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Subsidies and Spillovers in a Value Chain World:  
New Rules Required?

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## **Abstract**

Assessing the effects of subsidies is complicated, given the need to consider linkages within and across supply chain networks. A precondition for determining whether existing WTO disciplines on subsidies are adequate is better information and more empirical research on the extent to which negative international spillovers are created by prevailing policies. Many of the policies that affect supply chain operations are not considered subsidies under the WTO. There are no rules on subsidies for services or investment incentives. Conversely, some WTO rules may not be appropriate or effective given the increasing prevalence of value chains. There is an urgent need for policy analysis to determine how existing WTO disciplines impact on value chains and whether and how large the negative spillovers are of national policies. A necessary condition for any such determination is much better data on the measures that are employed by governments around the world, both at the central and sub-central levels.

## **Keywords**

Subsidies, value chains, investment, incentives, WTO.

**JEL code:** F13





## Introduction\*

As noted on the home page of the E15 Initiative Task Force on Rethinking International Subsidy Disciplines,<sup>1</sup> the use of subsidies by governments expanded dramatically after the 2008 financial crisis, with many governments bailing out their financial sectors and providing subsidies to support certain manufacturing activities, most notably and visibly the automotive sector. While a direct response to a major financial/demand shock, the use of subsidy instruments, broadly defined to include fiscal measures and investment incentives, has been a constant feature of government policy in both high-income and emerging economies. This takes different forms in different countries, depending in part on fiscal and administrative capacity. A common feature is that intervention is often non-transparent.

Motivations underlying efforts to promote certain types of economic activity in a jurisdiction include a desire to generate employment and investments that are deemed desirable from an economic growth and development perspective. These often include “high-tech” and “green-tech”-oriented activities, and more generally a desire to “move up” the value chain (VC) by encouraging investment in innovation and activities that generate higher productivity jobs. The employment objective is often central in assistance programs targeting small and medium-sized enterprises (SMEs), the main source of jobs in most countries. Industrial policy-related objectives are reflected in a plethora of programs and policies, with support for investment in what are deemed to be desirable activities as a common denominator. Examples of frequently used policies include government procurement preferences, local content requirements and subsidies, and tax/subsidy instruments.

This paper briefly discusses developments in the global trade landscape, in particular the emergence of international production networks and VCs, and the associated increase in the share of trade in intermediate products and services. It also provides a partial snapshot of available data on the use of various kinds of subsidies by governments. These illustrate that subsidies are widely used, mostly by richer countries, and relatively more frequently for services than for goods. The question whether they have significant negative impacts on foreign countries (welfare)—the main issue as far as the need for multilateral rules is concerned—is very difficult to answer however. Very little is known regarding the motivations for the use of subsidies or how large negative spillovers are. Matters are complex as it is necessary to take into account the linkages within and across value chain (VC) networks. Determining the net effects of sectoral or firm-specific government policies is more complicated than in a world where trade is based on countries/industries specializing according to comparative advantage. In a VC world, there may be efficiency reasons for governments to intervene in a targeted/specific manner—for example, to address coordination failures—and such interventions may benefit foreign plants/firms, their workers, and local communities. Negative spillovers can and will occur, as will deadweight losses, but their incidence may be unclear *ex ante*, making it difficult to identify rules of thumb for possible multilateral disciplines.

The economic rationale for what is embedded in the World Trade Organization (WTO) Agreement on Subsidies and Countervailing Measures (ASCM) can be challenged (for example, Sykes 2010, 2015). Whatever one’s views on this question, the greater complexity of international production that is associated with VCs implies that many of the elements of the ASCM need to be revisited. Of particular importance is that some types of subsidies that impact on VC location decisions and

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\* This paper was prepared for the E15 Initiative Task Force on Rethinking International Subsidy Disciplines, a joint venture of the International Centre for Trade and Sustainable Development (ICTSD) and the World Economic Forum (WEF). I am grateful to Simon Evenett and Johannes Fritz for making the Global Trade Alert data available, to Matteo Fiorini for his help in putting together the data, and to members of the ICTSD/WEF E15 taskforce on subsidies for helpful comments on an earlier draft.

<sup>1</sup> The E15 Initiative website is at <http://e15initiative.org/topics/subsidies/>.

operations are not covered by the ASCM. Whether they should be is an open question. The main recommendation made in what follows is that rather than launching into a process of renegotiating the ASCM, WTO Members consider engaging in a “discovery process” and designing mechanisms that provide firms and governments with a forum in which to discuss the perceived negative impacts of specific policies on investment decisions and the operation of VCs. A precondition for determining whether new disciplines are needed in the area of subsidies is better information and much more empirical research on the magnitude and incidence of negative international spillovers that are created by prevailing policies. In practice any such disciplines are likely to need to go beyond subsidies narrowly defined as governments make use of a variety of policy instruments that have analogous effects.

## 1. The Rise of Value Chains in International Trade

Trade patterns and paradigms have shifted in recent years, with increasing fragmentation of global production along VCs. An international VC involves a collection of firms (plants) located in different countries jointly forming a “production line,” with different parts of the production process undertaken by firms (plants) in different countries. Depending on the location of a firm (country) in a VC/production network, participation may either involve forward linkages, where an activity produces an output that is used in production for export in another nation, or backward linkages, where a firm uses imported parts and components that are inputs for production that is exported. An example is a country *A* that produces hides from cattle that are tanned and dyed in a neighbouring country *B* using chemicals imported from a third country *C*, with the leather produced in *B* used in the production of a car seat cover in country *D* that is shipped to a car plant located in country *E* that exports the cars to country *F*.

A VC permits enterprises in different countries to concentrate on (specialize in) specific tasks and activities without having to source required inputs locally or vertically integrating to produce and market the end product. A VC increases interdependence—each link in a chain relies on the upstream producers delivering their output on time and meeting the required quality and safety standards, whereas upstream firms are dependent on the downstream segments working efficiently, as stoppages or distribution problems there will affect the demand for inputs. The supply chain trade (SCT) associated with outsourcing and investment location decisions by large manufacturing and retailers (so-called lead firms) is often predominantly regional in nature (i.e., centred on Europe, North America and East Asia), although most VCs will embody at least some content that is produced outside the region.

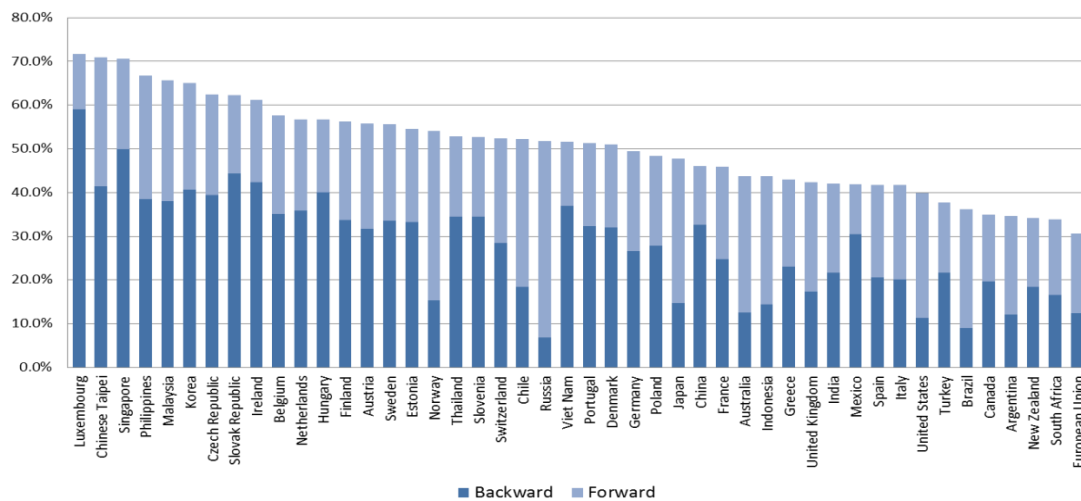
The growth in SCT has been supported by—indeed, is dependent on—cross-border movement of capital and knowledge (as the technology and know-how needed to undertake the various activities is often firm-specific). The increase in VC production is highly correlated with an expansion in foreign direct investment (FDI) (UNCTAD, 2013). The global value of the stock of FDI increased more than six fold in the last decade or so; local sales by foreign-owned firms were some US\$26 trillion in 2012, compared to US\$18 trillion for world merchandise trade.

Companies are the drivers of trade of international commerce. It is firms that invest and create the employment needed to undertake production activities and “do trade”—ranging from smallholder farmers, to microenterprises and SMEs that provide a variety of inputs, to logistics providers, processors, manufacturers, and service suppliers. SCT is dominated by large multinational companies – so-called lead firms – that decide where to locate plants, where to invest, who to source from, and so on. Some 80 percent of world trade is estimated to involve multinational companies (UNCTAD 2013). All of these firms source inputs and buy services from local suppliers and subcontractors. As a result, much SCT is “indirect”—the value of a final good incorporates payments for many intermediate goods and services that are not exported directly. Thus, a wide range of firms and sectors, including companies providing services to firms in other sectors, benefit from and are affected by VC-based

trade and investment opportunities. Available data indicate that about one-third of the value of all traded manufactured goods reflect the value of embodied services, and that, overall, if account is taken of sales of services by foreign affiliates, services account for more than 50 percent of world trade (Francois and Hoekman 2010).

One result of the increase in SCT is that imports make up an increasing share of the total value embodied in a given product—ranging from 25 percent to 40 percent or more for small open economies that are integrated into supply chains. Figure 1 breaks down SCT into imported inputs that are used in the production of exports (“backward linkage”) and exports of intermediates that are processed in the importing nation and then exported to a third country (“forward linkage”). The relative magnitude of each of these types of trade varies significantly across countries, as does the overall share of supply chain networks in total trade. The differences reflect a number of factors, including economic size, level of development, location, and policy. Countries that are far away from centres of economic demand and activity will also have lower participation in supply chains because of relatively high transport costs. If a country imposes high trade barriers or pursues industrial policies that make it difficult and more costly to import parts or components, investors may decline to invest there.

**Figure 1: Vertical Specialization, 1995 vs. 2009**



Source: Organisation for Economic Co-operation and Development (2013).

Notes: “Forward”: exports of intermediates used to produce exports in receiving country  
 “Backward”: imported inputs used in exports

The structure and volume of SCT is very sensitive to trade and other transactions costs, both direct financial and operating costs and costs associated with management of the associated networks. Reliability and predictability of flows of goods and services within the relevant networks is critical. Uncertainty and risks of incurring delays associated with unpredictable operating environments give rise to a need to maintain higher stocks and other forms of hedging and insurance, the costs of which may preclude SCT investments. Differences in the operating environment do much to explain why VC

investment and production tend to be regionally concentrated, and why SCT in most of Africa and much of Latin America and South Asia is limited compared to North America, Europe, and East Asia.<sup>2</sup>

Policy in a supply chain world is more complex than in one where trade is of a “ship and forget” nature and traded products are produced using local factors of production and locally produced inputs. An open trade regime becomes more important, as does action to minimize trade frictions such as delays in border clearance, low-quality transport and logistics that lead to physical losses, and difficulties in investing in operating or distribution facilities. Connectivity—including the quality of transport and logistics services and information and communications technology (ICT) networks and related services—is a critical determinant of competitiveness. Particularly relevant for the subject of this paper is that the policy agenda is about more than reducing trade costs. There may be a need for very specific types of government intervention to address coordination failures or domestic distortions of different kinds. This may involve the support for specific economic activities. Subsidies may be part of the set of instruments that can be used to address the market failures that may arise.

## 2. Potential Rationales for Government Intervention

Before focusing on subsidies and VCs, it is helpful to revisit the more general literature on the rationales for subsidies. This is useful in that it helps in assessing how standard insights and prescriptions change if VCs are taken into account.

The set of policies that can act to promote an economic activity is very large. Any measure by a government to disadvantage one activity relative to another will have the effect of subsidizing the latter. It is therefore necessary to recognize that if one seeks to discipline subsidies that give rise to negative international spillovers, the focus of attention must go beyond narrowly defined fiscal transfers. In the WTO context, an actionable subsidy is a measure that imposes a burden on the budget, is specific to an activity (as opposed to benefitting economic activity more generally), and conveys a benefit to those targeted. Subsidies that have an economy-wide impact and are not specific (education, general infrastructure, and basic research and development [R&D]) are not actionable. Specific subsidies might include support for exports or local content requirements (reduce incentives to import); targeted financial support, such as grants or loans from publicly capitalized banks; fiscal incentives such as grants or preferential financing to “encourage” industries in higher-technology exports; tax incentives that promote particular activities or technologies; investments in supporting economic infrastructure; aid schemes for SMEs; export credit insurance; state aid for loan guarantees for specific products; ad hoc rescue and restructuring aid, and so on. From an economic perspective, notwithstanding that this is a rather long list of measures, any policy that has differential effects across sectors or activities will act as a tax or subsidy, suggesting that any list of subsidies will be incomplete.

Subsidies that are sector specific may have an economy-wide objective. Examples include subsidies to sectors such as health, education, transportation, and communications. Conversely, subsidies that are economy-wide in scope may effectively be industry-specific, for example, the pursuit of an environmental objective whose attainment requires taxes or subsidies that primarily affect specific sectors such as the chemical or the automotive industry. It may well be that other policies maintained by the government outweigh any direct support given to a firm or sector. Such general equilibrium measures of the net or “effective” support that is implied by policy is important in assessing impacts on firms and on the rest of the world. What matters then is the effect of all policies

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<sup>2</sup> Bhattacharya and Moazzem (2013) note that Asian least developed countries (LDCs) tend to be more active in labour-intensive manufacturing activities such as apparel and textiles as well as agricultural and agro processing activities, while African LDCs have specialized much more in mining, natural resource-intensive chains, and agricultural products (for example, processed fruit). Asian LDCs have a much higher share of inputs in their total imports, whereas consumer products account for a higher share of total imports in African LDCs, reflecting the greater participation of Asian LDCs in manufacturing VCs.

taken together—do they stimulate/support a specific activity? And, if so, what matters from a rule-making perspective is whether they have a significant negative welfare impact on other countries and/or the world as a whole.

Subsidies are used for many reasons. They may be motivated by economic (efficiency) or non-economic goals (for example, to redistribute income in an effort to improve the equity of outcomes, or to buy political support or to create rents for politically well-connected individuals or groups). Policies that reflect rent seeking or rent creation will usually be market distorting if they affect production. Policies that reflect economic objectives may or may not be market distorting. A basic efficiency rationale for tax-subsidy schemes is to bring marginal private costs or benefits into alignment with marginal social costs or benefits. The need for this arises when externalities (market failures) cause social and private costs and benefits to diverge, so that private agents are not given an incentive to take into account the costs or benefits of their actions on others in the economy. Necessary conditions for a more efficient allocation of resources to result from intervention are that the problem is diagnosed correctly and the policy is targeted appropriately. In practice, governments can easily fail, especially if account is taken of the incentives of interest groups to lobby for a subsidy or a tax exemption.

Many of the measures of a subsidy nature maintained by governments come under the heading of industrial policy. As noted by Warwick (2013), thinking about the rationale for industrial policy interventions has moved from an approach based largely on product market interventions (production subsidies, state ownership, tariff protection) to market failure-correcting taxes and subsidies operating mainly on factor markets (R&D incentives, training subsidies, investment allowances, easing access to finance), to a focus on “interventions that help build systems, create networks, develop institutions and align strategic priorities.” Aghion et al. (2011) make a strong case for growth-enhancing sectoral policies that are competition and innovation-friendly and that aim at internalizing knowledge spillovers. They note that long-standing arguments for industrial policy continue to be valid—such as credit constraints that result in inadequate capital being allocated to high growth potential activities given that high-tech firms and start-ups often have limited assets and thus limited collateral to use to get loans. They also argue that the potential for capture and “white elephants” is reduced if industrial policy intervention and state aid is decentralized and targets firms located in different regions as well as sectors where there is more intra-sector competition, as this enhances the probability of a positive effect of sectoral state aid on export and innovation performance. A key criterion they propose is that subsidies be made available “evenly” within a sector, independent of nationality of ownership.

### ***2.1. Value Chains and Subsidy-like Policies***

Theoretical or empirical research on subsidies within a VC environment is very sparse. The limited extant literature tends to focus on trade policy (tariffs) not subsidies, with the exception of investment and location subsidies. The policy literature has noted that vertical specialization changes the incentive structure confronting firms and thus governments. The expansion of SCT, in conjunction with the associated flows of FDI, is expected to attenuate the incentives to use traditional trade policy instruments like tariffs (e.g., Blanchard, 2105). Being able to compete in a specific niche or value-adding activity requires that firms integrate into the relevant production networks. Significant levels of import protection would impede their ability to do so as it would increase the cost of inputs. In a recent empirical analysis, Gawande et al. (2014) show that the intensity of a country’s vertical specialization helps explain observed trade policy responses to the 2008 crisis as well as the level of trade protection pre-crisis.

SCT may increase incentives for government to use subsidies and subsidy-like instruments to target specific domestic economic activities. Analogous to tariffs and import protection, these may create negative international spillovers—for example, subsidies and similar policies to attract SCT-linked FDI that generates incentive competition between governments.

Baldwin and Venables (2015) provide a framework for analysing the interaction of forward and backward linkages within and across supply chains. This is important for considering the effects and design of policy because inputs will usually enter into multiple supply chains (multiple sectors). Thus, services are used in the production of many different products, and vice versa, the final products produced by many VCs will require common inputs.<sup>3</sup> They focus on the effects of different trade and industrial policy instruments and show that linkages across VCs create multiplier effects. For example, support for final goods producers can increase the range of parts and intermediate inputs produced in a territory, broadening the industrial base, and attracting entry of further downstream goods producers. Policies that on the margin expand the range of upstream inputs that are produced are likely to generate more industrialisation than policies that promote parts production within the margin (parts that are already produced domestically), or parts far beyond the margin (highly sophisticated parts that are not used in locally produced final goods but are all exported within a given VC).

Baldwin and Venables demonstrate that policies that support (subsidize) local production of intermediate inputs can result in an expansion of the industrial base. This includes incentives to attract value chain FDI, with the impact on SCT participation depending on the range of available input production capabilities in the host country and whether policies that centre on entry of FDI result in demand for locally produced inputs that allows the producers concerned to become competitive intra-VC suppliers (by allowing them to expand the scale of production). Policies that expand the range of parts and inputs (that is, the extensive margin) are more likely to result in expansion of the industrial base. However, as is the case in the strategic trade literature of the 1980s and 1990s, policy can easily get it wrong and result in adverse (welfare reducing) effects.

This is illustrated in a recent analysis of the effects of steel sector industrial policy use in major steel-producing countries from 1975 through 2000. Blonigen (2014) examines the impact of policies to support local steel production on the export competitiveness of downstream manufacturing sectors that are significant users of steel. He finds that a one standard deviation increase in the use of export subsidies and non-tariff barriers leads to a 3.6 percent decline in export competitiveness for an average downstream manufacturing sector. But this negative effect can be as high as a 50 percent decline for sectors that use steel as an input most intensively. Conversely, policies that target downstream activities may be to the detriment of upstream suppliers, especially if the former have market (monopsony) power—as is the case with automobiles, for example (Van Biesebroek and Sturgeon, 2013).

There has been extensive research on tax and subsidy policies targeting FDI, but most of this work does not consider production that is organized in multi-country VCs.<sup>4</sup> The upshot of much of this “non-VC” literature is that differences in tax regimes and FDI incentive schemes have an economic impact in that they are one factor explaining the allocation of FDI across jurisdictions.<sup>5</sup> There are a number of possible efficiency (welfare-improving) rationales for FDI subsidy policies. These centre around positive spillovers that are associated with FDI, with intervention justified either because of market failures or as a second-best instrument to create incentives for FDI in locations where this would have a high social return, including by generating positive agglomeration externalities. For example, Haufler and Mittermaier (2011) show that subsidies to FDI may give trade unions an incentive to exert wage restraint in exchange for additional jobs that are created in the newly-attracted

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<sup>3</sup> The economic literature on outsourcing, offshoring, and trade in tasks tends to limit attention to the unbundling of production processes within an industry across multiple countries or locations, not on cross-industry or cross-VC interactions that generate potential spillovers as well as interdependencies.

<sup>4</sup> See, Blomstrom and Kokko (2003) for a review of much of the literature.

<sup>5</sup> In a recent comprehensive study of the drivers of FDI stocks, Blonigen and Piger (2014) conclude that most host-country business environment variables, including host country infrastructure and institutions, are not robust determinants of FDI. However, while they consider the effects of trade and bilateral investment agreements, they do not assess the importance of investment incentives.

firms—a subsidy that more than compensates a firm for higher wage costs can not only induce a foreign investor to locate in the unionised country, but also generate the incentive for the union to choose to lower wages and get the FDI as opposed to a situation where wages are higher and employment is lower.

At the same time the literature also points to the potential for subsidy competition between jurisdictions to result in an overall welfare loss—especially if subsidies do not address a market failure (e.g., Blomstrom and Kokko, 2003). Ossa (2015) provides a recent illustration, analysing the effects of investment-related tax/subsidy incentives at the state-level in the United States (US). US states “spend” some US\$80 billion a year on tax incentives and subsidies to investment, reflecting a vigorous competition to attract investment. Ossa finds that this competition increases state-level welfare (by attracting firms, increasing employment, and raising wages) but generates beggar-thy-neighbour effects. While there are large potential gains at the state level from subsidizing investment, this distorts resource allocation by making intermediate inputs too cheap and thus generating excessive entry. There is a significant cost to the US as a whole—if states were to cooperate and refrain from subsidy competition, manufacturing real income in the US would be 3.9 percent higher.

Although investment subsidies may be costly, they can generate the outcomes that are sought by governments, such as local employment. Criscuolo et al. (2012) estimate the impact of a “regional selective assistance” program that offers investment subsidies to firms in depressed areas on condition they create or safeguard manufacturing jobs in these areas. Area eligibility is governed by EU state aid rules. Periodic changes in these rules allow the authors to construct instrumental variables for program participation and identify causality. Using two decades of United Kingdom (UK) panel data on the population of firms and matching these to program participants, they find positive effects on employment, investment, and net entry. A 10 percent investment subsidy generates about a 7 percent increase in employment. The effect is concentrated in smaller firms—there is no effect for larger firms (more than 150 employees). The policy raises area-level manufacturing employment by around 100,000 a year, mainly through significantly reducing unemployment. The “cost per job” was estimated at US\$6,300, suggesting that in some respects investment subsidies can be cost effective. This illustrates both that international cooperation can be welfare-improving and the difficulty of achieving it – cooperation would be easier if policies were ineffective and simply generated rents.

Moran (2014) focuses on the available evidence on the role and effects of policies that target FDI using a SCT lens. Coordination failures, information asymmetries, missing inputs of both a general (cross-sectoral) and very specific nature that are critical to VC production and SCT, and uncertainty regarding the policy stance, goals, and capacity of a government may all be prevalent in a country or jurisdiction and call for pro-active policy. A central feature of such policy from an FDI-attraction perspective will be to address the constraints that impede FDI (entry, establishment) and that limit the extent to which investors create and grow backward linkages—that is, connect with local suppliers of inputs, both goods and services. VC opportunities and related spillovers provide another rationale for creating an environment that is attractive to FDI. In a VC world, investment promotion becomes particularly important and this may need to go beyond provision of information and reducing uncertainty on the business environment and ensuring efficient trade facilitation. Targeting investment by first-tier suppliers of lead firms and contract manufacturers and providing support for the creation of backward linkages are two examples of policies that can help expand SCT trade and VC participation (Gereffi 2014; Farole and Winkler 2014).<sup>6</sup>

Thus, VC-based production and participation may call for targeted government intervention to address information asymmetries and coordination failures. Insofar as that is the case, government

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<sup>6</sup> The general literature on FDI already provides extensive evidence on its positive effects in both goods and services sectors on total factor productivity (TFP), wages, and so on. See, for example, the surveys by Francois and Hoekman (2010) for services and Moran (2014) more generally.

intervention is ‘market correcting’.<sup>7</sup> At the same time, the scope for intervention to be market distorting is likely to be significant as well. Whatever the case may be, VCs differ from the standard context analysed in the older trade and development literature as it involves not countries or industries, but (sets of) firms and plants in many countries. Instead of value added being mostly national, in a VC world the value of a final product is generated in many countries that are part of a network. Thus, interventions that expand the ability of a country to provide a greater share of total inputs may have positive local spillover effects, but at the same time, assuming a government does so effectively and enhances the competitiveness of the VC as a whole, there may be positive and negative cross-border spillovers (Van Biesebroeck, 2009; Blanchard, 2015).<sup>8</sup> The direction and size (distribution) of spillover effects will depend on linkages across countries within a VC and linkages across chains—both competing VCs and non-competing chains that may use the same type of inputs or that are buyers of what another VC produces.

The limited research literature suggests that although negative spillovers are likely to be created by FDI incentives, governments seeking to expand national SCT participation can use policy to increase investment and employment.<sup>9</sup> In that sense, there is nothing new about VCs as regards the potential benefits of cooperation on rules of the game. But such cooperation is likely to be harder to design, given that the distributional and efficiency effects are more difficult to determine *ex ante* and the potential greater scope/need for targeted interventions to address coordination failures that may impede FDI/SCT investments. Moreover, “injury” may not arise as a result of increased imports that negatively affect domestic firms, but take the form of “adverse effects” on firms that are located in third countries. Thus, a CVD will not be an effective instrument.

Investment incentives are likely to play an important role in a VC context. These need not involve direct fiscal transfers. Even if they do, that will only be one element of the set of measures that may be needed if the goal is to deal with coordination and other market failures. VC-related interventions to address such failures may well need to be very specific. While this reduces the potential for white elephants, targeting also implies that specific policies that are welfare enhancing may fall foul of WTO rules.

### 3. Use of Subsidies: A Post-2008 Snapshot

Data on subsidies are notoriously patchy and incomplete. One very useful recent source of data on the use of subsidies and related policy instruments is the Global Trade Alert (GTA).<sup>10</sup> What follows discusses the information that is reported in that database. No effort is made to assess the magnitude, let alone the effects of subsidies—the aim is simply to determine the relative intensity of the use of subsidies by looking at the number of subsidy measures imposed, how this varies across countries as a

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<sup>7</sup> As SCT may be subject to large shocks and associated volatility, there may also be a greater need for government policies to help firms deal with temporary shocks and the “bullwhip” effect that can characterize the propagation of shocks along VCs (Altomonte et al. 2012).

<sup>8</sup> McGuire (2014) documents how some countries have used selective government intervention to help national firms accumulate the necessary expertise and experience needed to build a niche in specific segments of the international global aerospace value chain, based in part on collaboration with global players in the industry.

<sup>9</sup> Subsidies may be a second best device for governments to overcome constraints that impede investment that they cannot affect. An example of such a constraint is trade policy. A local government cannot affect a nation’s trade policy, but this may be very important from a VC/SCT perspective. Kimmitt and Slaughter (2015) note that the limited number of preferential trade agreements (PTAs) negotiated by the US meant that Audi set up a plant in Mexico instead of Tennessee, in part because Mexico offered a location that had duty-free access to some 40 countries with which it had PTAs. In a VC world, what matters is access to inputs and getting processed/final products into export markets duty free. Investment incentives are a potential instrument a local government can use to offset specific locational or operating disadvantages but as this example illustrates, that may not be sufficient.

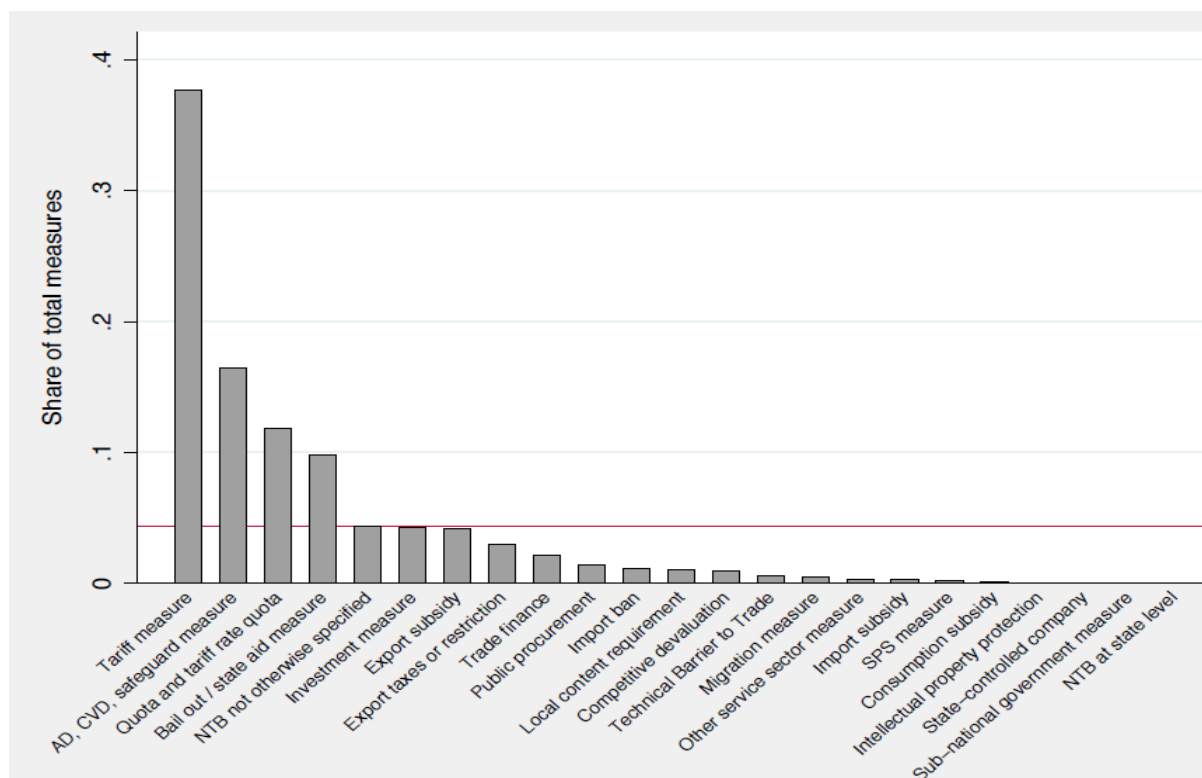
<sup>10</sup> The GTA website is at <http://www.globaltradealert.org/>.



function of per capita income, the distribution of measures by broad sector of economic activity (goods vs. services), and whether subsidies seem to target final demand (“downstream” activities) or instead are aimed more at inputs (“upstream” activities). It should be stressed that the approach used to do this is very rudimentary and purely exploratory. It should also be borne in mind that the GTA data only starts in 2009 and that much of the subsidies that are captured were put in place during and as a response to the financial crisis—we have no idea of what the “steady state” use of subsidies was before the crisis.

Figure 2 and Annex Table 1 report information on all trade-related measures that have been collected in the GTA as of April 2015. These spanned a total of 22,582 measures, ranging from tariffs and quotas to antidumping and investment incentives. Tariffs and contingent protection (“trade remedies” or “temporary barriers to trade”) account for 65 percent of all measures imposed. Four subsidy categories are distinguished in the GTA database (state aids; consumption subsidies; export subsidies; and import subsidies). Taken together these accounted for 14.3 percent of all measures imposed (for a total of 3,224 measures), the third most frequently used policy instrument in the post-2008 period. For high-income, non-Organisation for Economic Co-operation and Development (OECD) countries, subsidies are the second most frequently used instrument after tariff measures.<sup>11</sup>

**Figure 2: Global Trade Alert: Use of Different Measures, All Countries, 2009–2014**



Source: GTA.

Almost one-third (29 percent) of the subsidies used target exports (Table 1). Not surprisingly, high-income countries make more use of subsidies than lower-income economies. Subsidies account for

<sup>11</sup> Note again that the focus here is on a simple ‘count’ of measures, not on the value of the support granted or their effects. Given that state aids during this period were often very large in value terms, the implied share of subsidies vs. other policies is a downward biased measure of the economic significance of this instrument.

21.8 percent of all measures imposed by rich countries that are not a member of the OECD, whereas they account for only 5 percent of the measures used by low-income countries. Although subsidies account for 10 percent or less of all measures imposed by developing countries, the share of export subsidies in this rises as per capita incomes decline, suggesting that poor developing countries are more focused on directly promoting export competitiveness. That the WTO gives greater leeway for the use of export subsidies may be another factor explaining this. Investment measures account for only 4.2 percent of all measures for the sample as a whole, but account for around 12 percent of all measures imposed by lower-middle-income and low-income countries.<sup>12</sup>

**Table 1: Number of Subsidy Measures by Country Group and Shares, 2009–2014**

<b>Country group</b>	<b>All</b>	<b>OECD</b>	<b>Other HIC</b>	<b>UMIC</b>	<b>LMIC</b>	<b>LIC</b>
State aid	2,205	1,147	484	399	149	4
Consumption subsidy	30	4	14	7	5	0
Export subsidy	938	349	130	258	180	11
Import subsidy	61	20	8	18	14	0
<b>Shares</b>						
All subsidies (% of total)	14.3	15.9	21.8	11.1	10.6	4.7
Of which, export subsidies	29.0	23.0	20.4	37.8	51.7	73.3
Of which, other subsidies	71.0	77.0	79.6	62.2	48.3	26.7
<b>Memo</b>						
FDI measures (% of total)	4.2	1.3	3.2	4.7	12.6	11.3

Source: GTA, March 2015.

Note that because these data are only available starting in 2009, we do not know what the baseline use was of the different instruments. Virtually all governments engage in FDI promotion and offer incentives of varying kinds to attract FDI, often at the level of local governments (provinces, regions, municipalities, etc.). The same is true of import tariffs. Conversely, the use of ‘temporary trade restrictions’ such as antidumping is more concentrated in a limited number of countries.

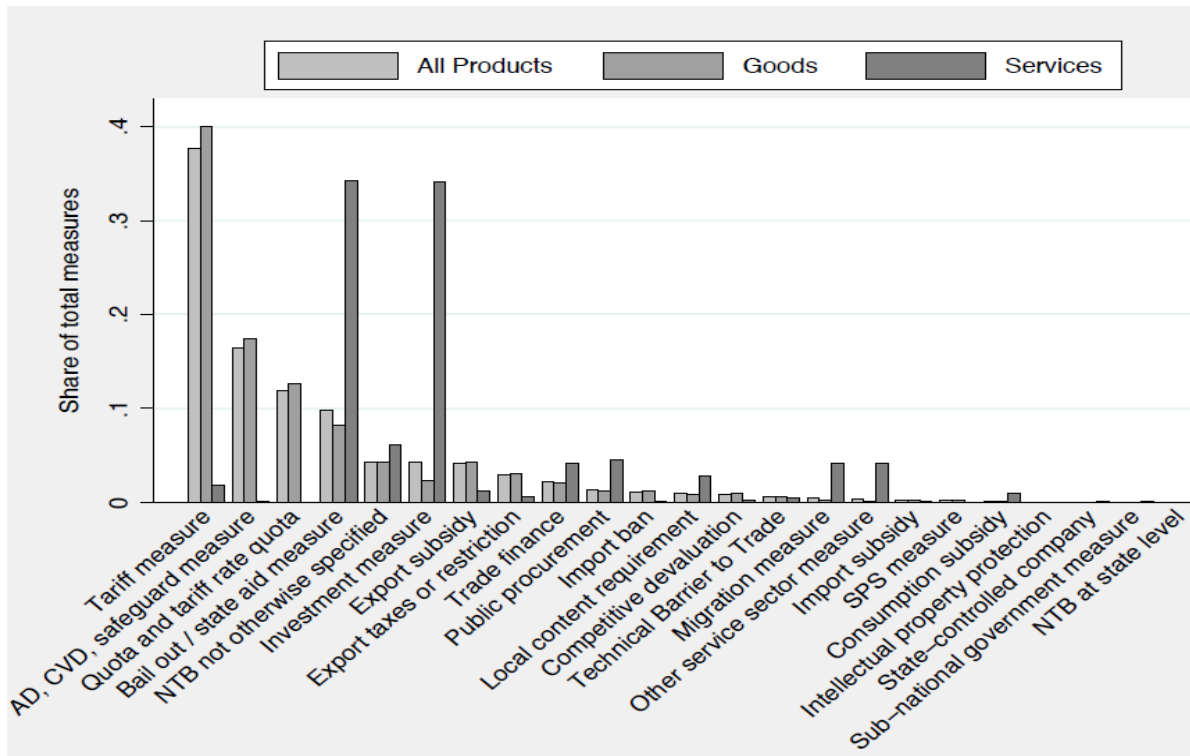
Figure 3 breaks down the use of measures across the goods and services sectors. Given that services cannot be affected by tariffs or temporary trade restrictions like antidumping (except indirectly), subsidies and other “non-border” measures are likely to be used more intensively for services. This is indeed the case. For the sample as a whole, subsidies account for about one-third of all measures pertaining to services. Investment measures account for another third.<sup>13</sup> The biggest

<sup>12</sup> Annex Table 1 provides data on all measures reported in the GTA database. Investment measures include tax/subsidies for FDI and policies affecting the ability of foreign firms to establish a commercial presence.

<sup>13</sup> Although subsidies are used relatively more frequently in services, it is worth noting that business does not appear to consider subsidies for services as a concern. For example, in the European Union (EU) survey of stakeholders on concerns and objectives to be addressed in the Trade in Services Agreement (TISA) talks, subsidies did not figure. The only exception was Canada’s policy on feed-in tariffs for renewable energy (European Commission 2014).

difference in instrument use between the goods and services sectors is for investment measures.<sup>14</sup> Here again, high-income countries, both OECD and non-OECD, make the most intensive use of subsidies—around 50 percent of all measures targeting services are subsidies. Lower-income countries, in contrast, rely primarily on investment measures, which account for more than 60 percent of all measures used in lower-middle-income and low-income countries targeting service sectors.

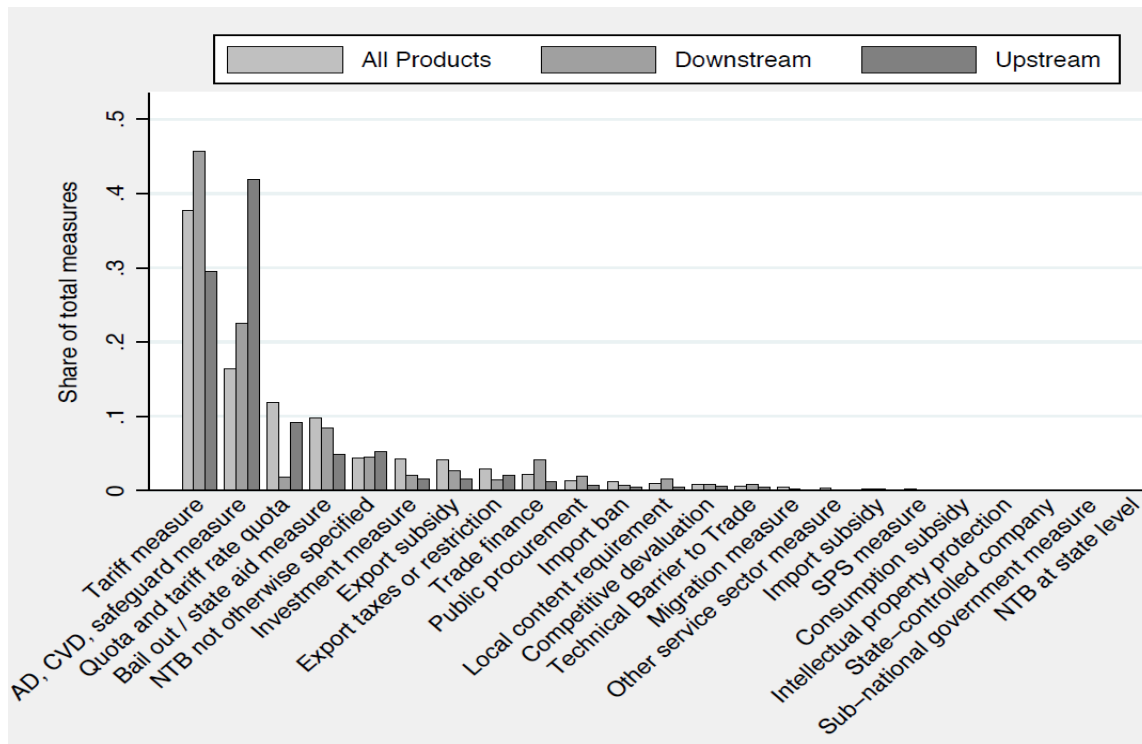
**Figure 3: Use of Policy Instruments, Goods vs. Services, All Countries**



Source: GTA.

In Figure 4, data are reported that are based on an exercise aiming to get a sense of whether policies are directed more towards upstream or downstream activities. This is done for goods only, using the Central Product Classification (CPC). The approach followed is to distinguish between products that are mostly inputs into production (chemicals, rubber, plastics, base metals) and products that mostly at the “downstream” end of production (furniture and similar products, fabricated metal products, office machinery, computers)—see Annex Table 2. Looking across all instruments, temporary trade barriers (antidumping, and so on) appear to be primarily targeting upstream products (inputs), whereas tariff measures are more focused on downstream products. Subsidies are used more for downstream product categories than for inputs. Figure 5 focuses more narrowly on the use of subsidies. These show that this pattern applies to both state aids and to export subsidies. The exception is low-income countries, which tend to use export subsidies that target slightly more inputs than downstream products. The information provided on the actions that are taken suggest that on balance countries seek to reduce discrimination (liberalize trade) more for upstream products than for downstream ones.

<sup>14</sup> In interpreting these data it should be recognized that services account for only a small share of total measures covered by the GTA database (6 percent). The main focus of trade policy not surprisingly is on goods.

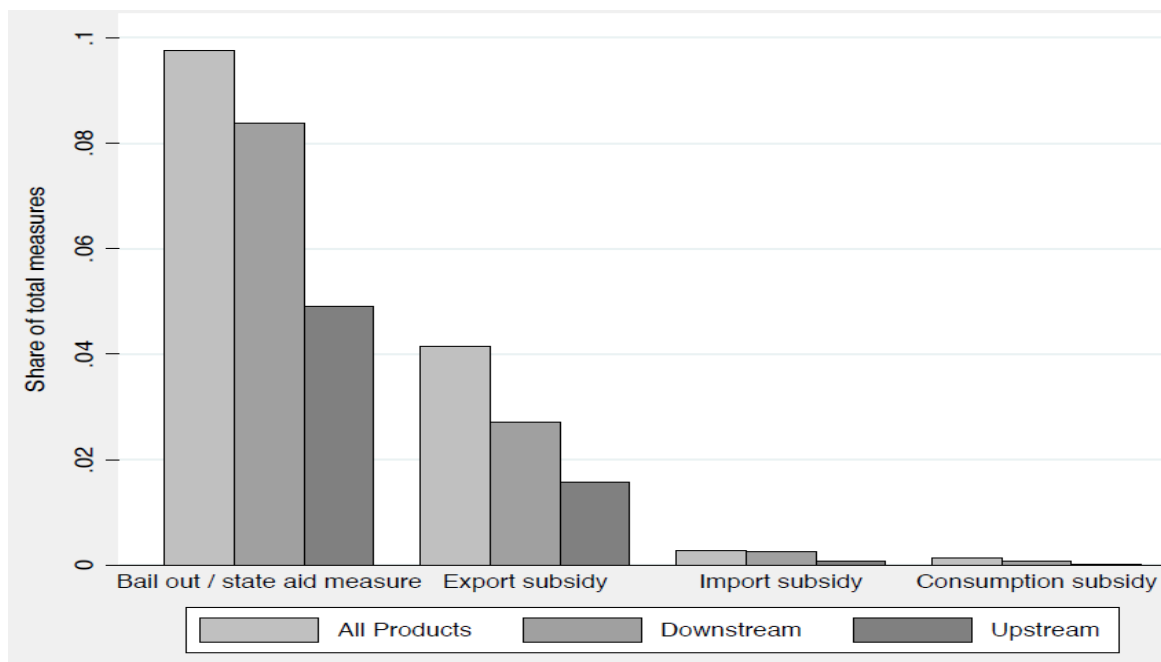
**Figure 4: Incidence of Instruments Used, Upstream vs. Downstream, All Countries**

Source: GTA.

The data that have been discussed pertain to the use of different instruments. In practice the policy action that is involved may have the effect of reducing or increasing trade. The GTA includes a code that reflects the assessment of the compilers of the database as to whether the measure restrains or expands trade, or, alternatively, the effect is ambiguous. These assessments are based on first principles, not on an analysis of estimated effects. Thus, a reduction in a tariff is regarded as liberalizing (coded 'green' in the GTA), whereas an increase in a tariff would be coded as 'red'. For some instruments virtually all measures are trade-restrictive. This is the case for antidumping and other temporary trade barriers, for example. There are interesting differences in the 'direction' of policy across instruments and country groups. For tariffs, most of the actions taken by high income countries and upper middle income countries involve liberalization – some 70 percent or more of all observations. This is also the case for quotas and tariff rate quotas. In contrast, lower middle income countries tend to be more restrictive – with more than 50 percent of observations coded red.

As far as state aid and investment measures are concerned, the aim of policy is on average more trade restrictive or discriminatory than is the case for traditional trade policies (abstracting from antidumping and other contingent trade policies). Some 70 percent of subsidy measures taken by richer countries are discriminatory; for lower-middle income countries the share is 100 percent. In contrast, investment measures taken by lower income developing countries are much more weighted towards reducing discrimination against foreign firms, while in OECD countries and upper middle income nations there is rough balance between liberalizing and more discrimination. As far as services are concerned, subsidies are almost all coded red, i.e., they involve discrimination in favor of local firms, whereas investment measures in developing nations are biased towards liberalization – something that is not the case for OECD countries, where a significant share of investment policy measures involve an increase in discrimination or restrictiveness.

**Figure 5: Use of Subsidies, Upstream vs. Downstream, All Countries**



Source: GTA.

#### 4. Implications for Current Rules and the Need for Change

The disciplines in the ASCM relating to subsidies on goods have a two-fold objective. First, to establish rules to avoid or reduce adverse effects on Members, and, more specifically to prevent the use of subsidies to nullify or impair concessions. Second, to regulate the use of countervailing duties (CVDs) by Members seeking to offset the injurious effects of foreign subsidization of products on their domestic firms. Adverse effects include injury to a domestic industry, nullification or impairment of tariff concessions, or serious prejudice to the country’s interests. Serious prejudice is defined to exist if the total ad valorem subsidization of a product exceeds 5 percent; subsidies are used to cover operating losses of a firm or industry; or debt relief is granted for government-held liabilities. Serious prejudice may arise if the subsidy reduces exports of WTO Members, results in significant price undercutting, or increases the world market share of the subsidizing country in a primary product. The focus of WTO disciplines in cases of prejudice is on the amount of the assistance given, not on the extent to which a subsidy harms trading partners. There are no subsidy disciplines for services.

Many of the elements of the ASCM are of questionable relevance from a VC/SCT perspective. The ASCM is premised on trade involving goods that are produced in one country and sold to another, i.e., implicitly if not explicitly (most) value added is assumed to be generated from domestic factors of production. This is less the case for VC-based SCT. As a result, it is less clear who benefits from a “subsidy.” Is it the VC as a whole, with the impact reflected in the final good? Or is the impact on specific segments only? Given the potential substitutability and/or complementarity of policy instruments, it becomes necessary to consider a broader set of policies and whether these as a whole generate negative spillovers – most notably investment incentives. In any such assessment, the first order of business is to identify and define the spillovers that are of concern.

In the General Agreement on Tariffs and Trade (GATT), it is all about a domestic industry—as long as a sufficiently large share of the industry is in agreement that they are being injured by a foreign subsidy, action can be initiated. It has always been recognized that taking action—imposing a CVD—will be detrimental to consumers and downstream users. But in a VC framework a CVD may

have no effect on the firms that bring the case. VCs do not operate as spot markets—there are complex relationships between the links in the chain/nodes of the network to ensure reliability of supply, quality, interconnection, and so on. Domestic input suppliers that are not part of a VC that imports parts/components therefore may not benefit from CVDs on imported inputs that are used by a VC. The end result may be that the relevant lead firm simply eats the cost of the CVD if it is not too high or else moves production elsewhere.<sup>15</sup>

If FDI policy is an important aspect of VC/SCT-related policies, an issue from a WTO perspective is that incentives to attract investment are not covered by WTO rules. The focus of WTO subsidy rules is on whether interventions are export subsidies, or cause adverse effects for exporters in third markets or domestic import-competing producers. But if the main goal and effect of SCT-promoting policies is to attract or retain FDI, the issue becomes one of investment diversion and global efficiency – cooperation aimed at preventing inefficient competition between jurisdictions that simply generates rent transfers to investors as opposed to addressing a market failure.

An implication of the centrality of FDI and more generally of investment for VCs or SCT-related policy interventions is that discrimination may be less of a feature than for trade policy. Investors will operate plants that generate local employment, independent of nationality of ownership. The spillovers that may arise are therefore somewhat different from the mercantilist motivation for many WTO rules—a concern about effects of policy on exporters. If the issue is investment incentives, effects are not (only) on exporters but on locations for investment, that is, the potential problem is investment diversion. Non-discriminatory investment policies may be distorting by attracting investment to less efficient locations. Investment subsidies may lead to higher employment and innovation but at the cost of other locations. Thus, if countries want to level the playing field and discipline the use of policies that go beyond what is necessary to deal with VC/SCT-related coordination and information problems, they will need to sit down and negotiate rules on investment incentives. Given the importance of services as a source of value added and in driving VCs, any such effort should span all sectors and include a focus on subsidies for services.

This will be a very difficult exercise, however, as it must go beyond subsidies in the sense of a fiscal transfer as defined in the ASCM and consider the net effects of a set of policies, including investment incentives. Given the complexity of determining the distributional effects of VC/SCT interventions, which will centre in part on identifying the counterfactual (what would have happened in the absence of a policy mix that led to an investment going to one location as opposed to somewhere else?), the challenge is not just to agree on rules *ex ante*, but to define what constitutes an undesirable spillover and to assess whether alleged actions have generated such spillovers.

The papers discussed previously point to the existence of negative spillovers and suggest a case for international disciplines. But it is very much an open question whether countries will agree that rules should be pursued. In the WTO working group on investment, it became clear early on that major OECD governments were not willing to discuss investment incentive programs, removing much of the potential rationale for a multilateral agreement (Hoekman and Saggi, 2000). In a VC context, it may be even less likely that there is appetite to agree to disciplines, given that a high import content of any given VC means investment subsidies will benefit some foreign interests as well as local ones. While there may well be investment diversion, documenting this is not straightforward given the overall distorted operating environment that is likely to reduce investment below what it otherwise would be in many lower-income countries.

Matters are complicated further by the fact that SCT subsidies will be embedded in products—that is, the effect for the end product is indirect and depends on the value share of the subsidized activity in the total. The extent to which services inputs and contributions to a VC benefit from government

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<sup>15</sup> Note that issues of transfer pricing will arise in assessing the extent to which a subsidy has benefited a given activity or the VC as a whole (the price or cost of the final good).

support will need to be considered (on average, services account for one-third or more of the value of goods) (OECD, 2013). Thus, to measure the effect of interventions, an analysis is needed of the sources of value added/profits. The size of the subsidy per se is not the right focus. In addition, the notion of injury would need to be revisited—given that a VC comprises a range of firms in different countries, does it make sense to allow a firm (set of firms) that are not part of given VC to take action that is aimed at inducing a lead firm to source from them as opposed to the preferred suppliers (but where the action simply makes the end product[s] less competitive on world markets), assuming the lead firm stays and does not pack up and leave? From an FDI-attraction perspective, permitting firms to launch CVD actions is likely to run counter to investment-promotion objectives and have detrimental impacts on the reputation of a country as a platform for VC-based activity.

## **5. Concluding Remarks**

What is the upshot of the foregoing regarding the need to rethink existing ASCM disciplines? Unfortunately a consequence of VC/SCT trade is that policy becomes more complex to design and the impacts of policies on both the country concerned and the rest of the world are more difficult to assess than in a world where trade does not involve vertical specialization and extensive unbundling of production activities across many countries/locations. The trope that further research and analysis is required applies here with a vengeance. A precondition for such analysis is much better data on applied policies. Current data collection and reporting effects are biased towards a subset of trade policy instruments – the coverage and quality of data on subsidies and investment measures/incentives is much less than for traditional trade policies such as tariffs and ‘temporary’ trade barriers.

Given interdependencies and linkages between the various activities that make up a VC and that are part and parcel of the unbundling of the production process across many countries, there may be greater need for pro-active policies to facilitate the operation of VCs. Many of these are the well-known horizontal policies that centre on the investment climate, property rights, rule of law, skills, infrastructure, connectivity, and so on. However, specific interventions may be needed as well, targeting coordination failures and missing links. The policy mix may include investment incentives of a fiscal nature, which may be efficient/rationale from the perspective of attracting firms and generating employment in extensive margin activities. But in practice other interventions that have similar effects—including generating negative spillovers on other countries/potential investment locations—may be preferred by governments over subsidies narrowly defined. Thus, insofar as countries can agree that there are joint benefits to be had from cooperating on rules of the game in this area, they will need to go beyond subsidies as defined in the ASCM.

At present, de facto subsidization that results, for example, from differential taxation or regulatory policies is not considered a subsidy under the ASCM. The agreement does not cover services and thus misses a large part of what drives VCs and the value addition that occurs along a VC. It also does not cover FDI incentive policies. Nor does it address regulatory policies that may be used to discriminate in favor of domestic economic activity. Insofar as these policy areas raise concerns, one line of argument is to call for WTO Members to address these through specific, stand-alone agreements. Although that would be a pragmatic approach, it suffers from the potential problem of missing the forest for the trees.

As argued in Hoekman (2014), the prevalence of VCs calls for policy analysis and international cooperation to focus more on how policies overall impact on VCs. One way to explore this is through a process of deliberation to determine if there is a basis for agreement between a subset of the WTO membership on a plurilateral agreement on global value chains (GVCs). The main need at this point, however, is not to start from the premise that new rules need to be negotiated, but instead to determine how existing ASCM (and other) WTO disciplines impact on SCT and whether there are significant negative spillovers stemming from national policies. A necessary condition for any such determination is much better data on the policies that are used by governments around the world, both at the central

and sub-central levels. That will require a shift in prioritization of the transparency and monitoring efforts of international organizations, including a concerted effort to map tax/subsidy policies that affect/target FDI and service sector activities.



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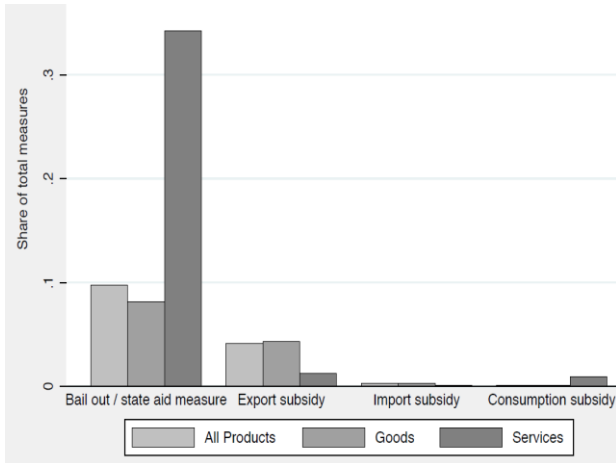
**Annex: Table 1: Number of Measures Implemented between 2009 and 2014 by Type and Country Group**

Measure type	Whole sample		HIC OECD		HIC non-OECD		Upper MIC		Lower MIC		LIC	
	Total	Share	Total	Share	Total	Share	Total	Share	Total	Share	Total	Share
<b>Subsidies</b>												
State aid measure	2,205	0.098	1,147	0.120	484	0.166	399	0.065	149	0.045	4	0.013
Consumption subsidy	30	0.001	4	0.000	14	0.005	7	0.001	5	0.002	0	0.000
Export subsidy	938	0.042	349	0.037	130	0.045	258	0.042	180	0.055	11	0.034
Import subsidy	61	0.003	20	0.002	8	0.003	18	0.003	14	0.004	0	0.000
<b>Other Measures</b>												
Competitive devaluation	201	0.009	11	0.001	0	0.000	85	0.014	73	0.022	32	0.100
Export taxes or restriction	669	0.030	23	0.002	75	0.026	279	0.045	267	0.081	25	0.078
Import ban	258	0.011	51	0.005	23	0.008	77	0.013	93	0.028	12	0.038
Investment measure	955	0.042	121	0.013	93	0.032	290	0.047	415	0.126	36	0.112
Local content requirement	228	0.010	9	0.001	20	0.007	69	0.011	115	0.035	15	0.047
Migration measure	101	0.004	48	0.005	20	0.007	32	0.005	1	0.000	0	0.000
NTB not otherwise specified	981	0.043	289	0.030	68	0.023	373	0.061	226	0.069	12	0.038
Other service sector measure	72	0.003	8	0.001	3	0.001	6	0.001	46	0.014	9	0.028
Public procurement	309	0.014	131	0.014	48	0.016	79	0.013	51	0.016	0	0.000
Quota and tariff rate quota	2,675	0.118	1,756	0.184	388	0.133	409	0.066	40	0.012	1	0.003
SPS measure*	44	0.002	3	0.000	12	0.004	11	0.002	16	0.005	2	0.006
State-controlled company	5	0.000	1	0.000	1	0.000	2	0.000	1	0.000	0	0.000
Tariff measure	8518	0.377	3238	0.340	1,087	0.373	2852	0.463	1,037	0.315	153	0.478
Technical barrier to trade*	131	0.006	10	0.001	3	0.001	78	0.013	40	0.012	0	0.000
AD, CVD, safeguard measure	3707	0.164	2126	0.223	424	0.146	779	0.126	286	0.087	0	0.000
Trade finance	486	0.022	179	0.019	11	0.004	55	0.009	233	0.071	8	0.025
<b>Total number of measures</b>	<b>22,582</b>		<b>9,531</b>		<b>2,912</b>		<b>6,159</b>		<b>3,288</b>		<b>320</b>	

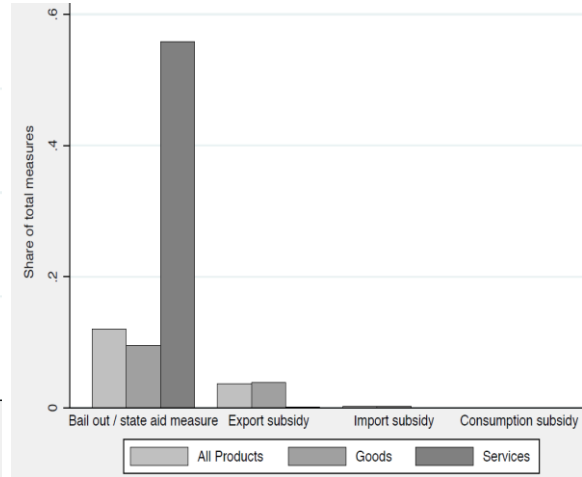
Notes: \* Not a focus of data collection in the GTA—data reported here greatly underrepresent the actual use of this instrument. HIC: high-income country; MIC: middle-income country; LIC: low-income country; NTB: non-tariff barrier; AD: antidumping; CVD: countervailing duty. Services-specific measures account for 1,383 of the 22,582 measures, for just 6 percent of the total. Source: GTA (March 2015).

Annex: Figure 1: Use of Subsidies, Goods vs. Services

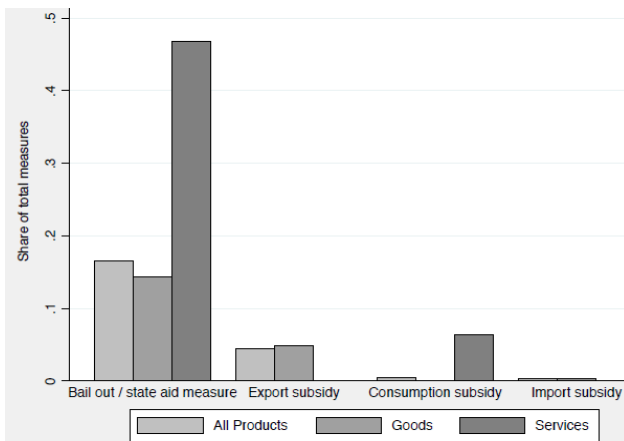
All countries



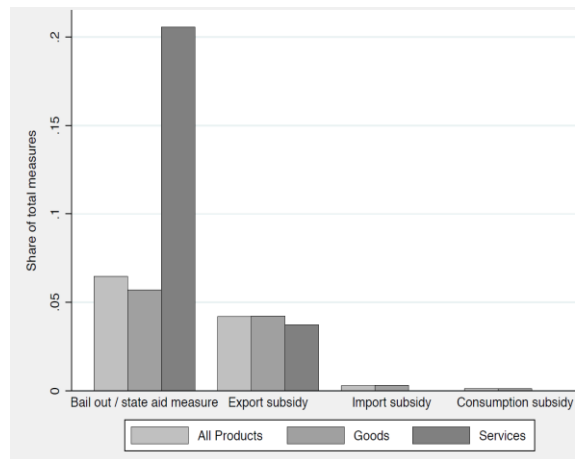
OECD member countries



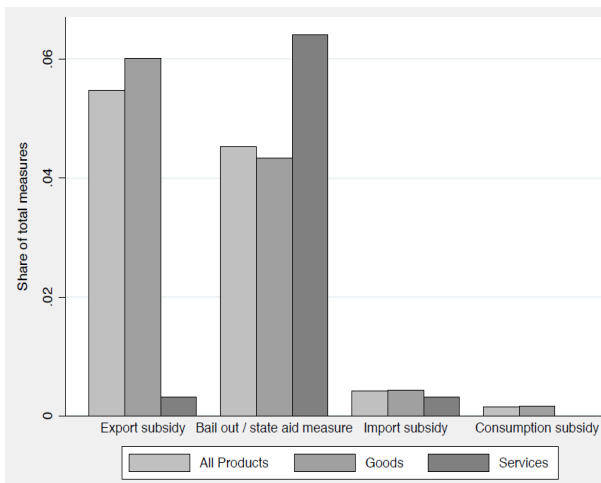
Other High-Income Countries



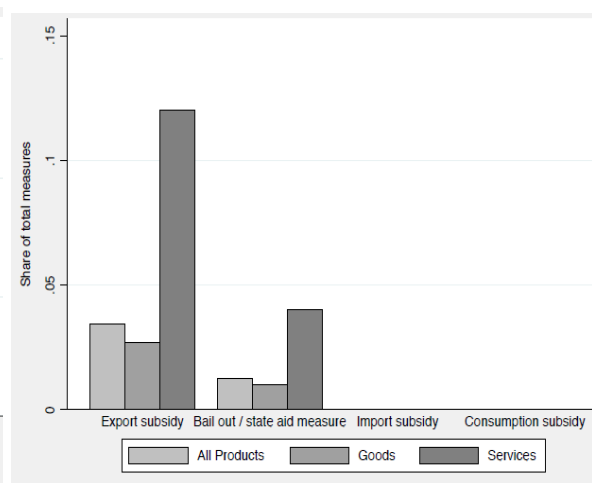
Upper Middle-Income Countries



Lower Middle-Income Countries



Low-Income Countries



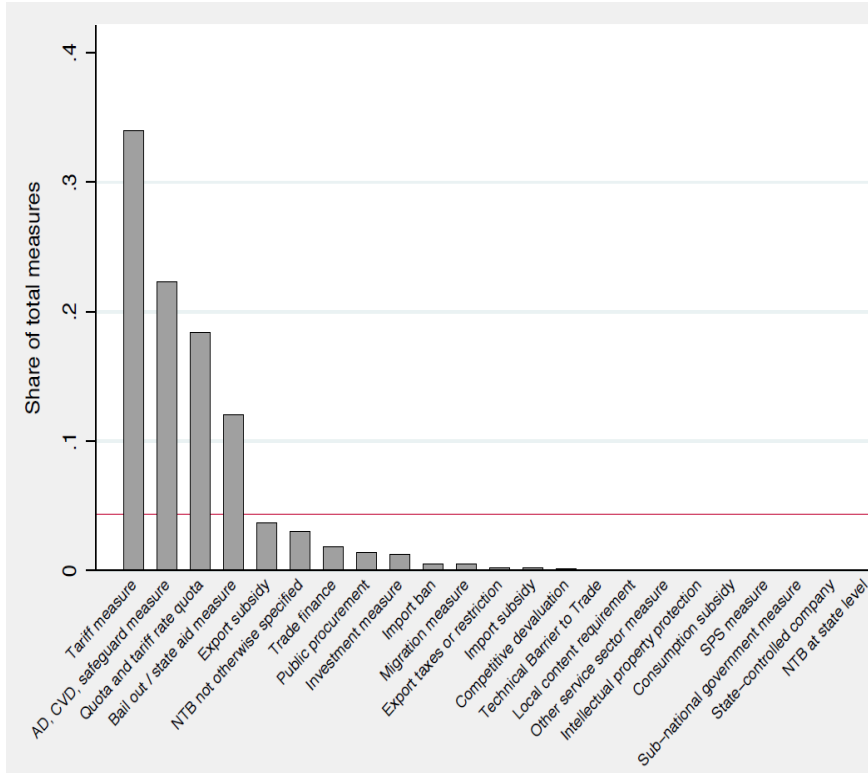
**Annex: Table 2: Upstream and Downstream Aggregates**

<b>Aggregate</b>	<b>CPC 2 Digit Code</b>	<b>Label</b>
Upstream	34	Basic chemicals
	35	Other chemical products; man-made fibres
	36	Rubber and plastics products
	41	Basic metals
Downstream	38	Furniture; other transportable goods not elsewhere classified
	42	Fabricated metal products, except machinery and equipment
	44	Special purpose machinery
	45	Office, accounting and computing machinery

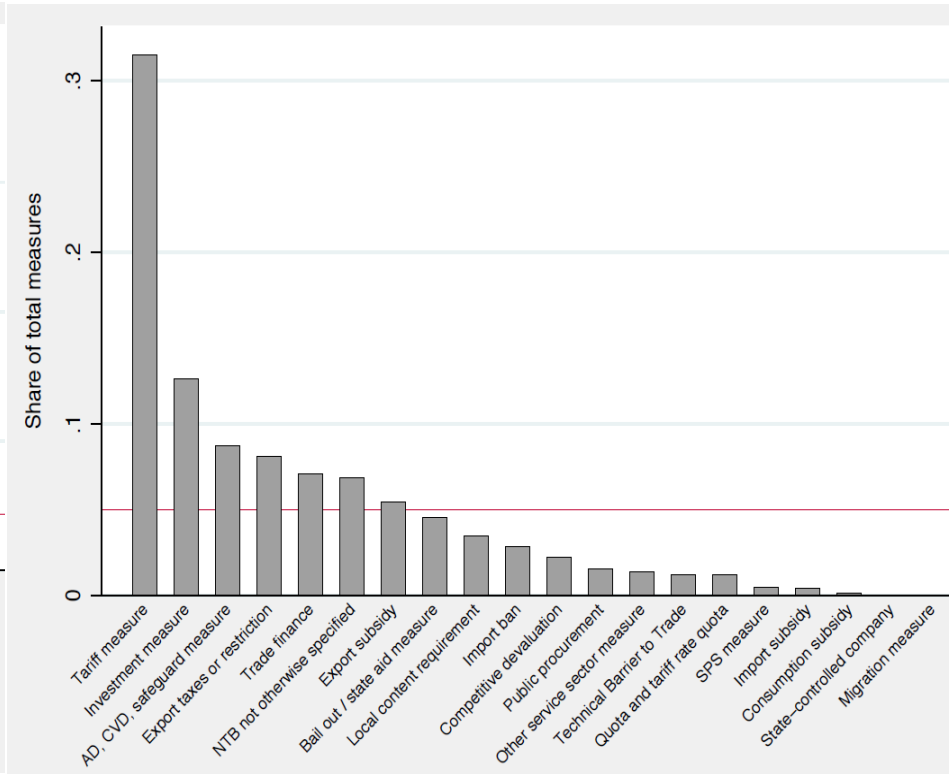
Note: Reference classification: CPC provisional.

**Annex: Figure 2: Global Trade Alert Data by Country Group, Instrument, and Sector**

Use of instruments, **OECD countries**

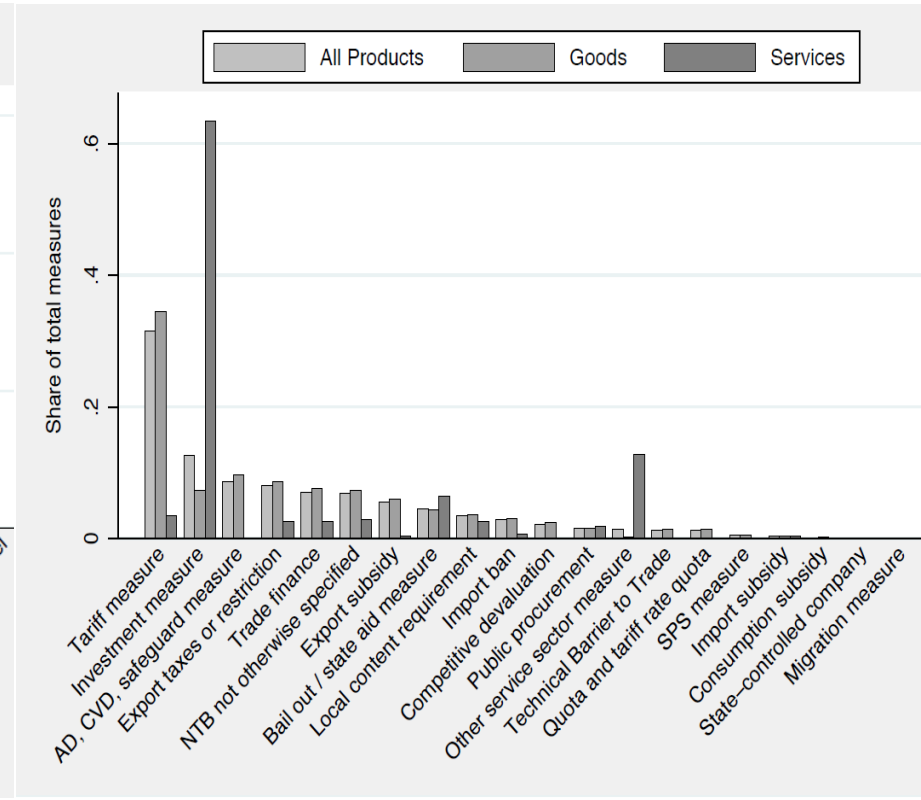
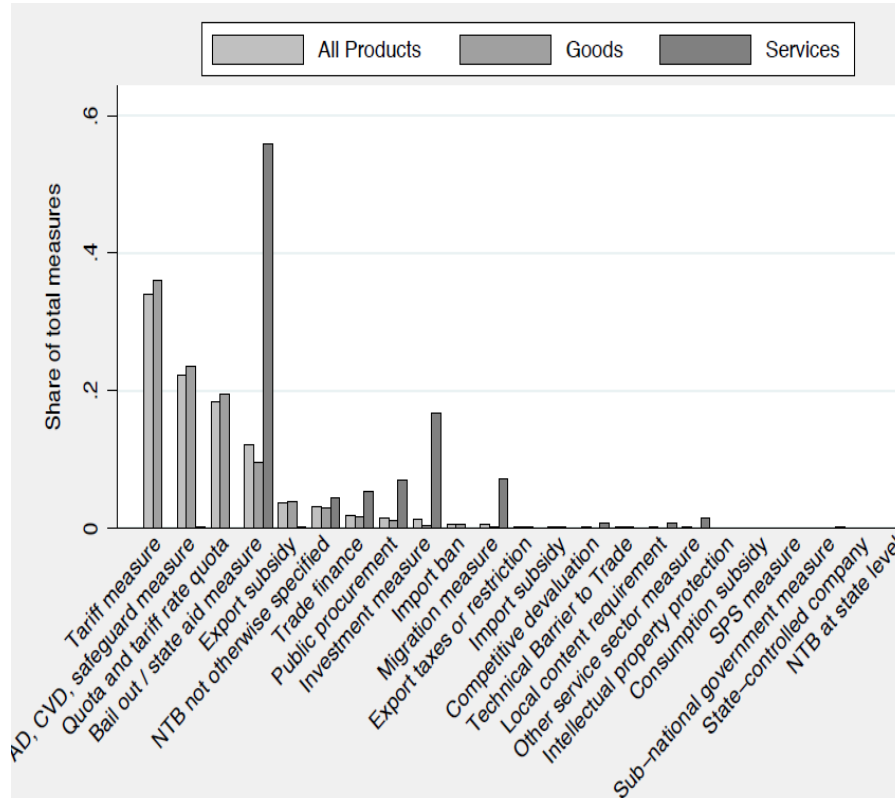


Use of instruments, **Lower Middle-Income Countries**



Use of instruments, goods vs. services, **OECD countries**

Use of instruments, goods vs. services, **Lower Middle-Income Countries**



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