

**DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INDUSTRY
COMMITTEE ON INDUSTRY, INNOVATION AND ENTREPRENEURSHIP**

GLOBAL VALUE CHAINS: PRELIMINARY EVIDENCE AND POLICY ISSUES

CIIE meeting, 31 March-1 April 2011

This paper analyses the existing evidence on Global Value Chains (GVCs), discusses the policy issues raised by GVCs and proposes new work to be undertaken by the CIIE, mainly within the context of the WPGI. The complementarities between the planned work on GVCs and the project on New Sources of Growth - Intangibles are highlighted. The paper is intended as the starting point for the policy discussion on GVCs within the CIIE.

Delegates are invited to comment on the objectives and research activities of the planned work on GVCs; to discuss the proposed deliverables and timeline of the GVC project. A number of questions may guide the discussion:

- Do the objectives and the overall structure of the project address the key policy interests of countries in this area?*
- What other policy questions/issues should be added?*
- How can the Secretariat best ensure that countries are fully engaged in the project? Are you willing to contribute directly, e.g. through case studies, analytical work, policy examples, etc.?*

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EXECUTIVE SUMMARY

1. This paper aims to develop a storyline for the WPGI/CIE work on global value chains (GVCs) for the PWB of 2011-2012, by bringing together the empirical evidence and analytical research on GVCs and analyzing new policy issues. The objective of the WPGI activities on GVCs is to develop policy relevant analysis and provide analytical support for the policy discussion in the CIE. The work on GVCs will be undertaken in close coordination with the work on 'New Sources of Growth' given the complementarities between the two projects.

2. The past decades have witnessed a strong trend towards the international dispersion of value chain activities such as design, production, marketing, distribution, etc. Different stages in the production process are increasingly located across different economies and intermediate inputs like parts and components are produced in one country and then exported to other countries for further production and/or assembly in final products. While distribution, sales and production activities were the first to lead the way, R&D and decision-making activities are also increasingly (re-) located internationally.

3. Firms try to optimise their production processes by locating the various stages across different sites according to the most optimal location factors across countries. Globalisation motivates companies to restructure their operations internationally through outsourcing and offshoring of activities. Because of their numerous affiliates abroad, MNEs play a prominent role in global value chains as they are more flexible in decentralising and outsourcing specific activities. But the development of GVCs also offers SMEs new opportunities by enabling them to expand their business opportunities across borders, although reaching international markets is generally more difficult for SMEs.

4. GVCs have deepened the process of globalisation along different lines: geographically (by including a larger number of countries, including emerging countries), sectoral (by affecting manufacturing but also increasingly services industries) and functionally (by including not only production and distribution but also R&D and innovation). Because of increased trade (including of intermediates) and FDI within GVCs it can be expected that, *ceteris paribus*, countries will benefit from a better integration into GVCs. A process of vertical specialisation has occurred between countries, *i.e.* a vertical division of labour with countries increasingly specialising along the value chain. Countries just like firms increasingly become specialised in specific functions within these GVCs

5. The development of GVCs has also contributed to the growing importance of emerging countries in the global economy. While OECD countries are gradually losing market share in international markets, emerging countries and particularly China have built up a strong export base over a very short period. However, research indicates that the strong export performance of China is largely based on the assembly of intermediates imported from other countries, especially in higher technology industries such as ICT products. Moreover, a large part of this trade (exports and imports) is controlled by foreign owned firms in dedicated export processing zones. As a result, the value created in China by these activities is only a fraction of the trade exported from China.

6. China has developed strong (manufacturing/assembly) links with East Asian countries particularly for the sourcing of intermediate inputs and increasingly seems to move up the value chain. Recent research shows that labour intensive activities are being relocated from the Chinese mainland to

other Asian countries (like. *e.g.* Vietnam, Philippines, Cambodia), suggesting that the vertical division of labour in East Asia continues with other countries taking over lower value activities from China.

7. The strong position of (emerging) countries in GVCs as reflected in export figures does not necessarily mean that these countries capture a large part of the value generated within GVCs. Several examples on the product level (iPod, iPhone, Nokia, shoes) show a rising discrepancy between physical trade flows at the one side and the creation and capturing of value within GVCs at the other side, following the increasing international fragmentation of production and the growing trade of intermediates. This geographical distribution of value creation directly determines where jobs and income are created and hence is of high policy interest.

8. The large value that is captured by companies like Apple and Nokia is directly dependent on their capabilities in branding, product development, design, knowledge integration and management, and business model management etc. Intangible assets are becoming increasingly important in the governance of GVCs since firms can use their superior idiosyncratic capabilities, which are often based on intangible assets, to shape the industry structure and to capture a larger share of value. Superior capabilities allow firms to innovate and compete in their own market segment, but also to change the competitive conditions within the whole value chain.

9. Since existing data and indicators fall short of capturing the impact of GVCs on the competitiveness of countries, governments are looking for more and better policy evidence. Trade flows are expressed in gross terms and record the full value of the good, including the embodied intermediate inputs; accordingly, imports and exports are assigned to a single country of origin or destination. Gross trade flows cannot capture the new international division of labour since the country producing the final good appears to export the whole value when in reality it may have only marginally contributed to this value.

10. More detailed analysis is necessary to examine the position of countries within international production networks and to explore which policies are needed to benefit from the new international organisation of productive activities. Trade in value added data aims to capture only the domestic value that countries are adding to goods and services and will give a better picture of the integration of countries in GVCs.

11. The globalisation of value chains raises some major policy challenges for OECD countries as well as emerging countries because of the new opportunities and challenges created by globalisation. Policy issues for GVCs overlap to a large extent with the familiar policy questions for governments to benefit from openness. The trend towards GVCs intensifies the policy challenges and may make them more urgent but it is not certain that it does require an overall fundamental change of direction in policy. Nevertheless, GVCs require also some different and complementary policy thinking.

12. A first issue is the possible need for more specific policies in order to better address the specificities of GVCs. Another policy issue is related to the difference between integrating into GVCs on the one hand and capturing value in GVCs on the other. A third policy issue relates the development of countries directly to their position in GVCs and questions if different development paths emerge in the presence of GVCs. A final issue that is discussed in this document is how the development of GVCs affects international policy discussions, including on trade imbalances and exchange rates.

GLOBAL VALUE CHAINS (GVCs): PRELIMINARY EVIDENCE AND POLICY ISSUES

1. Objective of the paper

13. This paper aims to develop a storyline for the WPGI/CIIE work on global value chains (GVCs) for the PWB of 2011-2012, by bringing together the empirical evidence and analytical research on GVCs and analyzing new policy issues. The objective of the WPGI activities on GVCs is to develop policy relevant analysis and provide analytical support for the policy discussion in the CIIE. The work on GVCs will be undertaken in close coordination with the work on 'New Sources of Growth' given the complementarities between the two projects.

14. The paper identifies gaps in the existing research and proposes further (analytical) work to be undertaken by the WPGI; an overview of the future work and the timing of the planned reports is also presented. Because of the broad character of GVCs, future activities will include joint work with other partners (internal and external to the OECD). Special attention will be devoted to cooperation with interested partners in emerging countries like China, India, Brazil and South Africa, given the common relevance of the topic of GVCs for these countries as well as for the OECD.

15. The paper builds on previous work by the OECD, in particular the report 'Staying Competitive in the Global Economy – Moving up the Value Chain' (summary report and compendium of studies) published in 2007 (OECD, 2007a and OECD, 2007b). Since then numerous OECD activities have touched upon GVCs across different domains (globalisation, trade, innovation, competitiveness, etc.). This paper tries to bring these various dimensions of analysis together in a broader policy framework and suggests specific activities for the future.

2. The emergence and spread of GVCs

What is a Global Value Chain?

16. A value chain generally describes the full range of firms' activities from the conception of a product to its end use and beyond; it includes activities such as design, production, marketing, distribution and support to the final consumer (Porter, 1986; Gereffi et al., 2001). Activities within a value chain can be undertaken by a single firm or divided among different firms; they comprise goods as well as services and they can be concentrated within one location or spread out over different geographical locations. The past decades have witnessed a strong trend towards the international dispersion of value chain activities, hence the name Global Value Chains. Different stages in the production process are increasingly located across different economies and intermediate inputs like parts and components are produced in one country and then exported to other countries for further production and/or assembly in final products.

17. The term GVC, originally from the management literature, has been associated in the economic literature with different concepts such as 'global production sharing' (Yeats, 1997), 'international fragmentation' (Jones and Kierzkowski, 1990), 'vertical specialisation' (Hummels and Yi, 1999), 'multistage production' (Dixit and Grossman, 1982), 'sub-contracting', 'offshoring' and 'outsourcing'.

The different terms all relate to the increasing importance of vertical production and trading chains across countries, although some differences exist among the concepts.

18. The international fragmentation of production has benefitted strongly from the increasing modularisation of products and codification of transactions through improvements in information technologies and industry-level standards. Modularity is a technical property of a product describing how different components of a product interact with one another (Gangnes and Van Assche, 2010). Non-modular products require components to be specifically adjusted to each other, hence limiting the separability of production activities. Modular products on the contrary consist of multiple components that interact through codified standards, hence allowing companies to slice up the value chain into separable production stages if needed. Companies have an incentive to disperse production stages across different locations if the different stages in the production process have varying factor intensities, e.g. to relocate labour-intensive activities towards low wage countries (Jones and Kierzkowski, 1990).

19. International fragmentation is however not without costs as it requires the coordination of activities across locations. GVCs will only develop if coordination or transaction costs (*e.g.* communication and governance costs) are lower than the expected cost advantages (Antràs and Helpman, 2004; Antràs et al., 2005). These coordination/transaction costs have fallen dramatically in the last decades since rapid technological advances in ICT have decreased the cost of organising and coordinating complex activities over (long) distances.

20. Plummeting costs of processing and transmitting information, organisational innovations and the development of international standards for products descriptions and business protocols have further facilitated the spread of GVCs. In addition, subsequent rounds in trade and investment liberalisation have resulted in rapidly falling barriers for trade and investment across borders (Grossman and Rossi-Hansberg, 2006; Baldwin, 2006). Lastly, transportation costs have declined over the past several decades (Hummels, 2007), directly benefitting the international trade of goods produced in internationally fragmented production processes.

21. Coordination costs and the degree of modularisation differ between industries and the patterns of GVCs therefore tend to vary by industry. The electronics sector is probably the most well-known industry where GVCs have rapidly developed because of the high degree of modularisation (the text below discusses the examples of the iPod, iPhone and Nokia). But the car industry has also witnessed already for some time the unbundling of its production between large assemblers and first/second tier suppliers.¹ Differences in international fragmentation between industries are not exclusively related to technological differences as low tech industries like the textile and leather industry (see below for examples on shoes and T-shirts) have also witnessed an increasing fragmentation of production stages.

22. Electronics and cars are examples of so-called ‘producer-driven’ chains where large manufacturing firms such as GM, Sony and Apple are at the top of the GVC. Technology (including design, etc.) and production expertise are core competencies that are largely developed and deployed in-house in these lead firms, or in captive suppliers that can be blocked from sharing technology with competitors. Hence, multinational firms (MNEs) play a major role in these networks reflected in the important linkages between affiliates in different countries. In contrast, so-called ‘buyer-driven’ chains have developed around large retailers such as Wal-Mart and highly successful brand merchandisers such as Nike. Products are often relatively simple products like apparel, house wares, and toys; the lead firms have only a limited number of factories of their own but source products from a large network of independent supplier firms.

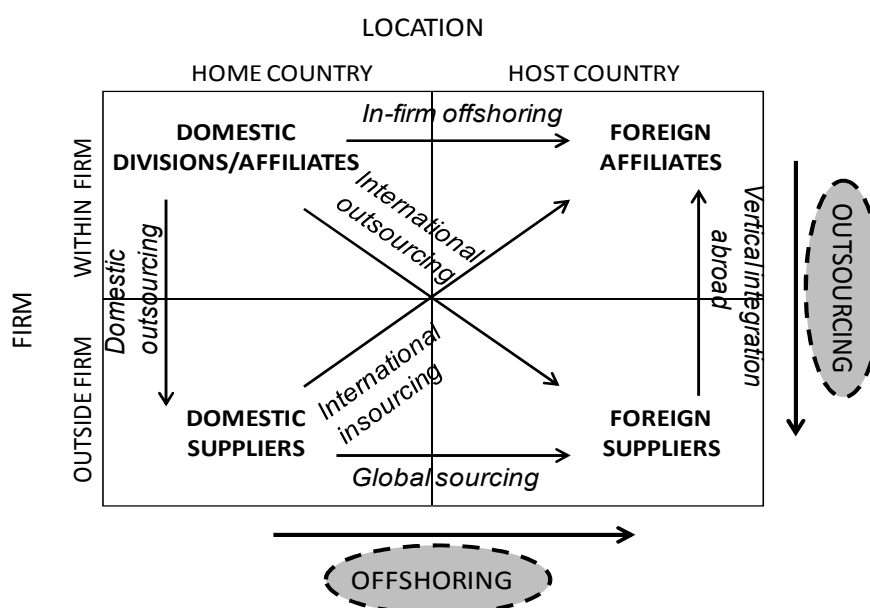
¹ The difference however is that instead of global fragmentation, this industry is more characterised by regional value chains because of the high transportation costs of cars and parts.

23. Gereffi et al. (2005) have developed an overall theory of governance of GVCs, distinguishing different categories of GVCs ranging from pure markets to vertical integrated hierarchies and by relating these to factors such as the complexity of transactions, the ability to codify transactions and capabilities in the supply bases. Economic transactions within GVCs include arm's length transactions between companies and independent suppliers as well as intra-firm transactions between headquarters and affiliates within multinational networks. Actors and linkages within GVCs may change over time as (smaller) firms might upgrade their activities and reinforce their positions.

Firm strategies of outsourcing/offshoring

24. The organisation of production, trade and investment across different countries within GVCs is based on firm strategies of outsourcing and offshoring (OECD, 2007a). As barriers to trade and investment have been lowered gradually and country boundaries have become less important, the relevant market for companies has grown both for inputs and outputs and has motivated companies to restructure their operations internationally. The larger the market, the more companies will focus on activities with increasing returns to scale and where they have a competitive advantage (Kommerskollegium, National Board of Trade, 2010). Outsourcing typically involves the purchase of intermediate goods and services from outside specialist providers, while offshoring refers to purchases by firms of intermediate goods and services from foreign providers, or to the transfer of particular tasks within the firm to a foreign location (Figure 1). Offshoring thus includes both international outsourcing (where activities are contracted out to independent third parties abroad) and international in-sourcing (to foreign affiliates).

Figure 1. Outsourcing and offshoring



Source: based on Van Welsum and Vickery (2004), Miroudot et al. (2009) and Sturgeon (2009).

25. In response to a more competitive environment, the motivations for firms to outsource/offshore activities can be broadly distinguished as cost and differentiation advantages (Maskel et al., 2006). Firms' search for cost advantages and higher efficiency drives them to source inputs from low-cost or more efficient producer economies, either domestically or internationally, and either within or outside the boundaries of the firm. Differentiation advantages relate to quality and innovation benefits and motivate firms to move activities to gain access to so-called strategic assets, whether skilled workers, technological

expertise, or the presence of competitors and suppliers which enables firms to learn from their experience. Tapping into foreign knowledge has become especially important in the internationalisation of R&D activities (OECD, 2008).

26. A specific motivation to move activities offshore is entry into new markets. Demographic shifts and rapid growth in several large non-OECD economies mean that an increasing part of global economic activity is taking place outside the OECD area. If firms wish to benefit fully from new growth centres, they need to be present in them. This does not necessarily involve the offshoring of existing production, but in many cases it involves expansion abroad.

27. Decisions on which activities to source outside the firm (and potentially across borders) and which ones to keep internally (but possibly in a foreign affiliate) are determined by the existence of transaction costs, the complexity of inter-firm relationships and asset-specificity. Research has for example shown that firms are more reluctant to source more complex or high value activities externally, as these are often considered strategic to a firm's core business. Reversely firms often relocate high-volume production that requires low skills or standard technologies to external providers that may have cheaper or more efficient production capabilities. This allows the firm to focus its activities on areas in which it has a comparative advantage, or allow it to engage in new, often high-value-added business activities.

28. While distribution, sales and production activities were the first to lead the way, R&D and decision-making activities are also increasingly (re-) located internationally (OECD, 2008). The past decades have witnessed an increasing internationalization of company activities including those related to innovation. Firms try to optimise their production processes by locating the various stages across different sites according to the most optimal location factors across countries. Since the importance of location factors varies across different activities, the attractiveness of countries will be different for specific functional activities (OECD, 2011a). Market size and growth is typically of greater importance for production and distribution activities, while an excellent research infrastructure and a large pool of highly skilled people typically attracts R&D investment.

The role of MNEs

29. MNEs play a prominent role in global value chains because of their numerous affiliates abroad; in addition, MNEs are increasingly observed to decentralise and outsource specific activities. MNEs' affiliates are not only engaged in serving local markets in the host country, but have become essential links in GVCs as they serve other (neighbouring) markets and produce inputs for other affiliates in the multinational's network. Both by arms-length relationships with other companies/suppliers (*i.e.* outsourcing) and own affiliates (*i.e.* offshoring), MNEs organise and disperse their production processes across different geographical locations. The cross-border trade between multinational firms and their affiliates, often referred to as intra-firm trade, accounts nowadays for a large share of international trade in goods. A growing part of such intra-firm trade concerns the exports and imports by foreign affiliates that manufacture (part of) products destined for other markets.

30. Theories of MNEs traditionally distinguish between horizontal and vertical MNEs (*cfr.* cost and quality/innovation benefits, see above). Horizontal MNEs are motivated by the desire to place production close to customers and avoid trade costs while at the same time realising economies of scale. They are multi-plant firms that produce similar outputs in both home and host countries, thereby economising on the costs of exporting. Vertical MNEs typically undertake different stages of production in different countries and have become especially important in GVCs following the decreasing coordination/transaction costs of production across borders. The production in one country serves as input for production activities in other countries and the location of the different stages depend on where the factors of production they use intensively are relatively cheap. In reality however, most MNEs affiliates display horizontal as well as

vertical characteristics; MNEs setting up an affiliate in China e.g. will often try to serve the large and rapidly growing Chinese market as well as benefitting from the lower (labour) costs.

31. The development of global value chains also offers SMEs new opportunities by enabling them to expand their business opportunities across borders, although reaching international markets is generally problematic for SMEs. The use of ICT and related services e.g. has eased small firms' access to markets beyond their national boundaries. In addition, the fragmentation of production together with the development of ICT is creating new entrepreneurial possibilities for SMEs. New niches for the supply of novel products and services continuously emerge and allow SMEs to exploit their flexibility and their ability to move quickly (OECD, 2006).

32. But SMEs also face serious challenges especially in terms of managerial and financial resources and the ability to upgrade and protect in-house technology. The lack of scale necessary to support the costs of adequate R&D, training of personnel, and fulfilment of the strict requirements of product standards and quality are considered to be important barriers for SMEs to integrate in GVCs. Moreover, if upgrading a small firm's position in the value chain is possible, it is typically linked to the take-up of a larger and more complex set of tasks. For example, small suppliers may have to contribute to product development, to organise and monitor a network of sub-suppliers, to ensure compliance with a broader set of standards, and to ensure delivery and quality at competitive prices (OECD, 2006).

3. What makes GVCs different?

33. Trade and foreign direct investment (FDI) have been the most important drivers of globalisation during the past decades. While these economic linkages between countries are not new, the scale and complexity of transactions has substantially increased over the past decades. Furthermore, trade and FDI have become increasingly interdependent since production has become more dispersed across borders and correspondingly import and export flows of intermediates have grown within GVCs. In addition, GVCs have deepened the process of globalisation along different lines: geographically (by including a larger number of countries, including emerging countries), sectoral (by affecting manufacturing but also increasingly services industries) and functionally (by including not only production and distribution but also R&D and innovation). As a result, an increasing number of firms, countries and other economic actors take part in today's global economy and have become increasingly connected across borders.

A different level of analysis

34. The nature of international trade has changed as international trade in activities/tasks has increasingly complemented international trade in goods (Grossman and Rossi-Hansberg, 2008). Following the international fragmentation of production, a single final good is often processed in many countries with sequential stages in the value chain being performed in the location most suited to the activity. Value added is being added in different countries throughout the production process and countries just like firms become increasingly specialised in specific functions within GVCs. A process of vertical specialisation has occurred between countries, i.e. a vertical division of labour with countries increasingly specialising along the value chain. In the case of MNEs this vertical specialisation takes place within the same firm.

35. Baldwin (2009) distinguishes between two types of unbundling in international trade. In the past, rapidly falling transport costs enabled the unbundling of production and consumption, resulting in growing trade of goods ("the first unbundling") and an increasing specialisation of countries in terms of industries according to their comparative advantage. Until recently production was generally undertaken at one place in line with countries' comparative advantages, but the strong decline in communication and co-ordination costs has facilitated the spatial unpacking of firms ("the second unbundling"). The latter process relates to the unbundling of stages and tasks in the production process, resulting in a deepening specialisation of

countries in terms of individual activities and functions (within and across firms/industries). Consequently, international trade increasingly consists of the imports and exports of intermediates in addition to trade in final goods.

36. The concepts of GVCs, offshoring and trade in tasks have increasingly been integrated in trade models which has resulted in (slightly) different outcomes.² It has become clear that GVCs require a different level of analysis and along the same lines, raise a number of new policy issues (Baldwin, 2009):

- **Individuals and firms instead of industries:** winners and losers of globalisation have traditionally been described in terms of industries, but GVCs and trade in tasks might affect individuals and firms within the same industry differently. Some employees could suffer from globalisation if their activities are relocated within GVCs, while others might prosper. Education and skills no longer seem to be the main factor for offshoring but rather the international tradeability and routine character of tasks.
- **Unpredictability:** the costs of offshoring tasks depend on a number of factors (communication and transport costs, the ease of managing tasks abroad, etc.) and is rather difficult to analyse; hence it is not clear where the ‘tipping point’ for international relocation is. Policy makers typically do not possess the firm-level information about which activities will be kept together and which can be (easily) offshored. It is therefore difficult to project which activities and tasks will be offshored in the near future and in which firm and industry.
- **Suddenness:** technological advances in ICT have drastically decreased the coordination/transactions costs of activities across geographical locations. The impacts of ICT vary for different tasks and depend on the complexity of the interactions; jobs that were generally considered to be unaffected by globalisation have become internationally mobile activities and are increasingly offshored.
- **Larger interdependence and blurring of ‘us versus them’:** as different countries add value to final goods and accordingly import/export intermediate inputs, gains in trade are less straightforward to calculate and the benefits of individual countries have become more interdependent.

Specific economic benefits

37. Because of increased trade (including of intermediates) and FDI within GVCs it can be expected that, ceteris paribus, countries will benefit from a better integration into GVCs. Most economic analysis shows that despite possible short-term losses of employment, there are considerable long-term benefits to globalisation and further economic integration between countries (OECD, 2007a). These benefits include higher standards of living for a growing share of the global community, greater product diversity, lower prices and higher productivity.

²

There has been a discussion about the need for new trade models, as some indicated that offshoring and GVCs are not new concepts, e.g. Mankiw (2004). Markusen (2005) and Bhagwati *et al.* (2004) also argue that international sourcing is likely to have qualitatively similar impacts since offshoring is fundamentally a trade phenomenon. At the other hand, Feenstra and Hanson (2003) argue that trade in intermediates may have more widespread implications (e.g. for labour markets), because intermediates may not only affect labour demand in the sectors in which imports occur but also in sectors that use imported intermediates to produce final goods and services.

38. Growing FDI and the larger presence of MNEs positively affect the economic growth of countries through expansion of productive capacity, job creation, human capital enhancement, innovation and technology diffusion, etc. While the number of empirical studies is rather limited, research has demonstrated the beneficial impacts of foreign investment; e.g. de Mello (1999) for a group of 16 OECD countries and 17 (mostly Asian) non-OECD countries. Other studies have also reported positive effects, but strongly dependent on the local conditions of the host country economy and firms (e.g. in terms of human capital; Borenzstein et al., 1998; Alfaro et al., 2010). Firm-level evidence points particularly to the importance of absorptive capacity for domestic firms benefitting from the presence of MNEs (for an overview, see Keller, 2004).

39. The theoretical trade literature has long argued for aggregate gains from openness: static gains from trade typically arise from the exploitation of comparative advantage and economies of scale. Trade opens foreign markets for goods and services that can be most efficiently produced in the home country, because of technological advantages (Ricardian trade models) or factor abundance (Heckscher-Ohlin models). Furthermore, wider markets due to trade may enable firms to take advantage of economies of scale that are not available when sales are limited to the domestic market, thereby lowering costs (trade models of imperfect competition). In addition, dynamic gains might arise, *i.e.* effects not only on the level but also on the long-term growth of productivity: through deepening specialisation, higher returns to investment (capital and R&D), and technology/knowledge diffusion and spillovers (Nordas *et al.*, 2006).

40. Although gains from trade are difficult to measure, the empirical evidence has largely shown that openness raises GDP and economic growth. A number of studies have provided evidence that more open countries typically grow faster than less open ones and have higher income levels at any given period of time (Dollar, 1992; Sachs and Warner, 1995; Harrison, 1996; Edwards, 1998; Frankel and Romer, 1999). In a panel study of 21 OECD countries, Bassanini and Scarpetta (2001) found that an increase in trade openness of 10 percentage points resulted in an increase in output per working-age person of 4%. A study of trade in 63 countries associated a rise of 1 percentage point in the ratio of trade to GDP with an increase in per capita income of between 0.5 and 2% (Frankel and Romer, 1999).

41. These economy-wide effects have been increasingly supported by recent empirical evidence analysing the effect of trade liberalisation on firm-level performance. Aggregate productivity growth is the result of the re-allocation of resources to higher value added activities, *i.e.* to industries that are comparatively more efficient and to more productive firms³. Bernard et al. (2006) e.g. show that industries characterised by falling trade costs tend to experience larger increases in productivity, hence supporting the (intra-sectoral) reallocation mechanisms and the reduction of x-inefficiency at the firm level. OECD (2010a) discusses similar results for emerging countries all suggesting an important re-allocation of resources towards more productive firms.

42. In addition to these ‘general’ gains of trade, GVCs can be expected to particularly improve efficiency since productivity impacts of international trade have been shown to be dependent on the type of goods. Imports of capital goods and intermediate goods may increase domestic productivity more strongly as they embody the transfer of technology, more than imports of final goods which do not impact on the domestic production process (Keller, 2004). Miroudot et al. (2009) show that industries with a higher proportion of imported intermediate goods display on average higher productivity in OECD countries.

³

Recent firm-level models of trade show the importance of re-allocation of resources by raising across-firm as well as within-firm productivity. Melitz (2003) describes how lower trade costs can promote the re-allocation of resources to more productive firms, while unproductive firms exit. In addition, the Melitz and Ottaviano (2008) model shows how lower trade costs increase competitive pressure in the domestic market and results in lower mark-ups and lower X-inefficiencies in firms.

Amiti and Konings (2007) show that productivity in Indonesia has benefitted relatively more from the decrease in tariff barriers for intermediate goods than from a similar tariff decrease for final goods.

43. Goldberg et al. (2009) reported that trade liberalisation resulted in significant falls in the prices of existing imported intermediates (larger than for final goods), a large expansion in the range of imported intermediates, increased sales, higher productivity and the introduction of new varieties in the final goods sectors. In more general terms, imports of intermediates benefit the competitiveness and productivity of domestic firms through (Grossman and Rossi-Hansberg, 2006; Fontagné and Toubal, 2010):

- A price effect: higher intermediate imports result in stronger competition between producers (including domestic producers) of intermediates, hence lowering the price of intermediates available in the domestic economy.
- A supply effect: higher imports bring about a larger variety of intermediates to the domestic economy.
- A productivity effect: new intermediate goods may better fit the technology of final goods producers and/or may spur innovation in the final goods sector.

44. Countries which allow firms to access technologically advanced inputs, regardless of where they are produced will, *ceteris paribus*, be more productive than those that do not. These economic benefits might even be realised in industries that enjoy a comparative advantage, but in which a country is at a comparative disadvantage for one or more specific tasks. Trade in tasks and intermediates will increase the efficiency and productivity of the non-offshored tasks.

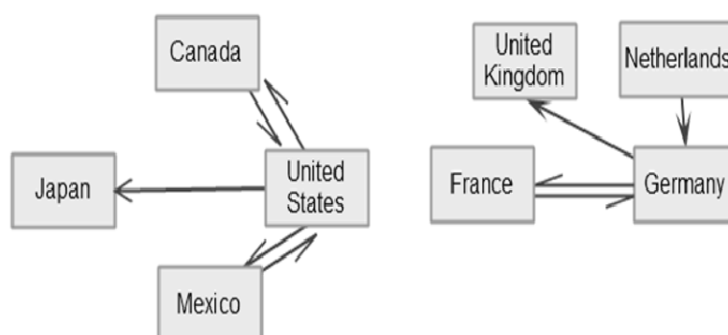
45. Lowering trade costs particularly for intermediate goods will facilitate the integration of countries within GVCs and bring specific economic benefits to countries. However, trade policy is not the only policy domain that matters, as it should be complemented with other policy measures. OECD (2010a) discusses the relevance of complementary policies to trade policies in order to optimize the gains in trade of intermediates: competition policy, lowering the entry barriers for new firms, building human capital and improving access to skilled labor, improving access to factor markets, improving the macro-economic environment and reducing policy certainty.

A global connectedness but regionally driven

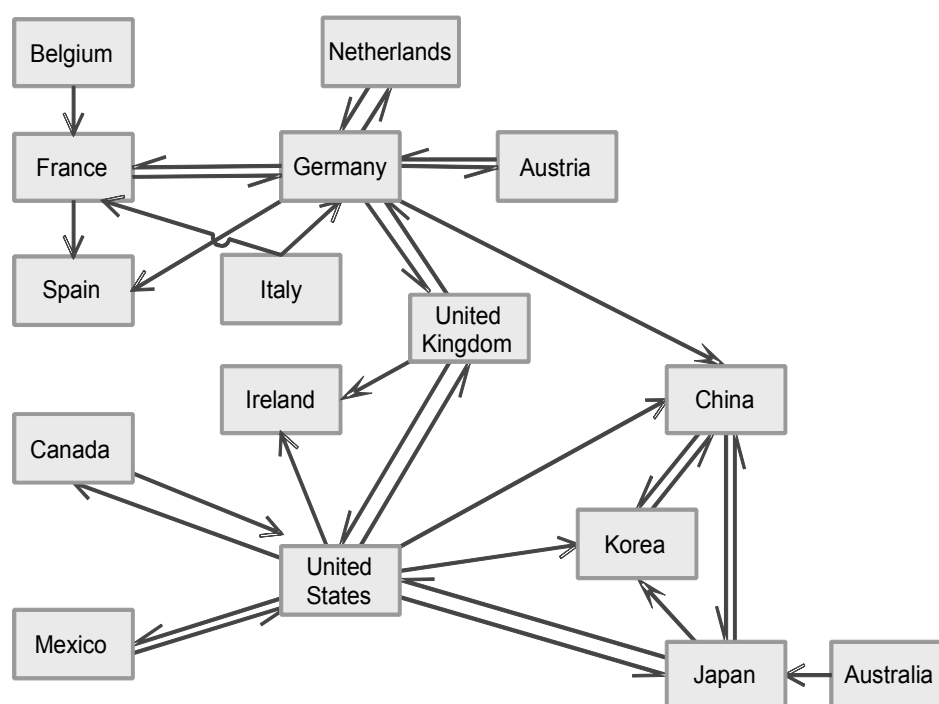
46. The functional and spatial fragmentation within GVCs is significantly affecting how the global economy operates. The disintegration of production has resulted in a deeper integration of trade, not only in final goods and services, but increasingly also in intermediate inputs. Figure 2 shows the bilateral exports of intermediate goods between economies and clearly indicates that intermediates trade between countries has become more important and more complex. While in 1995 only a couple of countries showed bilateral exports of intermediates above USD 25 billion, that number of countries has multiplied in 2005. On top of these intermediates trade flows, other economic linkages between countries include trade of final goods, FDI and transfers of technology within MNEs.

Figure 2. Bilateral exports of intermediate goods (> 25 billion USD), 1995 and 2005

1995



2005

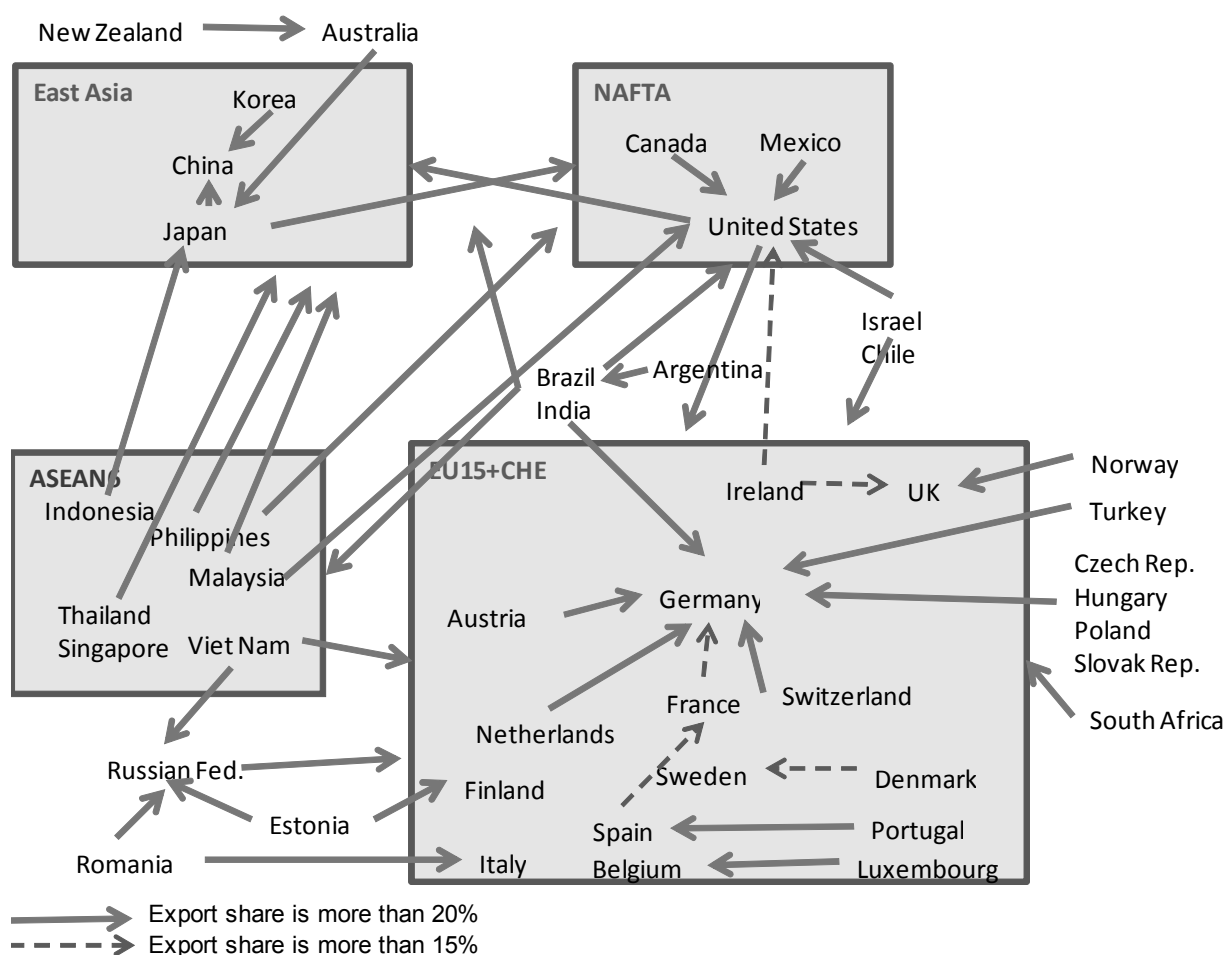


Source: Own calculations based on OECD Input-Output Database (September, 2010) and OECD STAN BTD (March, 2010).

47. Looking in more detail into these bilateral exports of intermediates not only in absolute terms, but also in relative terms, gives an indication which pairs of countries are important trade partners. More specifically, when looking at dominant links between countries (i.e. bilateral exports of intermediates which represent more than 15-20% of the total export of intermediates) shows how GVCs have significantly changed over a period of 10 years. While in 1995 (see Annex 1) Japan, Germany and the United States were by far the largest production centres, the increasing spread of GVCs shows the growing integration of countries at the global level.

48. The results also show that **GVCs (still) have a strong regional character** with 3 large groups of economies being important in the global trade of intermediate products: NAFTA, EU and Asia including East Asia (with Japan, Korea and China) and ASEAN economies (Figure 3). A large number of dominant links are identified within these groups of economies, while export flows between individual economies across different regional groups are significantly less important. It is merely by aggregating exports of different economies within regional groupings that dominants between NAFTA, EU, East Asia and ASEAN appear. There are some exceptions like e.g. the exports from Ireland to the United States which is most likely to be related to the large presence of US MNEs in Ireland. A stronger integration is also observed within Asia between East Asian and ASEAN economies and of Asia with other regional blocs. Yamano et al. (2010) shows how the production networks between Asian economies have become much more integrated over the period 1995-2005 and how intermediates are largely exchanged between economies (see also below).

Figure 3. Dominant links between economies, exports of intermediates, 2005



Source: Own calculations based on OECD Input-Output Database (September, 2010) and OECD STAN BTD (March, 2010).

49. The growing (global and/or regional) connectedness within GVCs has resulted in an increasing interdependence between countries, which has become very clear during the recent crisis. Because of their linkages, GVCs can give rise to a domino effect in times of adverse shocks as lower exports of final goods

directly lead to relatively smaller imports of intermediate inputs. The sharp drop in world trade during the recent crisis rose to a multiple of the decrease in world GDP; likewise, a remarkable large number of countries simultaneously reported a sharp drop in their exports/imports. Since goods and services are being produced sequentially in different countries, intermediates cross borders several times before the final product is sold to the final customer, resulting in larger synchronisation of trade decreases across countries and a larger drop of trade relative to GDP. While GVCs have not been the only contributing factor, some evidence suggests that the industries that have been most affected by the crisis are also those characterised by global production networks (OECD, 2010b).

Box 1. Planned work: Mapping of GVCs (joint with OECD Trade Directorate)

The objective of this activity in the overall project is to get better insights into GVCs across different industries and countries. Several indicators have been developed for the analysis of GVCs; this paper aims to analyse existing indicators and developing new indicators to get a more comprehensive idea to what extent and how countries are integrating in GVCs. Different data sources will be used: bilateral trade data by end use (capital, final and intermediate goods), Input-Output Tables, multinational networks based on ownership data, etc. Better evidence will directly feed into the policy discussion on effective policies for GVCs.

This activity aims to complement the data/indicator work discussed below with industry and firm/product case studies as this will illustrate the developments of GVCs in specific firms/industries/countries. Countries are invited to work with the Secretariat in developing new case studies or to provide existing work that has been undertaken at the national level. In particular, this work would benefit from the involvement of emerging countries in order to gain more insights on GVC developments on a global scale.

Timing: WPGI meeting 2012; a scoping paper will be discussed at the WPGI meeting 2011.

4. The integration of emerging countries in GVCs

The growing importance of emerging countries in the global economy

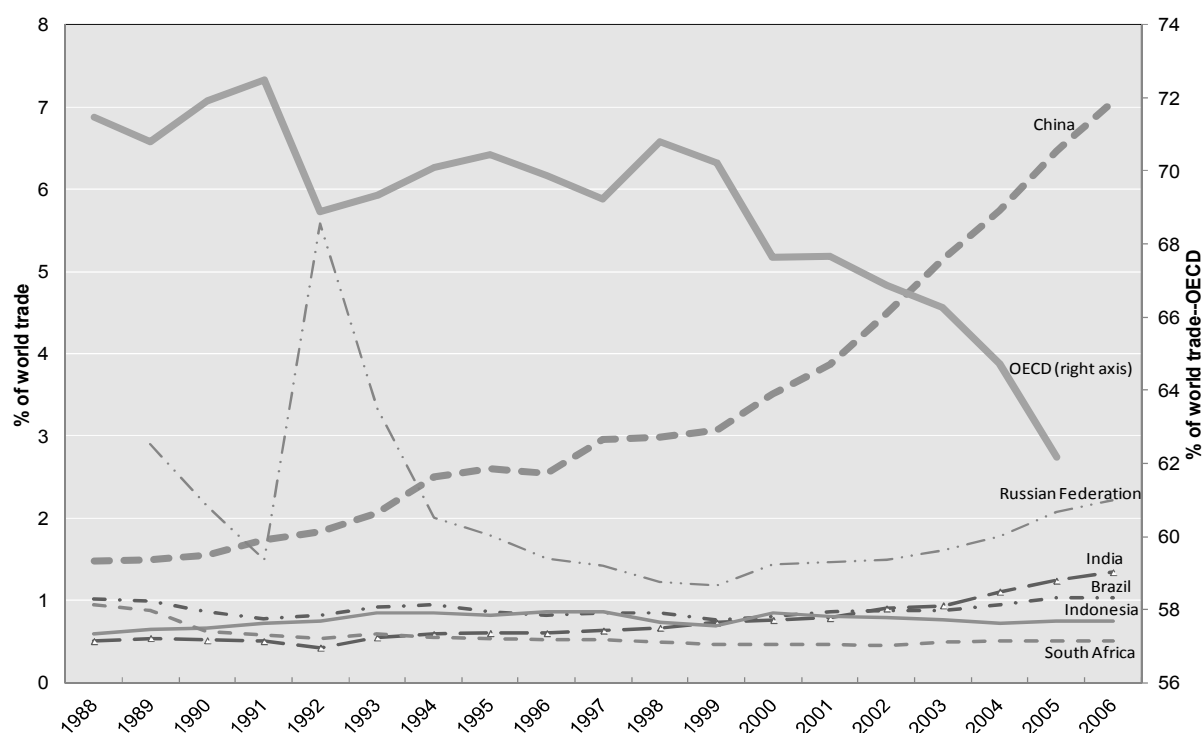
50. The development of GVCs has strongly contributed to the growing importance of emerging countries in the global economy. In the process of international fragmentation, many firms have offshored the most labour intensive activities (like e.g. assembly) towards emerging countries in search for lower costs and higher efficiency. The attractiveness of countries like Brazil, China, India and South Africa is however not only determined by lower labour costs, but also by their large and rapidly growing home market. Brantstetter and Foley (2007) for example demonstrate that until 2006 US firms have mainly located their plants in China to gain access to the Chinese market: almost 75% of the sales of these US affiliates was directed to the Chinese market while less than 10% was exported to the United States.

51. Emerging countries have attracted large inflows of FDI and new investments by MNEs during the past decade especially in production. Recently, foreign investments in higher value activities and innovation related investments also seem to be on the rise in emerging countries (OECD, 2011). Industrialised countries seem thus to face a growing competition from emerging economies in attracting MNEs not only at the low-end, low-technology end of the value chain, but also increasingly in the more technology and knowledge-intensive components.

52. The economic development of emerging countries is high on the policy agenda in OECD countries, with China at the centre of the globalisation discussion. While OECD countries are gradually losing market share in international markets, emerging countries and particularly China have build up a strong export base over a very short period (Figure 4). In the public debate, these growing market shares for China are often linked to the (significant) job losses in OECD manufacturing industries. Western companies are believed to move manufacturing plants to China only to take advantage of the low labour

costs, thereby hollowing out their own manufacturing industry while building up China's competitiveness (Van Assche, 2009). Aggregate employment data seem to support this assessment as manufacturing employment is gradually decreasing in the OECD era while growing in China.

Figure 4. Country shares in world exports of goods and services



Source: presentation P. Kowalski during the joint OECD-World Bank Workshop 'GVCs and emerging economies'

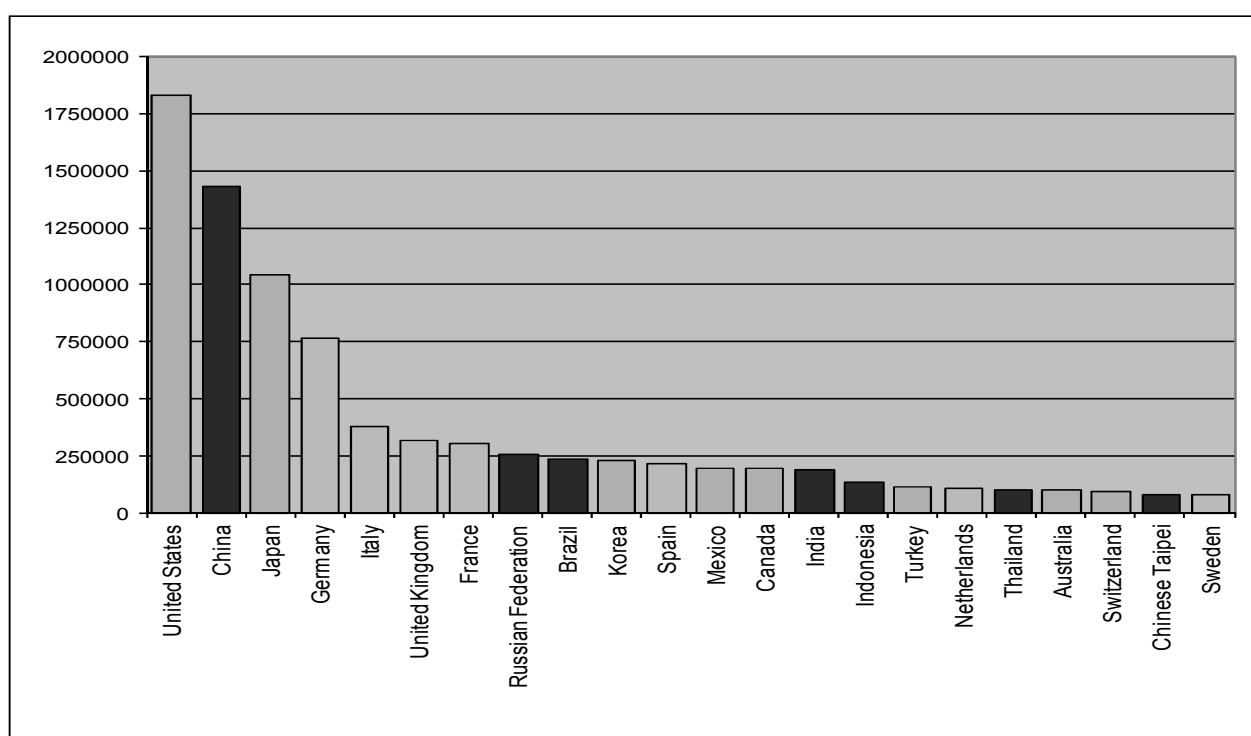
53. In addition, China increasingly seems to compete head-to-head with more developed countries in higher technology intensive industries. Export data show that China is nowadays not only a large exporter of low cost - low technology manufactures like toys, textiles and footwear but also increasingly of more sophisticated ICT products like electronics and computers (see Figure 9 below). For example, China became the largest exporter of ICT goods in 2004 (OECD, 2010c). Some have used this observation to conclude that China has succeeded very rapidly in upgrading its export portfolio; Rodrik (2006) indicated that the export mix of China resembles more that of a developed than of a developing country.

54. Aggregate figures might however hide the underlying processes at work within GVCs and lead to wrong conclusions. The large amount of electronic products exported by China is largely based on imports of intermediate inputs into China; hence the strong export performance of China in higher technology intensive industries seems to reflect mainly the large assembly activities of China (see below).

55. Along the same lines, the discussion about the manufacturing industry needs to be put in a broader framework explicitly including the development of GVCs. First, research has shown that the process of de-industrialisation in the OECD era is mainly driven by the falling demand for manufactured goods relative to services (as countries develop and consumer become richer) and the higher productivity growth in manufacturing relative to services. Second, notwithstanding its decreasing importance in terms of (direct) employment and (nominal) value added, the manufacturing industry still occupies a central position in OECD economies, and OECD countries still account for the bulk of manufacturing value

added, even if some non-OECD regions of the world have grown considerably in importance over the past decade (Figure 5). Third, the loss of manufacturing jobs in OECD countries is not exclusively linked to the offshoring of activities to emerging countries, since a large part of the offshoring is among OECD countries. Lastly, offshoring is not necessarily bad for the home country (in terms of productivity, innovation and competitiveness) and is often a sound management decision. Firms that offshore labour-intensive jobs to low-cost countries may actually end up saving domestic jobs since offshoring might strengthen their international competitiveness; the tasks that are moved offshore increase the productivity of the activities that were not relocated.

Figure 5. Global manufacturing value added, 2008, in million USD



Source: OECD estimates, based on UNSD; data are converted at exchange rates.

The role of emerging countries in GVCs

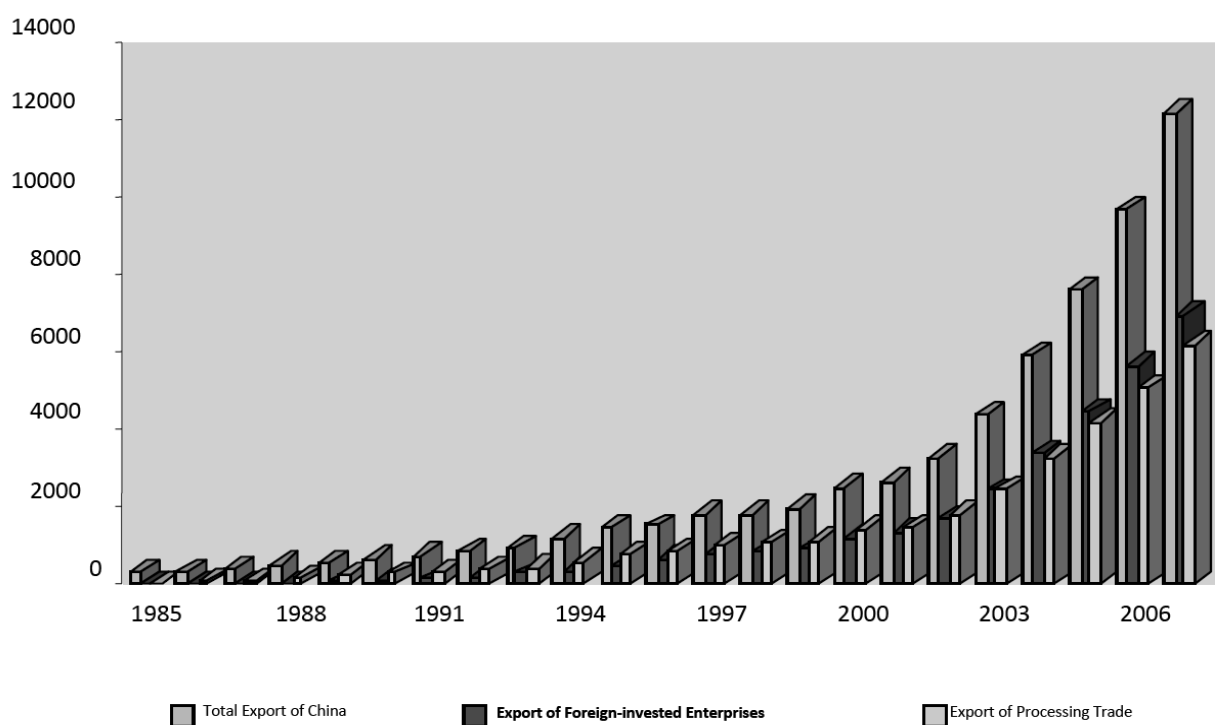
56. Aggregate trade data have to be interpreted carefully in the presence of GVCs where intermediate and final products are imported/exported between different countries, since countries increasingly specialize in specific stages/activities along the value chain. Aggregate trade flows do not necessarily reveal the actual activities that are undertaken by emerging countries and a more detailed look is required because of the different level of analysis of GVCs (see above). Until now, the existing research has focused almost exclusively on China and has largely abstracted from other emerging countries. The planned OECD work aims to study also other countries like Brazil, India and South Africa and to analyse the differences and similarities in GVC developments across emerging countries.

57. A couple of general conclusions have emerged from the large number of studies on China's international performance: first, the strong export performance of China is largely based on the assembly of intermediates imported from other countries, especially in higher technology industries such as ICT products. Second, a large part of this trade (exports and imports) is controlled by foreign owned firms in dedicated export processing zones. Third, the value created in China by these activities is only a fraction of

the trade exported from China. The drawback of these studies is that they use data up to 2005/2006; more recent data seems to suggest that some of these conclusions need to be re-evaluated as the trade performance of China seems to be changing towards higher value added activities.

58. Originally attracted by low labour costs and the favourable treatment in specific export processing zones, foreign firms moved their labour intensive manufacturing plants to China in order to reduce production costs. Firms are allowed to import intermediates without paying custom duties provided that these inputs are solely used for the production of final goods destined for third markets. The success of these export processing zones is reflected in the increasing share (above 50% since 1995) of this so-called processing trade in total exports from China (Figure 6). This processing trade consists almost exclusively of the pure assembly of imported intermediates into final goods exported to third markets. China's exports are thus for a large part based on foreign inputs; 'Made in China' therefore does not mean necessarily 'Produced in China' but rather 'Assembled in China'.

Figure 6. Total exports, processing exports and foreign firms' exports, China

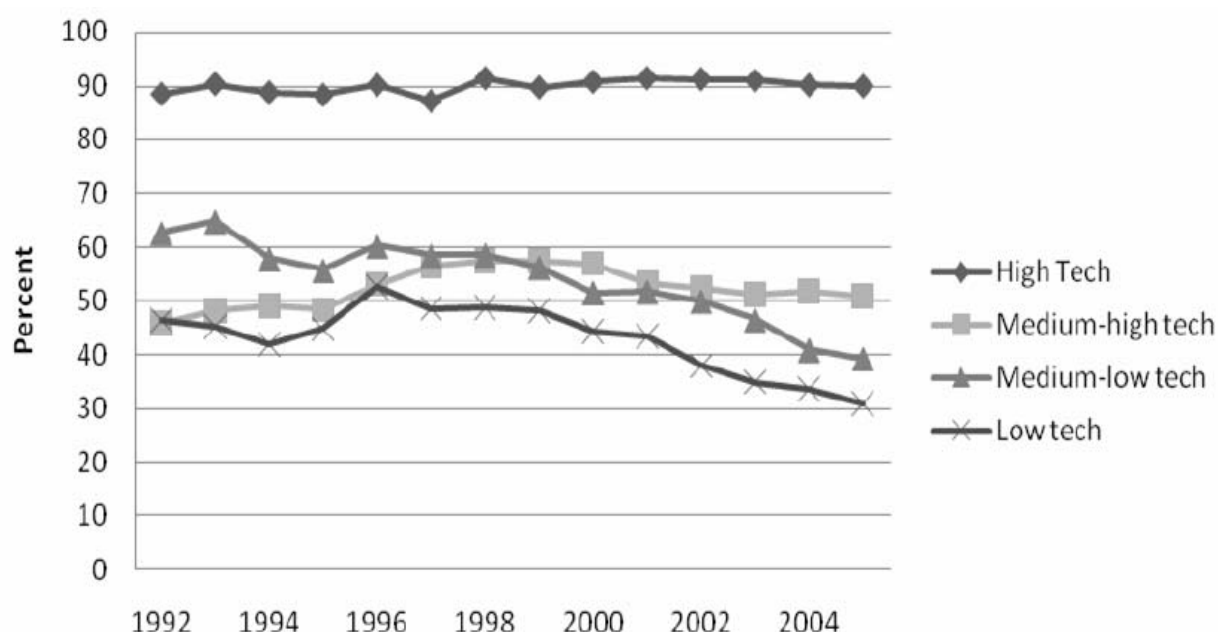


Source: Yue and Evenett (2010).

59. Foreign owned firms have been an important actor behind the strong export performance of China during the past decade as these firms are responsible for about 60% of the total exports from China. Official statistics indicate that around 80% of the total exports by foreign owned firms are processing exports. Brantstetter and Foley (2007) reported that the majority of the 200 largest exporting firms are owned by firms from other economies, primarily coming from Chinese Taipei, Hong Kong (China) and South Korea. Remarkably maybe but supporting the importance of the Chinese market for these MNEs, Western firms seem to play only a limited role at least in the number of large exporting companies: only 11% of the 200 largest exporters are MNEs from the United States, Japan and EU.

60. The large amount of processing trade by foreign owned companies also serves to qualify the strong export performance of China in higher technology intensive industries. Chinese Customs data clearly show that processing exports are relatively more important in higher technology industries (*e.g.* ICT equipment): while processing trade accounts for only 30% of the low technology exports from China, its share goes up to 90% for higher technology industries (Figure 7). Brantstetter and Lardy (2006) concluded that China is able to export more sophisticated ICT products because it imports the high value added parts and components from other countries. Van Assche and Gangnes (2007) and Amiti and Freund (2008) demonstrated that the upgrading of China's export mix disappears when leaving out the important category of processing trade. Xu and Lu (2010) show that especially foreign affiliates (coming from OECD countries, and not from Chinese Taipei and Hong Kong (China) through their processing trade activities are responsible for China's growing export sophistication.

Figure 7. Share of processing exports in total exports, China



Source: Van Assche (2009).

The division of labour in Asia

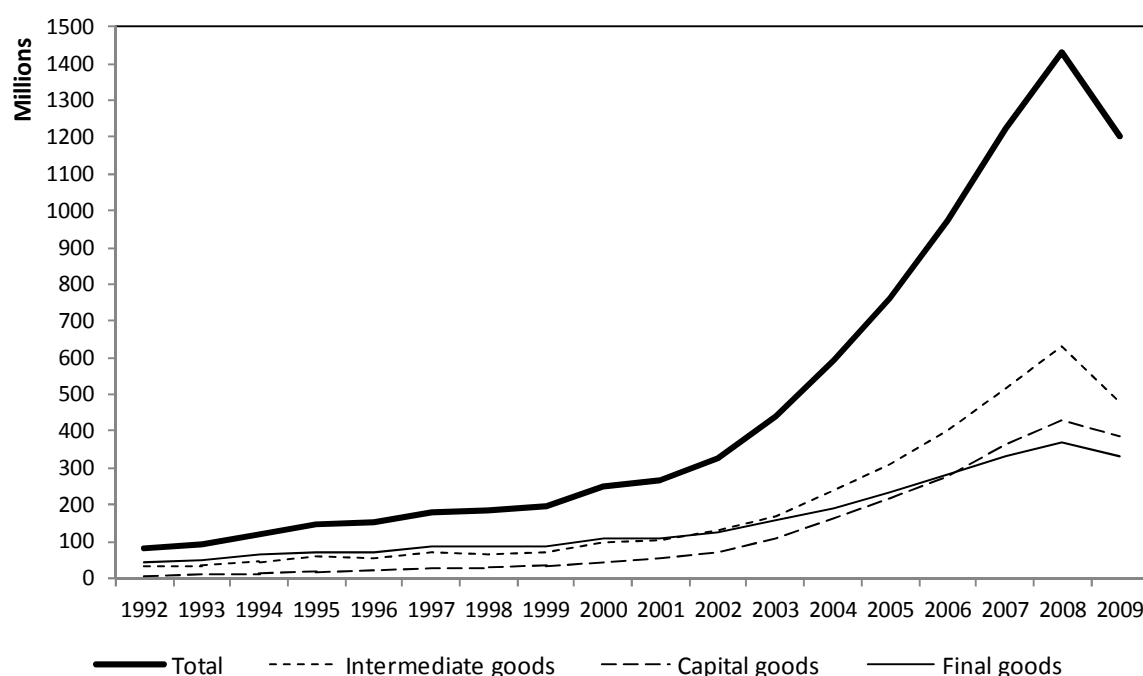
61. The economic development of China is deeply embedded in the development of GVCs as China imports large amounts of raw materials, equipment and other intermediates and then exports a big fraction of its output (almost 40% which is far above other large economies; Koopman et al., 2008). GVCs in China have a strong regional character as China has developed strong (manufacturing) links with East Asian countries, particularly for the sourcing of intermediate inputs. Almost 80% of the processing imports of China originate from other economies in the East Asian region, including these of high technology intermediates like parts and components (Chang et al., 2008). At the export side, the picture is more diversified with 45% of the final products assembled in processing zones exported to Europe and the United States. This has given rise to a triangular pattern of trade in Asia, where intermediates are largely exported from more developed countries (*e.g.* Korea and Japan) to China for assembly into final products, which are then exported back to developed countries.

62. GVCs have facilitated a process of vertical division of labour within Asia as Japan and other industrialised economies like Korea, Hong Kong (China), Singapore and Chinese Taipei have gradually

moved their low cost activities to overseas export platforms in low wage countries in Asia. This process has helped these early industrialized countries to upgrade their industrial capacities and exports, while at the same time allowed late industrialising countries including China to develop a comparative advantage in manufacturing. As a result, China plays a central role within these Asian GVCs as an assembler of final products.

63. This vertical division of labour in East Asia seems to be pushed further with other countries taking over lower value activities over from China ('flying geese' development model; Akamatsu, 1961; Ozawa, 2008). Recent research shows that labour intensive activities are being relocated from the Chinese mainland to other Asian countries (like. *e.g.* Vietnam, Philippines, Cambodia). In addition, China has also become a larger exporter of intermediates goods (particularly parts and components) and capital goods, also suggesting that China is developing other, higher value, activities, next to its pure assembly specialisation (Figure 8).

Figure 8. Exports of final, capital and intermediate goods, China



Source: OECD Bilateral Trade Database.

Box 2. Planned work: What explains countries' export performance – integration in GVCs?

The objective of this paper is to analyse the export performance of countries and analyse if the performance of countries is related to their integration in GVCs. The analysis will distinguish between the export performance for capital, final, and intermediate goods in order to study the effect of integration within GVCs (intensive and extensive margin). The paper will also establish what drives the export performance of countries within for each group of goods (capital, final and intermediate): the growth of export markets, the industry-sector growth or the competitiveness of exporting countries. The analysis will be undertaken for OECD countries as well as emerging countries; in order to capture the most recent developments (*e.g.* for China), the most recent data will be included in the analysis.

Timing: WPGI meeting 2011 (first draft).

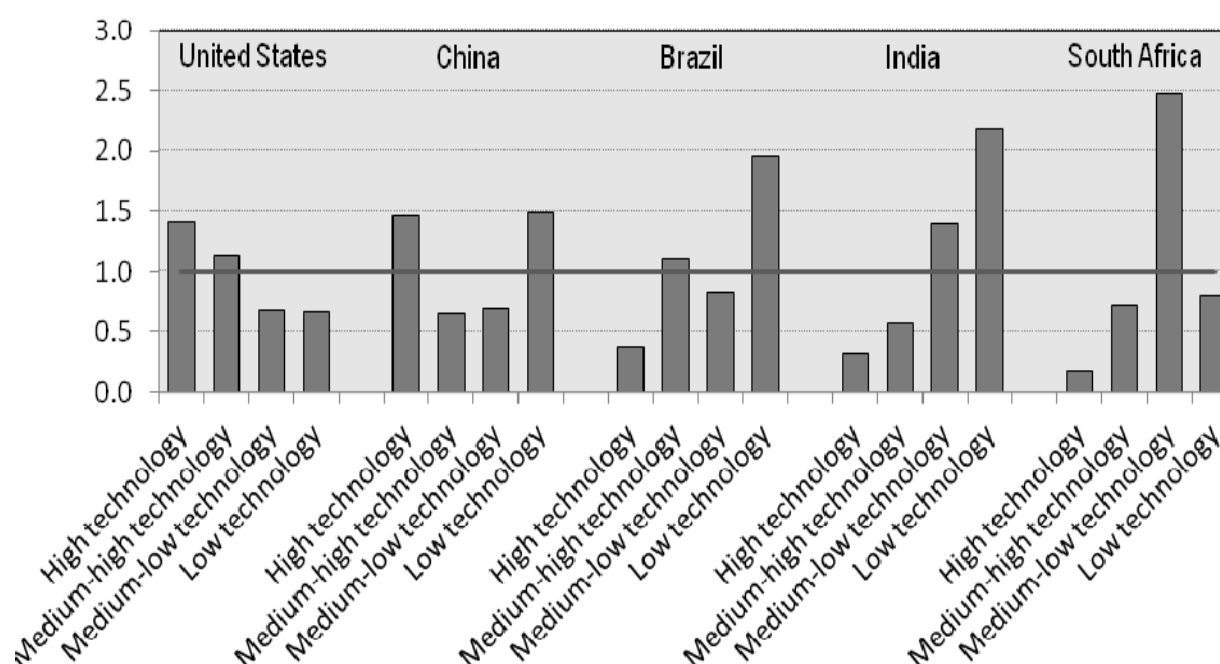
Export competition between emerging and OECD countries: price or quality?

64. Notwithstanding the fact that China's exports are heavily based on the imports of high value added intermediates, developed countries have increasingly become concerned about the competition of China especially in higher technology intensive products. Again aggregate trade data might result in too hasty conclusions and more detailed analysis is needed. Recent empirical evidence has shown that even within the same product categories, trade specialisation and competition increasingly take place in product varieties and market segments. Some countries export especially for lower market segment (reflected in a lower quality and lower price), while other countries target merely the top-end segments of the market. Analyzing the price or unit value of exports (calculated as trade in value divided by trade in volume) can offer more detailed insights on this. The underlying idea is that countries exporting at higher unit values offer higher 'quality' products, owing to their ability to sell identical products at a higher price (marketing, advertising, quality) or by specializing in higher priced segments (Aiginger, 1997).

65. Some recent studies have analysed the strong export performance of China by not only analysing the range of products and industries in Chinese exports but also focusing on price/quality segments. An important conclusion of this line of research is that China's export bundle overlaps to a large extent with those of more developed countries (*i.e.* China exports the same products) but that the unit values of Chinese exports are significantly lower (*i.e.* China is rather specialised in lower price/quality products). The fact that Chinese products are overall sold at a discount suggests that developed countries compete on other terms than only price and that the export competition of China with developed countries might be less intense than sometimes asserted (Rodrik, 2007; Branstetter and Lardy, 2006, Schott, 2008).

66. Figure 9 shows the special (export) position of China among other emerging countries like Brazil, India and South Africa. The latter countries all clearly show a strong specialisation towards the lower end of technology ladder (more specifically in the groups of low and medium-low technology industries). China, however, displays a two-spike specialisation pattern with a strong specialisation in the lowest technology industries (textiles, footwear, etc) and in the highest technology industries (especially ICT). The United States, representing a typical developed country shows a clear specialisation in more technology intensive industries.

Figure 9. Revealed comparative advantage, 2007



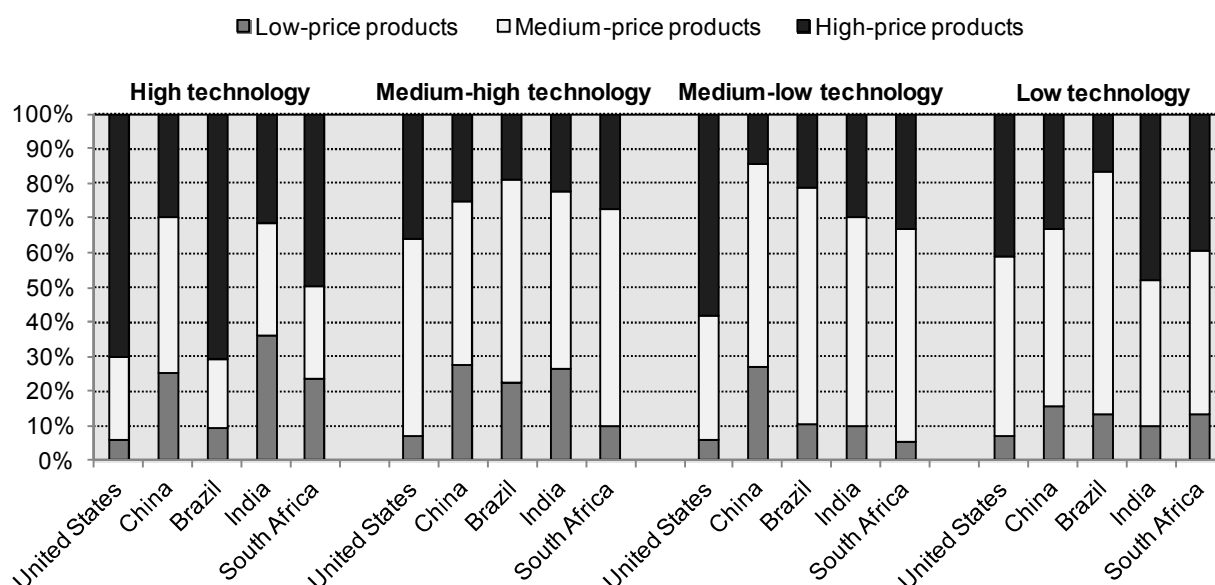
Source: Own calculations based on CEPII – BACI database.

67. Comparing the unit values of emerging countries' exports with those of the United States shows that on average the unit value of the exports of the emerging countries is, as expected, significantly lower than that of the United States (Figure 10). This observation is also valid in each of the technology categories; the results seem to suggest that the difference in unit values between emerging countries on the one hand and the United States on the other seems to decrease the lower the technological content of the industry. When analysing the high tech exports from China, it becomes clear that China mainly exports goods at a low or medium price, while the United States exports more than half of its exports at a high price. Hence, the competition between China and developed countries in more sophisticated products like ICT seems to be less direct, with China competing more on price while developed countries like the United States compete more on quality. This of course does not mean that individual US and Chinese companies might not compete head-to-head in specific products, but overall these results suggest a different level/kind of competition (price versus quality) between countries.

Box 3. Planned work: Export competition - Price or quality?

The objective of this note/paper is to analyse the export competition between countries by distinguishing between price and quality using information on unit values. The analysis will indicate how intense the competition is among countries and how this has changed over the years. The analysis will be done on the aggregate economy level, as well as on the individual industry level. In addition, the results will distinguish between final, capital and intermediate goods in order to provide more detailed insights on the position of countries in GVCs, e.g. to analyse how exports of final goods are linked to import of high quality intermediates. OECD as well as emerging countries will be included in the analysis.

Timing: WPGI meeting 2011 (first draft).

Figure 10. High/medium/low price segments in exports, 2007

Source: Own calculations based on CEPII – BACI database.

5. Capturing value in GVCs

Where is the value created and captured?

68. The strong position of (emerging) countries in GVCs as reflected in export figures does not necessarily mean that these countries capture a large part of the value generated within GVCs. A rising discrepancy is observed between physical trade flows at the one side and the creation and capturing of value within GVCs at the other side, following the increasing international fragmentation of production and the growing trade of intermediates. This geographical distribution of value creation directly determines where jobs and income are created and hence is of high policy interest.

69. The commonly cited study of the Apple iPod clearly showed that the actual value added in China represented only a fraction (USD 4) of the final retail price in the United States (USD 300), even if the final product was imported from China (Linden et al., 2009). Manufacturing activities in China for the iPod constitute the pure assembly of parts and components which are largely produced in the Japan, United States and Korea and then exported to China for assembly. A large part of the value added (around USD 140 is created and captured by producers of parts and components. The distribution and the retail sectors in the United States add another USD 75, while the rest (USD 80) is captured by Apple itself.

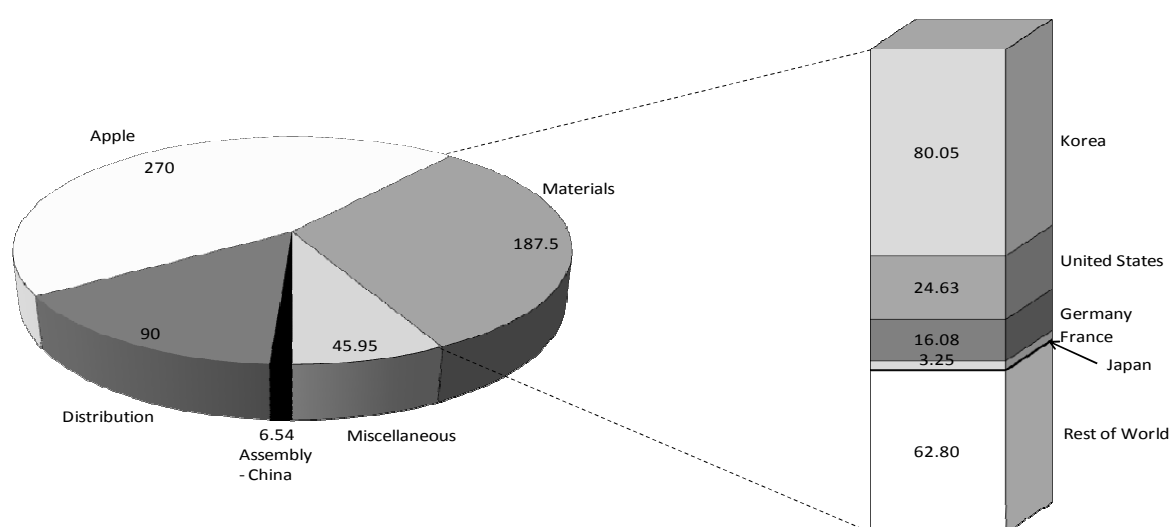
70. Recent published figures for another Apple product, the iPhone4 which was launched in the second half of 2010, allow for a similar exercise and largely confirm the limited value that is created/captured in China^{4,5} (Figure 11). Just as in the case of the iPod, the iPhone4 is designed and

⁴ Xing and Detert (2010) report similar results for the iPhone3: major producers of parts and components originate in Korea, Japan, Chinese Taipei, Germany and the United States, while the final assembly is done in China by one major firm (from Chinese Taipei). Just like in the case of the iPod, assembly costs attributable to China (USD 6.50) represent a small fraction of the total factory cost (USD 178.96).

⁵ Some products like the iPhone carry the label ‘Assembled in China’ instead of ‘Made in China’.

marketed by Apple but manufactured largely outside the United States. Total materials costs for the iPhone 4 are estimated to amount to USD 187.5, with Korea responsible for close to 50% of the parts and components going into the iPhone4. Other intermediates are produced by firms in the United States, Germany and France. Final assembly costs in China are estimated at USD 6.54, which is only about 1% of the retail price (USD 600) and less than 3.5% of the factory gate price (USD 194.04). It should be noted however that China's importance in value creation is likely to be larger, since several of the Korean part manufacturers (chip makers, battery suppliers, and those making printed circuit boards) actually produce these inputs in China.⁶

Figure 11. Value creation and capturing (in USD) for Apple's iPhone4 (retail price = USD 600)



Note: 1) the assignment of value to countries is based on headquarters.

2) Apple uses Toshiba as alternative supplier to LG; the value creation/capturing for Japan changes accordingly.

3) Apple margin includes royalties and licensing fees.

Source: iSuppli (Bills of Material) and Ali-Yrkkö et al. (2010) for distribution margins.

71. The difference between the retail price and the costs of inputs can be further decomposed into retail and wholesale distribution and Apple's margin. Using the estimates used by Ali-Yrkkö et al. (2010) of a 10-12% margin for retail and between 3.3-4.5% for wholesale, we arrive at a total distribution margin of USD 90.⁷ The Apple margin of USD 270 covers Apple's labour costs (in general management, sales and marketing, R&D, manufacturing, etc), the depreciation of tangible and intangible assets (like *e.g.*

⁶ More generally, if these part producers use foreign inputs, the value added created and captured may change accordingly.

⁷ Ali-Yrkkö et al. (2010) report that distribution margins on the very high end phone segment are lower than on general electronics products; Linden et al. (2009) reported for the iPod wholesale and retail distribution margins of respectively 10% and 15%. Nevertheless both papers indicate that estimating distribution margins is very difficult since they vary considerably across products and brands and often include various types of tie-ins/bundling with subscriptions to other services. In the case of Apple, the retail margin is captured by Apple through its physical and virtual Apple stores.

design, engineering), investments (including R&D) and does not equate to pure profits. This margin also includes the royalties Apple has to pay for the use of external technologies (software, etc.); these were estimated at USD 50 per unit for the iPhone3.

72. Ali-Yrrkő et al. (2010) developed another case study for a similar product (Nokia phone N95) and reported similar results. In the Nokia case, final assembly also represents a small value (only EUR 11 or 2% of the retail price), confirming the limited importance of the ‘country of final assembly’ in the commercial value of a product.⁸ Also in this case, a large part of the value is created and captured by the producers of parts and components (37% of the final sales price), while wholesale and retail distribution represents another 15%. Just like Apple in the case of the iPod and the iPhone, Nokia captures the largest part of the value created throughout the production chain (47%).

73. The geographical distribution of the value creation/capturing again underlines the importance of the ‘home market’, in this case Finland. Even taking into account the multiple location of productive activities (e.g. final assembly in Finland for Nokia phones exported to the European market and in China for phones exported to the US market), almost 40% is of the value added is captured by Finland (and 55% by the EU-27). In the specific case of the final assembly in China and final sales in the United States (‘Made in China’), the EU-27 still captures 51% of the value added. Just as in the case of the Apple products, hardware and software design happens primarily close to the headquarters in Finland.⁹

74. The observation that value capturing becomes increasingly detached from the physical flows of goods as a result of GVCs is not only valid in high technology modular industries like electronics. Rivoli (1999) reported on the international value chain of a simple T-shirt: from the cotton in the United States, to the textile factory in Shanghai China, to the T-Shirt distributor in the United States and the final market in Africa. This case study however did not analyse the distribution of value across the different countries in large detail.

75. A study on the EU shoes industry (Kommerskollegium, National Board of Trade, 2007) although undertaken from a different perspective, gives an insight into the geographical distribution of value creation/capturing for shoes sold in the EU market but all ‘Made in China/Vietnam’. The study distinguished between different types of shoes (low, mid and high price/quality segments) and showed how the value is created and captured accordingly (Table 1). The study did not include the retail distribution in the analysis but applied instead a simple rule for determining the retail margin (based on the wholesale price to the retailer), hence the overall results should be compared with care with the iPod/iPhone/Nokia examples discussed above.

76. The production process of the cheapest shoe, i.e. a typical shoe in the low price/quality segment, includes very low pre-manufacturing (design, quality control, etc.) and post-manufacturing (including profits) costs. Materials (in this case mainly cheap leather from Pakistan) represents 11% of the final retail price; manufacturing in China activity adds EUR 1.74 to the retail price of EUR 19.95 (i.e. 8.7%). While the shoe is manufactured in China, the largest value is created and added in the EU-market, mainly due to the retail margin. Of course, if the shoes are sold outside the EU-market, the retail margin is captured in a non-EU country.

⁸ This study uses a similar methodology as the previous studies but focuses on value added instead of gross margin.

⁹ In contrast to the iPod and iPhone examples, this study goes beyond headquarters locations for the *indirect* inputs (general management, corporate brand/image, re-usable tangible and intangible assets) and assigns these inputs to the actual location of the production factors.

77. A shoe for the mid-quality segment is sold at a much higher price; design and quality control are much more important in absolute terms (twice the costs of a low-quality shoe) but stay limited in relative terms. Post-manufacturing costs are more important (in absolute and relative terms), especially in terms of sales and marketing expenses and profits. Materials costs are also larger, but still represent only 12% of the final retail price; manufacturing in China/Vietnam adds EUR 2.52 but given the much higher retail price, the share of manufacturing drops to 5.6% of the total value created in the value chain.

78. The situation is completely different for high quality shoes, as pre-manufacturing and post-manufacturing costs are significantly larger than the pure manufacturing costs. Particularly design and development activities represent a major part of the total cost. Likewise, material costs are much higher since high quality leather is required for the production of this type of shoes. Manufacturing costs in China/Vietnam are also higher, which is related to the higher labour costs for higher skilled workers. Nevertheless these manufacturing costs only represent 5.3% of the final retail price of EUR 149.9 (and still only 11% of the wholesale price of the shoes).

Table 1. Value creation and capturing (in €) for 'typical' low/medium/high quality shoes, sold in the EU

	<i>low price/quality</i>		<i>mid price/quality</i>		<i>high price/quality</i>	
	<u>total</u>	<u>share EU</u>	<u>total</u>	<u>share EU</u>	<u>total</u>	<u>share EU</u>
Pre-manufacturing costs	1.00	0.95	2.00	1.50	26.00	24.50
<i>RDD (design, development)</i>	0.90	0.90	1.00	1.00	23.00	23.00
<i>Quality control</i>	0.10	0.05	1.00	0.50	3.00	1.50
Manufacturing	4.42	0.27	8.40	0.28	36.10	0.27
<i>Materials</i>	2.18		5.38		27.00	
<i>Labour</i>	0.93		0.95		4.20	
<i>Other costs</i>	0.44		0.87		1.10	
<i>Profits</i>	0.37		0.70		3.30	
<i>Sales price factory</i>	3.92		7.90		35.60	
<i>Sea Freight</i>	0.46	0.23	0.45	0.23	0.45	0.22
<i>Insurance</i>	0.04	0.04	0.05	0.05	0.05	0.05
Post-manufacturing	1.23	1.23	4.90	4.90	15.69	15.60
<i>Tariffs</i>	0.35	0.35	0.67	0.67	2.90	2.80
<i>Logistics</i>	0.22	0.22	0.22	0.22	5.00	5.00
<i>Sales and administration</i>	0.43	0.43	2.00	2.00	4.30	4.30
<i>Profits (gross)</i>	0.23	0.23	2.00	2.00	3.50	3.50
Sales price to retailer	6.65	2.45	15.30	6.68	77.79	40.37
Retail price	19.95	15.75	44.95	36.33	149.95	139.53

Note: retailer margin determined on rule of thumb (3 times sales price to retailer for low and medium price/quality shoes.

2 times sales price to retailer for high price/quality shoes).

Source: Kommerskollegium, National Board of Trade, 2007.

79. The different examples clearly illustrate the GVCs behind the products that one observes in the shop on the corner, be it an electronic product, a T-shirt or shoes. Products are often designed and conceived in developed countries, manufactured in emerging countries like China and Vietnam, with inputs sourced from other third countries. Consequently, the label ‘Made in China/Vietnam’ should thus be really read as ‘Made globally’ and in most cases the countries of origin only create and capture a fraction of the final sales price of the product.¹⁰ Manufacturing/assembly constitutes only a small part of the value added which is of course a direct result of the offshoring of these activities to lower cost countries.

80. An important conclusion is then that being integrated in GVCs is a necessary but not a sufficient condition for capturing value within GVCs; and this is not only valid for electronics or shoes but also more general. Recent published data (Koopman et al., 2008) e.g. show that the share of foreign value added in total Chinese manufactured exports is about 50%. When looking specifically at the important category of processing exports, this foreign share rises even to 82%. Furthermore, in addition to the small domestic content added in processing trade, it should be kept in mind that a large number of the firms active in these processing zones are foreign-owned.

Capturing value and intangible assets

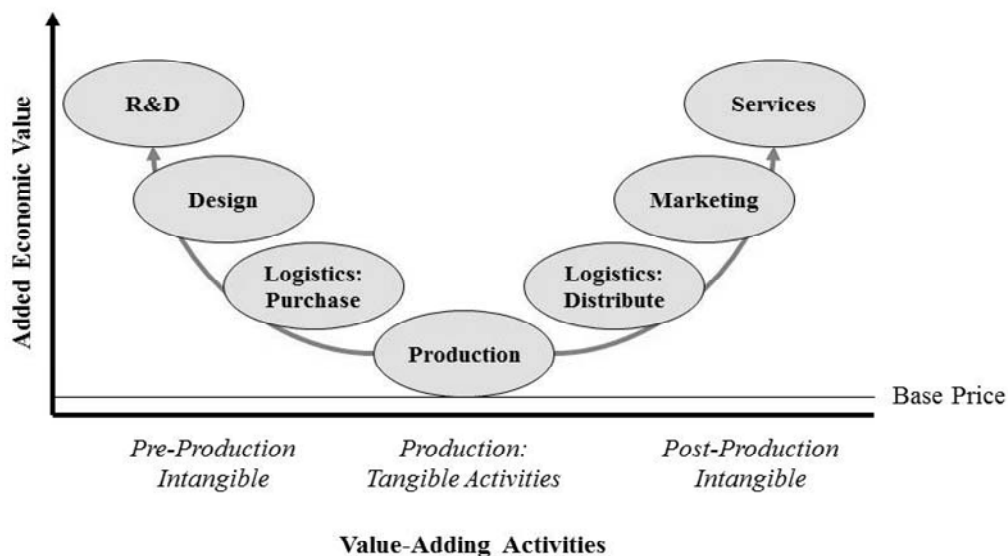
81. Capturing value does not any longer follow the cross-border flows of goods as the final assembly which is in most cases offshored often towards emerging countries represents only a small part of the value generation of the goods. Instead, most of the value is created in activities up and downstream and only limited value is created in the pure manufacturing/assembly stages (Figure 12). The examples above, both from higher and lower technology intensive industries illustrate that in-house and market services as well as various forms of intangible assets play a major role in creating/capturing value added within GVCs.

82. The large value that is captured by companies like Apple and Nokia is directly dependent on their capabilities in branding, product development, design, knowledge integration and management, and business model management etc. Sustained competitive advantage is increasingly based on innovation, which in turn is driven by investments in intangibles such as R&D, design, organisational capital, employee skills, marketing/sales experience, etc (OECD, 2010). Within an era of globalisation, GVCs facilitate the use of these intangible assets across borders allowing companies to export their innovations on a global scale.

83. Recent research suggests that intangible assets are not only a key input for successful innovation (*i.e.* in creating value) but are also important for effectively capturing the value from innovation (Jacobides et al., 2006; Dedrick et al., 2009). Intangible assets are becoming increasingly important in the governance of global value chains (GVCs) since firms can use their superior idiosyncratic capabilities, which are often based on intangible assets, to shape the industry structure and to capture a larger share of value. Superior capabilities allow firms to innovate and compete in their own market segment, but also to change the competitive conditions within the whole value chain. Firms are often able to manage the linkages with other firms within a GVC in such a way that they make themselves less replaceable while imposing a larger dependency on other firms. Because these other firms have to cooperate with them to create value, firms can leverage their own position in GVCs and capture more value.

¹⁰ Some products (*e.g.* Apple’s iPhone) carry the label ‘Assembled in China’.

Figure 12. Value creation within GVCs



Source: presentation G. Gereffi during the joint OECD-World Bank Workshop 'GVCs and emerging economies'.

84. Companies try to influence the distribution of value from innovation within GVCs by leveraging their intangible assets in order to manage the linkages between partners and shape the industry architecture. Different factors play an important role in this process (Teece, 1986; Dedrick et al., 2009; Jacobides et al., 2006):

- *High appropriability* helps companies to protect innovations from imitation and is directly dependent on the type of product/technology and the availability of legal mechanisms. If the level of appropriability is high, companies generally have time to develop their ideas and experiment, while reaping the fruits of the technology's success. Companies use a variety of means to protect innovations, ranging from formal intellectual property rights such as patents, to informal mechanisms such as secrecy, tacit knowledge, etc. Apple for example has filed a large number of patents for protecting their inventions in the iPhone while, they also apply large secrecy for specific technologies/knowledge which are not or less patentable.¹¹
- *The control of complementary assets* which are needed in conjunction with other capabilities and assets for the successful commercialisation of an innovation. Services such as marketing, manufacturing and after-sales support are often based on specialised complementary assets, which enable or enhance the functionality of the product. Companies typically source generic complements from different suppliers, while keeping the development of specialised complements often in-house. The recent trend of open innovation has resulted in the co-development of specialised complements between companies often through the exchange of patents (OECD, 2009). Apple for example has employed different strategies to secure the necessary complements and keeps e.g. the development of specialised software for the iPod and iTunes internally.

¹¹ "We have filed for over 200 patents for all the inventions in the iPhone and we intend to protect them", Steve Jobs (CEO of Apple) when launching the iPhone in 2007.

- *System integration skills* leverage companies' innovation activities as industries and products become more fragmented and decentralized. The central lead firm integrates the different stages in the value chain and makes different parts and components work together. The Apple example is again very illustrative in this regard, as its strong capabilities in design enabled Apple to take the lead in integrating the different components into the iPhone.
- *Standard setting* promotes interconnectivity between the different parts and components going into the product, but also enables the entry of new suppliers who conform with the standards, which increases competition between suppliers.

85. These factors are interdependent and directly determine the strategies of companies to create and capture value within GVCs. If for example conditions of appropriability are low, and the risk of imitation is high, companies will keep the development of complementary assets in-house or will apply their integration skills in a different, secret, way. The importance of each of these factors also depends on the presence of a dominant design in an industry, as this will increase competition (it will become more price driven and less quality/differentiation driven) and will directly limit the possibilities of firms in differentiated designs, development, etc.

86. Intangible assets and technologies (hard and soft) increasingly constitute an integral part of companies' business models as these assets not only spur innovation but also affect the distribution of profits from innovation. The competitive advantage of firms is therefore increasingly based on intangible assets. Korkeamäki and Takalo (2010) calculated in a recent paper the commercial value of Apple's iPhone and reported that patentable technologies (typically produced by intangible assets) explained about 25% of the total value. A large part of the remaining 75% is explained by 'soft technologies' (Bloom and Van Reenen, 2010), i.e. capabilities like design, engineering, management, marketing, etc. which are partially built on previous innovations and products that reflect the cumulative nature of innovation (e.g. Apple's brand name and corporate image based on earlier products like the iPod and Mac notebook).

87. Since the process of capturing value directly determines the creation of jobs and income, the development of intangible assets is also of direct interest for government policy. Linden et al. (2009) showed that the Apple iPod accounted for about 41 000 jobs worldwide in 2006, of which about 14 000 in the United States and 27 000 offshored. Around 6 000 of the US jobs were professional and engineering jobs directly linked to intangible assets/activities of Apple; the remaining 8.000 US jobs concerned non-professional jobs, mostly in retail. While the number of jobs offshore were twice as high than the jobs in the United States, wages paid in the United States were about twice as much as the wages paid overseas, with particularly higher wages for the engineering and professional functions,

88. These results suggest that innovation within GVCs benefit activities in the home country even if production including the manufacturing of high value parts and components is offshored. In some industries and for some products (e.g. shoes), production abroad is probably the only alternative for companies to stay competitive.

Box 4. Planned work: Project on New Sources of Growth - Intangible assets - GVCs

Understanding of the role of intangible assets in modern economies and the policies needed to foster their development and use is still poor. There is growing interest in intangible assets, as reflected in the policy agendas of a number of OECD countries. However, research on intangibles is scattered across finance, accounting, industrial organization and management disciplines. This calls for a multidisciplinary approach in analysing key policy problems. The project focuses on the role of intangible assets in growth and the associated policy implications. The project will also seek to improve the measurement of intangible assets both at the macro and firm level, by analyzing their contribution to growth and their relationship to new business models [see [DSTI/IND\(2011\)2](#)].

6. The need for better policy evidence

89. Governments are looking for more and better policy evidence since existing data and indicators fall short of capturing the impact of GVCs on the competitiveness of countries. More detailed analysis is necessary to examine the position of countries within international production networks and to explore which policies are needed to optimally benefit from the new international organisation of productive activities.

The available evidence on GVCs is indirect

90. The existing evidence on GVCs is mainly restricted to case study work (see above) and industry-specific surveys, but does not provide a comprehensive picture of the integrated global production structure. Some aggregate measures point to the increasing importance of GVCs, but in a rather indirect way. First, a trend of decreasing ‘production depth’ is observed in most OECD countries; the falling ratio of value added over production directly reflects the growing use of intermediates and the increased offshoring and outsourcing. Second, trade has been growing stronger than GDP during the past decade for almost all countries (with some countries displaying trade/GDP ratio’s above 100% during the past decades). Again, the increasing trade/GDP ratios follow directly from the growing importance of GVCs since intermediates are transferred several times across borders before the goods/services are sold to the final customer. As international trade data are expressed in gross output terms, they include the value of intermediates imported at each border crossing. In contrast, GDP is a value added concept and captures only the domestic value that countries are adding in the production of goods and services.

91. Trade data are the most obvious source of data for comparative analysis of GVCs across countries as they are available for a large number of countries and at a very high level of (industry/product) disaggregation. Trade nowadays increasingly happens across different production stages within industries and even within (multinational) enterprises as intermediate goods, finished goods as well as related services are exported and imported between branches of the same firms located in different countries. When analysing trade data in more detail, some stylised facts arise that seem at odds with (rather than supporting) the increasing importance of GVCs. A surprising observation for example is that trade data do not show a growing share of intermediates in total trade over the past decades (Figure 13). Trade in intermediate inputs grew at an average annual rate of 6.2% for goods and 7% for services between 1995 and 2006, but trade in final goods and services grew at the same pace.¹²

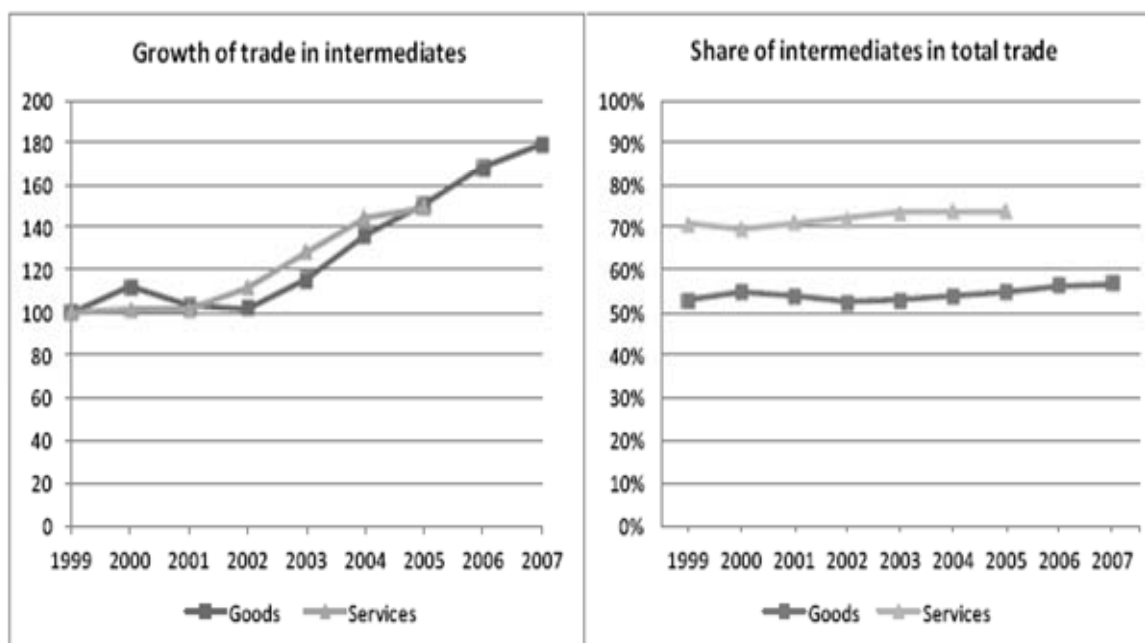
92. Some authors have argued that the increasing importance of GVCs is particularly visible in a subcategory of intermediates, in particular those that are imported and used to produce goods that are exported (Chen et al., 2005). The growing importance of GVCs has increased the attention for input-output (I/O) analysis, as I/O-tables offer (complementary) information on the value of intermediate goods and services. I/O tables measure the interrelationships between the producers of goods and services (including imports) within an economy and the users of the same goods and services (including exports).¹³

¹² Also data on intra-firm trade, i.e. trade between parent firms and their affiliates within MNEs does not seem to support the increasing spread of GVCs. Just as for trade in intermediate goods and services, the available data show that though intra-firm trade is important, this category of trade shows a relatively stable pattern over the past decade (OECD, 2011b).

¹³ An important advantage of I-O tables is that they classify goods according to their use (as input into another sector’s production or as final demand); in contrast, classification schemes (like e.g. the Broad Economic Categories (BEC) classification of the United Nations) divide goods into intermediate and other categories based on their descriptive characteristics. In addition, I/O-tables include information on inputs of/in services sectors, allowing for the analysis of the fast growing category of services trade.

They can therefore be used to estimate the contribution that imports make in the production of any good and service for export.

Figure 13. Trade in intermediates



Source: Miroudot et al. (2009).

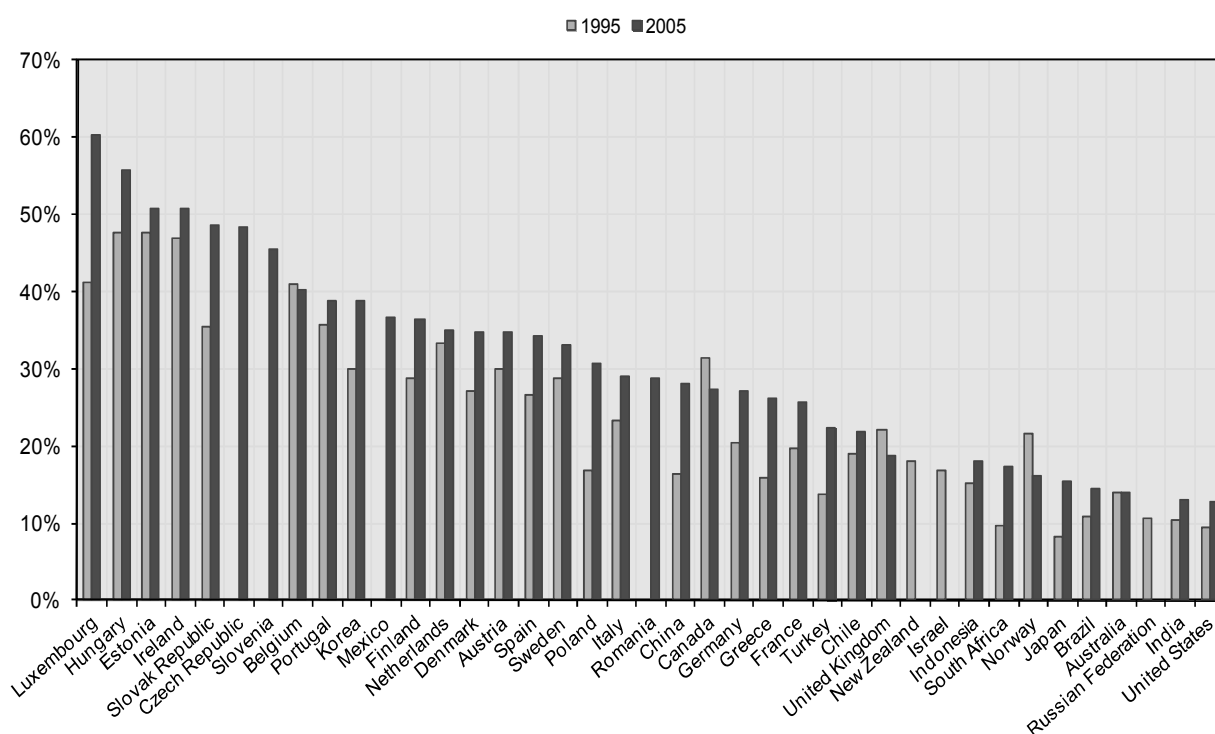
93. Indicators based on I-O information generally support the increasing importance of GVCs. ‘Vertical specialisation’ indicators measure the direct and indirect imported inputs that are included in a country’s exports Hummels et al. (2001). Results based on the OECD I-O database clearly show that countries’ exports are increasingly composed of intermediate inputs that are imported from abroad; between 1995 and 2005, the import dependency of exports increased in almost all countries (Figure 14). The import content of exports represented in 2005 on average 23% of total trade among OECD countries; in some countries such as Luxembourg, Hungary, Ireland and Estonia, the import content of exports exceeded 50% in 2005. Other countries like the United States, Russian Federation, Australia, Brazil and India import relatively less vertical trade than other countries because of their size. These typically smaller values of vertical specialisation for larger countries reflect that more links in the GVC are located within the (large) country.

Box 5. Planned work: STI Working Paper on International comparative evidence on GVCs

The paper will review the available data and indicators on GVCs based on different data sources (trade data, Input-Output Tables, etc.): Indicators on imported intermediates, offshoring, different measures of vertical specialisation, dominant links between trading countries... The paper will also highlight the major shortcomings of existing data and indicators, and will discuss work that is underway to improve the empirical evidence on GVCs.

Timing: WPGI 2011.

In addition the planned work on ‘Mapping of GVCs’ will also develop new indicators of GVCs (see Box 1).

Figure 14. Vertical specialisation: import content of exports

Note: For technical reasons, these figures use Israel's official statistics, which include data relating to the Golan Heights, East Jerusalem and Israeli settlements in the West Bank.

Source: OECD (2010b).

GVCs and competitiveness

94. The performance of countries on international markets is often compared using export market shares and indicators of revealed comparative advantage. Comparative advantage of countries is typically expressed in terms of (sub-)industries according to earlier trade models, but GVCs have shifted the analysis of countries' competitiveness to activities and tasks. The international fragmentation allows/forces countries to specialize in different activities in the production process (production of intermediates, final assembly, etc.), in addition to their traditional specialisation in products and industries. Countries just like firms increasingly become specialised in specific functions within these GVCs.

95. **GVCs directly challenge the 'export' measures of competitiveness** as countries' exports are increasingly made up of imports of intermediate inputs from abroad following the growing international fragmentation of the production process. The increasing importance of intermediates clearly suggests that countries no longer rely only on domestic resources to produce and export goods and services (Sturgeon and Gereffi, 2009). Following the international production fragmentation within GVCs, countries' exports no longer only reflect the embodied technology and relative endowments which characterise its domestic production activities, but also the technology and factor endowments of the countries from which it imports intermediate goods.

96. Indicators based solely on export data of final goods might thus misrepresent the real specialisation of countries; a favourable export-based indicator does not necessarily indicate a competitive edge in the production of a specific good but might hide the fact that a country is merely specialised in the final assembly of that good by importing intermediate inputs while adding little or no value to the good

itself. Likewise, trade flows indicate little about the true factor content or level of sophistication of a country's production. The iPod/iPhone examples have clearly shown that the concept of competitiveness needs to be assessed at a detailed level, in order to fully understand what drives the international performance of firms and countries.

Box 6. Planned work – Competitiveness and international specialisation

This note/paper will discuss the need for new and better measures of countries' international specialisation following the emergence of GVCs. Alternative indicators will be developed to discuss the competitiveness of countries and the activities they undertake within GVCs. The analysis will include OECD countries and emerging countries.

One line of research to link the work on intangibles and the work on GVCs is to analyse the impact of intangibles on the competitiveness of countries. Both projects include an important component on measurement; new and better indicators of intangible assets at the one side and of GVCs at the other side (e.g. trade in value added, see below) at the country/industry level could be combined in order to gain additional insights beyond more traditional trade models.

This work will be undertaken in combination with the work on the export performance of countries (see Box 2)

Timing: WPGI 2012.

Trade in value added

97. Trade flows are expressed in gross terms and record the full value of the good, including embodied intermediate inputs; accordingly, imports (exports) are assigned to a single country of origin (destination). Gross trade flows cannot capture the new international division of labour since the country producing the final good appears to export the whole value when in reality it may have only marginally contributed to this value. The example of the iPhone4 clearly illustrates this: China adds only USD 6.54 to final product, yet the export figures for China record the full value of the final product (i.e. the factory gate price of USD 194.04). The intermediate inputs which are imported by China from Korea, Germany, France, the United States, etc. are all assigned to China, since this country is the country of origin for the US imports of the iPhone4.

98. The way trade data are collected and constructed directly leads to a 'double-counting' or even 'multiple-counting' and tends to overstate the implicit value or factor content exchanged between countries. Hence, there is a general consensus that existing trade data are not detailed enough and are not collected on the right level of analysis to analyse the international fragmentation and GVCs. Trade statistics have been designed to capture trade flows in final products while nowadays most trade is of intermediate products, hence the increasing need to measure trade in terms of value added (Kierzkowski and Chen, 2010).

99. The OECD is developing new empirical evidence studying the emergence of GVCs based on inter-country input-output tables and a full matrix of bilateral trade flows. Trade in value added data aims to capture only the domestic value that countries are adding to goods and services and will give a better picture of the integration of countries in GVCs. Measuring the value-added content of trade consists in accounting for trade in intermediates and calculating the contribution of each economy to the global value chain. More importantly, this challenging recalculation of trade flows goes beyond simple statistical concerns. Understanding the real patterns of trade flows has important policy implications (e.g. on bilateral trade imbalances, see below).

Box 7. Planned work: Trade in value added

There is an increasing and important demand for statistics on trade in value-added. In the US, a 'Report on the state of available data for the study of international trade and foreign direct investment' prepared by leading economists also underlines that it would be desirable to have more data measuring value-added in trade and the US International Trade Commission has pioneered innovative work in this area. The Director-General of the WTO has emphasised on many occasions that trade statistics should be in value-added terms to give to policymakers the tools they need to face their responsibilities.

The OECD is working jointly with other international organisations and institutions (WTO, USITC, WIOD, IDE-JETRO) on the development of trade in value added indicators. The work requires the construction of inter-country input-output tables based on the combination of harmonised national accounts and a full matrix of bilateral trade flows. The results will not only benefit the work on GVCs but also the analysis of productivity and innovation (spillovers through GVCs, circulation of intellectual property and income), trade and employment (job content of trade, impact of offshoring) and green growth (carbon content of trade and impact of GVCs on the relocation of pollution).

Timing: as this work requires the set-up of a long term statistical infrastructure (in order to update the results annually), this planned work will go beyond the PWB 2011-2012 of the CIIE; nevertheless, first results can be expected in the course of the GVC work

7. Policy issues related to GVCs

100. The globalisation of value chains raises some major policy challenges for OECD countries as well as emerging countries because of the new opportunities and challenges created by globalisation. Policy issues for GVCs overlap to a large extent with the familiar policy questions for governments to benefit from openness. Globalisation implies a broad structural process that affects countries in different domains like e.g. trade, capital flows, migration, innovation, etc. Given that GVCs encompass most of these domains, the policy issues for GVCs largely reflect the policy imperatives discussed in the context of globalisation ranging from framework conditions to more specific policies.

101. The trend towards GVCs intensifies the policy challenges and may make them more urgent but it is not certain that it does require an overall fundamental change of direction in policy. Nevertheless, GVCs require also some different and complementary policy thinking. A number of policy issues have been touched upon when discussing the specific characteristics of GVCs; in what follows a more structural framework is proposed to discuss policy issues and possible responses in more detail.

102. A couple of broader policy categories have been included in this document in order to start the analysis and policy discussion; the planned work will help develop a broad policy framework on GVCs along different dimensions. A first issue is the possible need for more specific policies in order to better address the specificities of GVCs. Another policy issue is related to the difference between integrating into GVCs on the one hand and capturing value in GVCs on the other. A third policy issue relates the development of countries directly to their position in GVCs and questions if different development paths emerge in the presence of GVCs. A final issue that is discussed in this document is how the development of GVCs affects international policy discussions, including on trade imbalances and exchange rates.

Box 8. Planned work: Policy responses

The work on GVCs aims to analyse the policy questions and issues raised by the increasing importance of GVCs. In particular, the need for new/adapted policies towards globalisation will be assessed; differences between OECD countries and emerging countries will be discussed. This also involves policies aimed at capturing more benefits from GVCs at the national level and thus allows national agenda to be reflected in the work.

This work will benefit very much from the input and close involvement of countries (OECD as well as emerging). Countries are invited to provide more information about specific policies they have implemented or are in the process of implementing regarding GVCs. Analytical work and studies undertaken at the national level would contribute to the cross-country policy analysis in the CIIE work on GVCs.

Timing: CIIE meetings 2012

A need for more specific policies?

103. It can be argued that **GVCs require more finegrained policies given that GVCs impact national economies on a much more disaggregated level.** Different activities/stages/tasks in the production process are determined by different factors; hence, for government policies to be effective, they may have to be targeted more at specific activities. For example, location factors for production, distribution, R&D, etc. differ significantly since the attractiveness of countries varies considerably along the value chain (OECD, 2010). Attracting international investors in general or even along broad industry lines will thus be less effective. But things are not that straightforward.

104. The different unit of analysis also complicates the formulation of the appropriate government policies since winners and losers of GVCs are much more difficult to identify. The impacts are not longer expressed uniformly in terms of industries and/or coherent groups of jobs (low-skilled, blue collar, etc.), but much more on the individual (firm) level. Specific policies aimed at compensating losers of globalisation thus risk targeting too broadly defined groups. The same type of activities and jobs that are offshored by one firm, may grow in a competing firm in the same industry (Baldwin, 2009). Effects of GVCs are overall strongly dependent on the (sourcing) strategies of individual firms; the examples of the iPhone and Nokia N95 smart phones clearly illustrate the differences between firms even at the product level (Apple assembles only in China, while Nokia still assembles in Finland). This could lead to an argument that instead of more specific policies, policy makers should only design broader and generally applicable policies (framework conditions, general labour market and social policies, etc.).

105. The sensitivity to individual firm decisions also makes the effects of GVCs less predictable. Policy makers have generally less or no knowledge about when firms will decide about the offshoring of specific activities; this happens within the ‘black box’ of the firm and depends on the complex interaction between different activities. There is probably some ‘tipping point’ where further technological (ICT) advances lowers communication/coordination costs enough to offshore certain activities, but this threshold varies across activities and firms (Baldwin, 2009). Overall, governments may be less prepared for the impacts GVC might generate on national economies. Of course, the importance of offshoring has to be assessed in relation to the overall churning on the labour market.

Openness and integration into GVCs

106. A first broad category of GVC policies to be distinguished are policies aiming to increase the integration of countries into GVCs. It can be expected that such policies are of particular relevance for emerging and developing countries, although such policies might be also relevant for developed countries (e.g. in specific industries or for SMEs). Overall, the objective of integration into GVCs is to facilitate the

freer international flow of goods, services, capital, knowledge and people. Since activities are integrated within GVCs on a day-to-day basis, the flexibility and openness (to trade and FDI) of countries are crucial. Governments can play an important role in creating better framework conditions and an enabling business environment.

107. Lower trade barriers will facilitate the exchange of goods and services. Trade costs play a larger role in vertical trade within GVCs compared to regular trade as vertical specialisation leads to goods crossing national borders more times before reaching the final consumer (Yi, 2003; Ma and Van Assche, 2010). The reduction in trade barriers (including processing zones) have strongly favoured the shift from import substitution to export promotion policies and the integration in East Asia (Hummels and Rapoport and Yi, 1998). Reversely, rising trade costs because of increasing non-tariff barriers and home bias in government stimulus plans have significantly contributed to the large trade collapse in the recent economic crisis (Jacks, Meissner and Novy, 2009; Yi, 2009).

108. Given the increasing importance of imports for exports within GVCs, the costs of “national borders” have most likely grown. Protectionist (trade) policies may therefore directly hurt the competitiveness of domestic industries; instead of ‘beggar thy neighbour’ policies, protectionist policies might become ‘beggar thyself’ policies (Ens, 2009).

109. Lower investment barriers can favour the location of investments by lead firms. Barriers to investment cover a broad range of policy areas that determine how attractive countries are for international investment: investment policy, trade policy, competition policy, tax policy, human resources, infrastructure, corporate governance, responsible business conduct, public governance, promotion and facilitation. The OECD Policy Framework for Investment can help to identify the important issues governments should consider in improving their countries’ attractiveness to investment in general.

110. Trade within GVCs will benefit from a high quality infrastructure for transportation (airports, harbours, railways, highways, etc) as well as communication (ICT, broadband, etc.). Speed and flexibility are crucial for the exchange of physical goods/services as well as information across countries within GVCs. Adherence to international standards has become increasingly important, for the production of the increasingly modular physical goods as well as for the exchange of information across borders. Overall, reductions in effective transportation and communication costs can be seen as equivalent to trade liberalization in reducing costs of exchange and enhancing trade between countries (Globerman, 2010).

111. In addition to the investments in ‘hard’ transportation and communication infrastructure, the development of a ‘soft’ infrastructure (facilitating policies, procedures and institutions) is at least as important for the integration of countries in GVCs. For example, product and labour market policies can create transaction costs for the international exchange of goods and services.

112. Investments in logistics services (i.e. services and processes for moving goods from one country to another) are found to be strongly trade enhancing; examples are the organization and management of international shipment operations, tracking and tracing and the quality of transport and information technology infrastructures. High quality logistics impact trade relatively more than less policy-dependent trade determinants such as distance and transport costs; recent OECD results indicate that every extra day needed to ready goods for export and import reduces trade by around 4% (OECD, 2010d).

113. Lastly, the supply capacity of domestic firms (often SMEs) may need to be improved in order to connect them better into GVCs. Some countries have implemented initiatives to increase the opportunities for business linkages between local firms and international partners, ranging from the provision of information and building awareness, training facilities and courses, capacity building programs, upgrading activities, etc. (UNCTAD, 2006; OECD, 2006).

Capturing value in GVCs

114. A second broad category of government policies relates to the effective capturing of value within GVCs; this issue is of importance for developed countries as well as emerging countries although some differences apply. For developed countries, the question is rather how they can retain their competitive advantage (and develop new ones) especially in higher value added activities and how they can continue to compete in the global economy. For emerging countries, it is often mainly about moving up the value chain and how to capture more value and broader economic benefits from their already important activities in GVCs.

115. While largely reflecting the general policy challenges of competition in a global economy, GVCs articulate these challenges faster and at a more detailed level. As the growth potential of other sources such as capital accumulation and technological imitation becomes exhausted, innovation gradually becomes the most important source of economic growth since. The OECD Innovation Strategy (OECD, 2010e) has identified a broad range of government policies which are of importance for successful innovation, including general framework conditions as well as specific policies.

116. Developed economies are forced to look for new sources of growth, as they can only grow by inventing new technology, by innovating in products and processes, and by designing new management methods and business models. Products and services that are currently regarded as among the most innovative and experimental ultimately end up as commodities that can be produced anywhere and by many producers. Intangible assets like investments in R&D, design, brand names, software, complex systems integration etc. are the basis for successful innovation (OECD, 2010e). But intangible assets are also becoming increasingly important in the governance of GVCs since they allow companies to shape the competitive space and capture more value from innovation. **While value appropriation is the primary responsibility of individual companies, government policies can help create an environment conducive for the development of intangible assets.**

117. The distribution of profits along the value chain seems to challenge the importance of location and favour more the concept of ownership in national industrial policies. While the case study examples above have indeed shown that most of the value is captured in the home countries of companies, this seems however to be more related to the attractiveness of the home country than to the shareholders' nationality. GVCs allow companies to locate their activities according to the most attractive location factors; as such, the value captured by home countries merely reflects their attractiveness for innovation and development of intangible assets. Analyzing which location factors are key to keep companies with global mandates (*i.e.* globally competitive firms that operate in different countries and managed largely from local headquarters) is then a first exercise policy makers could undertake.

118. The location of firms with a global mandate directly benefits countries, since these companies are important for productivity, innovation, exports and employment. Overall, these firms can be domestic firms with global mandates or foreign-owned firms with local headquarters. Because of the key role of MNEs in GVCs, a first strategy for countries is to attract new investments by MNEs although policy competition between countries in attracting international investment is growing. In doing this, policy makers will clearly benefit from analyzing location factors in direct relation to the different activities in companies' value chains (OECD, 2011a). In addition to attracting foreign MNEs, government actions could try to help firms grow to more important positions in GVCs. This implies in the first place innovation policies, but also policies to help firms to internationalise (by trade, FDI, etc.). The examples of domestic firms that have succeeded in growing global mandates may be important in this.

119. GVCs contribute to the global distribution of productive activities in line with countries' comparative advantage; higher income economies increasingly move away from production into product

development, design, marketing and other service areas. Questions arise about the sustainability of this division of labour since it can be expected that emerging countries are determined to increase their value capturing as they push for further development. Emerging countries like China and India are increasingly attracting R&D investments and have become important players in the innovation landscape. What will the industrial future of developed economies look like? Some recent evidence has pointed to the importance of so-called co-location effects and the importance of production activities as attractor for following investments in other activities (in distribution and sales, but also in R&D). Does this mean that after the relocation of production activities also R&D and other high value added activities will follow? How will this affect the future value capturing of developed countries?

120. Similar arguments are used in the discussion about the future of the manufacturing industry in developed economies. The importance of up- and downstream activities (often with a services character) in value creation suggests that developed economies can rather easily give up pure manufacturing activities and focus instead on the large opportunities for services industries. Proponents of this strategy argue that manufacturing has become a rather generic and complementary activity that can be undertaken in many other countries and that essentially more specialised complements (like branding, design, systems integration, etc.) are of importance within GVCs. Critical voices however doubt the long term viability of this strategy since a declining manufacturing industry can erode the so-called industrial commons and will directly weaken the competitiveness of OECD countries (Pisano and Shih, 2009). Manufacturing is part of the innovation process in complex production processes and the loss of pure manufacturing activities may set off a chain reaction eroding innovation activities. Overall, the argument is that countries cannot only keep the innovative, R&D, and higher value added activities because of agglomeration effects, spillovers and clusters; ceding manufacturing might result in the loss of R&D and design capabilities in the longer term.

Moving up the value chain - compressed development

121. Emerging countries face the challenge of moving up the value chain in order to capture a larger part of the value created within GVCs. Some attention is however required when using the wording ‘moving up the value chain’ as this could actually been realized by moving downstream in the value chain. Most of the value in GVCs is created in activities up- and downstream (Figure 12); ‘moving up the value chain’ therefore relates to higher value activities which could be both upstream and downstream in the value chain.

122. While GVCs allow emerging countries to integrate rapidly into global operations and enter into export markets without the need to develop capabilities in product design, logistics, there is the risk that their specialisation in production will lock them in low value activities. Song (2007) describes how the Chinese electronics industry had been caught in a so-called ‘modularity trap’ until recently: despite significant increases in labour productivity, Chinese companies were operating in low value niches and activities without any possibility for upgrading their capabilities.

123. Traditionally, four different patterns of upgrading can be distinguished (UNCTAD, 2007): process upgrading (*i.e.* improving the efficiency of internal processes), product upgrading (*i.e.* improving products in terms of quality and /or performance), functional upgrading (*i.e.* raising the value added by changing the mix of activities) and inter-chain upgrading (*i.e.* moving to a new and more profitable value chain). It is clear that especially the last two forms of upgrading result in a larger value appropriation by emerging countries. The process of upgrading and the outcome are directly dependent on the governance of the GVC (Pietrobelli and Rabelotti, 2010).

124. Upgrading requires improving market access to international markets as well developing technological capabilities including intangible assets. This process of upgrading often requires large

investments (often with a sunk character) and this in a time of intense competition, shorter product life cycles and rising R&D investments. Because of the increasing innovation efforts in developed countries, emerging countries wanting to catch up are may chase a moving target (Whittaker et al., 2008). Furthermore, the interests of emerging countries (i.e. learning and upgrading) may not always be in line with these of developed countries and their lead firms, particularly in functional and inter-chain upgrading.

125. There are a growing number of companies from emerging countries that have been introducing global brands and greatly expanded their operations abroad; Lenovo, TLC and Huawei Technologies are only a couple of examples in China. Successful case studies also emerge in other industries and in other countries: Tata (India, automobiles), Embraer (aircrafts, Brazil). But there are also examples of companies that were less successful: companies from Chinese Taipei managed to upgrade from key suppliers to becoming original equipment manufacturers (OEM), but did not (yet) succeed in the transformation to original brand manufacturers (OBM).

126. Later developers have traditionally a second-mover advantage as they learned from early developers and upgraded by absorbing knowledge created elsewhere. The metaphor of the flying geese (Akamatsu, 1961; Ozawa, 2008) has often been used to describe the industrial upgrading process in East Asia. One economy (e.g. Japan), like the first goose in a V-shaped formation, led other economies toward industrialization (e.g. Korea) passing older technologies down to the followers as it moves into newer technologies. This process still seem to be happening as countries such as Vietnam, Bangladesh and Cambodia have in fact been picking up some of the textile and garment business in recent years from China.

127. But at the same time, this model of industrial upgrading and learning seems to come under increasing pressure as development takes less place according to distinct stages (endowments driven, resource driven, assembly driven, R&D driven and internet-based driven; UNCTAD, 2008). Instead development has become more compressed, not only in terms of a higher pace but also because different development stages are pursued concurrently by emerging countries. It is not clear if this compressed development will result in diverging development paths for emerging countries that are trying to integrate and capture value in GVCs. Countries like Korea e.g. industrialised earlier through the development of complete vertically integrated industries (producing intermediates and final products). It could be expected that countries that start to industrialise now will choose another development path and will specialize only in specific activities. Such a process of sequentially value chain upgrading will probably call for a rethinking of industrial policy and the role of the government.

128. The broader policy question is how integration into GVCs and moving up the value chain enables more inclusive growth and development in emerging countries. GVCs as a new form of globalization allow firms from these countries to integrate rapidly in the global economy, but policy makers want to see this global connectedness result in broader economic profits at the national level. This requires not only effective policies to integrate into GVCs, but also policies to maximize the spillovers to the national economy.

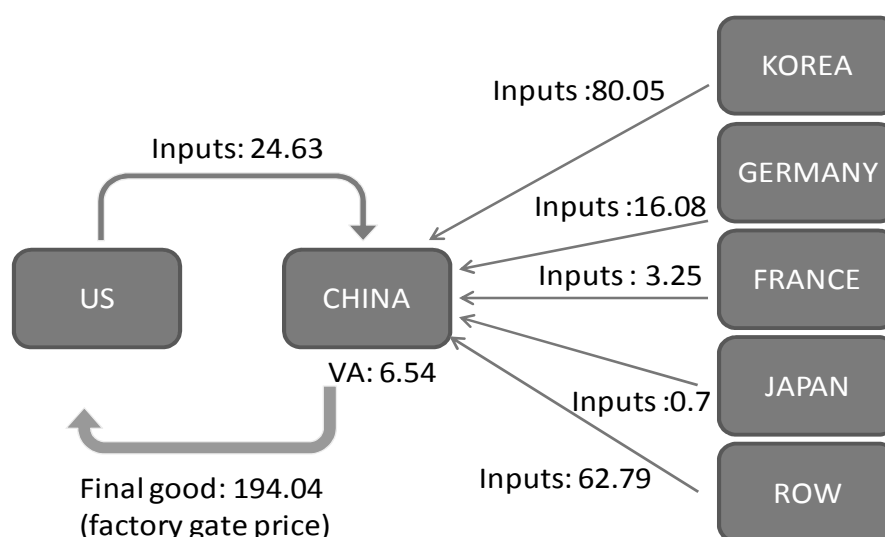
GVCs and international trade (imbalances)

129. Trade statistics measure trade in gross terms and hence inflate international trade flows following the growing trade of intermediates exported and imported within GVCs. Imports are completely assigned to the last 'country of origin' also in the case when these imports include intermediates that were produced and exported by third countries to the last reporting country. The typical double or multi-counting of intermediates will bias bilateral trade balances and hide the real economic dimension of bilateral exchanges between countries.

130. Economic theory has since long argued that only overall, and not bilateral, trade balances matter. Policies designed on the basis of bilateral trade imbalances without tackling the reasons causing the overall trade imbalance (country's savings, investment, monetary policy, etc.) will only redistribute the trade imbalance across trading countries. The role of intermediates renders bilateral trade imbalances even less useful. In reality however, one observes that large bilateral trade imbalances sometimes encourage trade policy responses in countries, which may need to be re-assessed in the light of the rapid development of GVCs.

131. The example of the iPhone4 has shown that China only operates as the assembling country in Apple's GVC and imports the required intermediates from other countries like Korea, United States, Germany, etc. While China adds USD 6.54 to the manufacturing of the iPhone4, it exports USD 194.04 or the total factory gate price to the United States. For each iPhone4, the United States incurs a trade deficit of USD 169.41 (= 194.04 – 24.63) with China in 'traditional' trade statistics (Figure 15).

Figure 15. Bilateral trade balance between the United States and China for one iPhone4 (merchandise goods, in gross output and value added)



US trade balance with	CHINA	KOREA	GERMANY	FRANCE	JAPAN	ROW	WORLD
Gross	-169.41	0	0	0	0	0	-169.41
Value added	-6.54	-80.05	-16.08	-3.25	-0.7	-62.79	-169.41

132. Measuring trade in value added and hence the domestic content of exports significantly affects the measurement of bilateral trade balances.¹⁴ The bilateral trade balance between the United States and China drops to USD 6.54 (i.e. the value added in assembly by China), while the largest deficit is now incurred by the United States with Korea. Likewise, the United States also incurs trade deficits with France, Germany, Japan and the Rest of the World for each iPhone4, reflecting the exports of intermediates

¹⁴ The overall trade balance of a country should not change since the double counting of intermediates is eliminated when taking the difference between exports and imports.

of these countries for China into final assembly. The comparison between bilateral trade balances in gross and value added terms clearly indicates that trade imbalances are especially inflated with countries responsible for (final) assembly activities.

133. The overall trade imbalance between the United States and China is reduced by more than 40% if trade were measured in value added terms. Taking into account differences between ‘normal’ exports and processing exports would reduce the bilateral imbalance even further since the foreign content of Chinese exports is usually higher than the foreign content of production for the domestic market (Maurer and Degain, 2010).

134. It is clear that these measurement issues have important policy implications. Addressing bilateral trade balances in value added terms will change the sometimes binary discussion in trade disputes; who exactly are “them” and “us” once domestic value-added in foreign products has been accounted for? Using these measures about domestic content and relating them to employment figures will also offer more insights where and to what extent employment is created by offshoring specific activities in GVCs.

135. Lastly, bilateral trade balances in value added demonstrate that the impact of a currency appreciation/depreciation is complex. Other things be equal, it can be expected that the lower the domestic content in a country’s exports, the smaller the effect of an appreciation of that country’s currency on the trade volume will be (Koopman et al. 2008). Because of the high import content of exports, currency depreciation will make exports of final goods cheaper but also make imported components more expensive for domestic producers. For example, Evenett and Francois (2010) argue that given the growing imports of Chinese parts and components into US final products, an appreciation of the Chinese currency will positively affect the US exports to China but reduce the US competitiveness elsewhere. In addition, a rise in the Chinese currency may diminish not only exports from China but also imports into China. Because China is a large final processor in the triangular trade within East Asia, this may directly impact the exports of Asian countries (Garcia Herrero and Toivu, 2010).

Box 9. Planned Work: Import trade policy and export competitiveness (joint with OECD Trade Directorate)

This note/paper will discuss the effect of trade policy, in particular regarding imports, on the competitiveness and export performance of countries, given the increasing importance of imports for exports. Using information from the OECD Input-Output Database, the increased costs of protectionist policies will be calculated. Effects on upstream as well downstream industries will be analysed to discuss the overall impact on the competitiveness of countries.

Timing: WPGI meeting 2012.

8. Conclusions

136. This paper has given an overview of the planned work on GVCs to be undertaken within the WPGI and the CIIE; a timeline of the work and the proposed deliverables are presented in Box 10. Reflecting the broad character of GVCs, the planned work discusses different topics: emerging countries, integration into GVCs, capturing value in GVCs, etc. The overall work includes the development of new data/indicators, as well as more analytical work; the project will discuss the policy questions and issues raised by the development of GVCs and analyse if new/adapted policies towards globalisation are needed.

137. Delegates are invited to comment on the objectives and research activities of the planned work on GVCs; to discuss the proposed deliverables and timeline of the GVC project. A number of questions can help to guide the discussion:

- Do the objectives and the overall structure of the project address the key policy interests of countries in this area?
- What other policy questions/issues should be added?
- How can the Secretariat best ensure that countries are fully engaged in the project? Are you willing to contribute directly e.g. through case-studies, analytical work, policy examples, etc.?

Box 10. Timeline of the Work on GVCs – PWB 2011-2012

WPGI-meeting, 19-20 May 2011

- STI Working Paper 'Internationally Comparative Evidence on GVCs'
- scoping paper 'Mapping of GVCs'
- draft paper 'What explains the export performance of countries – integration in GVCs'
- draft paper 'Export competition: price of quality'

CIIE-meeting, 7-8 November 2011

- report on WPGI meeting
- report on interim results

CIIE-meeting, March 2012

- report on interim results (including 'trade in value added')
- first draft of policy report on GVCs – link with project New Sources of Growth

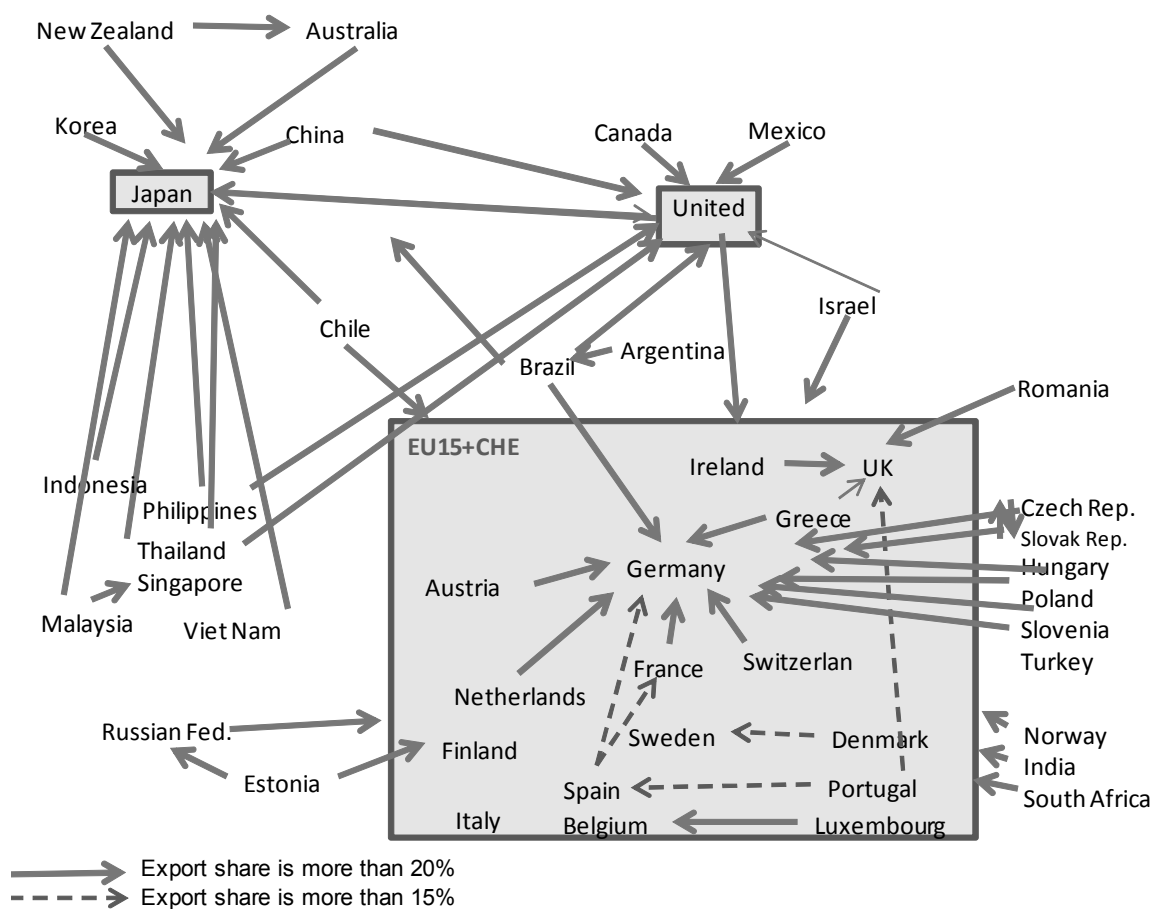
WPGI-meeting, May 2012

- draft paper on 'Trade in value added'
- final draft 'Competitiveness and international specialisation'
- final draft 'Mapping of GVCs'
- final draft 'Import trade policy and export competitiveness'
- first draft of final report on GVCs (analytical and policy)

CIIE-meeting, October 2012

- final report on GVCs (analytical and policy)

ANNEX 1 Dominant links between economies, exports of intermediates, 1995



Source: Own calculations based on OECD Input-Output Database (September, 2010) and OECD STAN BTD (March, 2010)

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