continuously broadening international economic agenda. While there was less agreement on the precise route to recovery, there was an established consensus on the benefits from a coordinated response, which (i) avoids accentuating pre-crisis asymmetries and failures in international markets

(ii) widens assistance in policy, technical, and economic terms to countries needing it
(iii) provides re-assurance concerning stability and coherence of broad economic policies in future.

The policy objectives of measures that were introduced in developed countries were expressed by the G20 leaders during their November 2008 statement: "To stimulate the economies, provide liquidity, strengthen the capital of financial institutions, protect savings and deposits, address regulatory deficiencies, unfreeze credit markets, and to ensure that international financial institutions can provide critical support for the global economy". As an immediate step in order to achieve these objectives, a decision was taken to use all instruments available for state intervention including fiscal, monetary, and credit support. A detailed examination of individual plans of three major economies, the United States, the European Union and Japan, reveal that they share three major objectives:

- reduce the human cost of the economic downturn: all the three recovery plans have specific provisions for labour – that is, to minimise job losses and ensure adequate income support for the less wealthy members of society;

- boost demand in order to stimulate growth; and

- support investment in specific sectors in line with the country's long-run economic and social objectives. The three recovery plans make reference to supporting innovation and technological progress. The environment is included as a high priority area in a number of countries' plans (China, Korea, European Union, Japan and the United States), while Canada also put particular emphasis on local economies and the primary sector.

Trade issues have also received great attention, with major economies re-stating their commitment to keeping markets open and resisting protectionist pressures. Following that principle, the G20 leaders' statement includes a "Commitment to an Open Global Economy" where countries commit to:

- Refrain from raising new barriers to investment or to trade in goods and services, imposing new export restrictions, or implementing WTO inconsistent measures to stimulate exports;

- minimise any negative impact on trade and investment of domestic policy actions including fiscal policy and action in support of the financial sector; and

- strive to reach agreement this year on modalities that leads to a successful conclusion to the WTO's Doha Development Agenda with an ambitious and balanced outcome.

Policy measures directly affecting trade

In its July 2009 report, the WTO Secretariat notes that in contrast to the number of measures observed during the same period in 2008, "the number of new trade-restricting or distorting measures announced or implemented since 1 March 2009 exceeds the number of new trade-liberalizing or facilitating measures by a factor of more than two." The measures have, principally, been introduced in specific sectors and rarely have general applicability. In most cases, restrictions also target products from specific sources.

There are examples of both restricting and opening measures in all the major sectors of economic activity. Generally speaking, non-OECD and non-WTO members have

resorted more often or more broadly (number of tariff lines) to increasing tariffs than OECD countries where tariff increases were generally very limited in scope. In the case of many emerging and developing economies, some tariff reductions or eliminations also occurred which makes it difficult to get a clear picture of the overall intent or effect. Among OECD countries there were also significant market opening measures, including an across the board reduction in tariffs by Mexico. A closer look at the number of policy initiatives shows that the frequency of restricting measures has been significantly higher in sectors such as agro-industries, metal and chemical industries. With the exception of trade in chemicals, these are sectors that were already subject to high trade barriers in the pre-crisis period.[4] Measures were also recorded in the automotive industry, and in textiles. These are worrying developments as they exacerbate distortions in sectors already subject to tariff peaks. Trade in services has been much less affected by the crisis for two reasons (Borchert and Mattoo, 2009): demand for a range of traded services is less cyclical and services trade and production are less dependent on external finance. Consequently, measures in these sectors were rare and mostly in the direction of further liberalizing, rather than restricting, trade.

Table 3.1 shows that a significant number of non-tariff measures were activated to restrict trade, such as the introduction of licensing requirements, quantitative export restrictions and safeguard measures. Bown (2009b) reports that while the number of antidumping cases in 2009 has levelled off after the initial escalation associated with the crisis in 2008, the use of safeguards spiked more recently. It is worth noting that developing countries accounted for almost 80% of all anti-dumping initiations for the period October 2008-October 2009, which mainly targeted other developing countries (WTO, 2009c).

Nevertheless, despite the increasing use of those instruments, the amount of imports targeted by all new measures thus far is relatively small. With the exception of India, country-by-country estimates indicate that new trade restricting measures thus far covered only 0.2% to 0.8% of the total pre-crisis (2007) level of imports (Bown, 2009a). These rough estimates were confirmed by the WTO in its latest monitoring report (2009c) where the share of the value of trade covered by new trade-inhibiting measures was evaluated at a maximum level of 1% of total world imports (Table 3.2). It should also be noted that this 1% estimate may overestimate the share of trade affected by crisis-related measures as the coverage is broad and includes the full range of trade remedies. The value of imports affected can be further allocated across sectors with shares ranging from 0 to 10%. Higher shares are observed in the agriculture sector as well as in the basic metal industries. Of the total affected imports, 36% were agricultural and 29% basic metal. The gap between estimates for those particular sectors and the rest is large, confirming that trade policy during the crisis has had very specific targets, following patterns already observed in the past.

Table 3.1. Measures directly affecting trade (by country)

Implementing country	Measures (September 2008 - August 2009) (1)								
	Trade-distorting					Trade-opening			
				Non-Tarriff				Non-Tarriff	
	Import tarriff	Export duties or distorting incentives	Non-trade restrictions	Anti-dumping or countervailing duties (2)	Investigations	Import tarriff	Removal of export distortions	NT facilitations	Access to credit
Australia					●	●			
Canada	●		●	●	●	●			
Iceland									
Japan			●						
Korea	●				●				
Mexico (3)	●		●		●	●			
New Zealand									●
Norway									
Switzerland (4)		●						●	
Turkey	●		●		●				●
United States	●	●		●	●				
European Commission		●		●	●				●
Non-OECD countries									
Brazil	●	●	●	●	●	●			●
China		●	●		●	●	●	●	
India	●	●	●		●	●	●	●	●
Indonesia	●		●		●	●		●	
Russia	●	●	●		●	●	●	●	
South Africa	●				●	●			
Application		Sector-specific	Sector-specific	Sector-specific	Sector-specific		Sector-specific	Sector-specific	Economy-wide
Examples of measures included in the category		Export duties; duty refunds; VAT remission; export subsidies	Import quotas; licencing requirements; safeguard measures; import ban; quantitative export restrictions on raw materials					Import permission; currency swaps to facilitate trade; authorisation and export licencing	

1. Clearly the different measures recorded here differ in the degree to which they distort or restrict trade or in terms of their significance as market-opening measures.

2. All trade remedies introduced during the reference period are included in this table, independently of their expiry date. Measures that were taken and terminated during the reference period are included as trade-distorting. Measures that were initiated before the outbreak of the crisis are not considered relevant and therefore are not included in the table even if they were terminated during the reference period.

3. Mexico's Suspension of preferential tariff treatment on 90 tariff lines of goods originating from the United States, was authorised by a NAFTA panel ruling as a response to an assessed lack of compliance by the United States with commitments regarding cross-border trucking services. See Ruling on Cross-Border Trucking Services (USA-MEX-1998-2008-01) issued on 6 February 2001.

4. This relates to a temporary export restitution for cream which was *de facto* terminated in September 2009.

Table 3.2. Value of trade covered by new trade measures, October 2008-October 2009

Description	HS code	USD million	Share in total affected imports	Share in total world imports
Total world imports		**16 011 892**		
Total affected imports		161 339	100,0	1,01
Agricultural products	01-24	57 199	35,5	0,36
Minerals	25-27	7 038	4,5	0,05
Chemical and products	28-38	6 451	4,0	0,04
Plastics and rubber	39-40	6 629	4,1	0,04
Hides and skins, leather, etc.	41-43	205	0,1	0,00
Paperboard, fibreboard of wood	44-49	1 642	1,0	0,01
Textile, clothing and footwear	50-67	11 267	7,0	0,07
Ceramic glassware	68-70	342	0,2	0,00
Precious stones, etc.	71	19	0,0	0,00
Base metals and products	72-83	47 165	29,2	0,29
Iron and steel	(72-73)	(45 514)	(28,2)	(0,28)
Other base metals	(74-83)	(1 651)	(1,0)	(0,01)
Machinery and mechanical appliances	84-85	14 975	9,3	0,09
Transport equipment	86-89	4 893	3,0	0,03
Precision materials	90-92	2 436	1,5	0,02
Other manufactured materials	93-97	808	0,5	0,01

Excluding Korea's fuel imports.

The OECD-WTO-UNCTAD report from which this material is drawn states that the inclusion of any measure implies no judgement by the WTO Secretariat on whether or not such a measure or its intent is protectionist in nature. Moreover, nothing in the table implies any judgement either direct or indirect on the consistency of any measure referred to with the provisions of any WTO agreement or such measure's impact on, or relationship with, the global financial crisis.

Source: WTO Secretariat estimates, based on *UNSD Comtrade database*.

Some types of trade-policy instruments have been used very little during the crisis. New export restrictions were introduced in China (for bauxite, coke, magnesium, zinc and silicon metal, among others).[5] New quotas on imports or exports were applied in Canada and Russia (milk protein substances, meat, poultry and pork), while Switzerland eliminated a similar provision for milk. New licensing and registration requirements have only been recorded in Indonesia (for food and beverages, electronics, footwear and garments). In a small number of cases export subsidies have been introduced or re-introduced, usually in agriculture. Export subsidies are among the potentially most trade distorting measures.

The new trade-facilitating initiatives do not follow clear sectoral patterns in the same way as observed for trade-restricting measures. It is, nevertheless, noteworthy that major developing or emerging economies have been more active in implementing such measures. Only Canada, Australia and Mexico among the OECD countries have adopted a broad policy to reduce tariffs. In India and China, tariffs and export duties were reduced widely as part of packages of measures adopted to facilitate trade. It is important to underscore however that those measures were taken along with many others of a restrictive nature. Whether openness of the economy as a whole was reinforced in those countries will only be able to be assessed in the future; that is, when comparisons to pre-crisis levels of trade flows become again meaningful.

Due to the financial nature of the current crisis, trade finance has also received attention during the design of the latest trade policies. Measures aiming to facilitate access to export credit were taken in many economies, such as in Brazil, the European Union, and India. Following the April 2009 G20 meeting, where a USD 250 billion pledge was adopted in the area of short term trade finance, 36 countries agreed at the OECD to worldwide export credit support to help boost international trade and investment. It is noteworthy that most countries have also implemented measures to facilitate the flow of credit to firms in difficulty, regardless of the international character of their operations. Those measures could also have filled a need related to trade.

Global foreign direct investment has fallen sharply since the onset of the crisis – by 14% in 2008 with a decline of 30-40% forecast for 2009. The fall is affecting all components of FDI, equity investment, reinvested earnings and other capital flows such as inter-company loans. These trends are most probably directly related to the crisis itself and are not indicative of an increased or worrying resort to investment-restricting measures. In fact as reported by the OECD/WTO/UNCTAD (2009), to the September 2009 G20 meeting, investment policy measures paint a reassuring picture. Only a few measures could be characterised as being restrictive towards foreign investment and indeed a substantial number of policy changes surveyed were directed at facilitating international investment. A note of caution is sounded however, particularly with respect to disguised discrimination against foreign investors that could occur where governments have entered into direct negotiations or become deeply involved in management of troubled companies. Transparency and accountability mechanisms will be particularly important in limiting this kind of development.

Measures with indirect bearing on trade

Measures taken behind the borders are generally intended to stimulate demand, ease the pressure on the supply side of the economy, and provide emergency injections to financial and other sectors at risk. This type of economic policy response would seem a priori, to have been more important than the use of trade instruments; hence we could expect also that significant implications for trade and for the international trading system may be found mainly in an exploration of these measures. As already noted in the introduction to this chapter, these measures, especially those taken in the financial sector, aimed to stabilise the sector and stave off systemic risk threatening the global economy. In other words trade was not the target of the measures (except in the specific case of trade finance) and any impacts on trade are in the nature of unintended or side-effects. Nonetheless, they warrant attention, both to improve understanding of the ways in which different measures may impact on trade and to assist policy makers in the design and implementation of exit strategies.

Table 3.3 gives an overview of the main types of measures that have been taken. As in previous sections, a distinction is first made between demand and supply side measures. A further distinction relates to whether measures are generic or sector specific. Specific discriminating (against foreign goods or firms) provisions are identified. Supply side measures are divided into those targeting, capital, labour or intermediate inputs.

Table 3.3. Behind-the-border measures indirectly affecting trade
(by implementing country)

Implementing country	Amount of the Fiscal package (%GDP) (5)	Measure (September 2008 - August 2009)							
		Demand		Supply					Financial sector rescue measures
		Government spending	Private consumption	Capital (Private)		Labour	Direct subsidies (or tax cuts) to producers	Credit facilitation	
				Domestic	FDI				
Australia (1)	0,9	▤■	■		■	■	□	□	□
Canada		■	■		■	■	□	□	□
Iceland									
Japan	2,3	■	■□		■□	■	■□	■	□
Korea	1,1	■	■□		■	▤■	■□	■	□
Mexico	4,7		□		■	■	■		
New Zealand	3,7	■	■						□
Norway	0,6	■		□			■	■	
Switzerland	0,3								□
Turkey (2)			□	■		■		■	
United States	5,5	▤■	■□	□	■	■	□	□	□
European Union									
Austria			□	■		■	■□	■	□
Belgium	0,6			■		■	□	■	□
Czech Republic (3)			□	■		■	■	■	
Denmark (2)						■	■		□
Finland (3)		■		■		■	■	■	□
France	1,3	■	■□	■		■	■□	■□	□
Germany	1,6	■	■□	■	■	■	■□	■	□
Greece			□			■	■□	■	□
Hungary	4,0					■	■	■	□
Ireland			□			■	□	■	□
Italy	0,3	■	■□			■	■	■	□
Luxembourg (4)			□	■		■	■	■	□
Netherlands	1,0	■	□	■		■	■□	■	□
Poland			□	■	■		■□	■	
Portugal	1,3	■	□			■	■□	■	□
Slovak Republic			□	■		■	■□	■	
Spain	8,1	■	■□			■	■□	■□	□
Sweden						■	□	■	□
United Kingdom	0,9	■	■□			▤■	■	■	□
Non-OECD countries									
Brazil	0,2	■	■□	■	■	■	□	□	
China	6,9	▤■	■□	■	■	■	□	■	□
India	0,3	■	■□		■	■	■	■	
Indonesia (2)(4)	0,9	▤■	■□		▤■	■	■□	■	
Russia	1,1	▤■	□			■	■□	□	□
South Africa	3,8		■		■	■			
Application		Economy-wide only		Economy-wide only		Economy-wide only			Sector-specific only
Examples of measures included in the category		Infrastructure for transports; schools; hospitals; grants to local governments		Tax or regulatory measures to support investment in physical private infrastructure; Rules governing the depreciation of capital; Industrial structure adjustments; Special loans for deployment of efficient innovations	Foreign entry incentives; facilitation of the operation of MNEs; FDI-specific taxation measures	Cutting on labour costs and employer's contributions; incentives for new hires; temporary employment programs; adjustments of unemployment benefits; retraining and activation	Direct state aid payments; Reductions of sales taxes; subsidised loans; speeding up the payment of governments bills.	State guarantees for credit; roll-over of loans; subsidised interest payments; subsidised guarantees; Adjustment of venture capital schemes; export credit guarantees.	

■	Economy wide
□	Sector specific
■□	Both economy wide and sector specific
▤	Negative provisions related to foreign interests

1. Provisions for the preferential treatment of firms from Australia and New Zealand in government procurement have only been observed in one state of Australia, New South Wales. No implementing guidelines have been issued, or measures put in place activating the policy (*Source*: WTO, 2009c).
2. Credit facilitation relates only to exports.
3. Credit facilitation relates to exports, but not only.
4. Both negative and positive provisions for FDI.
5. *Source*: ILO (2009). The amounts are taken for a horizon of two years. They exclude rescue packages for the financial sector.

While all countries have implemented policies to support the financial sector, countries differ in both the extent and composition of their interventions. Overall, the cost of the measures relative to the size of the economy has varied greatly. China has devoted 13% of its GDP to measures to support the market (including both the fiscal package and the injections in the financial sector), while the highest such numbers in the OECD were recorded in the United States (5.6%) and Mexico (4.7%) (ILO, 2009).

Relative to fiscal expenditure, the financial rescue measures much of which is in the form of guarantees or assurances, represent a disproportionally high share of the recovery packages in most countries. In the United Kingdom, for example, the financial rescue package (purchases of assets, guarantees) represents 28.6% of GDP against 1.3% for fiscal expenditure related to the crisis. The respective numbers for France (19% versus 1.1%) and Germany (19.8% versus 2.8%) show the same picture (ILO, 2009). There are two reasons for that policy choice. First, the banking sector is at the origin of the crisis and was facing higher risk than the rest of the economy. Second, a collapse of financial establishments could have exceptionally detrimental effects in the rest of the economy due to the sector's systemic importance.

The trade-relevance of those measures is large, not only because of the volume of the aid spilling over to all other market activities, but also due to the risk of distorting competition inherent in any such supply-side intervention where there is potential to discriminate between foreign and domestic institutions. Whether certain government bailout packages actually violate the commitments governments have made at the WTO (ASCM) is an issue that has received great attention.

Most major economies have refrained from such actions when designing financial rescue plans by broadening eligibility to foreign institutions early enough to avoid criticism. The United States for instance devoted more than 10% of its financial package to foreign banks (including major French and German banks). The European Commission introduced a formal requirement (incorporated later in the plans of Denmark, the Netherlands, Ireland, Portugal and France) that bailout measures in member countries do not discriminate between foreign and domestic banks (European Parliament, 2009; ECB, 2009).

Despite the prudential character of those provisions, the risk of distorting competition in financial markets remains. The stated intention may well have been to only assist firms of systemic importance and those whose difficulties stem from the market conditions, but which are otherwise fundamentally sound. The extent to which these intentions are put into practice is impossible to judge and when governments enter into close relationships with individual institutions as a result of the measures taken, it is very difficult to guarantee that there will not be some favouring of national firms over foreign firms or other weakening of the competitive environment. Transparency in the way measures are structured and implemented is therefore extremely important.

There is also a danger of anti-competitive outcomes due, quite simply, to the asymmetries in rescue packages. Such asymmetries are observed both within and across countries. Within countries, rescue efforts have concentrated on the biggest banks, those judged to pose systemic risks to the financial system and the economy and therefore in this sense "too big to fail". In addition to the longer-term moral hazard issues created by these interventions, there is an immediate "unlevelling" of the playing field, in that the largest institutions have been assisted and smaller ones left to fend for themselves, although the later could have benefitted from knock-on effects. The volume of aid has also varied enormously across countries as economies have been affected in very

different degrees of intensity by the crisis. This is shown in summary form in Table 3.4 and in full by-country detail in Annex Table D.1 where the different types of support granted to the financial sector by governments are expressed relative to 2008 GDP (using PPP weights). The G20 countries are divided into advanced and emerging economies. The difference in the scale of the interventions between the two groups is dramatic. Across all but one category of intervention (liquidity provision and other support by central banks) the scale of intervention by advanced economies both in absolute terms (billions of USD) and relative to GDP vastly exceeds that of the emerging economies reflecting mainly differences in the extent of the shock experienced as a result of the crisis. Here too there is potential disturbance of the "level playing field". In this sense, and despite the almost universal absence of explicit discrimination between domestically and foreign owned banks and financial institutions in the rescue packages, in practice it is extremely difficult to confine their effects to the country taking the measure.

Table 3.4. Summary of support for financial and other sectors and upfront financing need

As of August 2009; in % of 2008 GDP; average using PPP GDP weights

	Capital injection (A)	Purchase of assets and lending by Treasury (B)	Guarantees (C)	Liquidity provision and other support by Central Bank (D)	Upfront government financing (E)
Average G-20	2.2	2.7	8.8	9.7	3.7
Advanced economies	3.4	4.1	13.9	7.6	5.7
In billions of USD	1 160	1 436	4 638	2 804	1 887
Emerging economies	0.2	0.3	0.1	13.5	0.4
In billions of USD	22	38	7	1 581	47

Source: IMF (2009c) See also Annex Table D.1, for country detail and explanatory notes.

The extent to which the financial support measures affect competition in the sector depends not only on the asymmetries in the size of the rescue packages as they affect different institutions within and across countries, but also on the nature of the interventions. The expansion of existing and introduction of new guarantees for financial institutions has been a key element of the policy responses. These responses may have consequences for competition. Bonds backed by guarantees from highly rated governments affect the demand and pricing of investment alternatives. Given the insurance coverage extended to banks has not been set in a consistent fashion, the level playing field between internationally competing large banks might be affected. (OECD, 2009c). Competition impacts differ between direct subsidies, guarantees, or nationalisation and also depend on the duration of the interventions. The extent to which incentives have been built in that will push the institutions to prefer a return to the private sector will also be important. Private interventions leading to mergers and acquisitions, facilitated by relaxation of competition regulations, may have serious negative consequences for competition in the longer run and, past experience has shown, prove extremely difficult if not impossible to unravel.

Box 3.1. Trade in financial services

What is trade in financial services?

A financial service is defined in GATS as any service of a financial nature offered by a financial service supplier. In turn, a financial service supplier means any juridical or natural person of a WTO member country wishing to supply, or supplying, financial services, excluding public entities. Activities conducted by a central bank or monetary authority or by any other entity in pursuit of monetary or exchange rate policies are excluded.

In the balance of payments, only fees and charges associated with financial flows (*i.e.* the reward for intermediation) are recorded as financial services in the current account. Trade in financial services is distinct from (although closely related to) capital transactions.

More concretely, trade in financial services covers a wide range of services, such as banking services, asset management, securities trading, advisory and financial consultancy services, insurance services, insurance broking and agency services. The OECD *Codes of Liberalisation of Capital Movements and Current Invisible Operations* which were revised in 1992 to cover all financial services provided by non-residents and underlying capital operations and served as precursors to the GATS in the financial services area provide detailed descriptions of these services. Five basic types of services can be identified (Grosse, 2004):

- Mechanisms/instruments for savers to store their savings;

- Mechanisms/instruments for investors/borrowers to fund their projects;

- Mechanisms/instruments for carrying out payments;

- Mechanisms/instruments for managing and protecting risks; and

- Advice and management for savers and investors to deal with their financial needs.

Financial services can be provided internationally according to four modes of supply:

- *Mode 1 – cross-border supply*: with new technologies and the possibility of remote transactions, mode 1 has gain importance in the supply of financial services where no contact is needed between the consumer and the supplier.

- *Mode 2 – consumption abroad*: consumers can open a bank account abroad or insure themselves while travelling in the country of the service provider.

- *Mode 3 – commercial presence*: this is the main mode of supply; foreign financial service suppliers establish and provide the service in the host country.

- *Mode 4 – temporary movement of natural persons*: this mode of supply can be important for services such as advisory or insurance consultancy services where the consultant moves on a temporary basis to the country where he or she provides the service.

As a result of eliminating discrimination between foreign and domestic companies, and removing barriers to the cross-border provision of services, financial sectors all over the world have become increasingly internationalised. Foreign bank ownership has increased from 15 to 23% between 1995 and 2005, and can be as high as 58% in Eastern Europe. In the case of insurance, the market share of foreign owned companies has reached 41% in Central and Eastern Europe, 47% in Latin America and 12% in Asia.

The main objective of financial services liberalisation is to improve the efficiency of the domestic financial system and the allocation of resources via healthy competition with foreign providers. Trade in financial services can improve the quality, availability and pricing of financial services. It can also stimulate innovation through the dissemination of new technologies, know-how, and skills.

What are the rules applying to trade in financial services?

Within the OECD membership, under the legally binding *OECD Codes of Liberalisation*, members have the obligation to remove restrictions on financial services provided by non-residents under modes 1, 2 or 3, unless they have lodged reservations regarding those operations which they are not yet in a position to liberalise. The Codes provide for "standstill" – new restrictions may not be introduced – and reservations should be eliminated when the underlying restrictions no longer apply.

Within the larger WTO Membership, the General Agreement on Trade in Services (GATS) provides a multilaterally agreed, binding, and legally enforceable framework related to the financial sector:

- The GATS covers financial services with the following implications:

  - General obligations (binding for all services sectors and all modes of supply): Most-favoured-nation treatment and transparency.

  - Specific commitments: Market access and national treatment for sectors included in the schedule of commitments.

- The annex on Financial Services:

  - Contains the definition of financial services (classification distinguishing between 'insurance and insurance-related services' and 'banking and other financial services (excluding insurance)')

  - excludes services supplied in the exercise of governmental authority (activities conducted by central banks and monetary authorities, activities forming part of social security or public retirement plans and other activities conducted by a public entity for the account or with the guarantee or using financial resources of the Government)

  - carves out measures taken for prudential reasons (but these measures should not be used as a means of avoiding the Member's commitments and obligations under GATS).

- The Understanding on Commitments in Financial Services: unlike the Annex, the Understanding is not part of GATS and is an approach for scheduling commitments in financial services (no obligation to follow it, only for interested members – but most OECD countries are part of it). Specific commitments are extended to all Members (regardless of whether they are part of the Understanding) and include many of the provisions, including the "negative list" approach, in the OECD Code of Liberalisation of Current Invisible Operations:

  - Standstill (non-conforming measures limited to existing ones – no new restrictive measure)

  - Market access: Eliminate or remove monopoly rights; allow cross-border trade for insurance of risks relating to maritime shipping and commercial aviation, goods in international transit, reinsurance and retrocession, provision and transfer of financial data; grant commercial presence (mode 3); permit any new financial service; allow temporary entry for senior managerial personnel and specialists; remove or limit some categories of non-discriminatory measures.

  - National treatment: Grant access to payment and clearing systems, as well as membership or participation in self-regulatory bodies and other organizations or associations on the same basis as domestic financial services suppliers.

Work on strengthening domestic financial systems takes place in a variety of other fora, such as the OECD Committee on Financial Markets and the OECD Insurance and Private Pensions Committee.

_____

Source: OECD (2008), *OECD Codes of Liberalisation of Capital Movements and Current Invisible Operations: User's Guide*, based on WTO (1998), Kireyev (2002), Key (2004), Marachetti and Roy (2008).

Overall, and without being the objective of the measures, the interventions to support the financial sector may, by their very nature, have changed the competitive conditions governing the sector. This could be the case both with respect to trade in financial services across borders and with respect to competitive conditions within domestic markets between the financial sector and other sectors and within the sector itself. Nevertheless, these effects should be seen in the context of what the consequences would have been for trade and competition if governments had not acted. What is important now is that governments are aware of the need to rectify these distortions as and when financial conditions stabilise. There are choices to be made and governments can, if they so choose, opt for pro-competitive exit strategies that seek to re-level the playing field. For example, the extension of guarantees was not always as closely coordinated across borders as might have been desirable. Close communication and co-ordination regarding pricing and timing issues is required to avoid additional problems arising from inconsistencies in exit strategies within and across borders. They can also be mindful of these issues in their efforts to reform the regulatory environment more generally in the longer term.

Measures to support specific sectors

A number of industries have been the particular focus of support measures, both on the supply and demand sides, among them the automobile industry was one of the hardest hit by the recession. Support has included subsidies, including for short time working, and direct involvement in industry restructuring plans, and, on the demand side, car scrapping schemes. Very few of the demand side schemes has been found to discriminate against foreign produced cars (*e.g.* the Russian Federation and Mexico), although there have been reports, difficult to substantiate but persistent, that informal pressure has been brought to bear in some cases to persuade firms receiving government assistance to favour domestic investment and employment over foreign subsidiaries. In the following chapter the trade and welfare effects of automobile industry measures to stimulate consumption, or to subsidise production, with and without discriminatory provisions, are studied in a series of stylised policy experiments using the GTAP model.

A large number of countries have taken measures specific to the automobile industry. A compilation of the measures with a detailed description of the terms and value of the assistance offered is included as Annex Table D.2 (OECD 2010a).

Government procurement

Virtually all countries' stimulus packages have included substantial infrastructure components. For most countries planned expenditure is less than 1% of GDP but for China, Mexico and Poland it is larger – more than 5% in the case of China. As also shown in Table 3.5, public investment in infrastructure is a significant share of the stimulus packages in many countries, ranging from as high as almost 40% in China and Poland, to around a quarter in Denmark, Spain, France, Italy, and Turkey and around 10% or more in the United States, Sweden, Netherlands, Austria and Australia.

The issue of possible trade restrictiveness of government spending has received much attention in the context of the policy responses to the crisis for two reasons. First, because of the increased amount of government spending and investment in infrastructure included in the stimulus programs of various countries, the impact of any trade-restrictive practices, if they exist, could be significant. Second, because of an urgent need to support

domestic economies, government spending in this area has been subject to much public and media scrutiny with strong pressure being brought to bear to favour domestic over foreign firms and goods.

Table 3.5. Infrastructure spending in stimulus packages

Countries	Public support to investment with effects in physical infrastructure (% of GDP)	Public support to investment with effects on physical infrastructure*	Notes
Australia	0.64%	16.20%	Components "spending on public housing" and "community infrastructure projects"
Austria	0.35%	10.00%	
Belgium	0.11%	6.11%	
Switzerland	0.23%	54.91%	Components "flood defence, natural disasters and energy efficiency projects" in stimulus package approved in November 2008. Additional government spending approved for "roads and railways"
Canada	0.80%	20.00%	Includes "expenditure to build and repair infrastructure".
China	5.36%	38.40%	First stimulus plan (15/11/08) components: Public infrastructure development (railway, road, irrigation, and airport construction). Second stimulus plan (03/02/09) components: Rural Infrastructure, major infrastructure and public housing.
Czech Republic	0.33%	15.00%	
Germany	0.17%	4.72%	
Denmark	0.40%	26.67%	
Spain	0.84%	21.00%	
Finland	0.32%	8.42%	
France	0.22%	22.00%	
United Kingdom	0.12%	4.61%	
Greece	N/A	N/A	No spending announced on infrastructure

Table 3.5. Infrastructure spending in stimulus packages *(continued)*

Countries	Public support to investment with effects in physical infrastructure (% of GDP)	Public support to investment with effects on physical infrastructure*	Notes
Hungary	N/A	N/A	No spending announced on infrastructure
Indonesia	0.21%	14.31%	Component "infrastructure spending" in the stimulus announced in Jan 2009
Italy	0.34%	20.75%	Stimulus planned over a period of three years. The amount was divided by three and expressed in terms of 2009 GDP.
Japan	N/A	N/A	No spending in infrastructure in the stimulus programs announced by the government
Korea	0.84%	71.18%	Component of spending to local governments included in the Stimulus program announced in November 2008.
Luxembourg			No stimulus package reported by the European Commission.
Mexico	3.49%	N/A	The National Infrastructure Development Program planned spending of USD 200 billion over the next five years. The amount was divided by five and expressed in terms of 2009 GDP. The stimulus program for the Mexican economy represents different spending.
Netherlands	0.26%	16.25%	
Norway	0.51%	83.75%	Stimulus program announced in January 2009 and comprises mainly of increased government spending on infrastructure
New Zealand	0.12%	44.22%	Components on "roading" and "housing" in Phase 2 of the stimulus package announced in February 2009
Poland	1.10%	39.28%	
Portugal	0.18%	13.84%	
Slovakia	0.02%	1.60%	
Sweden	0.34%	10.63%	
Turkey	0.25%	26.16%	Component "highways capital spending" in the stimulus announced in January 2009 (TRY 10.7 billion)
United States	0.56%	9.06%	Component Infrastructure Investment (core and government facilities) of the ARRA.

Source: OECD, compiled from official announcements of stimulus packages.

The current WTO Government Procurement Agreement became effective 1 January 1996, but, as can be seen in Table 3.6, its membership is relatively limited. The European Union, the United States, Canada, Japan, Singapore and Hong Kong are the most notable parties to the agreement. However, a number of major economies such as Mexico, China, South Africa or Brazil either have not signed or are in the process of accession. In those countries, foreign suppliers could be subject to discriminatory practices without any possibility of recourse in multilateral law.

Table 3.6. Parties to the WTO Government Procurement Agreement

Parties engaged in the agreement	Year of entry into force
Canada	1996
European Union[1]	1996
Hong Kong, China	1997
Iceland	2001
Israel	1996
Japan	1996
Korea	1997
Liechtenstein	1997
Netherlands Aruba	1996
Norway	1996
Singapore	1997
Switzerland	1996
Chinese Taipei	1999
United States	1996

1) Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom; after 2004: Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic and Slovenia, After 2007: Bulgaria Romania.

Source: WTO.

WTO members can opt not to participate in the GPA. Signatory governments can also chose which government entities and which levels of government the commitments apply to, the minimum threshold values above which the Agreement applies and the services to be covered. Governments, therefore, have significant scope to define the range of applicability of the agreement. This has led to concerns about the effectiveness of the agreement in disciplining the expenditure of sub-national levels of government in particular in federally structured countries where a large share of government expenditure is carried out below the central or federal level.

The European Union has also established a system whose purpose is to guarantee transparency in procurement markets for suppliers across all its members. Public procurement is regulated by a specific Directive (EU, 2004) which is implemented in the national laws of each member state. The rules state that for projects above a certain financial threshold, a contract notice must be published in the *Official Journal* of the European Union. After the prescribed date, the bids are assessed and the contract award must also be reported in the Official Journal of the EU. Rejected bidders can challenge a decision, and the European Commission routinely acts to police infringements.

Preferential treatment in the crisis response measures

A small number of countries have officially incorporated preferential treatment in public procurement in the stimulus packages announced in response to the economic crisis.

In the United States, the American Recovery and Reinvestment Act of 2009 (ARRA), signed into law in February 2009, included a "Buy American" provision (Section 1605). That provision prohibits the use of recovery funds for a project for the construction, alteration, maintenance, or repair of a public building or public work unless all of the iron, steel, and manufactured goods used in the project are produced in the United States. The law also requires, however, that this prohibition be applied in a manner consistent with US obligations under international agreements and it provides for waiver under certain circumstances. Moreover, in February 2010 the United States and Canada announced that they had reached agreement on government procurement (subject to domestic approval processes) including permanent and reciprocal commitments under the WTOs Government Procurement Agreement with respect to provincial, territorial and state procurement. The agreement also provides for additional reciprocal guarantees of access on a temporary basis by Canada on a range of construction contracts in Canada's provinces and territories, and by the United States in relation to state and local public works projects under the ARRA of 2009.

Article 10 of the Chinese 2003 Government Procurement Law provides for domestic preference, "except for products that cannot be obtained in China under reasonable conditions". This policy was strengthened in 2007 by two implementing decrees. These limit the possibility to procure foreign goods to cases where domestic products are "unreasonably" more expensive or of lower quality. However, during the crisis and because of growing pressure from abroad, the National Development and Reform Commission and the Ministry of Commerce issued a joint statement on the 26 June 2009 clarifying that foreign-invested companies operating in China would be treated the same as Chinese companies.

Box 3.2. Trade intensity of government expenditures

Input-output tables have been used to estimate the import intensity of government consumption of public, social and other services compared to the import content of aggregate consumption in the same sector for different countries (Annex Table D.3). This shows, not surprisingly that the import intensity of government spending is systematically lower, as government spending is dominated by services such as health, education and social services that are not trade intensive by definition. However, when the trade intensity of these same services is compared between government and the economy as a whole it is again found that government spending is less import intensive in virtually all the countries for which the data are available. This does suggest that there is indeed an issue related to restrictiveness in government procurement.

In Australia, one state, New South Wales announced a broadening of "buy local" provisions although, in practice, no measures have been put in place activating the policy.

In the Russian Federation a Decree of the Russian Economic Development Ministry of 5 December 2008 (N°427) has given preferences to domestic producers setting a 15% price advantage until 31 December 2010 in the procurement of agricultural products, services in the agricultural sector, food, textiles, cloth, leather, footwear, metal products, machinery, medical equipment, watches, automobiles and others.

A number of other countries introduced discriminatory provisions in public procurement after September 2008, among them, the Ukraine, Kazakhstan, Paraguay, Indonesia and Chinese Taipei.

Government procurement is, as we have seen, subject to relatively light discipline in the context of the WTO. Additionally, there have been sufficient examples of new or reinforced discriminatory provisions to suggest that this is indeed an area of potential trade restrictiveness that merits continuing monitoring. Anecdotal evidence relating to how government investment is being undertaken in practice confirms this view, with many incidences reported of informal pressure being brought to bear or of technical specifications being set in ways that, *de facto*, discriminate against foreign firms.

Box 3.3. Green growth or green protectionism

Contemporaneous with announcements by governments that they were contemplating massive economic-stimulus packages were calls for a complete re-orientation of spending patterns in support of environmental ("green") priorities. At the June 2009 meeting of the OECD Council at Ministerial level, OECD countries were joined by Chile, Estonia, Israel and Slovenia in endorsing a Declaration on Green Growth. The Declaration envisages substantial increases in spending on the environment, particularly investments in lower-carbon sources of energy.

Judging from the pattern of stimulus spending so far, governments are heeding these calls. According to analysts for the HSBC Bank plc, of the nearly USD 2 800 billion in tax cuts, credits and extra spending announced by the world's economies through the end of January 2009, more than USD 430 billion was targeted at increasing the supply of low-carbon power, improving energy efficiency (particularly of buildings and transport) industries, or upgrading water or wastewater infrastructure. The average "green" share is estimated to have been around 16%, but approached 40% in China (the world leader in green spending) and over 80% in Korea.

This unfolding shift in policies could have long-lasting consequences for trade, and for the environment. However, if countries succumb to the temptation to adopt policies that protect their domestic industries, the economic and environmental benefits will be reduced.

Protectionism resulting from environmental measures can take several forms. Import barriers to protect a domestic environmental industry is an obvious form; subsidies to boost the income or reduce the costs of domestic environmental industries is another. "Murky" green protectionism occurs when governments adopt policies favourable to their own domestic producers under the guise of addressing legitimate environmental goals. Domestic industries may also be inadvertently protected from foreign competition as a result of environmental regulations that truly have no protectionist intent.

So far, the green protectionism quotient of the economic crisis appears to be modest. Nonetheless, there is plenty of reason for continuing vigilance. Since March 2009, for example, several countries have provided investment aids to help their car manufacturers develop "greener" vehicles. Others have applied "buy national" provisions to public procurement related to investment in renewable energy or environmental public works products.

Succumbing to pressures for green protectionism would not only reduce the gains from trade and blunt the spur to technological innovation provided by international competition, it would also undercut the credibility and trust that nations need to maintain as they enter into multilateral negotiations over new and wide-ranging environmental agreements, most notably a post-2012 climate regime. Among economies that are only now beginning to develop their own markets for environmental goods and services, there is a suspicion that calls by highly developed economies for ever more stringent environmental regulations are influenced by their commercial interest in supplying the goods and services needed to comply with those regulations. However unfounded those suspicions may be, green protectionism sustains them.

Other measures

Typical fiscal packages adopted by member countries have included a larger volume of tax cuts than infrastructure measures, with tax measures amounting to about two percentage points of GDP. There is a large degree of heterogeneity, however. Tax cuts of

more than 2.5% of GDP were adopted by Australia, Canada, Denmark, Iceland, Spain, Sweden and the United States, who made their largest cuts to income taxation, while Hungary and Ireland were forced to consolidate and raise income taxes substantially. Estimates from the cyclically adjusted series in the Economic Outlook database imply median falls in tax revenues across the OECD of 1.2% of GDP in 2009 and 1.5% in 2010, including the estimated effects of automatic stabilisers.

Almost all countries have, moreover, intervened in the labour market, with measures specifically targeting unemployment, Several countries dramatically increased expenditure on Active Labour Market Programmes (ALMPs), most notably Korea, Japan, Mexico, Poland, Spain and the United Kingdom. These countries all increased their spending by more than 25%, with Spain's expenditure on such programmes reaching over 1% of GDP. Four-fifths of OECD countries have responded to the current crisis by introducing or expanding short-time working schemes which aim to reduce the labour costs of companies while avoiding making workers redundant. Virtually all OECD countries have made some efforts to expand and/or strengthen training, despite concerns about the feasibility of scaling up such programmes too quickly.

Discriminatory measures

Specific provisions relating to foreign interests (firms or workers) were relatively rare. Most of the measures that have been taken have been open to all firms operating in the market, domestic or foreign. Negative provisions for foreign firms remain exceptional. They have been observed in a number of countries for government procurement (often in a form consistent to international trade commitments, or never applied as explained in the previous section) as well as in the United Kingdom and Korea regarding foreign workers. In developed countries there are suspicions that informal pressure is being brought to bear to ensure that nationals benefit from attempts to preserve firms and jobs, but this cannot be documented.

Notes

1. The so-called Harberger triangles.

2. Tariff rebates on intermediate inputs or refunds when the goods are exported are, however, common. Such schemes, however, entail administrative procedures and documentation that in some cases can be more costly than paying the tariff.

3. This was one reason why safeguard measures on steel were ended ahead of time in the United States (The White House, 2003).

4. Impediments to trade in chemicals concern mostly technical barriers to trade such as standards and regulations. Protectionism is not the dominant explanation for barriers in the sector.

5. The United States, the European Union and other countries have filed official complaints against China at the WTO.

Chapter 4.

The Trade and Economic Effects of Crisis Response Measures

Which measures taken in response to the crisis bring most benefits both to the country implementing the policy and to the world?

This question is addressed in this chapter using numerical simulations of the broad range of policy measures taken in response to the crisis. The analysis concentrates on behind-the-border measures but also looks into direct trade policy instruments, although these have not been major elements in the policy response. The analysis unambiguously shows that import protection is particularly unproductive and can be detrimental to the fragile economic recovery. Demand stimulus measures generally perform better than supply side measures, but sector specific measures, or measures favouring domestic products are inferior to more generic measures. Sector-specific supply side measures are overwhelmingly negative for partner countries who might find themselves entangled in a mutual subsidy spiral. They are also very difficult to unwind because of the rents they create.

This chapter uses a set of stylised model simulations to assess the trade- and economic effects of different policy measures taken in response to the economic crisis. The crisis and the measures taken in response to it are too recent to allow an *ex post* empirical assessment. Economic statistics are produced with some lag and the full effect of the measures on the economy will take time to become apparent. The current volatility of markets is an additional complicating factor that obstructs a clear view of the essential cause-and-effect relationships. Those considerations motivate the use of an economic model which can isolate the relevant changes in the economic and policy environment and which can be used to ask "what-if" questions. The model-based assessment takes into account the current economic structure and existing policies, and hence provides information relative to the status quo. It connects also all the countries in the global economy through trade linkages and through the distribution of global savings across countries. This allows the study of spill over, or indirect, effects between countries arising from unilateral or multilateral policy actions. The analysis also takes into account the input-output structure within the economy, and thus yields insights into cross-sectoral policy effects. Input-output analysis was used in Chapter 2 to investigate the role of increased vertical specialization. While that analysis assumed constant prices, the model used in this chapter allows prices as well as quantities to adjust to policy shocks such that a new equilibrium emerges.

The analysis focuses on the static economic efficiency of policies, using mainly national income and trade as indicators. The model used does not allow the analysis of dynamic growth effects. Such dynamic and long-term effects may be particularly relevant for responses to the crisis that include public investments in infrastructure. See, for example, McKibbin, Warwick and Stoeckel (2009) for a dynamic macro-economic analysis. The model is also not suited for a fully fledged fiscal-policy analysis which would allow the long-term consequences of running temporary fiscal deficits to be studied. These shortcomings of the method employed are fully acknowledged and should be kept in mind when interpreting the results. It should also be acknowledged that economic science has not yet reached a consensus on integrating sector-specific analysis (focusing on structural change) with dynamic macro-economic issues (focusing on balanced growth) for a variety of technical and theoretical reasons.

The model is used to simulate a wide range policy measures that are observed in response to the crisis. These range from economy wide demand side stimulus to sector specific subsidies implemented by a representative subset of economies: the EU25, United States, Japan and China. Border measures, both on the importing side and on exports are also analyzed. In each case, the effects on the economy taking the measure (own) and the effects on other economies are analyzed, with the aim of highlighting cross—country spill over effects from unilateral policies. The model results are also used to analyze the incentives to coordinate multilaterally amongst countries, and to investigate the incentives to retaliate through border protection for (low-income) countries that do not or cannot participate in coordinated stimulus packages.

The analysis highlights the need to properly target policy measures. If the problem is a shortfall in demand, as is the case in the current economic crisis, demand-side measures are a more appropriate response than supply-side measures. However, the specific design characteristics of demand-side measures determine their effectiveness in terms of their impact on GDP and on trade. The analysis finds that policies that bias demand towards specific sectors, and those that are biased towards domestic products are inferior to those that are more generic in design. Sectoral specific supply-side measures are found to yield overwhelmingly negative effects on the own economy, through maintaining or creating inefficiencies, and they yield negative pullovers on partner countries, through lowering production costs in one country relative to the world market.

		Box 4.1. Selected results obtained from CGE studies of trade liberalisation				
Study	**Model and Database**	**Liberalisation scenario**	**Notes**	**Global welfare gains USD billion**		
				Agriculture	**Other**	**Total**
Decreux and Fontagné (2009)	MIRAGE GTAP database 2004 base year	July 2008 drafts circulated by the WTO	Dynamic, imperfect competition in some sectors	n/a	n/a	57
Decreux and Fontagné (2008)	MIRAGE GTAP database 2004 base year	May 2008 drafts circulated by the WTO	Dynamic, imperfect competition in some sectors	n/a	n/a	43
OECD (2006)	GTAPEM GTAP database 2001 base year	50% cut in domestic agricultural support and 50% cut in applied tariffs – all sectors and regions		26	18	44
Kowalski and Shepherd (2006)	GTAP GTAP database 2001 base year	Elimination of tariffs, all sectors, all regions		35	33	68
Bouet et al. (2005)	MIRAGE GTAP database 1997 base year	Provisions included WTO draft compromise Proposal of March 2003	Dynamic, imperfect competition in some sectors	29	n/a	n/a
Anderson, et al. (2005)	LINKAGE, dynamic GTAP database 2001 base year data	Elimination of domestic agricultural support and trade protection in all sectors	Dynamic version	173	105	278
Beghin et al. (2002)	LINKAGE, dynamic GTAP database 1997 base year data	Elimination of agriculture support and protection in high-income OECD countries		108	n/a	n/a
François et al. (2005)	GTAP GTAP database 2001 base year data	Elimination of tariffs, all sectors, all regions[1]	Increasing returns to scale, medium run increasing returns to scale, long run	32	126	158
Hertel and Keeney (2005)	GTAP 2001 base year data	Elimination of domestic agricultural support and tariffs – all sectors and regions		56	28	84
OECD (2003)	GTAP 1997 base year data	Elimination of trade protection, all sectors[2]		34	63	174
Tokarick (2005)	GTAP 1997 base year data	Elimination of domestic agricultural support and trade protection		128	n/a	n/a
UNCTAD (2003)	GTAP 1997 base year data	50% cut in applied agricultural tariffs	Incorporates tariff preferences	20	n/a	n/a
USDA (2001)	CGE, dynamic	Elimination of domestic agricultural support and tariffs, all sectors	Static version Dynamic, productivity gains	31 56	n/a n/a	n/a n/a
World Bank (2003)	LINKAGE, dynamic 1997 base year data	Near 100% reduction in domestic agricultural support and applied tariffs	Static version Dynamic version	193 358	98 156	291 518

1. Includes gains from services liberalisation.
2. Includes gains from trade facilitation.

The model used

The model used in this chapter, the Global Trade Analysis (GTAP) model is well known and widely used for the analysis of international trade. It is a multi-sector, multi-country general equilibrium model of the world.[1] The version used for this report differs from the standard GTAP model only with regard to the inclusion of some additional tax instruments to analyze details of the fiscal-stimulus packages. Using a standard model is a deliberate choice: In this way the analysis can relatively easily be replicated by other researchers and the results can be checked.

For this report the GTAP version 7 database has been aggregated into nine regions: EU25, United States, Japan, Other developed economies, China, India, Sub-Saharan Africa, and Rest of the World.

The aggregation distinguishes nine traded commodities: agriculture and processed food; manufacturing; motor vehicles and parts; other transport equipment; textiles, clothing and footwear; oil and natural gas; natural resources; petroleum and chemical products; and services. Four production factors are distinguished: Land, capital, skilled labour and unskilled labour. The model is not very well suited to the evaluation of the impacts of interventions in the financial and banking sectors.

The same database, but with a different aggregation across countries and commodities, and a similar model, has recently been used by Bénassy-Quéré *et al*. (2009) to help understand the sharp reaction of trade flows to the economic downturn in the Asian financial crisis. Contrary to such a historical "back casting" approach, the current analysis uses the model for a set of stylised experiments.

In the main set of simulation experiments only four regions are simulated as engaging in new policies, while the other regions are passive. The EU25, United States, Japan and China are simulated to change their policies, either unilaterally or in a co-ordinated fashion. In one set of simulations the question is asked: What would be the effects if other countries raised import barriers while the four regions implemented a stimulus package?

Rising unemployment in many countries has been a prime motive for countries to provide stimulus packages. To take this reality into account, some of the simulations contrast a full employment situation with a labour market that is characterised by sticky wages and unemployment in both the skilled and unskilled segments of the labour market. While this is perhaps the most relevant baseline in today's world economy, it is equally important to understand the effects of stimulus packages when the economies will have been restored to a full (or almost full) employment situation, and countries will have to exit from the crisis-specific policies.

Unemployment of production factors represents a departure from the general equilibrium theory on which the model used in this report is based, and it is important to note that, absent a fully fledged theory of the labour market, the modelling is very simplified. Unemployment is modelled by fixing real wages for skilled and unskilled labour (nominal wages are still flexible) and letting the level of labour endowment adjust. This amounts to assuming that there is a pool of unemployed labour that has a perfectly elastic supply at the given real wage rate. Since labour supply is perfectly elastic at the given real wage rate, this provides an upper bound to employment effects of the stimulus packages.

Some supply-side measures target the production factor capital while others aim more directly at keeping labour in employment. The effects of such measures depend on the

ease with which capital and labour are substitutable for each other. If substitution were not at all possible, they would always move together if output expands. A subsidy to one of the production factors would also tend to lift use of the other production factors. However, if factors are substitutable for each other, a subsidy to, for example, capital would tend to increase the capital-labour ratio. Producers will use relatively more of the relatively cheaper capital and relatively less of the production factor labour. The overall effect on labour employment will depend on whether the capital subsidy is sufficient to boost output enough such that the substitution away from labour is offset by greater overall demand. In order to highlight the importance of the factor substitution effect, some simulations use lower elasticities of substitution (half their original values).

The model simulations do not allow the government budget to be in a permanent deficit. Government expenditures must match government income. Like all other actors in the model (consumers, producers) the government has to satisfy its budget constraint. While this is perhaps not a realistic assumption in the short run, it avoids the artificial creation of "free lunches". In the long run, the fiscal stimulus packages will have to be financed. The simulations therefore will show that any increase in government expenditure will have to be balanced, either by lower government expenditure elsewhere in the economy or by increases in tax revenues.

The model focuses on static efficiency of policy changes. It is not very well suited to assess typical macro-economic mechanisms, including investment behaviour and the fiscal aspect of policy making.

Finally, it should be noted that the numeraire price of the model is an index of global factor prices, and that global savings are distributed over regions to equalise expected returns on investment.

The model focuses on static efficiency of policy changes. It has already been noted that it is not very well suited to assess typical macro-economic mechanisms, including investment behaviour and the fiscal aspect of policy making. At least three further questions should be addressed regarding the choice of the model and benchmark against which simulation results are evaluated. First, whether a static model is suited to analyze essentially cyclical events; second, whether the standard economic assumptions, such as consumer utility maximization under budget constraints and cost minimization by firms, are valid in the current context of economic crisis, and third, whether the baseline of the model simulations should not reflect the disturbed economic situation of the moment.

A static multi-sector model is evidently not suited to address macro-economic cycles. The purpose of the simulations is to trace possible trade and economic effects of policy measures, and it is not attempted to analyze how economic behaviour might change over the course of the cycle. For example, if savings and expenditure behaviour would be different in times of crisis than in normal times, this effect would not be captured endogenously by the model, but could be imposed on the simulations by appropriate changes in parameters. Indeed, one of the simulations reported below goes towards this kind of analysis by increasing the marginal savings propensity of consumers to see if this changes the effects of demand stimulus packages. The CGE model rests on strong assumptions about rational choice behaviour of consumers and firms. Are those assumptions invalid in times of economic crisis? This is hard to answer, and absent alternative, and tested theories it appears prudent not to resort to different assumptions. Finally, should the correct baseline not be a "crisis baseline," as opposed to a world economy that is characterised by equilibrium on all markets? Since the model does not contain a financial sector, the relevant divergence from equilibrium that can be addressed

is on the markets for factors of production, labour and capital. In order to mimic possible (under-)utilisation of production factors this is exactly what some of the model simulations do, concentrating on the labour market. As will be seen below, this divergence from equilibrium assumptions makes an important difference for the assessment of the effects of the various measures taken in response to the crisis.

With these qualifications in mind, the next section proceeds to discuss the results of a large set of simulations undertaken with the model.

Simulations and results

Following the logic of Chapter 3, the effects of border measures are analyzed first, followed by a discussion of behind-the-border measures that have an indirect bearing on trade.

Border measures

The economic effects of border protectionist measures are well understood, and perhaps need less elaboration as compared to measures that have an indirect impact on trade. The benefits of multilateral trade liberalisation have been estimated using large scale applied models, for example OECD (2006a, 2006b) and Francois *et al.* (2005). Box 4.1 summarises recent results including those from previous OECD work. Chapter 3 showed that new protectionist measures mainly occurred in industries that that were already subject to relatively high trade barriers, such as agro-industries, metal industries and textiles. The share of trade covered by new border measures in response to the crisis has been less than 1%, suggesting a limited economic relevance at this point in time, but use of these instruments could be increased in the future under pressure of persistent unemployment. Indeed, there is no reason for complacency as increasing border protection is potentially very disruptive for the fragile recovery of the world economy. Multilateral coordination to bind and reduce tariffs can limit the potentially large losses to the world economy (Bouet and Laborde, 2009).

On the export side, some new or tightened restrictions on exports of some raw materials were observed, which have clear distortive effects on world markets and that can disrupt the supplies to processing industries in importing countries.

Against this background two sets of stylised border policies are simulated. In the first set, the EU25, United States, Japan and China raise their border protection against all other economies by increasing the wedge between world prices and domestic prices. Using a simple price-wedge captures, in a simplified way, the effects of various types of import measures as discussed in Chapter 3: tariffs and non-tariff measures raise the price of imported goods relative to domestically produced ones.[2] In order to capture the observed reality that new tariffs and non-tariff measures were mainly observed in a limited number of sectors, they are simulated in only three of the model sectors: Agriculture and processed food; manufacturing; textiles.

In the second set of simulations export restrictions on raw materials are simulated in China and the Rest-of-World region. Again this is implemented by a positive price wedge (a tax) between domestic prices and export prices. The model sector that is affected by the export restriction is 'natural resources which is an aggregate of forestry, fishing, coal and minerals.[3]

Selected results are summarised in Table 4.1 as multiplier effects of the policy change. This indicator of the effectiveness of the policy measures is a dimensionless number that divides the change in the economic variable of interest (exports or GDP) by the money value of the policy change.[4] "Own effects" are the effects on the country taking a policy measure, assuming that other countries do not take new policy measures. Effects on partners are the pullovers to all other regions in the model.[5]

Table 4.1 Multiplier effects of border policies[1]

	Trade effects Volume of exports			Income effects Volume of GDP		
	Own	**Partner**	**World**	**Own**	**Partner**	**World**
Import barriers[2]	-1.36	-0.80	-2.16	-0.66	-0.07	-0.73
Export restrictions[3]	-0.87	-0.20	-1.07	0.05	-1.12	-1.07

1. Trade indicators are calculated from the GTAP variable qxwreg, GDP indicators from qgdp. The multiplier divides the change in the variable of interest (exports or GDP) by the money value of the wedge, *i.e.* the price differential multiplied by the trade flow.

2. Simulated increase of wedge between import prices and world prices by 5% for agriculture and processed food; manufacturing; textiles in EU25, United States, Japan and China.

3. Simulated increase of wedge between domestic prices and export prices for natural resources by 10% in China and Rest of World.

Table 4.1 shows highly negative effects of increased border protection. On average, USD 1 worth of increased price support[6] leads to a USD 2.16 drop in world exports, and to a USD 0.73 drop in world income. An import barrier reduces exports from partner countries, but it also reduces own exports – and even more so. This is an illustration of the famous Lerner symmetry (after the economist Abba Lerner, who published this result in 1936): protecting against imports means ultimately that exports are taxed. Because import barriers raise domestic prices, through higher cost for intermediate inputs and through lifting the general price level for consumer products, export products also become more expensive and lose market share in the face of international competition. While the sectors being shielded behind higher import barriers may benefit from increased prices, overall domestic production in the economy implementing an import barrier will contract and it will use its resources less efficiently. All these leakages lead domestic income to decrease after the tariff is raised. Each dollar worth of the price wedge in the specific sectors leads to a drop of GDP by 66 cents. Raising an import barrier is clearly self-defeating. Such policies would also be particularly harmful to the fragile economic recovery by hampering the flow of commodities and resources to uses where they can earn the highest return.

Export restrictions achieve at least one objective: They reduce own exports. They also reduce partner countries' exports who suffer from increased prices of imported raw materials. Importers will also have to substitute towards alternative, and more costly, sources of supply, leading to an overall loss in GDP that is more than proportional to the value of the export price wedge. The income effects on the country implementing the export restriction are mixed. Diversion of raw material supplies to domestic industries can sometimes have positive employment and income effects, but overall the effects are small. Available evidence suggests that in many cases export restrictions are not the most efficient or effective in achieving the stated objectives of income growth or environmental protection (OECD, 2009d).

Trade restricting policies, whether on imports or on exports, are thus found to be particularly inefficient and lead to welfare losses in the economy taking the measure and in partner economies. To assist the economy in its recovery from the crisis, OECD countries have not resorted to the large-scale use of trade restricting border measures and have concentrated on domestic stimuli. The next subsection investigates the impacts of those measures that have an indirect impact on trade.

Behind-the border measures

Behind-the border measures taken in response to the crisis can be classified into those aiming at the supply side and those aiming at the demand side of the economy. Within those two broad classes, one can further distinguish sector-specific policies from economy-wide measures (Table 4.2).

Table 4.2. Schematic setup of behind-the-border simulation experiments

	Supply-side	Demand side
Sector-specific	Subsidies or tax reductions for production factors labour and capital	Consumer subsidies or tax reductions
Economy-wide	[Financial system rescue, not modelled]	Government expenditures Generic consumer tax reductions

A total of 14 simulation experiments has been executed, where in each case the model is run five times: Once for a co-ordinated scenario and four times for unilateral policy changes. The specification of the different scenarios is explained in detail in Box 4.2.

Box 4.2. Simulation Experiments

On the demand side, the following policy changes are simulated

Demand 1	Increase government expenditures
Demand 2	Increase government expenditures, unemployment closure
Demand 3	Generic consumption tax reduction
Demand 4	Generic consumption tax reduction, unemployment closure
Demand 5	Generic consumption tax reduction consumption subsidy, increased marginal savings ratio
Demand 6	Domestic only consumption tax reduction
Demand 7	Consumer tax reduction on motor vehicles

On the supply side, the following measures are simulated

Supply 1	Factor subsidy for motor vehicles only, labour, standard closure
Supply 2	Factor subsidy for motor vehicles only, labour, unemployment closure
Supply 3	Factor subsidy for motor vehicles only, capital, standard closure
Supply 4	Factor subsidy for motor vehicles only, capital, unemployment closure
Supply 5	Factor subsidy for motor vehicles only, capital, unemployment closure, short run
Supply 6	Factor subsidy for motor vehicles only, labour and capital, standard closure
Supply 7	Factor subsidy for motor vehicles only, labour and capital, unemployment closure, short run

---

A summary of the simulation results is presented in Tables 4.3 and 4.4, using the multiplier effect as an indicator. As before, results are decomposed into own effects and partner effects.

On average across all simulations, USD 1 worth of stimulus increases the volume of a country's own GDP by USD 0.64, and world trade could increase by USD 0.08, but the effects on the real GDP of other economies are mixed. The sign of these effects is not consistent, as the 95% confidence intervals around the mean values indicate. This highlights that broad generalizations about the policy packages are not possible, and a closer look at the design characteristics of policy measures is important. A further rough decomposition into demand-side measures and supply side measures in Table 4.3 yields some more insights. Demand-side measures that target only domestic products, such as a tax reduction for domestically produced goods, would lower the average effectiveness of the measures, relative to the same policies implemented in a generic fashion, such as a general reduction in consumption taxes irrespective of the origin of the product. The sign of the effects is still not completely certain, except for one important indicator: World trade volume would be negatively affected by a demand side measure that targeted domestic products only.

Another observation from Table 4.3 is that supply-side measures tend to consistently lower real GDP of partner countries, while the direction of the effects on trade and own GDP are not completely determined.

Table 4.3. Summary multiplier effects of policies

Change relative to value of stimulus	Mean effect	95% confidence interval	
		Minimum	**Maximum**
All measures			
Own real GDP	0.64	-0.14	4.83
Partner real GDP	-0.21	-0.90	0.06
World trade volume	0.08	-0.64	1.55
Demand-side measures, generic			
Own real GDP	0.51	-0.08	3.85
Partner real GDP	-0.06	-0.57	0.06
World trade volume	0.07	-0.15	0.87
Demand-side measures, targeting domestic only			
Own real GDP	0.00	-0.03	0.02
Partner real GDP	-0.02	-0.04	0.00
World trade volume	-0.15	-0.31	-0.04
Supply-side measures			
Own real GDP	0.84	-0.14	4.83
Partner real GDP	-0.35	-0.90	-0.01
World trade volume	0.12	-0.64	1.55

Broad generalisations across policy measures and across countries are clearly difficult and may be misleading. Table 4.4 provides some more detail on the relationships between design characteristics of measures and their average effectiveness, aggregated over countries, regions and commodities, but still there are wide variations. It can be observed that under the assumption of unemployment a given policy simulation has bigger and more positive effects than under a situation of full labour employment. Even though the representation of the labour market is very stylised in these simulations, this finding indicates that the assessment of policy options depends on whether some productions

factors are underemployed or whether the economy operates at full utilization rates. Subsequent sections explore in more detail the mechanisms behind these average outcomes.

Table 4.4. Average multiplier effects by policy measure

Experiment	Design characteristics of experiment								GDP		Trade	
	Demand	Supply	Domestic only	Sector specific	Labour	Capital	Unemployment	Other	Volume		Volume of exports	
	2	3	4	5	6	7	8	9	Own	World	Own	World
Demand 1	X								-0.05	-0.05	-0.16	-0.09
Demand 2	X						X		0.05	0.01	-0.16	-0.08
Demand 3	X								0.01	0.01	-0.04	0.01
Demand 4	X						X		3.01	2.74	0.01	0.49
Demand 5	X			X					0.04	0.05	0.30	0.36
Demand 6	X		X						0.01	0.00	-0.25	-0.19
Demand 7	X							X	0.00	0.02	0.22	0.05
Supply 1		X		X	X				0.08	0.04	0.21	0.20
Supply 2		X		X		X			0.16	0.03	-0.70	0.18
Supply 3		X		X		X	X		0.51	-0.19	-0.70	0.16
Supply 4		X		X	X		X		3.95	3.39	0.32	0.87
Supply 5		X		X		X	X	X	0.44	-0.04	-0.76	0.17
Supply 6		X		X	X	X			0.11	0.05	-0.04	0.20
Supply 7		X		X	X	X	X	X	1.76	1.31	-0.35	0.46

Indicators are for WORLD totals. The multiplier is calculates as the ratio of the change in the indicator variable to the money value of the policy shock.

International transmission mechanisms: demand side stimulus

The size and sign of the effects of stimulus measures are difficult to determine across the broad range of policy scenarios, and will obviously also depend on the characteristics of the country implementing the measure. Elements such as the size in the world economy, the openness to imports and the composition of imports, and the weight of exports in GDP will all play a role.

Two main channels play a role in transmitting a demand-side stimulus from one country to other countries. The first channel operates through trade. A domestic measure that stimulates consumption regardless of the origin of the goods will also tend to raise import demand. This leads to higher exports from partner countries, which will then tend to see an expansion of those industries that specialise in the goods that are now in higher demand in the country implementing the measure. At the same time, the demand stimulus tends to have an upward effect on prices of production factors in the country implementing the measure. This translates into higher export prices and loss of

competitiveness in that country through an appreciation of the real exchange rate. Demand-side measures therefore tend to have a certain "anti-own export bias," but they can raise exports of other countries. How this increased export demand translates into higher GDP depends crucially on the specialization patterns in those countries.

The second channel operates through demand for investment and the allocation of global savings across countries. The country implementing the measure will typically see increased returns to capital as a consequence of the stimulus. This attracts capital from abroad, and lowers investments in countries that do not engage in the stimulus.

Movements of relative prices, rates of return and allocations of investment funds should be assessed against the no-policy baseline. Without stimulus packages, rates of return would have fallen more sharply, and the stimulus measures tend to at least dampen that downward movement. Hence, against the no-policy baseline, the effect is a rise in rates of return. When looking empirically at rates of return they might still fall short of their pre-crisis levels.

Those mechanisms are illustrated in Table 4.5, which decomposes the percentage changes of the components of real GDP following a demand-side stimulus in a situation of unemployment. In this case a lowering of consumption taxes is simulated, equal to 1% of base GDP in all cases. The top panel reports the results only if the EU25 implements the policy, the middle panel shows the results if the United States' unilaterally implements the policy and the bottom panel shows the results if all four big countries implement the same measure simultaneously.

The EU25 stimulus would raise domestic consumption by 2%, and it would raise imports by 0.77%. Investments would increase by 0.58%, following the rise in expected rates of return to capital. The net effect on real GDP would be a 2.14% increase. In contrast, other countries would experience a drop in their GDP despite an increase in exports to serve the EU25 import demand. The main channel at play is reduced investments in countries that do not see increasing rates of return to capital.

When the United States implements the policy all those effects are also present and the "anti-own exports effect of demand side policies is more clearly visible. For the EU25 the positive effect on own exports is partly a result of intra-EU trade which is included in the figures. Investments in the United States are simulated to increase by 0.92%, drawing away investment resources from other countries. The rise in consumption and investments in the United States would further widen the global imbalance of savings and investments.

A country acting unilaterally will see marked changes in the composition of final demand. If all four countries, EU25, United States, Japan and China, simultaneously implement the demand stimulus, all of them would see a rise in returns and investments. However, as other countries are not implementing a stimulus policy they are faced with reduced domestic investments, which are only partly offset by higher exports so that on balance they register a negative effect on their real GDP.

Table 4.5. Decomposition of % changes of real GDP with demand stimulus

	Consumption	Investment	Exports	Imports	GDP
Only EU25 lowers consumption tax					
EU25	2.02	0.58	0.32	-0.77	2.14
United States	-0.18	-0.20	0.12	0.09	-0.16
Japan	-0.11	-0.30	0.09	0.07	-0.09
China	-0.03	-0.18	0.02	0.02	-0.04
Rest developed	0.00	-0.17	0.05	0.01	0.00
India	-0.04	-0.16	0.01	0.05	-0.01
Sub-Saharan Africa	0.00	-0.21	0.00	0.05	-0.01
Rest of World	0.05	-0.15	0.04	0.01	0.01
World	0.57	0.04	0.65	-0.20	0.61
Only United States lowers consumption tax					
EU25	-0.19	-0.33	0.22	0.12	-0.18
United States	3.70	0.92	-0.11	-0.64	3.86
Japan	-0.16	-0.43	0.13	0.10	-0.13
China	-0.03	-0.26	0.03	0.01	-0.04
Rest developed	0.03	-0.23	0.09	-0.05	0.01
India	-0.06	-0.23	0.01	0.08	-0.01
Sub-Saharan Africa	-0.06	-0.32	0.00	0.12	-0.02
Rest of World	0.06	-0.24	0.06	0.02	-0.01
World	0.99	0.04	0.43	-0.13	1.03
EU25, United States, Japan and China lower consumption tax					
EU25	1.71	0.06	0.66	-0.58	1.87
United States	3.36	0.55	0.10	-0.47	3.55
Japan	2.98	0.91	-0.05	-0.47	3.29
China	1.68	0.00	0.16	-0.60	2.34
Rest developed	0.03	-0.56	0.18	-0.01	0.00
India	-0.13	-0.53	0.02	0.19	-0.03
Sub-Saharan Africa	-0.08	-0.71	0.01	0.21	-0.05
Rest of World	0.14	-0.53	0.14	0.04	-0.01
World	1.92	0.14	1.23	-0.38	2.06

Experiment is Demand 4 (unemployment closure); trade results for intra-regional trade for regional aggregates. The tables decomposes the % change of the accounting identity GDP = C + I + E-M. A negative sign in front of the % change of imports means that imports are growing; a positive sign means that imports are shrinking.

The simulated generic consumption stimulus lowers consumption taxes on all products, regardless of their country of origin. A variation on that policy is a reduction of consumption taxes only for products of domestic origin. Through lowering the relative price of domestic products, such a policy creates an expenditure bias towards domestically produced goods. Consequently, the impact on world trade is lower compared with a generic tax reduction, and the impact on world GDP is muted (Table 4.6). The reduction of taxes only on domestic goods also stimulates the domestic and the world economy, but it is clearly a less preferable alternative. For the same size of policy package (1% of GDP) the generic tax reduction is more effective.

Table 4.6. Comparison of generic demand stimulus with "domestic only" stimulus[1]

	Generic	Domestic only	Generic	Domestic only
	Per cent change world imports		Per cent change world GDP	
Only EU25 lowers consumption tax	0.20	0.11	0.61	0.51
Only United States lowers consumption tax	0.13	0.10	1.03	0.99
EU25, United States, Japan and China lower consumption tax	0.38	0.25	2.06	1.91

1. Experiments are Demand 4 and Demand 6 (unemployment closure); the policy shock amounts to 1% of GDP in all cases; trade results for intra-regional trade for regional aggregates.

Further simulation results show that demand-side measures that are sector-specific can lead to economy-wide efficiency losses. The better option is a demand-side stimulus that allows consumers to decide themselves where to spend transfers generated by the policy. While a sector-specific demand stimulus can generate a boost in output in that sector, it generates by design also an expenditure bias towards that particular industry, hence potentially leading to slowdown in other sectors of the economy. At the same time, imports of goods into the stimulated sector can act as a transmission channel to foreign producers, both in final goods and in intermediate inputs.

An expansion of government expenditure can lead to a drop in GDP volume (but an increase in GDP value), and it leads to negative effects on own exports. This result is mainly due to the current pattern of government expenditures. Current government expenditures are mainly on non-tradeables, especially public services. Stimulating the non-tradeable portion of the economy draws resources into it and increases price levels (GDP value goes up), but hampers the export sectors who see their products become less competitive. This is a variant of the Dutch disease effect. However, increased public investments in public goods such as infrastructure and R&D may have positive productivity effects in the longer run, which the current analysis is unable to quantify.

Supply-side measures

All simulated supply-side measures register unambiguously negative effects on partner countries' GDP, and most simulated supply side-measures record a negative multiplier on own exports. This is explained by the sector-specific nature of those measures: If one sector is singled out for the stimulus, resources are drawn from other activities into that sector. While this particular sector may well see its exports rise as a result of the subsidy, other sectors witness a decline which comes from an appreciation of the real exchange rate. Drawing resources into the target sector tends to bid up factor prices in the economy, which makes the country's exports more expensive relative to other countries. Obviously, the strength of this effect depends on the utilization rate of production factors in the base situation. If there are un(der-) employed resources, the rise in factor prices, and hence the real exchange rate appreciation, would be more muted.

Partner countries' GDP tends to be negatively affected by unilateral supply-side measures. Contrary to demand-side measures, the international spill over effects through trade and investment are predominantly negative. Supply-side measures boost output in

one country and drive other suppliers from the market through a reduction of production costs in the country implementing the measure. Here lies also a danger of engaging in a mutual subsidy spiral that in the end serves mainly the factor owners in the sector being subsidised, but is wasteful from an economy-wide perspective.

The inefficiency of sectoral supply-side measures is illustrated in Figure 4.1, which reports the change in the share of motor vehicles in industrial real value added (total value added minus agriculture and food processing; oil and gas; natural resources; and services) for the case of a factor subsidy to motor vehicles only. The factor subsidy, in fact a reduction of factor taxes, is afforded to both labour and capital, while there is unemployment of labour.

Figure 4.1. Change of motor vehicles share in value added with sectoral supply stimulus for motor vehicles (%)
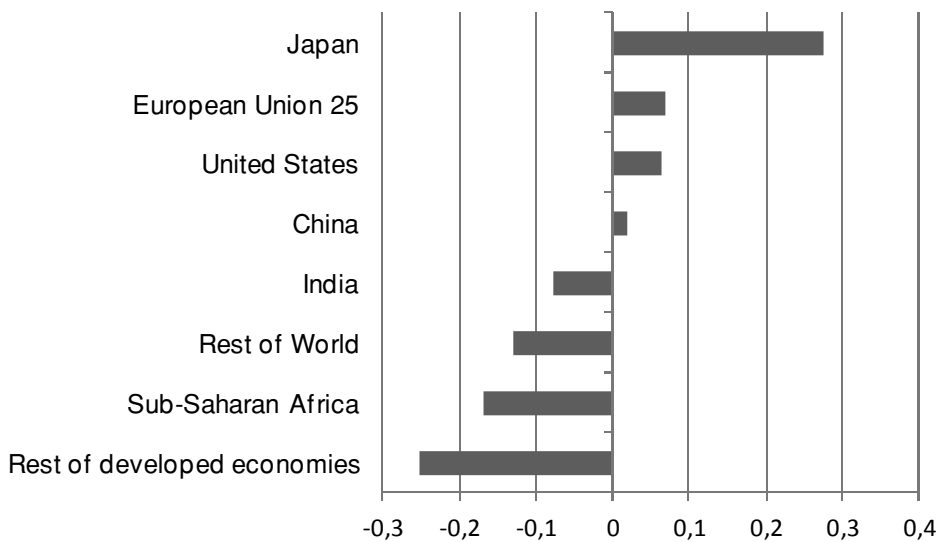
The experiment is Supply 7, factor-tax reduction on labour and capital; unemployment closure.

When all four countries, EU-25, United States, Japan and China, simultaneously engage in such a policy, the share of motor vehicles in industrial value-added increases. This increase may not seem big: In Japan, for example, the share goes up from 10.8% to 11.1%, but substantial absolute amounts of money are involved in this change. In real terms, factor owners in the motor-vehicle industry would see their income increased by about 1% in the EU25 and in the United States, by 2.8% in Japan and by 0.5% in China. This type of policy creates rents in one particular sector that makes it more difficult to reverse the policy once the economy has resumed growth. In addition, the transfer efficiency of this sectoral policy is low. Although real GDP is found to increase in those regions implementing the policy, the multiplier (change in GDP per global dollar of sectoral tax reduction) is as low as 0.021 for China, 0.13 for Japan and 0.5 for the EU25 and the United States. The higher value for the EU25 and the United States is related to the relatively larger employment effects, both direct and indirect, that give the motor-vehicle industry in those two countries a particularly large weight in the economy.

Simulations show particularly negative effects if the subsidy (or tax reduction) is afforded only to capital. If the price of capital is lowered relative to that of labour, a

substitution towards more capital use occurs, and this can be detrimental to employment. With labour unemployment, reducing the tax burden on wages generates more positive effects on GDP and employment. The multiplier on a country's own GDP (both value and volume) is found to be exceptionally high in that case: Lowering labour costs, while keeping real wage rates for workers constant, leads to an expansion of output and to additional employment that generates additional income for households which subsequently trickles second-round income effects.

The incentives to co-ordinate

The results show significant spill over effects from unilateral policies, which provide a strong rationale for multilateral co-ordination of policies – both in their design and in developing exit strategies To investigate the incentives to coordinate, Table 4.7 shows a pay-off matrix where the average multipliers on own national income and the national income of other economies that potentially participate in co-ordination (EU25, United States, Japan and China) are given. The simulation experiment singled out is a generic consumption tax reduction in a situation of unemployment.

Table 4.7. A coordination equilibrium for a demand-stimulus policy under unemployment[1]

Own economy		Other participating economies			
		No policy		**Implement policy**	
	No policy	0.00	0.00	-0.33	3.03
	Implement policy	3.03	-0.33	2.71	2.71

1. Experiment implements a generic consumption-tax reduction under conditions of unemployment; numbers are average effects (multipliers) of the equivalent variation (EV) in response to a policy shock; the first number in each cell gives pay-off for the row player; the second number gives the pay-off of column player.

If no country engages in any policy, the effects are zero for everyone. If one country implements the policy, but others do not, the own pay-off is 3.03 (= additional national income per dollar of consumption-tax reduction), but the pay-off for the other economies is a negative -0.33. If all countries implement the policy, each will receive a pay-off of 2.71. Given this incentive structure, all countries will find it optimal to implement the policy. Regardless the actions of others, the pay-off for the own economy is always greater if the policy is implemented compared with not implementing the policy. Likewise, other participating economies always receive a greater pay-off from implementing than not implementing the policy. Hence, the Nash equilibrium of that game (implement, implement).

Table 4.8 repeats the analysis, but in a situation of full employment. While the structure of the incentives remains the same it illustrates that the policy multipliers are much smaller in the case of full employment. While in the situation of unemployment, the cost of multilateral action, as opposed to unilateral action, is USD 0.3 = (3.03-2.71), or 10% of the multiplier, the cost of co-ordination increases to 50% (0.02/0.04) of the multiplier.

Table 4.8. A co-ordination equilibrium for a demand-stimulus policy with full employment[1]

Own economy		Other participating economies			
		No policy		**Implement policy**	
	No policy	0.00	0.00	-0.02	0.04
	Implement policy	0.04	-0.02	0.02	0.02

1. Experiments implements a generic consumption tax reduction, with standard closure; Numbers are average effects (multipliers) of the equivalent variation (EV) in response to policy shock; the first number in each cell gives pay-off for row player, the second number gives pay-off of column player.

It thus appears that multilateral coordination amongst the big economies is a natural outcome. However, there are negative pullovers on those economies not participating in the stimulus packages. With massive fiscal stimulus packages the centre of gravity of the world economy can shift, and especially low-income economies may find themselves disadvantaged by their inability to implement such domestic policy packages. They might be tempted to assist their domestic industries by border measures. Table 4.9 shows the pay-off structure of such a game between the co-ordinating economies and "retaliating economies." The co-ordinating economies are simulated to engage in the demand stimulus policy with full employment as before in Table 4.8. The retaliating economies are all the other regions in the model, and they are simulated to implement a 5% increase in all border tariffs.

Table 4.9. Retaliation with border measures does not pay off[1]

Coordinating economies		Other economies			
		No policy		**Raise tariffs**	
	No policy	0.00	0.00	-0.03	-0.04
	Implement fiscal stimulus	0.02	-0.02	-0.02	-0.06

1. Experiments implements a generic consumption tax reduction, with standard closure; Numbers are average effects (multipliers) of the equivalent variation (EV) in response to policy shock; the first number in each cell gives pay-off for row player, the second number gives pay-off of column player.

Table 4.9 illustrates a number of important points. First, if tariffs are raised it affects negatively national income of all countries, including the country raising the tariffs. This is a well-known welfare effect of border measures and arises mainly from efficiency losses in the wake of raising barriers against competitive foreign suppliers. Second, and contrary to the co-ordination game on stimulus packages, if all countries implemented their respective policies the overall pay-off for the world would be negative. In fact, raising tariffs if other countries implement fiscal stimulus packages increases the damage to the tariff-raising country, because it closes itself against cheaper imports. This may benefit some domestic producers but others who depend on imports of intermediate goods as well as consumers are negatively affected.

What can be the outcome of this game? Co-ordinating economies find it always better to implement their fiscal stimulus policies than not implementing. If they implement, and no tariff retaliation occurs, they receive a pay-off of USD 0.02 per dollar of stimulus. If retaliation occurs, their pay-off is turned into a negative USD -0.02, but this is still better than doing nothing since they would lose USD -0.03 per dollar of tariff revenue earned in retaliating economies. However, retaliating economies are better off from refraining from raising tariffs. They would still lose USD -0.02 per dollar of fiscal stimulus, but this is clearly better than losing USD -0.06. The Nash equilibrium of that game would thus be for coordinating economies to implement the policy and for the other economies not to retaliate.

Conclusions: Towards a roadmap for policy design

The stylised simulations of policy measures yield insights into their wider economic effects, and they can alert policy makers to unintended side-effects that only become apparent when taking an economy-wide and international viewpoint. Specific implementation details play a great role, as was highlighted in Chapter 3, but those are impossible to incorporate into a simulation analysis as pursued here.

The analysis highlights the need to properly target policy measures. If the problem is a shortfall in demand, as is the case in the current economic crisis, demand-side measures are more appropriate than supply side measures. Demand side measures tend to work better, both on the own economy and partners. The one supply-side policy that is an exception is a labour market policy. Amongst the supply-side policies, the best option is to lower the tax burden on labour. If the problem is unemployment, the appropriately targeted response is a labour market policy, not a subsidy to capital.

The specific design characteristics of demand-side measures determine their effectiveness in terms of their impact on GDP and on trade. Even if they are not by design discriminatory, indirect effects through trade and investment can limit their efficiency – both on the domestic economy and globally. The analysis finds that policies that bias demand towards specific sectors, and those that are biased towards domestic products, are inferior to those that are more generic in design.

Demand-side measures that are sector specific tend to bring economy-wide efficiency losses. While a sector-specific demand stimulus can generate a boost in output in that sector, they generate by design also an expenditure bias towards that particular industry, hence potentially leading to a slowdown in other sectors of the economy. The better option is a demand-side stimulus that allows consumers to decide for themselves where to spend transfers generated by the policy.

Governments engaging in massive public investment projects should be aware of potential adverse effects. If the expansion of government expenditures occurs in non-tradeables (or less traded goods and services), such as services, the boost in those sectors attracts resources from parts of the economy, which bids up factor prices and makes tradeable sectors less internationally competitive. This in turn may be detrimental to real GDP. If public investments are coupled to "buy domestic" provisions, their efficiency is very much lowered. An increase in the volume of government expenditures should be carefully targeted at investments that generate future productivity gains.

Shifting government demand towards private demand will be a challenge when exiting from public expenditure policies.

Sectorally specific supply-side measures are found to yield overwhelmingly negative pullovers on partner countries, through lowering production costs in one country relative to the world market. This can lead to a wasteful mutual subsidy spiral. They also bear negative effects on the own economy, through maintaining or creating inefficiencies.

Sectorally specific supply-side measures create rents in the sector being stimulated that tend to become incorporated into the value of fixed assets which makes it more difficult to reverse the policy once the economy has resumed growth. In addition they are not very transfer efficient.

Non-participating countries, especially low-income economies may find themselves disadvantaged by their inability to implement policy packages that support their domestic industries. They might be tempted to assist their domestic industries by border measures. However, raising tariffs if other countries implement fiscal stimulus packages increases the damage to the tariff-raising country, because it closes itself against imports that become cheaper in the wake of fiscal stimuli implemented elsewhere. This may benefit some domestic producers but others who depend on imports of intermediate goods and consumers are negatively affected. As a result, there is an economic incentive not to raise tariff as retaliatory measure.

Border measures, both on the import side and on exports are found to have the largest negative effects of all measures considered. They score negatively on the economy-wide income effects in the country implementing such measures as well as on the income of partner countries. Implementing import protection also harms a country's own exports, and hence throws further sand into the machinery of economic recovery. Export restrictions on raw materials raise world prices of those products and they force foreign processing industries to search for alternative suppliers in the short- to medium term. Effects on the domestic economy are mixed.

Notes

1. For more information on the model, the database and the research network see www.gtap.org

2. Tariffs lead to government revenues while non-tariff measures typically do not. For the illustrative purposes of the simulations this difference is not taken into account. Given the size of the simulated tariff increases the additional tariff revenues are not big enough to make a significant difference for the results reported here. A more refined analysis could model the different measures and their revenue effects in greater detail.

3. If the actual instrument used is an export quota, the price wedge will capture its tax equivalent.

4. The multiplier indicators relate the change in the variable of interest Z (GDP or trade) to the value of the policy change X (*e.g.* money value of the price wedge, size of subsidy or tax reduction): $I = \Delta Z / \Delta X$

5. The decomposition is calculated by the Gempack program indicators.tab, which has been specifically written for this project.

6. The price wedge created by the tariff multiplied by the volume of production.

Annex A.

Quantitative Analysis in Support of Chapter 2

Keynesian trade multiplier and trade to GDP elasticity

In the Keynesian model of an open economy:

$$Y^D = C + I + G + X - M \tag{1.1}$$

If we assume that investment, government expenditure and exports are independent of income and that consumption and imports depend on income we get the following expression for equilibrium income:

$$Y = cY + \bar{I} + \bar{G} + \bar{X} - mY \tag{1.2}$$

or

$$Y = \left(\frac{1}{1 - c + m}\right)(\bar{I} + \bar{G} + \bar{X}) \tag{1.3}$$

Where

$$\left(\frac{1}{1 - c + m}\right)$$

is the open economy multiplier that is greater than 1.

An additional dollar of spending would rise aggregate spending by more than a dollar; the multiplier effect of an injection occurs because of the chain of expenditures. The multiplier increases with the marginal propensity to consume (decreases with the marginal propensity to save (1-c) and decreases with marginal propensity to import.

Hence, in this model an additional dollar of exports results in $\left(\frac{1}{1-c+m}\right)$ additional USD of income:

$$dY = \left(\frac{1}{1 - c + m}\right) dX \tag{1.4}$$

Relation to the trade to GDP elasticity

Note that both *c* and *m* are assumed to be fixed parameters so it is assumed that imports are proportional to income $M = mY$ so that

$$\frac{dM}{M} = \frac{dY}{Y}$$

Hence, proportional changes in imports are assumed equal to the proportional changes in income, *i.e.* imports to GDP elasticity equals 1. In contrast, the relationship between proportional changes of exports and income cannot be decisively determined as they depend on the share of exports in final demand:

$$\frac{dY}{Y} = \frac{dX}{\bar{I} + \bar{G} + \bar{X}} = \frac{1}{\left(\frac{\bar{I} + \bar{G} + \bar{X}}{\bar{X}}\right)} \frac{d\bar{X}}{\bar{X}}$$

(1.5)

In a situation where $\bar{I} + \bar{G} = 0$ proportional change in income would be equal to proportional change in exports. If, however, $\bar{I} + \bar{G} > 0$ proportional changes in income will be *smaller* than proportional changes in exports, exports to GDP elasticity will be larger than 1. Hence, exports to GDP elasticity increases as the share of exports in exogenous (*i.e.* assumed independent from income) expenditure categories diminishes. In this sense the simple Keynesian approach provides a ready explanation for the existence of the disparity between proportional changes in exports and income during both crisis and normal times.

Imports-GDP elasticities in the long run and during the 2008-09 crisis

An error correction model estimation for OECD countries

Figure 2.3 in Chapter 2 shows an "instantaneous" multiplier, calculated with data provided for the same quarter. The observed variation in the calculated multiplier, especially during economic crises, suggest that there might be lags between changes in GDP and the time it takes to impact imports (and *vice-versa*).

Furthermore, there might be a long-run equilibrium relationship between the growth of imports and the growth of GDP (*e.g.* as posited by the Keynesian marginal propensity to import) but also stochastic fluctuations. We can use the Error Correction Model (ECM) to account for this. We start with a very simple proportional relationship between trade and GDP:

$$M_t = Q.Y_t$$

(2.1)

where *M* are imports (in volume), *Y* is real GDP and Q the share of imports in GDP. In log form, the equation can be written:

$$m_t = q + y_t$$

(2.2)

with *m*, *q* and *y* the natural logs of the previous variables.

To account for the dynamic relationship observed in Figure 2.3, we include the lagged values of both trade (m_{t-1}) and GDP (y_{t-1}), as well as stochastic fluctuations (u_t). The model can be written:

$$m_t = \alpha_0 + \alpha_1 m_{t-1} + \beta_1 y_t + \beta_2 y_{t-1} + u_t \tag{2.3}$$

Assuming that there is a long-run equilibrium relationship between *M* and *Y,* and that m^* and y^* are the equilibrium values of *m* and *y*, we have:

$$m^* = \alpha_0 + \alpha_1 m^* + \beta_1 y^* + \beta_2 y^* \tag{2.4}$$

At the equilibrium, we set u_t equal to zero and equation (2.4) implies that:

$$m^* = \frac{\alpha_0}{1-\alpha_1} + \frac{\beta_1 + \beta_2}{1-\alpha_1} y^* \tag{2.5}$$

Equation (2.5) is consistent with equation (2.2) if we have $q = \alpha_0/(1-\alpha_1)$ and $(\beta_1 + \beta_2)/(1-\alpha_1) = 1$. This is the long-run equilibrium relationship between trade and GDP. We can interpret $\gamma = (\beta_1 + \beta_2)/(1-\alpha_1)$ as the long-run equilibrium trade multiplier.

Equation (2.3) can then be used to model a divergence from equilibrium in the presence of stochastic shocks. Taking the first difference of m_t, adding and subtracting $\beta_1 y_{t-1}$ and then $(\alpha_1 - 1)y_{t-1}$ from the right hand side, it can be rewritten as:[1]

$$\Delta m_t = \alpha_0 + (\alpha_1 - 1)(m_{t-1} - y_{t-1}) + \beta_1 \Delta y_t + (\beta_1 + \beta_2 + \alpha_1 - 1)y_{t-1} + u_t \tag{2.6}$$

The coefficients β_1 and β_2 indicate the short-run impact of a change in GDP on imports. $(\alpha_1 - 1)$ is the speed at which trade adjusts to the discrepancy between trade and GDP in the previous period. This is the error correction rate.

Equation (2.6) is the classic specification of an "Error Correction Model" (ECM). Running Phillips-Perron unit root tests, we can see that *m* and y have unit roots but we reject the assumption that Δm and Δy contain unit roots. A Johansen test further shows that the rank of cointegration of *m* and *y* is one. This justifies the use of the above specification. We can estimate the model for OECD countries in the following way:

$$\Delta m_t = \alpha_0 + \delta_1 m_{t-1} + \delta_2 \Delta y_t + \delta_3 y_{t-1} + \varepsilon_t \tag{2.7}$$

Equation (2.7) is the same as equation (2.6) with $\delta_1 = \alpha_1 - 1$, $\delta_2 = \beta_1$ and $\delta_3 = \beta_1 + \beta_2$. The advantage of the specification is that we have directly the long-run equilibrium trade multiplier by dividing two of the estimated coefficients: $\gamma = \frac{\beta_1 + \beta_2}{\alpha_1 - 1} = \frac{\delta_3}{\delta_1}$. Furthermore, δ_1 is the speed at which imports adjust to trade and δ_2 is the short-term impact of GDP on trade (short-term multiplier). Using the same data as on Annex Figure 2.3, the results are found in Annex Table B.1.

Over the period 1961-2009, all the variables of the model are significant and the model explains 55% of the variance in the data. The goodness-of-fit improves when looking at more specific time periods in recent years. We find strong coefficients (both in terms of statistical and economic significance) for the short-term adjustment of trade to GDP changes (Δy_t). The speed at which imports converge to their equilibrium value is less significant and the coefficient is relatively small. In the last row of Annex Table B.1 the implied long-run trade multiplier (γ) is reported. Its value is rather high (2.38) and as expected it has increased over time. One interesting result is that it seems to be smaller in the 2000s than in the 1990s. However, in the last regression for the 2000s, the lags of imports and GDP are not significant and therefore some caution should be exercised.

To examine differences across countries, Annex Table B.2 reports the results of similar regressions at the country level. Generally, the model works quite well in explaining the variations across the growth rate of trade and GDP. There are, however, countries or years for which coefficients are not significant and the trade multiplier could not be calculated. All countries for which data are available have seen an increase in their trade multiplier after 1990. Between the 1990s and 2000s, the sample is split between countries in which the elasticity has increased and countries where it has decreased. The highest multipliers in the 2000s are found for Denmark and Portugal. While the values for the rate of convergence (first column) are of the same magnitude across countries, the short term impact of changes in GDP on trade shows more variation.).

To what extent could the drop in demand have contributed to the drop in trade?

One way of approaching this question is to apply the so-called import adjusted decomposition of GDP growth (*e.g.* Kranendonk and Verbruggen, 2008). The gist of this method is the decomposition of import demand into smaller categories related to individual expenditure categories. According to this approach the GDP can be expressed as follows:

$$ GDP = C + I + G + X - M = \left(C^D - C^M \right) + \left(I^D - I^M \right) + \left(G^D - G^M \right) + \left(X^D - X^M \right) \text{ (2.9)} $$

where *C, I, G, X and M*, are the familiar expenditure categories and A^D is an expression denoting the part of expenditure on category A that is produced domestically and A^M denotes the part of expenditure on category A that is produced abroad. Thus C^D is private consumption expenditure on products and services produced domestically and C^M is private consumption expenditure on products and services imported from abroad. Similarly G^D is government expenditure on products and services produced domestically and G^M is government expenditure on products and services produced abroad.

Expressing (2.9) in growth terms gives us:

$$ \dot{y} = \dot{c} \left(\frac{C^D - C^M}{GDP} \right) + \dot{i} \left(\frac{I^D - I^M}{GDP} \right) + \dot{g} \left(\frac{G^D - G^M}{GDP} \right) + \dot{x} \left(\frac{X^D - X^M}{GDP} \right) \tag{2.10} $$

where $\dot{y}$ is the rate of growth of GDP, $\dot{c}$ is the rate of growth of private consumption, $\dot{i}$ is the rate of growth of gross fixed capital formation and $\dot{x}$ is the rate of growth of exports.

It is worth pointing out that this formulation explicitly assumes that the rates of growth of purchases of domestically produced and imported categories are equal. In reality they may well not be equal and, in fact, finding out whether they have been equal during the crisis is an exercise that we undertake here and one that can shed light on the role of trade in the current crisis.

Unfortunately, none of the A^M categories is directly reported in national accounts data; we simply do not know what part of private final consumption expenditure is on imported products. Fortunately, all the other variables in (2.10) are observed and A^M can be derived from the estimated coefficients of the following equation:

$$ \dot{y} = \beta_1 \dot{c} + \beta_2 \dot{i} + \beta_3 \dot{g} + \beta_4 \dot{x} + \varepsilon \tag{2.11} $$

where:

$$\beta_1 = \left(\frac{C^D - C^M}{GDP} \right), \ \beta_2 = \left(\frac{I^D - I^M}{GDP} \right), \ \beta_3 = \left(\frac{G^D - G^M}{GDP} \right), \ \beta_1 = \left(\frac{X^D - X^M}{GDP} \right) \quad (2.12)$$

By collecting all the estimated A^M items and the associated growth rates we get an estimated change in imports that would be consistent with proportional changes in individual expenditure categories under the assumption that the rates of change of purchases of domestically produced and imported categories are equal:

$$\dot{m}_{PREDICTED} = \dot{c} \left(\frac{C_{EST}{}^M}{GDP} \right) + \dot{i} \left(\frac{I_{EST}{}^M}{GDP} \right) + \dot{g} \left(\frac{G_{EST}{}^M}{GDP} \right) + \dot{x} \left(\frac{X_{EST}{}^M}{GDP} \right) \quad (2.12)$$

where *EST* subscripts denote categories estimated from the coefficients in (2.11).

We do have data on the actual proportional changes in imports and we can compare them with the predicted changes.[2] Thus, if $\dot{m}_{PREDICTED} = \dot{m}$ the observed changes in trade (*i.e.* imports) were consistent with proportional changes observed for individual final demand categories. In other words, $\dot{m}_{PREDICTED} = \dot{m}$ would be an indication that there was nothing specific about trade during crisis, *i.e.* that once we account for different shares of imports in individual final expenditure categories and different growth rates of these categories, we are able to explain all variation in imports. However, if $\dot{m}_{PREDICTED} > \dot{m}$ this means that imports fell by more than what would be expected if purchases on domestic products were falling at the same rate as the purchases of foreign products. The existence of such an inequality suggests a trade-specific issues or set of issues.

Results

Annex Table B.3 presents the results of estimations for each of the individual G7 countries for the period 1981q1 – 2008q2 (the cut off at the second quarter of 2008 is intentional but the inclusion of data from the second half of 2008 and the beginning of 2009 does not significantly change the results—results available upon request). All LHS and RHS variables are year-on-year growth rates. The results presented in Annex Table B.3 reveal relatively similar import-adjusted contributions of individual expenditure categories to GDP across the G7 members, which is reassuring. Certainly there are some differences such as for example the relatively larger contribution of fixed capital formation to GDP and a relatively smaller contribution of exports in the United States or relatively higher contributions of private consumption in the United Kingdome and Japan, but overall the structure of contributions is rather homogenous across the G7. Another property of these estimations is their relatively high explanatory power (with an exception of Italy) and high statistical significance of estimated coefficients.

Annex Table B.4 presents $\dot{m}_{PREDICTED}$ derived from the estimated equation and the actually observed changes in imports $\dot{m}$ in 2008q4, 2009q1 and, for France and the United States in 2009q2. These results are not reported here, but it is worth mentioning that falling exports are the largest contributor to falling import demand across all G7 countries — a large part of the predicted trade collapse is associated with trade of intermediate inputs that are later exported. Other important contributors are private

consumption and investment while government expenditure is not, which has partially to do with the fact that government expenditure kept growing in the 2008q4 –2009q2 period and partially to do with the fact that imported products account for a small share of this category of expenditure.

Perhaps unsurprisingly, the group of countries where reductions in imports were preceded by falling exports (Germany, France and, to some extent, Italy) record $\dot{m}_{PREDICTED}$ that are much closer to $\dot{m}$ than in the group of countries where imports started falling earlier (United States, United Kingdom, Japan).

Notably, the actual collapse in imports was smaller only for Germany than what would actually be consistent with trends in the final demand (ratio of predicted to actual reduction in imports of -2.14 in 2008q4 and of 1.06 in 2009q1). This means that in 2008q4, Germany's imports fell less than what would be predicted by this quarter's fall in final demand (in fact they were still growing at a positive rate) while the fall in 2009q1 was more or less consistent with what would be predicted if purchases of domestic products were falling at the same rate as the purchases on foreign products.

For France, we are able to explain up to 40% of import collapse in 2008q4 and progressively less so in the first two quarters of 2009 (29 and 21%, respectively). For Italy, we are able to explain up to 30% of the import collapse in 2008q4 and 29% in 2009q1. For Canada and the United Kingdom, we are able to explain up to, respectively, 22 and 26% of import collapse in 2009q1, an improvement from the 2008q4.

In the United States, only up to 8% of reduction in imports in 2008q4 can be explained by falling final demand and this share decreases to around 3-4% in 2009q1 and q2. Final demand had an even smaller contribution to Japan's falling imports in 2008q4 and explained up to 13% of import reduction in 2009q1.

An input-output analysis of import requirements

In an open economy, the Leontief input-output model tells us that the total supply of goods and services is equal to domestic output plus imports:

$$X = X^d + M \tag{3.1}$$

where X^d is domestic output and M are imports. We also know that gross output and imports are used to supply intermediate inputs to domestic producers and for a variety of final uses, which include consumption, investment and exports. We can write:

$$A.X^d + Y = X^d + M \tag{3.2}$$

where $A.X$ are intermediate inputs (with A the matrix of inputs requirements) and Y is final demand. For domestic output, equation (3.2) implies that:

$$A_d.X^d + Y^d = X^d \tag{3.3}$$

with $A.X^d = A_d.X^d + A_m.X^d$ where A_d is the matrix of domestic inputs requirements (and A_m the matrix of imported inputs requirements). Equation (3.3) can be transformed to let appear the Leontief inverse and to express domestic output as a function of domestic final demand:

$$X^d = (I - A_d)^{-1}Y^d \tag{3.4}$$

with I being a unit matrix[3] and $(I-A)^{-1}$ the Leontief inverse. The Leontief inverse tells us the extra output to be expected when domestic demand increases.

For imports, we can write an expression similar to equation (3.3) showing that imports are either used as intermediate inputs or for final demand:

$$M = A_m X^d + Y^m \tag{3.5}$$

with Y^m being the final demand of imported goods and services and $Y = Y^d + Y^m$.

Combining (3.4) and (3.5), we have:

$$M = Y^m + A_m (I - A^d)^{-1} Y^d \tag{3.6}$$

As we know that $Y = Y^d + Y^m$, we can introduce $Y^d = F_d Y$ and $Y^m = F_m Yi$ so that (3.6) becomes:

$$M = F_m Y + A_m (I - A^d)^{-1} F_d Y \tag{3.7}$$

where F_d and F_m are coefficients representing the share of domestic and imported final goods and services. These coefficients can also be interpreted as matrices when decomposing Y into its different components: Consumption, investment and exports.

Equation (3.7) provides the import requirements of final expenditures in GDP. It shows that the impact of increased final demand on trade is twofold. First, imports naturally increase because higher income means that more final goods and services will be imported (the first term on the right hand side). F_m represents the marginal propensity to import final goods and services and provides an estimation of the direct impact of demand on trade. The second term of the equation can be understood as an indirect effect that takes place through imported intermediate inputs. Increased final demand means that domestic producers will use additional imported inputs and the extra imports that are created are summarised by the product of the matrix of imported inputs requirements and the Leontief inverse of the matrix of domestic inputs requirements. Annex Table B.3 presents the direct and indirect import requirements of OECD countries at the sector level, expressed as a share of domestic demand[4].

The ratios in Annex Table B.3 indicate how many units of imports are induced by a USD 1 increase in demand. For example, in the agriculture and fishing sector (the first industry in Annex Table B.5) an increase of USD 1 in demand was associated in 1995 with a direct import requirement of USD 0.036 and an indirect import requirement of USD 0.089. Together, imports of agriculture and fishing products increase by USD 0.125 (0.036+0.089).

Annex Table B.3 shows that import requirements have increased for all manufacturing industries between 1995 and 2005. For some services sectors, such as "hotels and restaurants", "renting of machinery and equipment," "computer activities" or "other business activities", it has however decreased. The combined impact of the direct and indirect effects leads to import requirements that can be quite high in "office machinery and computers," "radio, TV and communication equipments," "medical precision and optical instruments," or "motor vehicles." These sectors are particularly dependent on imports. Such high figures are also explained by vertical specialisation and the fact that increased demand triggers a chain of additional imports from these sectors.

Notes

1. See Keele and De Boef (2004).

2. Data used in this estimation come from the OECD National Accounts Database where they are originally expressed in millions of USD, volume estimates based on fixed PPPs, OECD reference year, annual levels, seasonally adjusted. This quarterly data has then been transformed to year-on-year percentage changes used in the estimation.

3. A matrix of order n (n being the number of sectors in the economy) with a diagonal of "1" and all other elements set to zero.

4. We divide both sides of equation (15) by total demand (which is equal to gross output minus net exports).

Annex B.

Additional Tables and Figures in Support of Chapter 2

Annex Table B.1 Estimation of the Error Correction Model for OECD

	1961-2009	1960s	1970s	1980s	1990s	2000s
Dependent variable: Δm_t						
m_{t-1}	-0.015*	-0.410**	-0.173**	-0.171*	-0.180**	-0,185
	(0.009)	(0.174)	(0.085)	(0.089)	(0.082)	(0.126)
Δy_t	2.229***	1.696***	1.828***	1.341***	1.876***	3.339***
	(0.228)	(0.599)	(0.558)	(0.298)	(0.054)	(0.451)
y_{t-1}	0.035**	0.659**	0.243**	0.340**	0.466**	0,427
	(0.016)	(0.265)	(0.120)	(0.160)	(0.201)	(0.299)
Number of observations	192	35	40	40	40	37
R-squared	0,60	0,33	0,49	0,60	0,88	0,84
Long-run trade multiplier (δ_3/δ_1)	2,301	1,608	1,401	1,980	2,582	2,316

OLS estimation with robust standard errors. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Annex Table B.2. Estimation of the Error Correction Model at the country level

Countries	Period	Estimation - Dependent variable: Δmt			Long-run trade multiplier		
		mt-1	Δyt	yt-1	All years	Before 1990	After 1990
OECD							
Australia	1960q1-2009q1	-0.053**	0.806**	0.093**	1,762	1,352	2,203
Austria	1960q1-2009q2	-0.140***	1.850***	0.268***	1,915	1,834	
Belgium	1960q1-2009q2	-0.090**	1.600***	0.157**	1,753	1,665	1,858
Canada	1960q1-2009q2	-0.046**	1.740***	0.079**	1,727	1,537	1,491
Chile	1995q1-2009q2	-0.163**	2.074***	0.362**			2,228
Czech Republic	1995q1-2009q2	-0,017	1.147*	-0,011			
Denmark	1960q1-2009q1	-0,022	1.243***	0,042	1,948	1,353	2,964
Finland	1960q1-2009q1	-0.167***	2.018***	0.276***	1,658	1,358	2,065
France	1960q1-2009q2	-0.034**	2.085***	0.072**	2,102	1,807	2,627
Germany	1960q1-2009q2	-0.033*	0.734***	0.067*	2,032	1,915	3,643
Greece	1960q1-2009q2	-0.053**	3.139***	0.120***	2,253	1,963	
Hungary	1995q1-2009q2	-0.099*	3.312***	0.266*			2,694
Ireland	1960q1-2009q1	-0,026	0.511***	0,038	1,477	1,394	2,705
Italy	1960q1-2009q2	-0.051**	1.308***	0.088**	1,730	1,498	2,746
Japan	1960q1-2009q2	-0.037**	1.066***	0.052*	1,385	1,269	3,098
Korea	1970q1-2009q2	-0.132**	2.020***	0.206**	1,556	1,443	1,844
Luxembourg	1960q1-2009q1	-0.073***	0.470**	0.100***	1,361	1,330	1,633
Mexico	1960q1-2009q2	-0,021	2.594***	0.059**	2,779	1,273	2,721
Netherlands	1960q1-2009q2	-0,034	0.370***	0,055	1,598	1,522	2,309
New Zealand	1960q1-2009q1	-0.111***	0.739***	0.188**	1,689	1,358	1,750
Norway	1960q1-2009q2	-0.075***	0,255	0.069**	0,918	0,706	1,490
Poland	1995q1-2009q2	-0.561***	2.373***	1.173***			2,090
Portugal	1960q1-2009q2	-0,018	0.965***	0,027	1,537		2,142
Slovak Republic	1993q1-2009q2	-0,088	0.890**	0,139			
Spain	1960q1-2009q2	0,002	-0,422	-0,034			
Sweden	1960q1-2009q2	-0.146***	0.855***	0.261***	1,783	1,528	1,920
Switzerland	1960q1-2009q1	-0,014	1.052***	0,028			2,501
Turkey	1960q1-2009q1	-0,049	2.193***	0.097*	2,004		2,173
United Kingdom	1960q1-2009q2	-0.174***	1.337***	0.354***	2,039	1,852	2,122
United States	1960q1-2009q2	-0.080***	1.729***	0.160***	1,996	1,778	2,798
OECD Accession countries							
Estonia	1995q1-2009q2	-0.271***	2.113***	0.413***			1,527
Israel	1995q1-2009q2	-0,145	2.081***	0,120			
Slovenia	1996q1-2009q1	-0.495***	2.585***	0.931***			1,881

OLS estimation with robust standard errors. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The multiplier is not reported when the coefficients used to calculate it are both non significant.

Annex Table B.3. Estimation results by individual G7 country

Variable	Canada				France				Germany				Italy			
	Coefficient	Standard Error	t-Statistic	Probability	Coefficient	Standard Error	t-Statistic	Probability	Coefficient	Standard Error	t-Statistic	Probability	Coefficient	Standard Error	t-Statistic	Probability
C	0,42	0,06	7,42	0,00	0,40	0,04	10,64	0,00	0,43	0,03	12,41	0,00	0,41	0,05	8,08	0,00
I	0,14	0,02	8,25	0,00	0,14	0,01	9,76	0,00	0,16	0,02	10,31	0,00	0,12	0,02	5,52	0,00
G	0,10	0,04	2,33	0,02	0,14	0,03	5,01	0,00	0,08	0,03	2,96	0,00	0,12	0,04	3,22	0,00
X	0,18	0,01	12,61	0,00	0,12	0,01	15,54	0,00	0,14	0,01	17,75	0,00	0,12	0,01	9,82	0,00
R-squared	0,87				0,90				0,89				0,74			
Adjusted R-squared	0,86				0,90				0,88				0,73			
Standard deviation of regression	0,83				0,40				0,59				0,77			
Sum squared residuals	73,14				17,36				36,74				62,23			
Log likelihood	-133,64				-54,52				-95,77				-124,75			
Mean dependent variable	2,79				2,10				1,99				1,75			
Standard Deviation of dependent variable	2,25				1,26				1,72				1,47			
Akaike information criterion	2,50				1,06				1,81				2,34			
Schwarz criterion	2,60				1,16				1,91				2,44			
Durbin-Watson statistics	0,77				0,69				0,82				1,23			

Variable	Japan				United Kingdom				United States			
	Coefficient	Standard Error	t-Statistic	Probability	Coefficient	Standard Error	t-Statistic	Probability	Coefficient	Standard Error	t-Statistic	Probability
C	0,51	0,04	14,49	0,00	0,51	0,04	14,30	0,00	0,40	0,05	8,72	0,00
I	0,23	0,02	14,51	0,00	0,10	0,02	6,15	0,00	0,21	0,02	12,09	0,00
G	0,07	0,03	2,60	0,01	0,09	0,04	1,99	0,05	0,16	0,04	4,03	0,00
X	0,11	0,01	13,51	0,00	0,10	0,01	7,38	0,00	0,09	0,01	9,88	0,00
R-squared	0,92				0,78				0,89			
Adjusted R-squared	0,91				0,78				0,89			
Standard deviation of regression	0,57				0,78				0,61			
Sum squared residuals	34,63				63,67				39,16			
Log likelihood	-92,52				-126,01				-99,28			
Mean dependent variable	2,34				2,61				3,07			
Standard Deviation of dependent variable	1,95				1,64				1,85			
Akaike information criterion	1,75				2,36				1,88			
Schwarz criterion	1,85				2,46				1,98			
Durbin-Watson statistics	0,86				0,94				1,23			

Annex Table B.4 Predicted and actual proportional changes in imports

	% Change in imports	2008Q4	2009Q1	2009Q2
Canada	Predicted	-1,46	-3,80	
	Actual	-7,68	-17,02	
	Ratio predicted / actual	0,19	0,22	
France	Predicted	-1,25	-2,90	-2,29
	Actual	-3,09	-9,97	-10,94
	Ratio predicted / actual	0,41	0,29	0,21
Germany	Predicted	-2,29	-6,97	
	Actual	1,16	-7,26	
	Ratio predicted / actual	-1,97	0,96	
Italy	Predicted	-2,69	-4,94	
	Actual	-8,87	-16,99	
	Ratio predicted / actual	0,30	0,29	
Japan	Predicted	-0,55	-1,74	
	Actual	2,56	-15,33	
	Ratio predicted / actual	-0,22	0,11	
United Kingdom	Predicted	-1,12	-3,58	
	Actual	-7,66	-13,58	
	Ratio predicted / actual	0,15	0,26	
United States	Predicted	-0,54	-0,51	-0,71
	Actual	-6,81	-16,25	-18,56
	Ratio predicted / actual	0,08	0,03	0,04

Annex Table B.5. Direct and indirect import requirements for OECD countries

Industry	1995			2000			2005		
	Direct	**Indirect**	**Combined**	**Direct**	**Indirect**	**Combined**	**Direct**	**Indirect**	**Combined**
Agriculture and fishing	0,036	0,089	0,125	0,039	0,097	0,136	0,058	0,124	0,181
Mining and quarrying	0,010	0,492	0,502	0,011	0,574	0,585	0,013	0,642	0,655
Food products	0,093	0,071	0,164	0,104	0,081	0,185	0,128	0,096	0,224
Textiles and wearing apparel	0,245	0,183	0,427	0,303	0,223	0,526	0,358	0,265	0,623
Wood,publishing and printing	0,032	0,166	0,197	0,037	0,190	0,226	0,037	0,207	0,245
Refined petroleum and other treatments	0,042	0,213	0,257	0,054	0,220	0,279	0,111	0,279	0,390
Chemical products	0,094	0,369	0,463	0,107	0,403	0,509	0,150	0,445	0,595
Rubber and plastic products	0,050	0,296	0,348	0,052	0,336	0,389	0,054	0,391	0,445
Metal products	0,031	0,301	0,332	0,028	0,326	0,354	0,027	0,388	0,416
Mechanical products	0,292	0,218	0,509	0,301	0,242	0,542	0,316	0,261	0,577
Office machinery and computers	0,433	0,273	0,749	0,459	0,292	0,778	0,502	0,450	0,972
Radio,TV,communication equipments	0,238	0,343	0,614	0,263	0,387	0,683	0,247	0,466	0,773
Medical, precision and optical instruments, watches and clocks	0,353	0,249	0,637	0,316	0,310	0,665	0,334	0,367	0,729
Motor vehicles	0,326	0,213	0,549	0,347	0,214	0,571	0,392	0,260	0,652
Other transport equipments	0,241	0,244	0,492	0,268	0,261	0,545	0,293	0,284	0,602
Other manufacturing	0,119	0,209	0,328	0,117	0,255	0,373	0,136	0,272	0,407
Electricity, gas and water	0,003	0,011	0,015	0,004	0,015	0,020	0,012	0,037	0,049
Construction	0,001	0,004	0,005	0,002	0,005	0,007	0,004	0,005	0,009
Trade and repairs	0,000	0,012	0,012	0,001	0,023	0,024	0,004	0,015	0,019
Hotels and restaurants	0,063	0,043	0,108	0,064	0,047	0,113	0,025	0,051	0,075
Transport, storage and auxiliary activities	0,026	0,081	0,106	0,031	0,093	0,124	0,029	0,124	0,153
Post and telecommunications	0,010	0,045	0,055	0,007	0,042	0,049	0,013	0,047	0,061
Finance	0,018	0,048	0,066	0,009	0,051	0,060	0,014	0,063	0,077
Real estate	0,001	0,003	0,004	0,001	0,003	0,004	0,002	0,002	0,005
Renting of machinery and equipment	0,020	0,163	0,186	0,014	0,171	0,187	0,007	0,144	0,151
Computer activities	0,047	0,132	0,187	0,049	0,098	0,152	0,051	0,073	0,126
Research and development	0,002	0,174	0,176	0,000	0,207	0,207	0,006	0,272	0,279
Other business activities	0,014	0,168	0,182	0,012	0,154	0,166	0,007	0,107	0,114
Other services	0,006	0,010	0,016	0,007	0,008	0,016	0,005	0,008	0,013

Source: Author's calculations based on *OECD Input-Output Tables*, 2009 edition. The combined impact is the sum of the direct and indirect import requirements. Coefficients are averaged over OECD countries. For each country, the closest year to 1995, 2000 and 2005 is selected.

Annex Table B.6. Year-on-year growth rates in trade of goods and manufacturing production

	2007Q1	2007Q2	2007Q3	2007Q4	2008Q1	2008Q2	2008Q3	2008Q4	2009Q1	2009Q2
					United States					
Exports of goods	9,7	9,2	11,5	12,5	17,1	18,8	17,3	-3,3	-21,5	-25,9
Imports of goods	4,3	3,8	3,4	10,6	11,6	14,6	14,5	-9,4	-30,1	-34,7
Manufacturing production	0,7	1,6	1,6	1,7	0,8	-1,0	-3,9	-8,6	-14,0	-15,7
					Germany					
Exports of goods	23,0	19,5	18,0	17,9	22,2	23,2	13,4	-13,9	-32,9	-34,0
Imports of goods	19,0	16,0	14,1	16,5	24,4	23,6	19,1	-10,7	-26,8	-29,6
Manufacturing production	7,9	6,5	6,2	5,5	2,6	6,8	1,7	-7,6	-20,9	-23,9
					Japan					
Exports of goods	9,7	7,3	10,0	14,6	23,2	18,0	5,6	-11,5	-35,7	-34,1
Imports of goods	5,0	4,2	4,4	14,9	27,1	28,3	26,6	4,9	-26,1	-34,2
Manufacturing production	3,0	2,3	2,6	3,4	2,4	0,8	-1,4	-14,6	-34,6	-27,9
					OECD Total					
Exports of goods	14,2	11,4	13,9	17,1	21,5	23,4	15,7	-12,9	-30,0	
Imports of goods	12,7	10,6	11,7	17,4	21,5	22,8	17,0	-11,9	-30,5	
Manufacturing production	3,7	2,9	3,3	2,7	2,3	1,2	-2,4	-9,9	-18,7	

Source: OECD *Main Economic Indicators Database*.

Annex Table B.7. Export and import performance by broad product category

France

	Exports								Imports							
	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009	Jan to Mar-2009	Contribution to total Jan to Mar-2009	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009	Jan to Mar-2009	Contribution to total Jan to Mar-2009
0: Food and live animals	-18,0	-25,6	-12,4	-24,9	-21,4	..	-18,7	4,8	-18,0	-19,7	-12,6	-15,7	-14,3	..	-16,7	3,8
1: Beverages and tobacco	-36,3	-35,5	-29,6	-36,2	-27,9	..	-33,6	2,7	-22,7	-23,6	2,3	-22,1	-27,3	..	-14,3	0,4
2: Crude materials, inedible, except fuels	-49,8	-50,4	-48,7	-55,2	-48,9	..	-49,6	4,1	-37,3	-35,7	-31,1	-47,4	-44,8	..	-34,6	2,9
3: Mineral fuels, lubricants and related material	-45,1	-40,4	-47,0	-54,5	-60,0	..	-44,2	6,7	-43,8	-40,7	-37,8	-46,3	-45,2	..	-40,9	22,8
4: Animal and vegetable oils, fats and waxes	-31,3	-42,2	-28,4	-28,5	-40,3	..	-33,9	0,3	-18,0	-27,0	-30,3	-33,9	-46,0	..	-24,9	0,4
5: Chemicals and related products, n.e.s	-25,1	-29,1	-16,7	-30,5	-25,1	..	-23,7	13,6	-19,7	-21,8	-21,3	-29,2	-26,7	..	-20,9	9,4
6: Manufactured goods	-35,3	-40,1	-37,2	-47,1	-38,2	..	-37,6	16,6	-33,3	-36,6	-36,7	-46,3	-44,5	..	-35,6	17,8
7: Machinery and transport equipment	-38,3	-36,5	-35,1	-40,1	-26,9	..	-36,6	45,1	-31,5	-31,0	-28,4	-37,1	-30,7	..	-30,2	35,2
8: Miscellaneous manufactured articles	-16,5	-24,3	-16,5	-29,7	-18,5	..	-19,2	6,2	-13,3	-20,1	-14,8	-26,3	-21,1	..	-16,1	7,2
9: Commodities and transactions, n.e.c	-24,7	-5,8	-15,9	-18,4	7,6	..	-15,0	0,1	-1,4	-17,3	-11,2	-35,8	-36,5	..	-11,9	0,0

Germany

	Exports								Imports							
	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009	Jan to Mar-2009	Contribution to total Jan to Mar-2009	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009	Jan to Mar-2009	Contribution to total Jan to Mar-2009
0: Food and live animals	-12,7	-15,9	-12,5	..	..	..	-13,7	1,5	-9,6	-14,9	-13,3	..	..	..	-12,6	2,6
1: Beverages and tobacco	-3,3	-17,5	-23,0	..	..	..	-14,7	0,3	-8,1	-11,4	-0,8	..	..	..	-6,6	0,2
2: Crude materials, inedible, except fuels	-48,4	-48,2	-46,9	..	..	..	-47,8	2,8	-32,3	-40,6	-42,6	..	..	..	-38,5	5,2
3: Mineral fuels, lubricants and related material	-29,5	-29,6	-52,2	..	..	..	-38,2	3,1	-25,0	-36,2	-37,1	..	..	..	-32,8	16,3
4: Animal and vegetable oils, fats and waxes	-16,7	-8,6	-27,6	..	..	..	-18,6	0,1	-33,4	-33,7	..	..	..	..	-23,8	0,3
5: Chemicals and related products, n.e.s	-30,6	-26,4	-20,0	..	..	..	-25,7	12,1	-15,0	-25,2	-22,9	..	..	..	-21,2	9,6
6: Manufactured goods	-34,3	-36,8	-36,2	..	..	..	-35,8	15,7	-32,3	-38,3	-42,6	..	..	..	-37,9	20,1
7: Machinery and transport equipment	-34,0	-38,7	-31,9	..	..	..	-34,8	52,4	-26,6	-29,0	-25,1	..	..	..	-26,8	34,7
8: Miscellaneous manufactured articles	-22,6	-23,3	-22,9	..	..	..	-22,9	6,9	-10,6	-16,8	-15,5	..	..	..	-14,3	5,5
9: Commodities and transactions, n.e.c	-26,0	-33,6	-26,3	..	..	..	-28,7	5,1	-20,4	-21,1	-10,8	..	..	..	-17,3	5,6

Italy

	Exports								Imports							
	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009	Jan to Mar-2009	Contribution to total Jan to Mar-2009	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009	Jan to Mar-2009	Contribution to total Jan to Mar-2009
0: Food and live animals	-13,9	-21,0	-12,1	-25,1	-23,8	..	-15,7	2,2	-20,8	-22,0	-15,7	-21,2	-21,3	..	-19,4	3,7
1: Beverages and tobacco	-24,3	-21,1	-18,2	-24,1	-14,6	..	-21,0	0,8	-2,1	-19,0	-10,9	-19,2	-22,2	..	-10,9	0,3
2: Crude materials, inedible, except fuels	-41,7	-47,0	-34,4	-38,8	-34,9	..	-40,7	1,5	-37,3	-45,3	-44,1	-53,2	-51,3	..	-42,4	5,4
3: Mineral fuels, lubricants and related material	-53,9	-53,1	-56,3	-56,1	-52,8	..	-54,5	7,6	-8,1	0,6	-13,5	-19,9	-26,4	..	-7,4	3,1
4: Animal and vegetable oils, fats and waxes	-14,2	-22,9	-10,7	-34,5	-21,8	..	-15,9	0,2	-24,5	-23,9	-30,8	-33,3	-38,0	..	-26,8	0,6
5: Chemicals and related products, n.e.s	-32,2	-31,1	-25,2	-35,8	-30,6	..	-29,4	9,0	-29,3	-19,4	-24,2	-34,9	-32,9	..	-24,3	9,2
6: Manufactured goods	-36,8	-40,4	-35,7	-45,1	-43,7	..	-37,6	22,9	-44,1	-49,6	-47,0	-53,3	-54,8	..	-47,0	23,5
7: Machinery and transport equipment	-36,6	-37,4	-32,2	-42,5	-35,6	..	-35,2	39,4	-34,0	-36,7	-30,0	-44,1	-37,5	..	-33,5	28,0
8: Miscellaneous manufactured articles	-25,5	-28,1	-26,2	-34,6	-34,4	..	-26,7	14,2	-12,7	-18,7	-16,2	-26,5	-19,9	..	-15,9	4,9
9: Commodities and transactions, n.e.c	-16,8	-30,8	-23,6	-25,6	-19,4	..	-24,4	2,2	-78,9	-81,0	-76,9	-79,0	-76,9	..	-78,9	21,4

Japan

	Exports								Imports							
	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009	Jan to Mar-2009	Contribution to total Jan to Mar-2009	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009	Jan to Mar-2009	Contribution to total Jan to Mar-2009
0: Food and live animals	-17,1	-10,3	-8,4	-0,3	..	..	-12,0	0,1	2,3	-10,2	-12,1	-13,3	..	..	-6,8	1,6
1: Beverages and tobacco	-24,6	4,4	13,6	5,8	..	..	-3,1	0,0	19,1	4,9	2,6	-22,3	..	..	8,7	-0,2
2: Crude materials, inedible, except fuels	-36,7	-31,7	-33,7	-24,9	..	..	-33,9	1,1	-16,9	-34,2	-46,2	-40,5	..	..	-32,5	7,2
3: Mineral fuels, lubricants and related material	-34,1	-38,3	-48,3	-45,6	..	..	-40,8	1,6	-33,4	-43,6	-49,2	-46,9	..	..	-42,4	49,6
4: Animal and vegetable oils, fats and waxes	0,3	-26,7	-16,1	-5,1	..	..	-16,2	0,0	2,6	-22,9	-27,1	-35,0	..	..	-15,8	0,1
5: Chemicals and related products, n.e.s	-37,0	-38,3	-29,7	-21,9	..	..	-34,8	7,8	-0,2	-19,3	-22,8	-16,4	..	..	-14,0	3,5
6: Manufactured goods	-17,6	-35,3	-36,0	-32,2	..	..	-30,6	8,9	-12,8	-40,2	-39,2	-44,5	..	..	-30,5	9,2
7: Machinery and transport equipment	-38,3	-45,3	-49,5	-42,8	..	..	-44,8	71,1	-24,4	-33,4	-33,3	-31,4	..	..	-30,3	24,5
8: Miscellaneous manufactured articles	-35,9	-36,5	-39,5	-29,2	..	..	-37,4	5,1	-7,1	-22,4	-7,3	-9,6	..	..	-6,9	2,4
9: Commodities and transactions, n.e.c	-35,8	-26,3	-30,8	-14,3	..	..	-30,9	4,3	-33,0	-28,8	-28,6	-9,0	..	..	-30,3	2,0

France

	Exports								Imports							
	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009	Jan to Mar-2009	Contribution to total Jan to Mar-2009	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009	Jan to Mar-2009	Contribution to total Jan to Mar-2009
0: Food and live animals	-20,2	-19,4	-16,8	-20,4	-20,3	..	-18,8	1,9	-21,3	-20,4	-22,1	-20,3	-21,1	..	-21,3	4,5
1: Beverages and tobacco	-26,4	-33,4	-27,4	-20,3	-19,5	..	-29,2	1,5	-24,1	-27,7	-20,9	-22,8	-26,2	..	-24,1	0,8
2: Crude materials, inedible, except fuels	-52,6	-51,5	-46,4	-48,1	-58,9	..	-50,0	3,6	-54,2	-55,0	-44,9	-47,6	-51,8	..	-51,4	4,6
3: Mineral fuels, lubricants and related material	-31,7	-46,9	-45,1	-47,4	-50,3	..	-41,4	15,4	-34,7	-43,1	-37,6	-52,9	-57,4	..	-38,4	13,5
4: Animal and vegetable oils, fats and waxes	19,1	25,9	34,6	15,2	-40,3	..	25,9	-0,1	4,1	-35,4	-35,6	-43,1	-40,9	..	-24,8	0,2
5: Chemicals and related products, n.e.s	-19,9	-16,7	-21,5	-22,1	-27,8	..	-19,4	9,9	-20,5	-22,1	-23,1	-18,1	-27,7	..	-21,9	7,1
6: Manufactured goods	-46,5	-47,5	-41,5	-47,2	-48,6	..	-45,2	17,5	-36,7	-41,0	-39,1	-41,7	-36,3	..	-39,0	14,5
7: Machinery and transport equipment	-38,2	-39,0	-35,4	-40,4	-36,3	..	-37,5	40,9	-40,6	-44,0	-37,8	-43,5	-40,6	..	-40,8	43,8
8: Miscellaneous manufactured articles	-29,3	-27,7	-27,4	-30,8	-29,3	..	-28,0	9,5	-20,4	-24,0	-28,1	-25,7	-24,8	..	-24,2	10,2
9: Commodities and transactions, n.e.c	9,1	0,5	9,2	-12,6	-23,1	..	6,2	-0,1	-27,8	-32,4	-32,6	-29,5	-22,3	..	-31,0	0,7

United States

	Exports								Imports							
	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009	Jan to Mar-2009	Contribution to total Jan to Mar-2009	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009	Jan to Mar-2009	Contribution to total Jan to Mar-2009
0: Food and live animals	-19,1	-25,3	-20,4	-19,8	-20,6	..	-21,6	6,5	-3,6	-9,9	-1,4	-5,3	-9,2	..	-4,9	0,5
1: Beverages and tobacco	-4,0	-8,1	10,5	-27,2	-23,7	..	0,1	0,0	-11,0	-8,9	1,5	-20,0	-12,9	..	-5,8	0,1
2: Crude materials, inedible, except fuels	-28,0	-25,3	-28,8	-32,2	-35,2	..	-27,3	7,5	-14,8	-37,3	-36,5	-47,3	-49,8	..	-29,9	1,5
3: Mineral fuels, lubricants and related material	-19,9	-31,9	-35,1	-37,3	-35,5	..	-29,3	6,7	-50,8	-53,9	-51,0	-54,9	-56,0	..	-51,8	38,5
4: Animal and vegetable oils, fats and waxes	-11,7	-52,5	-61,1	-39,1	-23,0	..	-47,5	0,8	-3,3	7,4	-40,9	-43,7	-37,7	..	-14,5	0,1
5: Chemicals and related products, n.e.s	-19,7	-16,7	-11,4	-18,4	-17,2	..	-15,8	9,7	-12,9	-21,0	-12,1	-13,5	-21,3	..	-15,3	4,4
6: Manufactured goods	-26,8	-31,1	-28,3	-33,9	-33,8	..	-28,7	12,4	-20,7	-35,8	-32,8	-39,9	-41,6	..	-29,8	10,9
7: Machinery and transport equipment	-22,2	-24,9	-22,6	-28,5	-29,9	..	-23,2	44,9	-26,7	-34,9	-29,2	-33,2	-32,9	..	-30,3	36,1
8: Miscellaneous manufactured articles	-17,4	-11,9	-9,9	-15,6	-12,3	..	-13,0	6,1	-10,4	-23,2	-12,2	-19,1	-20,4	..	-15,3	6,9
9: Commodities and transactions, n.e.c	-8,0	-31,9	-33,7	-35,0	-26,3	..	-25,9	5,5	-10,9	-4,0	-7,1	-13,8	-16,7	..	-7,4	0,8

Source: OECD MSIT Database.

Annex Table B.8. Export, import, production and value added shares of broad product categories

	United States				
	Exports	**Imports**	**Intermediate inputs**	**Gross output**	**Value added**
C01T05 AGRICULTURE, HUNTING, FORESTRY AND FISHING	4,0	1,5	5,0	5,3	5,8
C10T14 MINING AND QUARRYING	1,4	14,6	4,7	7,4	12,5
C15T37 MANUFACTURING	94,6	83,9	90,3	87,3	81,7
C15T16 Food products, beverages and tobacco	4,3	4,0	14,5	12,8	9,4
C17T19 Textiles, textile products, leather and footwear	2,1	8,6	1,8	2,0	2,2
C20 Wood and products of wood and cork	0,6	1,6	2,2	2,1	2,0
C21T22 Pulp, paper, paper products, printing and publishing	2,8	1,9	8,8	10,5	13,9
C23T25 Chemical, rubber, plastics and fuel products	20,5	17,1	28,6	26,4	21,9
C26 Other non-metallic mineral products	0,9	1,5	1,9	2,4	3,4
C27T28 Basic metals and fabricated metal products	6,4	8,3	9,9	10,4	11,4
C29T33 Machinery and equipment	39,0	33,6	14,2	15,7	18,6
C34T35 Transport equipment	20,4	17,0	14,4	13,2	10,9
C36T37 Manufacturing n.e.c. and recycling	3,1	6,4	3,7	4,5	6,3

	Germany				
	Exports	**Imports**	**Intermediate inputs**	**Gross output**	**Value added**
C01T05 AGRICULTURE, HUNTING, FORESTRY AND FISHING	0,8	2,7	2,5	2,8	3,5
C10T14 MINING AND QUARRYING	0,2	10,8	0,8	0,8	1,0
C15T37 MANUFACTURING	99,0	86,4	96,7	96,4	95,5
C15T16 Food products, beverages and tobacco	4,1	5,7	10,4	9,5	7,7
C17T19 Textiles, textile products, leather and footwear	3,0	6,3	1,7	1,7	1,7
C20 Wood and products of wood and cork	0,7	0,8	1,6	1,5	1,5
C21T22 Pulp, paper, paper products, printing and publishing	3,0	2,9	5,0	5,5	6,6
C23T25 Chemical, rubber, plastics and fuel products	19,6	20,0	18,2	17,5	15,9
C26 Other non-metallic mineral products	1,3	1,2	2,3	2,5	3,0
C27T28 Basic metals and fabricated metal products	9,4	11,0	12,8	13,2	13,9
C29T33 Machinery and equipment	33,2	30,9	23,5	25,7	30,4
C34T35 Transport equipment	23,6	18,5	22,4	20,6	16,7
C36T37 Manufacturing n.e.c. and recycling	1,9	2,6	2,2	2,3	2,6

	Japan				
	Exports	**Imports**	**Intermediate inputs**	**Gross output**	**Value added**
C01T05 AGRICULTURE, HUNTING, FORESTRY AND FISHING	0,1	3,3	2,9	4,1	6,4
C10T14 MINING AND QUARRYING	0,0	27,7	0,3	0,3	0,4
C15T37 MANUFACTURING	99,8	69,0	96,9	95,6	93,2
C15T16 Food products, beverages and tobacco	0,5	10,3	9,0	9,8	11,6
C17T19 Textiles, textile products, leather and footwear	1,1	9,8	1,4	1,4	1,6
C20 Wood and products of wood and cork	0,0	2,6	0,7	0,7	0,8
C21T22 Pulp, paper, paper products, printing and publishing	0,6	1,4	4,7	5,5	7,1
C23T25 Chemical, rubber, plastics and fuel products	14,0	19,1	21,5	20,2	17,5
C26 Other non-metallic mineral products	1,2	1,2	1,8	2,2	3,1
C27T28 Basic metals and fabricated metal products	8,7	9,2	15,7	14,6	12,5
C29T33 Machinery and equipment	45,1	36,0	23,9	25,9	29,9
C34T35 Transport equipment	27,6	6,4	19,0	17,3	13,9
C36T37 Manufacturing n.e.c. and recycling	1,2	4,0	2,5	2,3	1,9

	Canada				
	Exports	**Imports**	**Intermediate inputs**	**Gross output**	**Value added**
C01T05 AGRICULTURE, HUNTING, FORESTRY AND FISHING	3,0	2,1	6,3	6,6	7,1
C10T14 MINING AND QUARRYING	18,5	7,9	8,3	17,8	33,3
C15T37 MANUFACTURING	78,5	89,9	85,4	75,5	59,6
C15T16 Food products, beverages and tobacco	6,0	4,6	12,7	12,9	13,3
C17T19 Textiles, textile products, leather and footwear	1,6	4,3	1,5	1,9	2,7
C20 Wood and products of wood and cork	6,1	0,9	5,0	5,4	6,2
C21T22 Pulp, paper, paper products, printing and publishing	7,5	3,4	8,2	10,3	15,1
C23T25 Chemical, rubber, plastics and fuel products	17,5	16,9	24,4	21,6	15,0
C26 Other non-metallic mineral products	0,9	1,4	1,7	2,1	3,0
C27T28 Basic metals and fabricated metal products	11,1	9,4	12,6	13,0	13,8
C29T33 Machinery and equipment	16,1	29,8	8,5	9,6	12,1
C34T35 Transport equipment	30,3	25,7	22,6	19,8	13,4
C36T37 Manufacturing n.e.c. and recycling	2,8	3,6	2,8	3,5	5,3

Annex Table B.8. Export, import, production and value added shares of broad product categories

(*continued*)

	France				
	Exports	**Imports**	**Intermediate inputs**	**Gross output**	**Value added**
C01T05 AGRICULTURE, HUNTING, FORESTRY AND FISHING	2,9	2,2	6,6	8,5	13,8
C10T14 MINING AND QUARRYING	0,6	11,1	0,0	0,0	0,0
C15T37 MANUFACTURING	96,4	86,7	93,4	91,5	86,2
C15T16 Food products, beverages and tobacco	8,9	6,9	14,9	14,6	13,8
C17T19 Textiles, textile products, leather and footwear	4,7	7,2	2,7	3,0	3,6
C20 Wood and products of wood and cork	0,6	0,9	1,4	1,4	1,6
C21T22 Pulp, paper, paper products, printing and publishing	2,5	3,2	5,5	6,1	7,7
C23T25 Chemical, rubber, plastics and fuel products	23,9	22,7	23,7	22,2	17,7
C26 Other non-metallic mineral products	1,4	1,6	3,3	3,8	5,2
C27T28 Basic metals and fabricated metal products	8,6	9,9	11,5	12,4	15,3
C29T33 Machinery and equipment	24,6	27,0	15,0	16,1	19,5
C34T35 Transport equipment	22,8	17,3	19,4	17,4	11,6
C36T37 Manufacturing n.e.c. and recycling	1,9	3,2	2,7	3,0	3,9

	Italy				
	Exports	**Imports**	**Intermediate inputs**	**Gross output**	**Value added**
C01T05 AGRICULTURE, HUNTING, FORESTRY AND FISHING	1,4	3,2	2,8	4,8	10,2
C10T14 MINING AND QUARRYING	0,3	11,2	0,5	0,9	1,8
C15T37 MANUFACTURING	98,3	85,6	96,7	94,3	88,0
C15T16 Food products, beverages and tobacco	5,6	8,0	12,3	11,7	9,8
C17T19 Textiles, textile products, leather and footwear	13,1	9,0	10,3	10,4	10,7
C20 Wood and products of wood and cork	0,5	1,5	1,9	2,0	2,3
C21T22 Pulp, paper, paper products, printing and publishing	2,1	2,9	4,7	5,0	5,8
C23T25 Chemical, rubber, plastics and fuel products	17,0	21,1	19,4	17,7	12,9
C26 Other non-metallic mineral products	3,0	1,3	4,4	4,8	5,8
C27T28 Basic metals and fabricated metal products	11,7	14,7	15,3	15,9	17,5
C29T33 Machinery and equipment	30,6	23,6	19,6	21,0	25,2
C34T35 Transport equipment	11,1	15,6	7,5	6,9	5,3
C36T37 Manufacturing n.e.c. and recycling	5,1	2,1	4,7	4,7	4,8

	United Kingdom				
	Exports	**Imports**	**Intermediate inputs**	**Gross output**	**Value added**
C01T05 AGRICULTURE, HUNTING, FORESTRY AND FISHING	0,7	2,6	4,1	4,1	4,1
C10T14 MINING AND QUARRYING	8,0	8,4	4,5	9,1	16,7
C15T37 MANUFACTURING	91,2	89,1	91,4	86,9	79,3
C15T16 Food products, beverages and tobacco	4,7	7,6	15,0	14,8	14,5
C17T19 Textiles, textile products, leather and footwear	2,9	7,6	2,0	2,3	2,8
C20 Wood and products of wood and cork	0,2	1,2	1,4	1,6	2,1
C21T22 Pulp, paper, paper products, printing and publishing	2,6	3,3	8,6	9,9	12,6
C23T25 Chemical, rubber, plastics and fuel products	23,4	18,3	25,8	23,5	19,1
C26 Other non-metallic mineral products	1,0	1,1	2,6	3,0	3,6
C27T28 Basic metals and fabricated metal products	6,9	7,4	9,4	9,9	10,7
C29T33 Machinery and equipment	38,5	30,7	16,2	17,3	19,5
C34T35 Transport equipment	14,1	15,1	15,1	13,6	10,6
C36T37 Manufacturing n.e.c. and recycling	2,4	4,4	3,7	4,0	4,5

Source: OECD STAN Database.

### Annex Table B.9. GDP and its components at times of crisis, expenditure side, G7 countries

		2007Q4	2008Q1	2008Q2	2008Q3	2008Q4	2009Q1	2009Q2
OECD Total	Real GDP (GDP)	2,7	2,4	1,7	0,5	-2,1	-4,7	
	Private final consumption expenditure (C)	2,1	1,8	1,0	0,1	-1,2	-2,1	
	Final consumption expenditure of general government (G)	2,4	2,5	2,2	2,4	2,6	2,1	
	Gross fixed capital formation (I)	2,2	0,9	0,0	-1,6	-6,0	-12,3	
	Exports of goods and services (X)	6,4	6,6	5,7	2,7	-6,1	-15,7	
	Imports of good and services (M)	4,9	4,4	2,7	0,8	-5,5	-15,1	
Canada	Real GDP (GDP)	2,8	1,7	0,7	0,3	-1,0	-2,1	
	Private final consumption expenditure (C)	5,4	5,1	3,9	3,0	0,2	-0,8	
	Final consumption expenditure of general government (G)	3,7	4,5	3,9	3,3	3,1	2,0	
	Gross fixed capital formation (I)	4,5	3,9	2,4	1,1	-3,7	-9,3	
	Exports of goods and services (X)	-1,5	-3,0	-4,3	-4,3	-7,3	-14,8	
	Imports of good and services (M)	8,5	6,1	5,3	0,2	-7,7	-17,0	
France	Real GDP (GDP)	2,1	1,9	1,0	0,1	-1,6	-3,4	-2,6
	Private final consumption expenditure (C)	2,8	1,9	1,3	0,5	0,1	0,5	0,7
	Final consumption expenditure of general government (G)	1,1	1,0	0,9	1,3	1,5	1,2	1,4
	Gross fixed capital formation (I)	5,5	4,2	2,0	-0,3	-4,1	-7,4	-7,1
	Exports of goods and services (X)	2,3	5,0	0,5	-1,1	-6,5	-15,2	-12,1
	Imports of good and services (M)	4,1	4,6	1,3	-0,4	-3,1	-10,0	-10,9
Germany	Real GDP (GDP)	1,6	2,9	2,0	0,8	-1,8	-6,7	-5,9
	Private final consumption expenditure (C)	-1,3	0,8	-0,4	-0,4	-0,6	-0,1	
	Final consumption expenditure of general government (G)	2,0	1,5	2,1	1,9	1,5	0,8	
	Gross fixed capital formation (I)	2,6	5,8	5,1	4,2	-0,5	-11,4	
	Exports of goods and services (X)	3,2	7,1	5,4	3,2	-6,3	-17,5	
	Imports of good and services (M)	2,7	5,2	3,9	5,2	1,2	-7,3	
Italy	Real GDP (GDP)	0,2	0,4	-0,3	-1,3	-3,0	-6,0	-6,0
	Private final consumption expenditure (C)	0,7	-0,1	-0,9	-0,9	-1,6	-2,5	
	Final consumption expenditure of general government (G)	0,7	0,1	1,0	0,7	0,7	0,7	
	Gross fixed capital formation (I)	-0,4	-0,6	-0,1	-2,4	-8,7	-12,6	
	Exports of goods and services (X)	0,8	-0,5	0,2	-3,8	-10,8	-21,7	
	Imports of good and services (M)	-0,4	-2,1	-2,6	-4,3	-8,9	-17,0	
Japan	Real GDP (GDP)	2,4	2,5	1,8	0,5	-1,8	-4,9	
	Private final consumption expenditure (C)	2,2	2,6	1,8	1,1	-0,5	-2,9	
	Final consumption expenditure of general government (G)	1,2	2,3	2,9	2,6	3,5	2,8	
	Gross fixed capital formation (I)	4,9	1,4	-0,8	-3,9	-7,8	-13,2	
	Exports of goods and services (X)	3,4	3,7	2,8	0,5	-3,8	-11,6	
	Imports of good and services (M)	5,6	3,8	3,5	-1,7	-7,7	-13,6	
United Kingdom	Real GDP (GDP)	2,4	2,5	1,8	0,5	-1,8	-4,9	-5,6
	Private final consumption expenditure (C)	2,2	2,6	1,8	1,1	-0,5	-2,9	
	Final consumption expenditure of general government (G)	1,2	2,3	2,9	2,6	3,5	2,8	
	Gross fixed capital formation (I)	4,9	1,4	-0,8	-3,9	-7,8	-13,2	
	Exports of goods and services (X)	3,4	3,7	2,8	0,5	-3,8	-11,6	
	Imports of good and services (M)	5,6	3,8	3,5	-1,7	-7,7	-13,6	
United States	Real GDP (GDP)	2,5	2,0	1,6	0,0	-1,9	-3,3	-3,9
	Private final consumption expenditure (C)	2,0	0,9	0,6	-0,7	-1,8	-1,5	-1,8
	Final consumption expenditure of general government (G)	2,1	3,1	2,7	3,0	3,1	1,9	2,5
	Gross fixed capital formation (I)	-0,1	-1,1	-2,2	-3,8	-7,5	-15,3	-17,1
	Exports of goods and services (X)	10,2	9,3	11,0	5,4	-3,4	-11,6	-15,7
	Imports of good and services (M)	0,9	-0,8	-1,9	-3,3	-6,8	-16,2	-18,6

Source: *OECD National Accounts database*, author's calculations.

**Annex Table B.10. Similarity indices of output and trade structures**

	Exports - Output	Imports - Output	Exports - Value added	Imports - Value added	Intermediates - Output	Intermediates - Value added	Exports - Intermediates	Imports - Intermediates
Germany	0,86	0,87	0,85	0,89	0,97	0,89	0,86	0,86
France	0,83	0,84	0,76	0,78	0,96	0,85	0,85	0,83
United Kingdom	0,74	0,76	0,70	0,76	0,96	0,88	0,74	0,76
Italy	0,83	0,85	0,82	0,81	0,97	0,89	0,82	0,86
Japan	0,70	0,77	0,71	0,80	0,96	0,87	0,70	0,75
United States	0,69	0,70	0,70	0,72	0,95	0,84	0,69	0,68

Source: These are Kreinin-Finger indices calculated on the basis of shares in output, value added, exports, imports, intermediate inputs from the OECD STAN database for 2006. Included industries are: C15T16 Food products, beverages and tobacco; C17T19 Textiles, textile products, leather and footwear; C20 Wood and products of wood and cork; C21T22 Pulp, paper, paper products, printing and publishing; C23T25 Chemical, rubber, plastics and fuel products; C26 Other non-metallic mineral products; C27T28 Basic metals and fabricated metal products; C29T33 Machinery and equipment; C34T35 Transport equipment; C36T37 Manufacturing n.e.c. and recycling.

Annex Figure B.1. Drop in trade between January 2008 and January 2009 by SITC activity
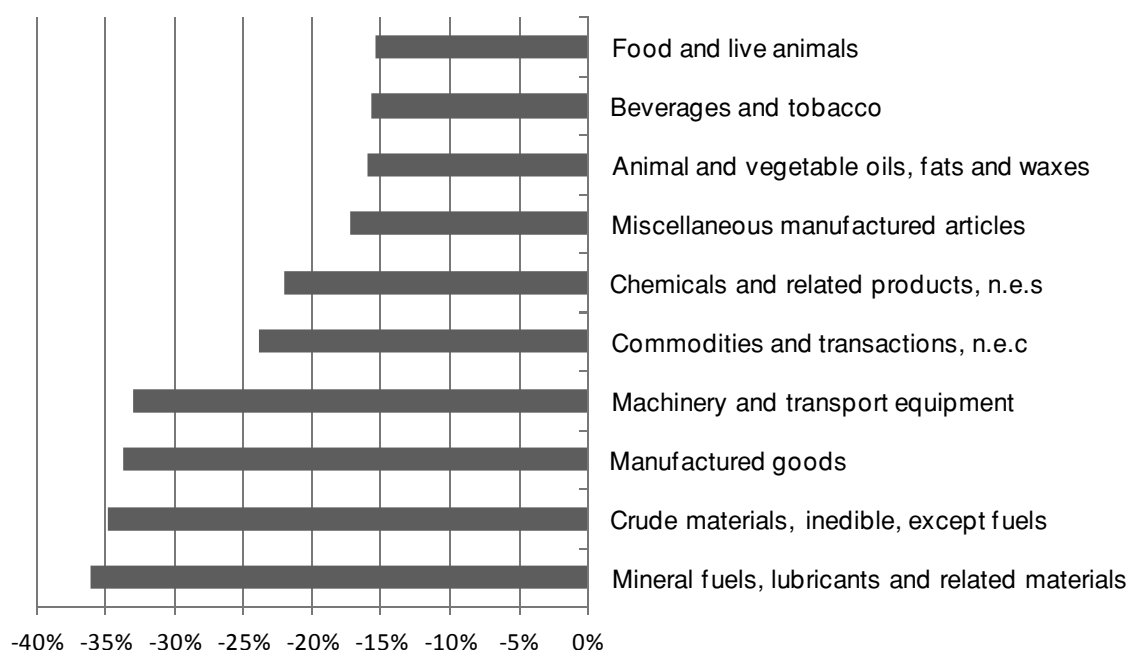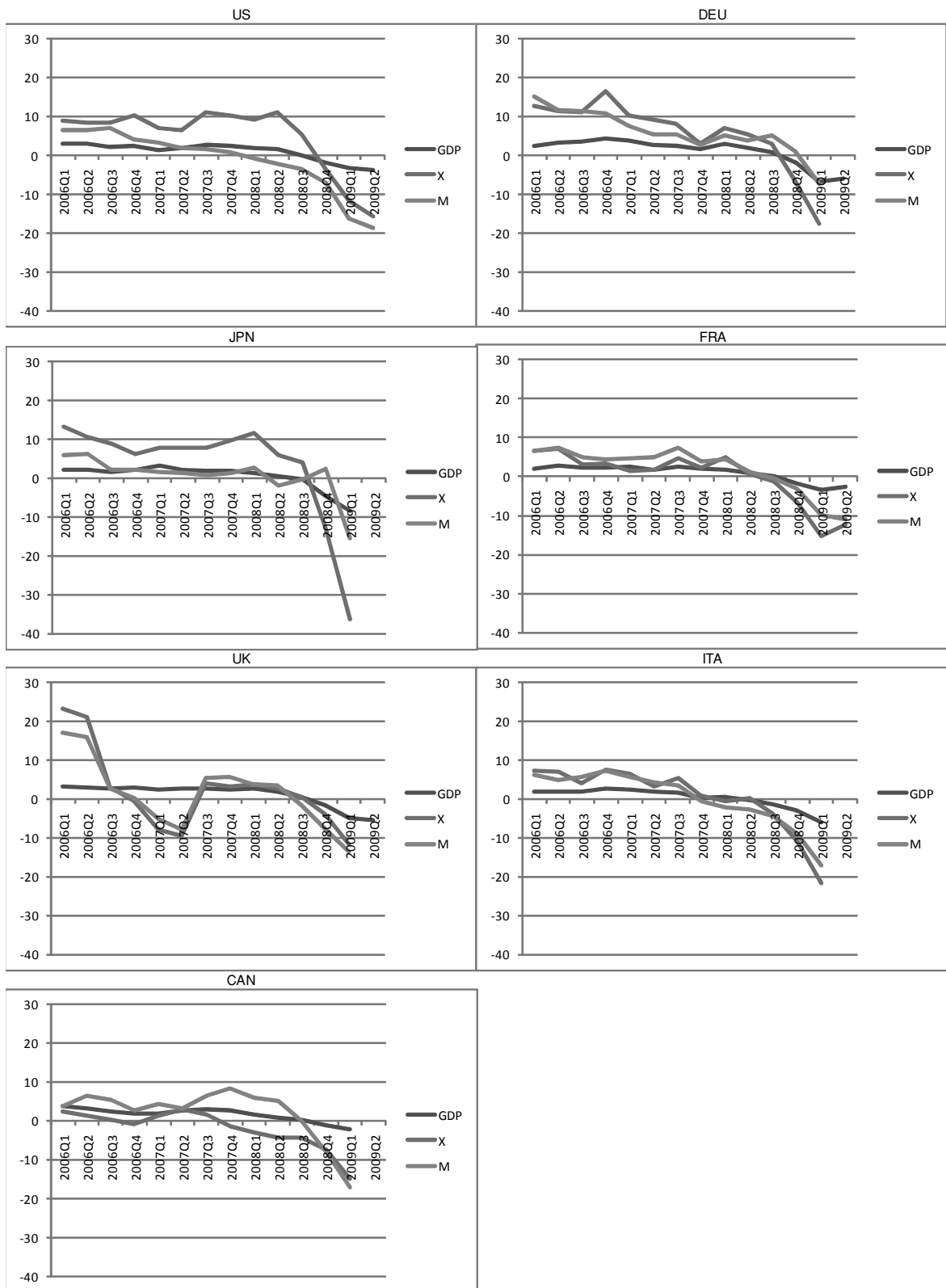

Source: OECD MSIT database.

**Annex Figure B.2. Average share of vertical specialisation in OECD countries
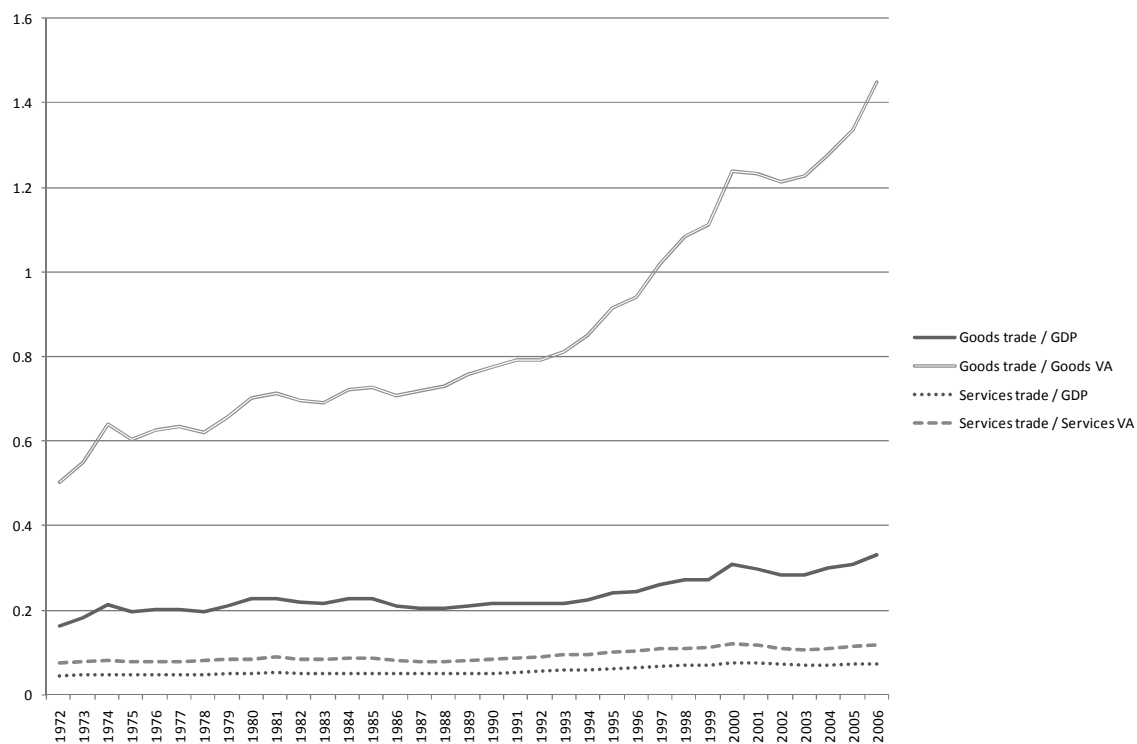(import content of exports), 1995 and 2005**
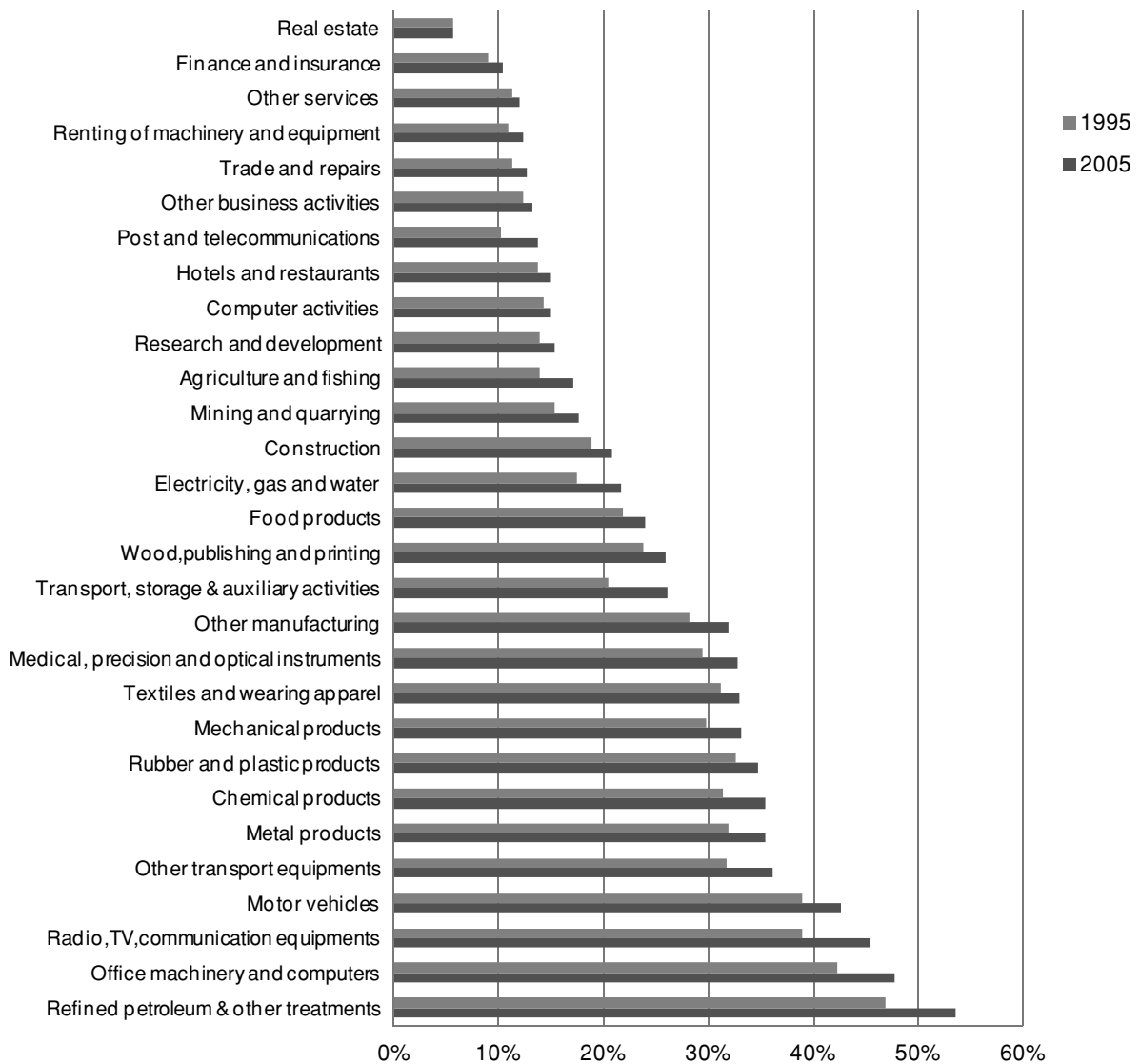
Source: Miroudot and Ragoussis (2009). Based on *OECD Input-Output Tables* (2009).

Annex Figure B.3. Real GDP, exports and imports growth rates

Source: OECD *National Accounts Database*, authors' calculations.

**Annex Figure B.4. Trade to GDP and trade to value-added ratios for goods and services
(annual data, 1972-2006)**

Source: *OECD National accounts* database.

Annex C

Short-term trade finance and its impact on trade:
Evidence from panel data and time series

The methodology used to ascertain the effect of changes in the stock of trade finance, demand and the cost of financing on both import flows and total trade is assessed in this annex. It is well known that there is a paucity of reliable data on trade finance. We use a proxy to assess the impact of changes in trade finance on cross-country changes in imports and total trade over time. In particular, we estimate separately the last three quarters of 2008 and first quarter of 2009 and investigate how the effect of changes in trade finance availability, demand and cost of financing may have affected imports and total trade flows before and after the onset of the crisis.

For the analyses, the estimation sample consists of a panel of 43 countries for the period 2005q1 to 2009q1. The data used in estimations is presented in Annex Table C.1.

Annex Table C.1. Panel data variables

Variables	Description
log imports	Log of imports in constant USD 2 000 = 100
log trade	Log of imports + exports in constant USD 2 000 = 100
log world gdp	Log of world gdp in constant USD 2 000 = 100
log gdp	Log of country gdp in constant USD 2000 = 100
log berne	Berne Union − log of the stock of export credit insurance in USD 2000 = 100
High yield spread	Log of US high yield spread on ten-year government bonds.

Model specification

The empirical methodology involves estimating several models using the GMM Arellano-Bond dynamic panel estimator which relate import (trade) volumes to past levels of imports (trade), demand conditions, a trade finance proxy and other determinants of cross country imports (trade) over time.[1] Since import (trade) volumes exhibit much persistence over time, an appropriate model relates current imports (trade) to changes in past imports (trade) as well as other explanatory variables. A baseline model for imports is specified as follows:

$$limports_{i,t} = \beta_0 + \alpha_1 limports_{i,t-1} + \beta_1 lberne_{i,t}$$
$$+ \beta_2 \lg dp_{i,t} + \beta_3 spread_t + \alpha_i + u_{i,t} \tag{1}$$

where the α_i are the individual country effects assumed to be correlated with the right hand side variables. The model is estimated in first differences which removes the country level unobserved heterogeneity.

Equation (1) is modified for total trade as follows:

$$ltrade_{i,t} = \beta_0 + \alpha_1 ltrade_{i,t-1} + \beta_1 lberne_{i,t}$$
$$+ \beta_2 \lg dp_{i,t} + \beta_3 lworldgdp_t + \beta_4 spread_t + \alpha_i + u_{i,t} \quad (2)$$

Equations (1) and (2) are estimated separately for the periods prior to and after 2008q2 to assess the effect of the variables of interest on imports and total trade. Additionally, an interaction term of trade finance with regional dummies is included for both periods to assess any regional differences which the impact of trade finance may have on trade.

Econometric results

Results from estimating equations (1) and (2) and their modifications are presented in Annex Table C.2. In general, the estimation results reveal all coefficients have the expected signs and are mostly statistically significant at the 1% significance level. On average, lagged imports positively and significantly affect current imports in the period before the collapse (Annex Table C.2, column 1). In other words, current imports will positively influence next period imports. This dynamic relationship can reflect such things as ongoing import supply contracts and path dependence. However, lagged imports matter much less after the onset of the crisis (column 2). This can be attributed to the short time horizon during the crisis in which we only observe four quarters, or that import volumes in the period after Q1 2008 are being determined by other factors than past import levels. This is intuitively appealing as during the crisis period imports have been falling sharply but unpredictably.

As expected, domestic demand, captured in the models by GDP, is a strong determinant of a country's imports. In the baseline specification of columns (1) and (2), domestic demand affects imports less than proportionally with estimated elasticities of 0.556 pre-crisis and a higher elasticity of 0.710 during the crisis.

The change in trade finance availability, captured by the change in the log of export credit exposure as reported by Berne Union members (lberne) is a positive and statistically significant determinant of changes in imports.[2] In columns (1) and (2), holding constant the effects of the other determinants of aggregate imports, the results reveal that a 1% increase in trade financing on average is associated with a change in imports of 0.123% pre-crisis and 0.391% during the crisis period.

A spread variable was included in the models to proxy the general cost of financing. This variable refers to high-yield spreads and is used in levels, as opposed to logs. Its coefficient can therefore be interpreted as a change in percentage point of the high-yield spread affecting imports (trade). The estimates imply that changes in the high-yield spread has no impact on imports pre-crisis but a significant impact post-crisis where a 1 percentage point increase in the cost of financing is associated with a fall in imports of 0.8%, all else equal.

Turning to the trade models in columns (3) to (6), the estimated effects are consistent with the models for imports. Domestic demand conditions, captured by GDP, are also consistent with the estimated impact in the import models with larger estimates post-crisis

than pre-crisis. Global demand conditions, captured by world GDP show the expected positive relationship to trade with estimated elasticities of 0.694 pre-crisis (column 3) rising to 0.973 after the onset of the crisis (column 4). Global finance conditions, or the cost of credit, is proxied by the spread variable. This variable, insignificant in the pre-crisis period, becomes significant after the crisis arises. Although the coefficient is of small magnitude, it indicates that the cost of financing became an issue in the post-crisis period. For a 1 percentage point increase in the cost of finance, estimated trade is predicted to fall by between 0.5 and 0.7%, holding constant other factors.

Finally, to assess whether the change in trade finance has had a differentiated effect on different regions, the models include interaction terms between six regional indicator variables and the trade finance proxy, lberne (columns 5 and 6 in Annex Table C.2). The baseline regional dummy variable (excluded category) is for Europe so all other regional interaction terms are expressed as they differ with respect to Europe. The estimated results from after the crisis reveal that falls in trade finance affected trade for Asia, MENA and South America more than Europe.

These models are explaining a significant amount of variation in the endogenous variables in question (imports or total trade). The R-squared refers to the squared correlation between the predicted dependent variable and the actual observed dependent variable.

Annex Table C.2 Econometric Results

Model	(1)	(2)	(3)	(4)	(5)	(6)
Period	Q12005-Q12008	2008Q2-Q1 2009	Q12005-Q12008	2008Q2-Q1 2009	Q12005-Q12008	2008Q2-Q1 2009
Dependent variable	Log(imports)		Log(trade)			
Log(lagged imports)	0.312***	0.170***				
	(0.029)	(0.065)				
Log(GDP)	0.556***	0.710***	0.499***	0.615***	0.516***	0.559***
	(0.033)	(0.072)	(0.044)	(0.073)	(0.045)	(0.077)
Log(Berne finance)	0.123***	0.391***	0.051*	0.173***	0.124***	0.127*
	(0.019)	(0.074)	(0.029)	(0.067)	(0.037)	(0.068)
High yield spreads	0.000	-0.008***	-0.007	-0.005*	-0.005	-0.007**
	(0.003)	(0.002)	(0.004)	(0.003)	(0.004)	(0.003)
Log(lagged trade)			0.184***	0.130*	0.162***	0.180**
			(0.033)	(0.068)	(0.034)	(0.072)
Log(Worldgdp)			0.694***	0.973***	0.544***	0.769***
			(0.128)	(0.258)	(0.138)	(0.262)
Log(berne) Asia					-0.127***	0.463***
					(0.034)	(0.166)
Log (berne) MENA					-0.007	0.648*
					(0.071)	(0.355)
					(0.101)	(0.346)

Annex Table C.2 Econometric Results (*continued*)

Model	(1)	(2)	(3)	(4)	(5)	(6)
Period	Q12005-Q12008	2008Q2-Q1 2009	Q12005-Q12008	2008Q2-Q1 2009	Q12005-Q12008	2008Q2-Q1 2009
Dependent variable	Log(imports)		Log(trade)			
Log(berne) North America					0.009	0.334
Log (berne) Oceania					-0.028	0.196
					(0.097)	(0.312)
Log(berne) South America					-0.057	0.530**
					(0.041)	(0.214)
Constant	-0.724***	-1.454***	-5.986***	-9.035***	-4.702***	-7.188***
	(0.093)	(0.231)	(1.103)	(2.244)	(1.188)	(2.276)
R-squared	0.911	0.855	0.889	0.863	0.870	0.857
N	681	195	681	195	681	195

*** p<0.01, ** p<0.05, * p<0.1. R squared calculated as the squared correlation between the predicted dependent variable and the observed dependent variable. All models estimated in first differences using the Arellano-Bond GMM dynamic panel estimator.

Data description and sources

Imports. From IMF International Financial Statistics (IFS) for all available countries 2000q1-2009q1. From OECD for OECD countries and major non-OECD countries. All in USD. IFS data deflated using GDP deflator (2000=100). OECD data and major non OECD deflated using import price deflator. Import price deflators exist for only a small number of countries in IFS so the country GDP deflator was used to deflate all imports for IFS data.

GDP figures are generally not seasonally adjusted and are deflated by country-specific GDP deflators. Unadjusted data for United States, United Kingdom, Canada and Portugal do not exist so have been replaced with seasonally adjusted data for both the world time series and for panel.

Berne_finance: Berne Union export credit exposure is in current US dollars and has been deflated using US GDP deflator.

Spread is US high yield spread on ten-year government bonds.

Annex Table C.3. Countries included in the econometric analysis

Australia	Germany	Norway
Austria	Greece	Philippines
Belgium	Hungary	Poland
Bolivia	Iceland	Portugal
Canada	Iran	Romania
Colombia	Ireland	Russia
Costa Rica	Israel	Slovakia
Croatia	Italy	Spain
Cyprus	Japan	Sweden
Czech Republic	Luxembourg	Switzerland
Denmark	Malaysia	Tunisia
Ecuador	Malta	United Kingdom
Finland	Morocco	United States
France	Netherlands	
Georgia	New Zealand	

Annex Table C.4. Correlation matrix

	Log(imports)	Log(trade)	Log(gdp)	Log(worldgdp)	Log(berne)	High yield spread
Log(imports)	1					
Log(trade)	0.9939	1				
Log(gdp)	0.9054	0.9037	1			
Log(worldgdp)	0.1201	0.1118	0.0808	1		
Log(berne)	0.8701	0.8644	0.8593	0.135	1	
High yld spread	0.0587	0.0743	0.0906	0.3651	0.1238	1

Notes

1. This method of estimation chosen here was the Arellano Bond estimator as it is a dynamic estimator that is suitable for analyzing panel data where the data exhibit a dynamic relationship over time. International trade data is appropriate for use with the Arellano Bond estimator for this reason. One of the main differences between Arellano Bond and fixed effects panel estimation is the presence of the lagged dependent variable as a regressor in the model. This lagged variable captures the dynamic nature of trade and measures how current trade (imports) is affected by past trade (imports). Additionally, the Arellano Bond estimator estimates the model in first-differences. This is a requirement to handle the correlation between the unobserved heterogeneity inherent in panel data models and the lagged dependent variable. The models presented here were also estimated using basic fixed-effects panel data estimation. Although the magnitude of some of the coefficients changed, the basic relationships found using the Arellano-Bond estimator remained in the fixed-effects models.

2. The question arises as to the direction of the causality of trade flows and trade finance stocks, as with most economic estimation. Correcting for potential endogeneity is however non-trivial particularly in the present case. The two main ways of correction – finding a proper instrument for trade finance, and using lagged variables – were not possible in the present case due to lack of appropriate instruments and short time periods, particularly during the crisis period. This issue is prevalent in much econometric analysis, and is often difficult to correct, but is an additional reason to interpret results with caution.

Annex D.

Additional Tables in Support of Chapter 3

Annex Table D.1. Support for Financial and Other Sectors and Upfront Financing Need

(as of August 2009; in% of 2008 GDP; average using PPP GDP weights)[1]

	Capital injection	Purchase of assets and lending by Treasury[2]	Guarantees[3]	Liquidity provision and other support by Central Bank	Upfront government financing[4]
	(A)	(B)	(C)	(D)	(E)
Advanced North America					
Canada	0.0	10.9	13.5	1.5	10.9
United States[5]	5.2	1.5	10.6	8.1	6.9
Advanced Europe					
Austria	5.3	0.0	30.1	…	8.9
Belgium	4.8	0.0	26.4	…	4.8
France[6]	1.4	1.3	16.4	…	1.6
Germany	3.8	0.4	18.0	…	3.7
Greece	2.1	3.3	6.2	…	5.4
Ireland	5.9	0.0	198.1	…	5.9
Italy[7]	0.6	0.0	0.0	…	0.6
Netherlands	3.4	11.2	33.6	…	14.6
Norway[8]	2.0	15.8	0.0	21.0	15.8
Portugal [9]	2.4	0.0	12.0	…	2.4
Spain[10]	0.8	3.9	15.8	…	4.6
Sweden[11]	1.6	4.8	47.5	13.9	5.2
Switzerland	1.1	0.0	0.0	24.9	1.1
United Kingdom[12]	3.9	13.8	53.2	19.0	20.0
European Central Bank	…	…	…	8.5	…
Advanced Asia and Pacific					
Australia	0.0	0.7	8.8	…	0.7
Japan[13]	2.4	11.4	7.3	1.9	0.8
Korea[14]	2.3	5.5	14.5	6.5	0.8

Annex Table D.1. Support for Financial and Other Sectors and Upfront Financing Need *(cont.)*

	Capital injection	Purchase of assets and lending by Treasury[2]	Guarantees[3]	Liquidity provision and other support by Central Bank	Upfront government financing[4]
	(A)	(B)	(C)	(D)	(E)
Emerging Economies					
Argentina[15]	0.0	0.9	0.0	5.4	0.9
Brazil[16]	0.0	0.8	0.0	10.8	0.0
China	0.0	0.0	0.0	22.5	0.0
India	0.4	0.0	0.0	8.3	0.4
Indonesia[17]	0.0	0.0	0.1	1.2	0.1
Hungary[18]	1.1	2.4	1.1	13.6	3.5
Poland	0.0	0.0	3.2	5.4	0.0
Russia	1.2	1.2	0.5	11.6	2.3
Saudi Arabia[19]	0.0	1.2	N/A	30.6	1.2
Turkey[20]	0.0	0.3	0.0	3.7	0.0
AverageG-20	2.2	2.7	8.8	9.7	3.7
Advanced Economies	3.4	4.1	13.9	7.6	5.7
In billions of USD	1 160	1 436	4 638	2 804	1 887
Emerging Economies	0.2	0.3	0.1	13.5	0.4
In billions of USD	22	38	7	1,581	47

1/ Columns A, B, C and E indicate *announced* or *pledged amounts, and not actual update.* Column D indicates the *actual changes in central bank balance sheets from June 2007 to June 2009.* While these changes are mostly related to measures aimed at enhancing market liquidity and providing financial sector support, they may occasionally have other causes, and also may not capture other types of support, including that due to changes in regulatory policies. For the Euro zone countries, see the ECB row.

Averages for column D include the Euro zone as a whole.

2/ Column B does not include treasure funds provided in support of central bank operations. These amount to 0.5% of GDP in the United States, and 12.8% in the United Kingdom.

3/ Excludes deposit insurance provided by deposit insurance agencies.

4/ Includes gross support measures that require upfront government outlays. Excludes recovery from the sale of acquired assets.

5/ Estimated upfront financing need for 2009-10 is USD 990 bln (6.9% of GDP), consisting of the allocated amount under TARP (USD 510 bln); Treasury purchases of GSE preferred stocks (USD 400 bln); and treasury support for Commercial Paper Funding Facility (USD 50 bln).

6/ Support to the country's strategic companies is recorded under (B); of which EUR 20 bn will be financed by a state-owned bank, *Caisse des Depôts et Consignations*, not requiring upfront treasury financing.

7/ Does not include the temporary swap of government securities for assets held by Italian banks undertaken by the Bank of Italy.

8/ Excluding asset accumulation in Sovereign Wealth Funds, the balance sheet expansion during the period was only 4.5% of GDP (Column D).

9/ A maximum amount of EUR 20 bn (12% of GDP) is allocated to both guarantees and capital injection, with the latter not exceeding EUR 4 bn.

10/ Spain created a Bank Restructuring Fund (FROB) in June, with the current legislative framework providing for EUR 9 billion (direct government financing of EUR 6.75 billion, complemented by EUR 2.25 billion from the deposit insurance funds), to support the possible eventual restructuring of the financial sector. The size of the FROB could potentially be increased up to EUR 99 billion (9% of GDP) through debt issuance. Column C includes approved bank debt guarantees up to EUR 100 bn, and another EUR 100 bn that would be extended, if needed.

11/ Some capital injection (SEK50 billion) will be undertaken by the Stabilization Fund.

12/ Estimated upfront financing need is GDP289 bn (20% of GDP), consisting of Bank Recapitalization Fund (GDP 56 bn), Special Liquidity Scheme (GDP 185 bn) and financing for the nationalization of Northern Rock and Bradford & Bingley (GDP 48 bn).

13/ Budget provides JPY 3 900 bn (0.8% of GDP) to support capital injection by a special corporation and lending and purchase of commercial paper by policy-based financing institutions.

14/ In 2009, KRW 8 trillion will be provided from the budget to support for SMEs.

15/ Staff estimates.

16/ Liquidity support and loan purchases are provided through public banks and deposit insurance fund, entailing no upfront financing.

17/ Small interventions have been recently implemented through the deposit insurance agency that are not yet quantified.

18/ The expansion of the central bank balance sheet reflects mostly the increase in Net Foreign Assets as a result of IMF and EU disbursements in the context of the SBA-supported program. During this period, the increase in central bank domestic assets was limited to 2.3% of GDP.

19/ A significant part of the central bank balance sheet expansion is due to a large accumulation of foreign assets during 2008.

20/ Column B shows loans by the SME Industry Development Organization, not requiring direct treasury financing.

Source: IMF (2009c), FAD-MCM database; IMF staff estimates based on announcements by official agencies. Among G-20 countries, Mexico and South Africa have not provided any direct support to the financial sector.

Annex Table D.2. Principal measures to support the automobile sector

	Scrapping scheme			Other measures
	Duration	Incentives	Total amount	Effects
Australia				Direct schemes of industry assistance of AUD 6.2 billion to make the automotive industry more economically and environmentally sustainable by 2020. Business tax deduction on new capital investment, including vehicles: For SMEs; deduction of 50% of the cost of assets ordered between 13 December 2008 and 31 December 2009. For other businesses in 2009: Deduction of 30% of assets acquired before 30 June 2009 and 10% between 1 July and 31 December 2009.
Austria	April 2009 to December 2009 (probably phased out in July).	EUR 1 500		
Belgium				Tax reduction to purchase new cars equivalent to 3% (< 115 CO2) or 15% (< 105 CO2) depending on emissions (started in 2007). In addition, the automobile sector will benefit from a number of horizontal measures, in particular changes in the system for economic temporary unemployment for blue-collar workers and its provisional extension to white-collar workers. Measures at the regional level: The Flemish government support to the car industry amounted to EUR 10.5 million in 2009. The Walloon Government has developed a specific fiscal green measure to promote buying of less polluting cars (CO2 emissions), in the form of an "eco-bonus/malus".
Canada	Until 31 March 2011 (for the federal programme).	Varies by manufacturer. "Retire your ride programme": CAD 300. Provincial scrap-it programme (British Columbia).		

	Scrapping scheme				Other measures
	Duration	Incentives	Total amount	Effects	
Czech Republic	Under abeyance.	CZK 30 000.			Tax measures: Increase rates for old cars, lower rates for some types of vehicles (hybrid, etc.).
Denmark	Since 1 July 2000 but changes in the incentives in 2002.	Premium of DKK 1 750 (approximately EUR 235) for cars retired after 30 June 2002.	DKK 150 million allocated in 2009. In the budget proposal for 2010, DKK 153.2 million are allocated	Premiums were paid for approximately 95 000 cars in 2008.	
Finland					In the 2009 budget car taxation based on CO_2 emissions, heavier lorries, vans and coaches will get a reduction based on the total weight.
France	Until end 2010.	EUR 1 000 in 2009 then EUR 700 in January 2010 and EUR 500 in July 2010.	EUR 380 million in 2009 and EUR 240 million in 2010.	About 20% of all the cars sold in January benefited from this scrapping incentive	State guaranty for loans for the purchase of cars (EUR 6.5 million). An additional tax of EUR 4 on every registration certificate (in force from 15 April 2009). New measure to favour model shift and encourage eco-maintenance of vehicles (reduced VAT).
Germany	Until December 2009 but funds used by September 2009.	EUR 2 500.	EUR 5 billion.	New car registration increased by 30% in February.	Adjustment of the annual circulation tax for passenger cars on the basis of CO_2 emissions.
Greece	30 September – 2 November.	EUR 500 to 2 200 depending on the type of vehicle.			A 50% cut in the registration tax on new cars applicable between April and August 2009.
Italy	Until end 2009.	EUR 800 to 1 500			

	Duration	Scrapping scheme			Other measures
		Incentives	Total amount	Effects	
Japan	10 April 2009 to 31 March 2010.	Subsidy of JPY 125 000 to 250 000 for the purchase of high-energy efficiency car, if scrapping a car 13 years old or more. Subsidy of JPY 50 000 to 100 000 for purchasing a high-energy efficiency car if scrapping a car of less than 13 years old.	JPY 370 billion (EUR 2.78 billion)	As of 28 September 2009, about 730 000 requests were received while 18 600 cases were already subsidised. A total of JPY 19.9 billion has been spent.	Green tax schemes for automobiles were upgraded in April 2009. The motor vehicle tonnage tax (April 2009 to April 2012) and the automobile acquisition tax (April 2009 to March 2012) were reduced or exempted for environmentally-friendly automobiles.
Korea	May 2009 to December 2009.	Tax incentives for consumer trading in older vehicles: 70% tax reduction on individual consumption tax (national tax, 5 to 10%) and 70% tax reduction on registration tax (local tax, 5%) and acquisition tax (local tax, 2%).			
Luxembourg	January 2009 to December 2009.	EUR1 500 to 1 750.			The scrapping scheme complements a pre-existing measure which provides EUR 750 for purchase of energy-efficient cars.
Norway	Permanent scheme.	NOK 5 000.			

	Scrapping scheme				**Other measures**
	Duration	**Incentives**	**Total amount**	**Effects**	
Netherlands	1 August 2009 to 1 January 2011.	EUR 750 to 1 750.	EUR 85 million.		Reduction in the registration tax compensated by an increase in the annual circulation tax for all vehicles. Discount in annual circulation tax for fuel-efficient cars. Lower excise duties for Liquified Natural Gaz to the amount applied to petrol cars. Reintroduction of a fiscal scheme for passenger cars with low-emission diesel engines.
Portugal	Since 2000, renewed annually. Scheme made more generous from August to December 2009.	EUR 1 250 to 1 500 from August to December 2009 (EUR 1 000 to 1 250 before).	EUR 34 million (estimate for 2009 before August change).		The car industry is currently an important beneficiary of a short-time working scheme.
Slovak Republic	Until end 2009.	9 March to 25 March: EUR1 500; 6 April to 14 April: EUR 100.	EUR 55.3 million.	In these two periods, 44 200 cars with average age of 21 years were scrapped. The owners of scrapped cars can use the subsidy by the end of 2009. Up to 30 May 2009, 31 589 cars with subsidy from this scheme were sold or ordered.	

	Scrapping scheme				Other measures
	Duration	Incentives	Total amount	Effects	
Spain	1 December 2008 to 31 July 2010 (Plan Vive) and 22 May 2009 to 18 May 2010 (Plan 2000E).	Plan Vive: Interest-free loan up to EUR 10 000 for a period of five years provided the new car has a value up to EUR 30 000. Also applicable for the purchase of old car if the scrapped car is at least 15 years old. Plan 2000E: direct support from the government: EIR 500 per car, conditional on the manufacturers adding another EUR 1 000 per car. Some Autonomous Communities could provide an additional support of EUR 500 per car if the scrapped car is at least ten years old or at least 12 years old when people purchase second-hand cars.	Plan Vive: EUR 1.2 billion. Plan 2000E: EUR 100 million and 200 000 cars, at maximum, to be financed. It is likely to be widened to Euros 140 million and 280 000 cars, at maximum, to be financed.	From December 2008 to February 2009, the credit was granted for 9 000 vehicles (Plan Vive). At the end of October 2009, more than 190 000 cars were scrapped (Plan 2000E).	Support of EUR 800 million for the sector in forms of soft loans for investment in production facilities and support for investment in RD and training. Promotional measures to support export. Pilot programme for electric cars. Financing facilities for small and medium-size companies in the automobile sector.
Sweden	Until July 2009.	Tax premium of SEK 10 000 for private persons purchasing a new eco car.			A number of tax exemptions for eco cars were abolished.

| | Scrapping scheme | | | | Other measures |
	Duration	Incentives	Total amount	Effects	
Turkey					Special consumption taxes (SCT) on motor vehicles were reduced in varying proportions according to vehicle types and periods of 2009.
United Kingdom	May 2009 to March 2010 (but probably used up to October 2009).	GBP 1 000 (conditional on the manufacturers adding another GBP 1 000).	GBP 300 million.	Accounted for about 10% of car sales in June 2009.	
United States	24 July to 24 August 2009.	USD 3 500 to 4 500 bonuses.	USD 3 billion.	Between 0.2 to 0.6 million vehicles (Council of Economic Advisers, 2009).	Tariff on Chinese tyres.
Brazil					Reduction of federal VAT on purchases of small cars and trucks, and other federal taxes on the production and financing of motorbikes. Value: About USD 3.3 billion for 2009.
China	From 1 June 2009 to 31 May 2010	CNY 3 000 to 6 000 (only large cars can be scrapped).	CNY 4 billion.		Cars to the countryside programme (CNY 5 billion).
India					A reduction in the excise duty on cars and utility vehicles with an engine capacity of 2 000 cc and above. A reduction in excise duty for small cars from 16 to 12% and for hybrid cars from 24 to 14% in the 2008 budget.

Source: OECD, 2010a.

Annex Table D.3. Public procurement

Country	Year	Import content of government consumption in public social and other services	Import content of aggregate consumption in public social and other services
Australia	2004	1.18%	1.52%
Austria	2004	0.84%	2.02%
Belgium	2004	0.54%	1.20%
Brazil	2000	0.00%	1.07%
Canada	2000	0.00%	1.07%
Switzerland	2001	0.09%	2.29%
China	2005	0.19%	2.27%
Czech Republic	2005	2.11%	1.43%
Germany	2005	0.16%	0.90%
Denmark	2004	0.28%	3.16%
Spain	2004	0.26%	1.11%
Estonia	2005	0.13%	0.61%
Finland	2005	0.00%	0.54%
France	2005	0.55%	0.46%
United Kingdom	2003	0.11%	1.25%
Greece	2005	0.00%	1.11%
Hungary	2005	0.65%	1.79%
Indonesia	2005	2.57%	8.11%
Ireland	2000	0.00%	0.49%
Italy	2004	0.02%	0.43%
Japan	2005	0.00%	0.39%
Korea	2000	0.00%	2.71%
Luxembourg	2005	0.56%	8.09%
Mexico	2003	0.05%	0.03%
Netherlands	2005	0.28%	1.18%
Norway	2001	0.53%	0.43%
New Zealand	2002	1.12%	0.42%
Poland	2004	0.48%	0.46%
Portugal	2005	0.01%	0.81%
Russia	2000	0.43%	2.85%
Slovakia	2000	0.00%	2.67%
Slovenia	2005	0.62%	1.03%
Sweden	2005	0.12%	0.35%
Turkey	2002	2.57%	3.00%
Chinese Taipei	2001	0.00%	2.08%
United States	2005	0.00%	0.18%
South Africa	2000	0.00%	0.88%

Source: Author's calculations using the OECD (2010) *Structural Analysis (STAN) Input-Output Database*.

Annex E.

Statistical Decomposition of Policy Effectiveness Indicators

This appendix decomposes the policy effectiveness indicators (change in the variable of interest divided by the money value of the policy shock) using regression analysis. The objective is to relate the design characteristic of the policy to its effectiveness as defined by the multiplier. The regressions are performed over the set of simulation results on unilateral policy moves, yielding 56 observations. Table Annex E.1 reports the results. As can be seen, only a few of the estimated coefficients are highly statistically significant, and hence the estimates need to be carefully interpreted. Nonetheless, the table could be used as a guide.

For example, suppose the EU25 were to spend unilaterally EUR 1 (or USD) on a stimulus package. The economy is characterised by unemployment on the labour market. This EUR 1 would translate into EUR 1.6 (=0.332+1.557+0.787) worth of own real GDP if spent on a generic demand-side measure, such as lowering consumption taxes (=-1.06 + 0.332+1.557+0.787). But it would translate to only EUR 0.87 (=-1.06 + 0.332+1.557+ 0x1.259+0.036) real GDP if spent on reducing capital cost in one sector. Similarly, the effects on partner GDP and on trade volumes can be traced out, bearing in mind the limited statistical significance of the estimated coefficients.

Table Annex E.1. Policy design characteristics and policy effectiveness

Explanatory variables	Own real GDP	Partner real GDP	World real GDP	Own export volume	Partner export volume	World trade volume
Demand or supply measure (1/0)	0.787	0.247	1.034	0.747	-0.463	0.285
Domestic only (1/0)	0.018	-0.073	-0.055	-0.242	0.095	-0.147
Sector specific measure (1/0)	0.036	-0.06	-0.023	0.032	0.096	0.129
Labour or capital subsidy (1/0)	1.259	0.144	1.403	0.857	-0.54	0.317
Unemployment (1/0)	1.557	-0.326	1.231	-0.056	0.227	0.171
EU15 (1/0)	0.332	0.045	0.377	0.35	0.188	0.538
United States (1/0)	0.535	-0.044	0.491	0.072	0.079	0.152
Japan (1/0)	0.158	0.032	0.19	0.044	0.126	0.17
Constant	-1.06	-0.199	-1.259	-0.882	0.376	-0.507
Number of observations	56	56	56	56	56	56
R^2	0.51	0.784	0.463	0.556	0.618	0.436
F-statistic	6.109	21.327	5.059	7.343	9.485	4.535

References

Araújo, S. and E. Gonnard (2009), "Trade and the crisis: what do high-frequency statistics tell us?" presentation at the Workshop on The Impact of the Economic Crisis on Trade, OECD, 9 April.

Araújo, S. and J. Oliveira Martins (2009), *The Great Synchronisation: What do high-frequency statistics tell us about the trade collapse?* VoxEU.org, 8 July.

Auboin, M. (2007), *Boosting Trade Finance in Developing Countries: What Link with the WTO?* World Trade Organization, Geneva.

Baldwin, R. (2009) (ed.), *The Great Trade Collapse: Causes, Consequences and Prospects*, A VoxEU, Centre for Economic Policy Research, London.

Bénassy-Quéré, A., Y. Decreux, L. Fontagné, and D. Khoudour-Castras (2009), *Economic Crisis and Global Trade Flows: A Tale of Two Deflators?* July, CEPII, Paris.

Berman, N. and P. Martin (2009), *The vulnerability of sub-Saharan Africa to the Financial crisis: the Case of Trade*, July, mimeo.

Blanchard, O. and M. Kremer (1997), "Disorganization*"*, *Quarterly Journal of Economics*, N°111, pp. 1091-1126.

Bouët, A., J.-C. Bureau, Y. Decreux, and S. Jean (2005), "Multilateral Agricultural Trade Liberalization: the contrasting fortunes of developing countries in the Doha Round", *World Economy*, N°28–29, pp. 1329–1354.

Bouët, A., and D. Laborde (2009), "The potential cost of a failed Doha Round", *IFPRI discussion paper 00886*, Washington.

Bown, C.P. (2009a), "The Global Resort to Antidumping, Safeguards, and other Trade Remedies amidst the Economic Crisis" in Everett and Hotelman (eds.) *Trade Implications of Policy Responses to the Crisis.*

Bown, C.P. (2009b), *Protectionism continues its climb: A Monitoring Update to the Global Antidumping Database*, Brandeis University and the Brookings Institution. Mimeo

Brasher, Keith (2009), "China Builds High Wall to Guard Energy Industry," *New York Times*, 13 July.

Borchert, I. and A. Mattoo (2009), "The Crisis-Resilience of Services Trade", *Policy Research Working Paper 4917*, The World Bank, April.

CEPR (2009), *The Global Trade Alert 1st Report*, 8 July.

Chauffeur, J.-P. and T. Ferule (2009), "Trade Finance in Crisis: Market Adjustment or Market Failure?" *Policy Research Working Paper 5003*, The World Bank, July.

Cheung, C. and S. Guichard (2009), "Understanding the World Trade Collapse*", OECD Economics Department Working Paper* 729, 30 October 2009.

Decreux, Y., and L. Fontagne (2009), *Economic Impact of potential outcome of the DDA*, N°2009-01, CEPII-CIREM, May.

Decreux, Y. and L. Fontagne (2009), *An Assessment of May 2008 Proposals for the DDA,* N°2008-01, July, CEPII-CIREM.

Eichengreen, B. and K.H. O'Rourke (2009). *A Tale of Two Depressions*, VoxEU.org, 1 September.

Escaith, H. and F. Gonguet (2009), *International Trade and Real Transmission Channels of Financial Shocks in Globalized Production Networks*, mimeo.

ECB (2009), "National rescue measures in response to the current financial crisis", *Legal Working Paper Series No 8*, Frankfurt.

European Commission (2004), "Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the Coordination of Procedures for the Award of Public Works Contracts, Public Supply Contracts and Public Service Contracts", *Official Journal L134.*

European Commission (2008), *Communication from the Commission to the European Council: A European Economic Recovery Plan*, Brussels.

European Commission (2009), "The EU's Response to Support the Real Economy During the Economic Crisis: An Overview of Member States' Recovery Measures", *Occasional Papers,* N°51, Brussels.

European Parliament (2009), "Directive 2009/14/EC amending Directive 94/19/EC on Deposit-Guarantee Schemes as Regards the Coverage Level and the Payout Delay", Brussels.

Francois, J., H. Van Meijl, and F. Van Tongeren (2005), "Trade liberalization in the Doha Development Round," *Economic Policy* Vol. 20 (42), pp.349-391.

Francois, J. and J. Woerz (2009), *The Big Drop: Trade and the Great Recession*, VoxEU.org, 2 May.

Freund, C. (2009). "The Trade Response to Global Downturns: Historical Evidence", *Policy Research Working Paper* 5015, The World Bank, August.

G20 (2008), "Statement from the Summit on Financial Markets and the World Economy".

Grosse, R. (2004), *The future of global financial services*, Basil Blackwell, Oxford.

Hummels, D., J. Ishii, and K.M. Yi (2001), "The nature and growth of vertical specialization in world trade", *Journal of International Economics,* Vol.54(1), pp. 75-96.

International Chamber of Commerce (2009), *Rethinking Trade Finance 2009: An ICC Global Survey*, Document No 470-1120 TS/WJ, 31 March.

International Labour Organisation (ILO) (2009), *The Financial and Economic Crisis: A decent work response*, Geneva.

International Monetary Fund (IMF) (2009), *IMF-BAFT Trade Finance Survey*, March.

IMF (2008a), *IMF Executive Board approves Stand-By Arrangement for Iceland*, Press Release No. 08/296.

IMF (2008b), "IMF Executive Board approves Stand-By Arrangement for Hungary". Press Release No. 08/275.

IMF (2009c), *The State of Public Finances Cross Country Fiscal Monitor*, November.

Irwin, D. (2002), "Long-Run Trends in World Trade and Income", *World Trade Review*, Vol.1(1), pp. 89-100.

Jansen, M. and E. von Uexkull (2010), *Trade and Employment in the Global Crisis*, International Labour Office, Geneva.

Japan Ministry of Finance (2008), *Fiscal Investment and Loan Program Plan for 2009*.

Keele, L. and S. De Boef (2004), "Not Just for Cointegration: Error Correction Models with Stationary Data", *Nuffield College Working Papers in Politics*, December.

Key, S. (2004), *The Doha Round and Financial Services Negotiations,* American Enterprise Institute, Washington, DC.

Kowalski. P. and Shepherd (2006), "South-South Trade in Goods", *OECD Trade Policy Working Papers,* N°40, OECD, Paris.

Kireyev, A. (2002), "Liberalization of Financial Services and Financial Sector Stability," *IMF Working Paper* 02/138, Washington.

Kranendonk, H., and J. Verbruggen (2008), "Decomposition of GDP Growth in Some European Countries and the United States", *De Economist*, Vol. 156(3).

Lanz, R., S. Miroudot, and A. Ragoussis (2009), "Trade in intermediate goods and services", *OECD Trade Policy Working Paper*, N°93, 3 November.

Levchenko, A., L. Lewis and L. Tesar (2009), "The Collapse of International Trade During the 2008-09 Crisis: In Search of the Smoking Gun", unpublished manuscript, December.

Mc Kibbin, J. Warwick, and A. Stoeckel (2009), *The effect of the global financial crisis on world trade*, mimeo prepared for the World Bank, July.

Marchetti J.A., and M. Roy (eds.) (2008), *Opening Markets for Trade in Services: Countries and Sectors in Bilateral and WTO Negotiations*, Cambridge University Press.

Miroudot, S. and A. Ragoussis (2009), "Vertical trade, trade costs and FDI", *OECD Trade Policy Working Paper*, No. 89, July.

OECD (2006a), *Agricultural Policy and Trade Reform. Potential effects at Global, National and Household Levels,* Paris.

OECD (2006b), *Trading up: Economic Perspectives on Development Issues in the Multilateral Trading System*, Paris.

OECD (2009), "Status Report: Inventory of Investment Measures taken between 15 November 2008 and 15 June 2009," Directorate for Financial and Enterprise Affairs, DAF/INV(2009)4/Final.

OECD (2009a), "Competition and financial markets", *OECD Roundtable Series on Competition Policy, Working Paper* No. 92 (2009).

OECD (2009b) "Prudential Regulation and Competition in Financial Markets", Rüdiger Ahrend, Jens Arnold and Fabrice Murtin, *Economics Department Working Paper* N°735.

OECD (2009c), "Expanded Guarantees for Banks: Benefits, Costs and Exit Issues", Sebastian Schich, *OECD Journal, Financial Market Trends*, Vol. 2009, N°2, Paris.

OECD (2009d), "Export Restrictions on Strategic Raw Materials and their Impact on Trade and Global Supply", Jane Korinek and Jeonghoi Kim, *OECD Trade Policy Working Papers,* N°95 (2010).

OECD (2010), "Responding to the Crisis while Protecting Long-Term Growth" in OECD *Going for Growth*, Economics Department, Paris.

OECD (2010a), "The Automobile Industry in and Beyond the Crisis", David Haugh, Annabelle Mourougane and Olivier Chantal *Economics Department Working Paper*, N°745, Paris.

OECD/FAO (2009), *OECD-FAO Agricultural Outlook 2009*, Paris and Rome.

OECD/WTO/UNCTAD (2009), *Report on G20 Trade and Investment Measures*, September 2009.

Trinh, B., P. Le Hoa, and B.C. Giang (2008), "Import multiplier in input-output analysis", DEPOCEN *Working Paper Series* No. 2008/23.

United States Congress (2009), Public Law 111-5: American Recovery and Reinvestment Act of 2009.

United States Department of Commerce (2008), *Trade Finance Guide: A quick Reference for US Exporters,* Washington, April.

UNCTAD (2009), *Investment Policy developments in G20 countries*, Geneva.

Wehinger, Gert (2009), "The Turmoil and the Financial Industry: Developments and Policy Responses", *OECD Journal: Financial Market Trends*, Vol. 96, N°1.

The White House (2003), *President's Statement on Steel*, Office of the Press Secretary, December.

WTO (1998), *Financial Services – Background Note by the Secretariat*, Document S/C/W/72, December 1998.

WTO (2009a), *Report on the TPRB from the Director General on the Financial and Economic Crisis and Trade-Related Developments*, 23 March, Geneva.

WTO (2009b), *Report on the TPRB from the Director General on the Financial and Economic Crisis and Trade-Related Development*, 1 July, JOB(09)/62, Geneva.

WTO (2009c), *Annual Report on the TPRB on Trade and Trade-Related Developments*, 18.11.2009, Geneva.

Yi, K.-M. (2009), "The collapse of global trade: The role of vertical specialization" in R. Baldwin and S. Evenett (eds.), *The Collapse of Global Trade, Murky Protectionism, and the Crisis: Recommendations for the G20*, A VoxEU.org publication, Centre for Economic Policy Research (CEPR), London.

OECD Trade Policy Studies

Trade and Economic Effects of Responses to the Economic Crisis

The dramatic collapse in world trade in 2009 is, this report shows, mainly due to: the drop in demand for highly traded products; the drying up of trade finance; and the vertically integrated nature of global supply chains. Contrary to expectations, protectionist measures were relatively muted and did not play a significant part. In fact, because of their sheer size, stimulus measures may have had more impact on trade than direct trade policy measures Nevertheless, dollar for dollar, direct trade restricting measures have the most strongly negative impacts on growth and employment: a one dollar increase in tariff revenues results in a USD 2.16 drop in world exports and a USD 0.73 drop in world income.

The analyses presented here suggest that exit strategies from measures to deal with the crisis will be most effective in boosting growth and jobs if they first roll back measures that discriminate between domestic and foreign firms and those that target specific sectors. General demand stimulus measures and active labour market policies are preferable under current conditions.

Related reading

OECD Insights *From Crisis to Recovery: The Causes, Course and Consequences of the "Great Recession"* (Forthcoming)

OECD Employment Outlook 2010: Moving beyond the Jobs Crisis (2010)

The Financial Crisis: Reform and Exit Strategies (2009)