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Trade Costs - What Have We Learned?

A SYNTHESIS REPORT

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Abstract

Trade Costs: What Have We Learned? A Synthesis Report

Understanding trade costs is essential for formulating policy interventions designed to reduce such costs. This report synthesises all OECD work on cost factors across the entire trade chain. These factors can be located behind the border, such as non-tariff regulatory measures, market access restrictions, trade finance availability and costs and general impediments on doing business; crossing the border, such as documentation and customs compliance requirements, lengthy administrative procedures and other delays; and in all stages of the international trade chain, such as transport infrastructure and logistics. The report proposes a series of questions to help identify priority areas, taking into account country specificities. The strong interdependencies between cost factors, magnified by the prevalence of global value chains, mean that policies to address costs and facilitate trade need to be undertaken in a comprehensive manner, although the cost-benefit ratio of certain trade facilitation reforms, particularly at the border, may offer immediate and significant benefits.

Keywords: Trade costs, trade facilitation, non-tariff measures, trade finance, transport and logistics, border procedures.

JEL classification: F13, F14, F15.

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Executive Summary

The OECD Trade Committee has investigated trade cost factors in a large number of areas along the international trade chain, identifying their determinants, measuring and analysing their impact and providing policy insights.

Behind the border, goods may face a series of cost factors, including non-tariff regulatory measures, market access restrictions, trade finance availability and cost and general costs or impediments to doing business. Non-tariff barriers can almost double the restrictive effect imposed by tariffs for a considerable number of products; restrictions on trade in services can severely hamper growth, not only because of the direct economic significance of services sectors but also as a result of the "enabling" character of services for goods trade; the scarcity and unpredictability of trade finance and the quality of the business environment influence business decisions and the cost of market entry. These are fundamental cost factors that would affect transactions even where goods and services are only sold domestically.

In all stages of the international trade chain, transport infrastructure and logistics are determining cost factors through their impact on time delays, considered even more taxing on trade than tariffs. Transport infrastructure is the most costly but also the most significant component of transport costs, bringing great benefits in terms of export performance at all levels of development., For maritime transport, which is the dominant mode of transport, costs still amount to an valorem equivalent of 6% of the imports value, while road transport is crucial for intra-continental trade and landlocked economies. However, the provision of high-quality physical infrastructure cannot lower transport costs without efficient and competitive logistics services. The lack of a pro-competitive environment is today a greater constraint to many developing countries than infrastructure and is critical for translating lower transport costs into lower prices.

Crossing the border, documentation and customs compliance requirements, lengthy administrative procedures and other delays can increase transaction costs an estimated 2 to 24% of the value of traded goods. In addition, in some countries, revenue losses from inefficient border procedures may exceed 5% of GDP. The OECD Trade Facilitation Indicators estimate that the potential for trade cost reductions from the measures negotiated in the WTO would amount to 10% of total trade costs for OECD countries and between 13 and 15.5% for countries outside the OECD area. Border costs vary to a certain extent depending on a country's per capita income level, as well as on the trading firm's size, with richer countries and larger companies being less affected. Available evidence also suggests that agro-food products face higher transaction costs than manufacturing products. On the other hand, implementation costs seem circumscribed and quickly recouped by the significant long-term gains in productivity, public revenue and export competitiveness for both public and private agents. OECD analysis shows that a 1% cost reduction could increase world income by USD 40 billion and that exports potentially benefit at least as much as imports.

In order to identify priority areas to address among the various cost factors, policy makers need to adopt a pragmatic approach that takes into account country specificities. A diagnostic approach can be summarised in a series of sequential questions: What is the underlying source of trade costs? Where is the source of trade costs located within the international trade chain?

How much does it cost to reduce or eliminate the identified primary trade barrier, given national capacities? To what extent is such action dependent on partners' trade policies? What is the impact on other trade costs further upstream and downstream?

The strong interdependencies between all the above cost factors mean that addressing one of them will be insufficient to reduce trade costs if not accompanied by complementary reforms on other cost factors. If reducing rents at one link of the trade chain increases the incentives to extract rents at earlier or subsequent stages, then cost-reducing trade policies may simply result in distributional shifts, with no reduction in total trade costs. The importance of these interactions is magnified by the prevalence of global value chains that multiply costs each time borders are crossed and condition the productivity and competitiveness of domestic production and exports on the cost-effectiveness of imports.

The link of trade facilitation to specific points of the trade chain, which make it easier to identify and target interventions, as well as the significantly positive cost-benefit ratio of trade facilitation interventions suggest that endeavours at the border offer immediately available and significant benefits.

"In every chain of reasoning, the evidence of the last conclusion can be no greater than that of the weakest link of the chain, whatever may be the strength of the rest."

Thomas Reid, *Essays on the Intellectual Powers of Man*, 1785

I. Introduction

In a world where communication and technological improvements have considerably shortened distances between countries, and where nations are increasingly integrated economically, the influence of trade costs on international trade flows remains large and crucially important. Over the globalisation era from 1950 to 2000, the decline in total trade costs accounted for more than 30% of world trade expansion (Jacks, Meissner and Novy, 2011)[1]. Obstfeld and Rogoff (2000) hold that trade costs are the explanation to the "six major puzzles" in modern international macroeconomics.[2]According to Anderson and van Wincoop (2004), total trade costs still amount to an ad-valorem equivalent of about 170% of the goods' value. The New Economic Geography literature sees in trade costs the prime determinant of the location of economic activity and of income disparities.

Undertaking trade liberalisation and facilitation today calls for a better understanding of trade costs. This understanding will help analyse cost-generating non-tariff measures and trade restrictive policies in a wide sense, and orient the choice of policy interventions, such as trade facilitation, meant to reduce these costs.

The notion of trade costs -and the scope of policies meant to facilitate the international circulation of goods and services- is not limited to the focus of current international negotiations on trade facilitation, targeting all customs-related impediments and costs that goods have to incur when literally crossing the border, including administrative procedures, public fees and charges but also indirect costs such as procedural delays at the border, storage and inventory costs, bribery and informal trade. It also includes all "at-the-border" but also "behind-the-border" cost factors borne in addition to the marginal production cost, when getting a good or service to its user. Put differently, trade costs can be viewed as the difference between the amount of trade flows that would take place in a hypothetical "frictionless" world and what is actually observed, as commonly defined by trade economists. A non-exhaustive list would then include transport infrastructure, logistics, business and financing services, regulation and non-tariff measures, access to and circulation of information, the business climate and institutional environment, etc., in both exporting and importing countries.

The Trade Committee has investigated cost factors in a large number of areas, all along the international trade chain, producing extensive findings and policy insights, identifying their determinants, and measuring and analysing their impact. The current study aims to synthesise these studies in a comprehensive manner, emphasising the costs of not removing barriers to

1 However, the influence of trade costs was found to be much larger during the first globalization era (1870-1913), where 60% of the increase in world trade could be explained by a decrease in trade costs.

2 The home bias in trade puzzle (why do people seem to have such as strong preference for consumption of their home goods?); the saving-investment puzzle (why do observed OECD current account imbalances tend to be so small relative to saving and investment when measured over any sustained period?); the home equity bias puzzle (why do home investors overwhelmingly prefer to hold home equity assets?); the consumption correlations puzzle (why isn't consumption more highly correlated across OECD countries?); the purchasing power parity puzzle (how is it possible that the half-life of real exchange rate innovations can be three to four years?); and the exchange rate disconnect puzzle (why are exchange rates so volatile and so apparently disconnected from fundamentals?).

trade, the benefits to be expected from trade facilitating policies, but also the implementation cost that governments have to incur, financially and politically, when engaging in such reforms. In doing so it aims to highlight the interactions and complementarities between trade cost components all along the international trade chain. Finally the paper provides policymakers with an integrated framework to identify priorities for reform in order to effectively facilitate the movement of goods and services across borders, taking into account country-specific circumstances and implementation capacities. The proposed methodology aims to answer the following questions. What is the underlying source of trade costs? Where is it primarily located on the international trade chain? How much does it cost to reduce/eradicate the identified primary trade barrier, given national capacities? To what extent is such a component dependent on partners' trade policies? What is the impact on other trade costs' components, upstream and downstream?

The study is structured as follows. Section II proposes a brief reminder on the measurement of trade costs. Essentially, it argues that none of the two main approaches for measuring trade costs succeeds in providing an accurate description of the extent of such costs but should be rather used in combination. Based on numerous OECD studies, Section III provides an extensive summary of the current state of evidence on all behind-the-border and at-the-border trade cost components, following the unfolding of the international trade chain, from the producer to the final user. Section IV underscores the synergies and complementarities between the reviewed cost factors and advocates a holistic approach. Section V proposes a conceptual framework for "trade costs diagnostics" aimed at defining policy priorities according to countries' specific circumstances. Section VI concludes.

II. Measuring trade costs

Despite the considerable amounts of work and interest that have been devoted to the issue of trade costs, providing a comprehensive and directly available measurement of trade costs, for a large number of countries and time periods, remains an incredibly difficult challenge. Direct measurement approaches suffer from severe limitations and can be only partial in terms of cost factors coverage and data availability, while indirect approaches based on trade volumes and/or prices by definition provide less information about the priorities policymakers should target in order to facilitate trade.

This section reviews very briefly the two main approaches for measuring trade costs – direct and indirect – and their policy relevance, based on the common distinction used in previous work (Anderson and van Wincoop, 2004; Chen and Novy, 2012). The review shows that the two approaches complement each other, each having advantages and drawbacks. Schematically, one can think of trade cost estimates based on direct measures as *lower bounds*, whereas indirect measures provide *upper bounds*, the true value of trade costs lying probably somewhere in between.

Direct measurements

Direct trade costs measurements rely on the collection of directly observable data or proxy variables on various cost sub-components. For instance, measures of border-related trade costs are often based on a count of the average number of days that is needed for a good to cross the border, or on the monetary cost of filling customs documents and complying with all administrative procedures. Policy barriers such as tariffs and non-tariff measures (NTMs) are similarly directly available from a range of statistical sources, such as the UNCTAD's TRAINS database or CEPII's MAcMap. Regulatory measures and standards are often explicitly measured by simple frequency counts and coverage ratios of prevailing standards in

a given country, making use of the information collected when standards are notified at the WTO. Likewise, transport costs are commonly proxied by freight charges and insurance costs or by the average time needed to carry a product to its final destination.

Direct measures of trade costs are typically included in a gravity equation of trade, together with a number of commonly used variables such as distance, common border, or common language, in order to disentangle part of the more observable components. For a number of direct cost studies, quantitative analysis needs to be based on a "translation" of qualitative information into ad valorem trade cost equivalents (TCEs) as quantitative proxies. This is commonly done using gravity model estimates, where estimated elasticities of imports/exports with respect to the qualitative indicators of interest[3] are compared to elasticities of tariff barriers, expressed ad-valorem, in order to obtain ad-valorem equivalents, as for instance in Portugal-Perez and Wilson (2012). A similar approach is followed by Hummels et al. (2007).

Most OECD studies on trade costs and trade facilitation have relied on the direct approach, focusing on one or several cost components. For instance, investigating the impact of specific at-the-border trade facilitation measures, twelve Trade Facilitation Indicators have been constructed based on surveys and publicly available information (OECD, 2011e). A range of studies on the impact of hard infrastructure and logistics on trade flows has made use of numerous survey-based country score indicators, such as the World Bank *Logistics Performance Index* and *Doing Business* indicators, the World Economic Forum's *global Competitiveness Index* but also country case studies (e.g. OECD 2006b). The OECD Maritime Transport Costs database includes actual costs of transporting traded goods by sea, broken down by product and by importing and exporting country (www.oecd.org/trade/costs).

Although quite extensively used, direct cost measurements suffer from a series of limitations. The first major limitation concerns incompleteness and measurement problems. Anderson and van Wincoop (2004) emphasise that "direct measures are remarkably sparse and inaccurate". Many trade costs components are partially or totally unobservable by the analyst and can thus hardly be converted to plausible ad-valorem equivalents. If standards and regulations or a country's business climate are difficult to measure, smuggling, informal trade or information costs are in practice totally unobservable. Thus, trade cost estimates taken from such measures can be only partial. Furthermore, available indices and direct measures are often poor in country, year, industry, or product coverage, thus hold strong risks of introducing a sample selection bias in the statistical analysis and often prevent from generalising the results.

In addition, there are issues with the way these measurements are commonly modelled[4] and trade cost components aggregated into a single summary measurement to provide a comprehensive view of overall trade costs[5].

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3 Elasticity coefficients will indicate the percent variation of trade volumes generated by a 1% increase of the qualitative indicator of interest.

4 Gravity-based estimations often make use of log-linearised multiplicative forms of the various trade cost components, thus assuming a uniform impact of these cost factors across bilateral relations, while such assumptions are not sufficiently supported by theory and can lead to misleading results (as is the case with distance estimates for instance, as discussed in Anderson and van Wincoop, 2004).

5 Obviously, there would be inherent arbitrariness in combining various costs components into a single trade cost function or weighted average not supported by theory. On the other hand, adding a long list of highly correlated trade cost indices as separate regressors in a single regression embodies strong risks of multicollinearity and decreases the estimates' precision, even in the fortunate case where data is

Thus, as emphasised by Chen and Novy (2012), using these partial direct measurements as proxies for total trade costs and as additional regressors in gravity equations in order to estimate their impact on trade flows can only provide *lower bounds* to the full impact of trade barriers, which remains at least partially unobservable to the analyst.

Indirect measurements

In order to circumvent these difficulties – incompleteness, arbitrariness – and in cases where a "direct accounting approach [is] impossible" (Jacks, Meissner and Novy, 2011), the indirect method aims at quantifying overall barriers to trade by seeking to infer the extent of trade impediments from trade flows without distinguishing between cost sub-components. Under this approach trade costs correspond to the difference between the trade flows that would be expected in a hypothetical "frictionless" world and what is actually observed in the trade data. Like Moses Abramovitz famously said about the residual Total Factor Productivity in growth accounting, here trade costs are somehow a "measure of our ignorance". Their inference is most of the times based on the widely used gravity equation, which has nevertheless numerous and solid theoretical foundations (Anderson, 2011).

The major advantage of such indirect and "global" measurements is that no arbitrary definition of a trade cost function is needed in the calculation[6]. As a function of observable bilateral trade data at the industry level, measurements can be reasonably made available for many more countries, industries and time periods than direct trade cost measures.

However, indirect trade costs measurements may be less useful to policymakers as, by definition, they are comprehensive and include all elements, observed and unobserved, that explain why trading with another country is more costly than trading domestically. As such, it is not an easy task to disentangle what cost factors contribute the most to the overall trade cost measurement, and what segment of the chain facilitating policies should address in priority[7].

It is admittedly possible to undertake a decomposition of the variance of total trade costs, as a way to combine indirect and direct measurements into a single regression, but this would present similar measurement and incompleteness problems as mentioned above, in addition to those inherent to trade flows data[8]. Thus, results from variance decomposition should be taken

simultaneously available for all components. Previous OECD attempts have illustrated that, due to data limitations, it is practically impossible to include all trade constraints into a single regression (OECD 2011c). The number of observations (country-year pairs, country-product-year triplets, etc.) for which all trade costs are observable is often too limited.

6 Whatever the theoretical foundation that is retained for the gravity equation – a micro framework with monopolistic competition as in Anderson and van Wincoop (2003), a Ricardian model of trade (Eaton and Kortum, 2002), a firm heterogeneity model (Chaney, 2008) – Dennis Novy (2012) shows that easy computational rearrangements allow to isolate trade costs and express them as a sheer function of observable trade flows. Trade costs are expressed as a relative measure, i.e. as the ratio of international trade over domestic trade. A rise in τ_{ij} indicates that international flows have increased relative to domestic ones, thus that it has become easier for the two partners to trade between them than to trade within their own countries.

7 An additional problem is that such measurement can be highly sensitive to the assumptions made on, and value retained for the elasticity of substitution σ, measuring how easy it is to substitute one good for another. This elasticity is usually estimated from bilateral trade data and observable trade costs, or directly from demand equations using data on prices (see Feenstra, 1994).

8 Furthermore, strong endogeneity, simultaneity and reverse causality concerns arise in such regressions but are most of the times considerably overlooked.

with extreme care. As an attempt to apply such method, Duval and Utoktham (2011) regress an indirect (non-tariff policy-related) trade cost measurement on a wide range of direct measurements, including a liner shipping connectivity index, a proxy for telecommunication infrastructure, numerous doing business indicators and exchange rate misalignment measurements, in both bilateral partners[9]. Using direct trade cost measurements as determinants of the comprehensive, indirect one, the authors are able to explain around 50% of the total variation in the indirect measurement of trade costs, implying that close to half of the variation is not captured by the data.

All in all, inferred measurements of trade costs from trade data can be taken as *upper bound* estimates and must be used in complement to direct measurements, while the combination of indirect and direct measurements in variance decomposition analysis still needs further refinement.

III. Facilitating the international circulation of goods and services: Do benefits exceed the costs?

This section summarises the current state of knowledge and evidence on trade costs all along the international trade chain, mainly based on OECD quantitative and qualitative studies. The review aims to follow the "logical" order of barriers that traded goods and services incur, from the producer/exporter to the final consumer/importer. This schematic representation of the trade chain is depicted in Figure 1. The impact of "behind-the-border" cost factors affecting goods and services before they reach border checkpoints is considered first, although in reality many of these cost factors are likely to be borne on both sides of the border. They are thus likely to affect the goods or services a second time in the destination or transit country once the border is crossed. In this regard, in Figure 1, the allocation of several trade cost elements is not exempt from some degree of arbitrariness. Second, we review a trade cost component that is transversal to the whole trade chain and makes the connection between all participants in the trade chain, namely transport infrastructure and logistics services. Moving forward along the chain, the third sub-section discusses all the "at-the-border" and mostly customs-related trade costs. Finally, a few noticeable features of "beyond-the-border" cost factors that are peculiar to the import side are underscored.

Within each point, the study underlines: (i) the costs of not removing barriers to trade, (ii) the benefits to be expected from trade facilitating policies, but also (iii) the implementation cost that governments have to incur, financially and politically, when engaging in such reforms.

9 More specifically, the authors employ Ordinary Least Squares (OLS) estimations with time fixed effects, using the *contemporaneous* values of the (presumed) independent variables, on a short panel of 92 countries observed over four consecutive years only (2004-2007) because of data limitations. Such an identification strategy cannot control satisfactorily for all risks of endogeneity, reverse causality and multicollinearity and most of the variables are in addition strongly serially correlated over such a short time period.

A. *Getting to the border: "Behind-the-border" cost factors*

Trade transaction costs affect goods and services both before crossing the border and after that stage until they reach their final user. They can relate to non-tariff and regulatory measures, market access restrictions, trade finance or the business climate. These are basic cost factors that affect transactions even when the goods or services are only traded domestically and are a fundamental part of the economic and policy environment of the concerned countries.

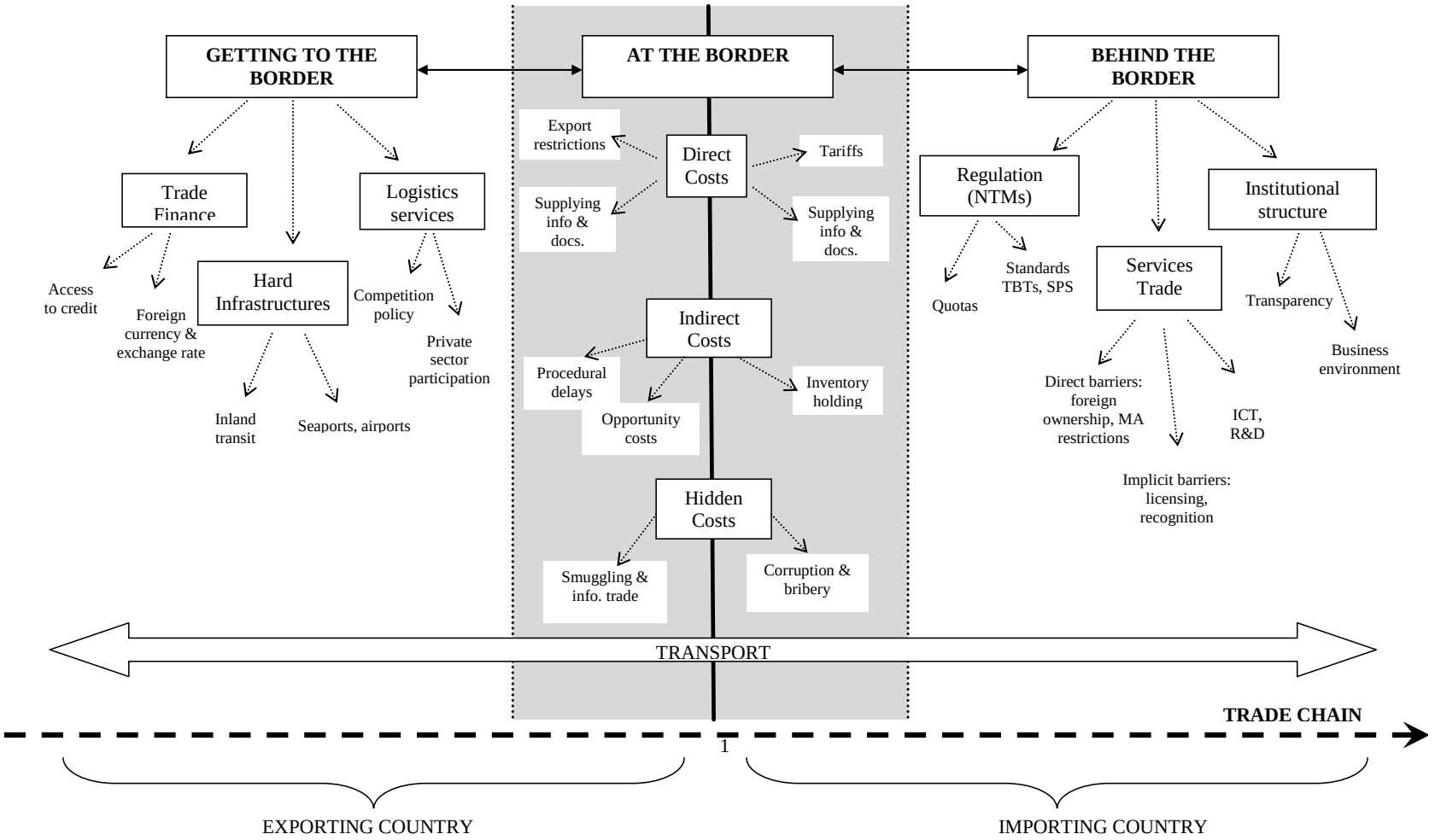
Complying with domestic regulations

Behind-the-border trade costs, both at the exporting or importing side, concern to a large extent domestic, regional or international regulation and standards, commonly designated as non-tariff measures (NTMs). NTMs broadly refer to all policy interventions other than tariffs that affect trade in goods and services[10]. These include import quotas, export restraints, government procurement, technical barriers to trade, sanitary and phyto-sanitary measures, rules of origin, domestic content requirements, etc. They play an ever-increasing role in international trade, as subsequent rounds of multilateral negotiations under the aegis of the WTO have resulted in steady declines in classic barriers to trade like tariffs and quotas, while demand for products (especially agricultural ones) that respond to consumers' legitimate concerns on health, safety, the environment, etc., have drastically increased the number of regulatory norms. Simultaneously, the global fragmentation of production, as well as the proliferation of regional and preferential trade agreements have made NTMs such as rules of origin even more complex, stringent and trade distorting.

Evaluating the economic and welfare impacts of NTMs is a hard task, as behind the intentions of correcting market failures can lay disguised protectionism. As such, NTMs can represent a substantial trade cost and become a severe obstacle for firms and individuals, and hurt competitiveness. For instance, Kee, Nicita and Olarreaga (2009) have estimated that NTMs add on average an additional 87% on the restrictiveness imposed by tariffs. In some countries, like Australia and Mexico, the coverage ratio, i.e. the share of the import basket that is affected by non-tariff measures, can exceed 90% (Disdier et al., 2008). Likewise, developing countries' export products are sometimes almost all subject to regulations and standards prevailing in rich countries. Overall, Nicita and Gourdon (2012) estimate that 30% of international trade flows are subject to Technical Barriers to Trade (TBT) and 15% to Sanitary and Phyto-Sanitary (SPS) measures (60% in the case of agricultural products).

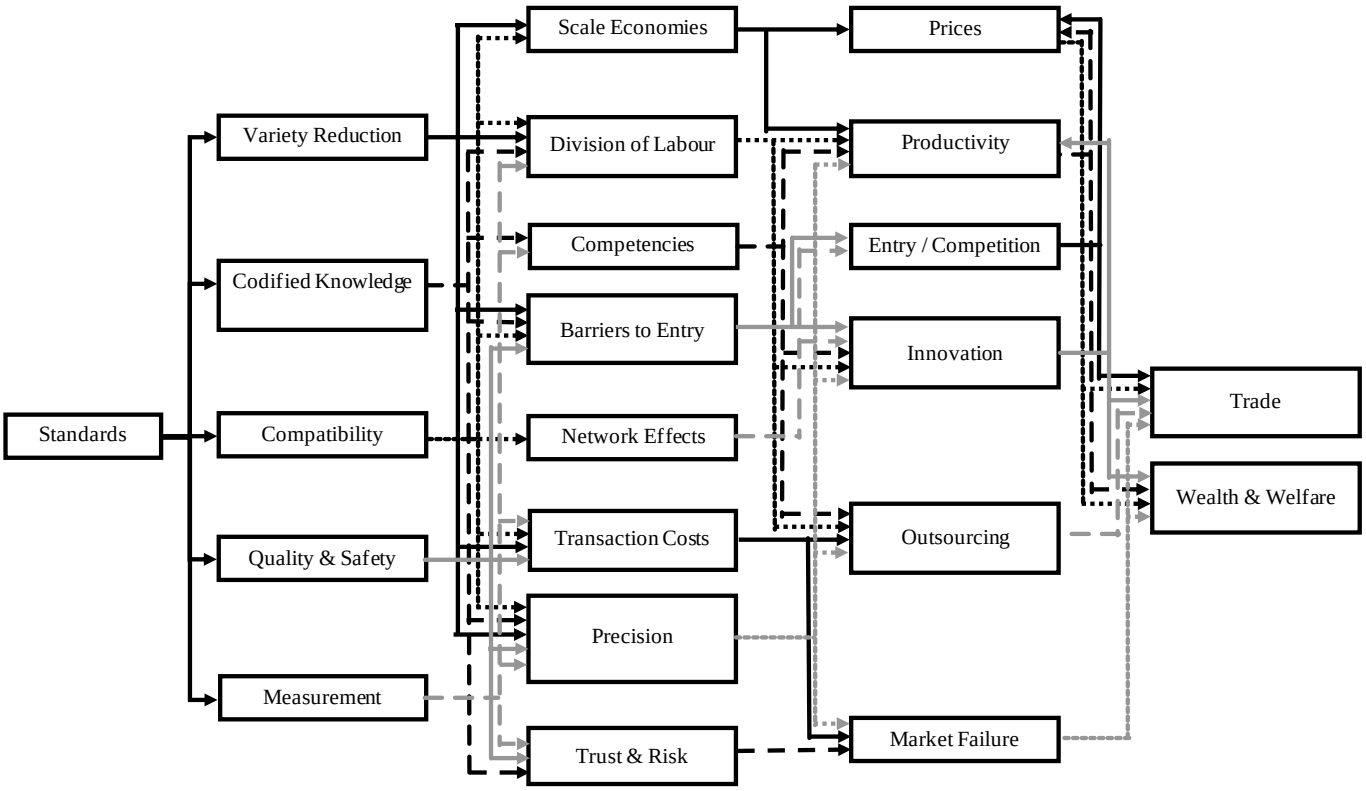
10 In *The New Palgrave Dictionary of Economics* (Second edition, 2008), John Beghin gives the following definition: "Non-tariff barriers (NTBs) refer to the wide range of policy interventions other than border tariffs that affect trade of goods, services and factors of production. Most taxonomies of NTBs include market-specific trade and domestic policies affecting trade in that market. Extended taxonomies include macroeconomic policies affecting trade."

Figure 1. Trade Cost Diagnostics



In an attempt to review the large body of empirical literature – and its various approaches, from gravity equations to partial and general equilibrium models – Swan (2010) notes that it "does not provide a single answer to the question of trade effects". He explains that it is precisely because the linkages between standards and trade are multiple, complex and do not necessarily go in the same direction (as summarised in Figure 2), that empirical results are so mixed: standards may decrease the variety of products offered to consumers, but can coordinate the division of labour, act as carrier of codified knowledge, signal products' quality and safety, boost innovation, enhance trust among partners, etc.

Figure 2. Inside the Standards–Trade "Black Box"



* 'Competencies' encompass institutions, innovation- and productivity-relevant knowledge, and vision

** 'Barriers to entry' include compliance costs

*** 'Precision' includes uniformity and consistency

Source: Swan (2010).

The OECD has undertaken numerous quantitative and qualitative assessments of the trade and welfare effects of NTMs (see OECD, 2005, for an extensive analysis). In general, this analysis is far from being as straightforward as for tariffs, for theoretical reasons but also due to issues of measurement and data collection. On the theoretical side, the impact of NTMs on trade flows may arguably go in both directions. Though they impose higher costs on companies (by limiting their ability to outsource, diverting business resources, etc.), they can also boost trade flows by improving consumer confidence. The net effect is thus *a priori* ambiguous. Disdier et al. (2008) find for instance that measures taken under the WTO Sanitary and Phyto-Sanitary and Technical Barriers to Trade Agreements impede developing countries and least developed countries' trade in agricultural and food industry products to OECD countries, whereas they do not affect significantly trade among OECD members. On the other

hand, OECD (2009g) concludes that well-designed regulations and conformity assessments can significantly enhance trade flows. Most studies point to the large degree of variation of trade impacts according to sectors, importing and exporting countries, standards' type and whether NTMs are harmonised on an international basis[11]. Within industries characterised by varying productivity among firms, compliance with (foreign) standards and regulations may represent additional sunk costs that induce smaller and least productive firms to exit the export market and serve the domestic market (Melitz, 2003)[12].

However, such regulations and standards can be welfare-enhancing by reducing information asymmetries and potentially protecting domestic consumers from negative externalities (stemming, for example, from importing pests and diseases), even though they may at the same time reduce the number of varieties at consumers' disposal. NTMs can also address market failures concerning producers or global commons issues like the protection of the environment. Thus, even though standards and regulations may impose a substantial cost to traders and impede trade flows, this should not be necessarily regarded as an economic inefficiency. On the contrary, their net welfare impact may be positive.

OECD (2009g) and van Tongeren et al. (2012) provide a unified partial equilibrium framework in order to systematically undertake cost-benefit analysis of given standards or regulations on all types of agents (domestic producers, foreign producers, domestic consumers, government) and infer the net impact on society's welfare. The framework compares the costs and benefits of alternative regulations that could be enforced by policymakers in order to tackle a given market imperfection or failure. A key feature of this framework is its ability to identify and separate agents that are affected by products' characteristics and externalities, and those that are not. Assessing the cost and benefits of NTMs thus requires defining how the former group values these characteristics, as well as their avoidance, which empirical non-market valuation methods like the Willingness to Pay (WTP) or the Quality Adjusted Life Years (QALYs) aim to do. Applying such an approach to imports of shrimps in the EU, van Tongeren et al. (2012) find that implementing a sanitary standard that eliminates the use of antibiotics in aquaculture decreases foreign producers' output, increases domestic producers' output, while consumers' surplus increases. Overall the international welfare unambiguously increases with the regulation, and even more so when consumers are fully aware of the safety issue.

Such cost-benefits analysis may however overlook trade effects and, more importantly, dismiss substitutability and complementarities between varieties. In an attempt to combine the trade and welfare approaches, by using gravity model estimates in the above-described partial equilibrium framework, Disdier and Marette (2010) find that in most cases, stricter standards (on imported crustaceans in the European Union, the United States, Canada and Japan) are welfare-improving in spite of significant reductions in trade flows and higher trade costs.

All in all, in the perspective of reducing trade costs components all along the international trade chain, it is thus clear that the removal of NTMs should be planned only when it can be convincingly argued that it would not generate net welfare losses. As Disdier and Marette (2010) conclude, there is a "danger of treating NTMs as equivalent to tariffs restricting trade. NTM reduction without a clear welfare framework may be groundless and erroneous."

11 The issue of regional and/or multilateral harmonization of regulations and standards will be further discussed in Section 4.

12 Assuming that supplying the domestic market is not subject to additional requirements.

Barriers to services trade

The regulatory cost factors reviewed in the previous sub-section mostly (though not exclusively) concern trade in physical goods, which largely dominate international exchanges. But, services are today an essential component of most of the world economies, representing about 75% of domestic GDP in OECD countries. Tradable services include as diverse activities as ICT, transport and distribution services, business, legal and accounting services, finance and insurance, construction and engineering, tourism, etc. In 2007, the WTO stated that 20% of world trade was made of services exports. In addition, in the early 2000s, the services share of total Foreign Direct Investments (FDI) was 67% according to UNCTAD (73% and 50% in developed and developing countries, respectively).

Because services are complex in nature and can be supplied internationally through several modes[13], they offer wide latitude for varying and potentially highly un-transparent restrictions. Barriers to trade and regulations on services trade may in some cases be specific to one mode, yet they are interlocked, especially when services are considered as a whole, and this complicates the analysis and the establishment of a clear taxonomy of barriers to trade in services. Contrary to goods, services do not have to bear physical transport costs and associated hurdles. However, geographical distance between producers and consumers still induce substantial costs and barriers, so that distance may have an influence on the choice of the supply mode. Mode 1 (cross-border trade) and Mode 3 (FDI) are the two most important modes of supply in practice. What drives the choice between these two modes is essentially a trade-off between cross-border trade costs – practically, communications costs and restrictions on transactions – and barriers to entry – practically, investment costs and compliance with foreign regulation, in addition to opportunity costs through missed economies of scale (OECD, 2009b; Francois and Hoekman, 2010). Services trade costs are thus related to the larger trade-investment-competition nexus rather than to trade policy in a narrow sense.

In the literature, typologies of barriers to trade in services usually distinguish between policies affecting the entry on a market (such as licensing quotas), and those raising operating costs once entered (price controls, taxes on foreign firms). Within each, a further distinction is made between policies and regulations that discriminate between firms with respect to their nationality and those that do not (Francois and Hoekman, 2010). As will be seen below, the ability to identify which regulations are discriminatory, restrict the access to markets and are purely rent-creating, from those that aim legitimately at correcting market failures, will matter for policy choices. OECD (2008b) distinguishes between direct services trade barriers and implicit ones. Direct trade barriers include explicit restrictions on market access and foreign ownership, or national treatment restrictions on cross-border trade, commercial presence or movement of natural persons. Implicit barriers rather relate to regulations which *de facto* impede foreign services suppliers to operate, such as licensing procedures, lack of recognition of equivalent qualification, etc.

The OECD Services Trade Restrictiveness Indices (STRIs) account for these several distinctions and categorise the various policy areas that can affect services trade, based on official regulations: *foreign ownership & market entry restrictions, restrictions on temporary movements of people, barriers to competition, regulatory transparency,* and *other discriminatory measures*. Measured for all 34 OECD countries, they highlight how restrictions

13 The General Agreement on Trade in Services (GATS) has retained four major modes: (i) direct cross-border trade, (ii) movement of the customer to the provider's country, (iii) sales of services through an offshore affiliate (legal person) and, (iv) temporary movement of persons to provide services.

to services trade vary according to sectors and modes of supply. For example, while restrictions to the movement of people and on foreign ownership and market entry are the largest restrictions on services trade in computer services, construction, architecture and engineering services, as well as in legal and accounting services, the telecommunication sector seems relatively more constrained by barriers to competition and public ownership[14]. Overall restrictiveness to services trade is relatively high in legal and accounting services and in the telecommunication sector, but relatively low in construction, architecture and engineering services, and in computer and related services.

Restrictions on trade in services are commonly held to severely hamper the growth potential (Hoekman and Mattoo, 2008) and deepen the economic isolation of geographically disadvantaged countries (Bochert et al., 2012; Arvis et al., 2007; OECD, 2011c). OECD studies have demonstrated to a large extent through which channels policies facilitating the international circulation of services can translate into economic efficiencies and boost trade and growth in both developed and developing economies.

Services are first used to a large extent as direct intermediate inputs into production functions. Intermediate inputs indeed represent 73% of total trade in services (OECD, 2009e). As such, they participate directly to improving firms' productivity and reducing the cost of production of final goods and services. As products become more and more dematerialised and embody more technological content, and as production is increasingly vertically "fragmented", "disintegrated" and "split", new productive tasks based on services, like design, engineering or marketing, have gained in importance along the production process and increasingly participate to product differentiation in manufacturing goods. This is tangible when reviewing the services share of gross output and the ratios of intermediate services to value added in manufacturing sectors: from the mid-1990s to mid -2000s, the service intensity has increased in all manufacturing sectors except the most high-technology ones (see document TAD/TC/WP(2012)33). Firms' competitiveness is therefore increasingly dependent on their access to and the availability of a broad variety of low-cost, high-quality services inputs. Such provision of services needs not take place outside the firm: relocating complex services activities to subsidiaries abroad through FDI is now an important way of reducing production costs while maintaining transaction costs at a low level (OECD, 2011d).

Second, tradable services are also key "enablers" of trade in manufacturing goods, in particular communication, financing, business and transportation services. They considerably ease the flows of products at all stages of the production process, through both time and space. This function has gained even more importance as supply chains become more integrated internationally. In many respects, manufacturing and services activities are indeed complementary and cannot progress in isolation. OECD (2008b) develops a computable general equilibrium model to estimate how services trade liberalisation impact trade in manufacturing goods, in which services trade costs are exogenous. She estimates a non-linear relationship: it is only after a certain level that lower services trade costs have a significant impact on trade in non-agricultural products. In other words, the costs of trading services need to be reduced close to zero in order to enhance manufacturing trade. Wilson and Portugal-Perez (2012) find that improvements on an index of "ICT infrastructure" bring marginal benefits that are increasing with a country's per capita income level: richer countries gain more from investments in information and communication technologies, while low-income and developing nations should first pursue other policy priorities in order to facilitate the international circulation of goods.

[14] See TAD/TC/WP(2012)12 to TAD/TC/WP(2012)15 for detailed sectoral studies of the STRIs.

All of these elements have important policy implications. It appears that, across the four modes of supply, most barriers to services trade relate to regulatory and juridical issues. Therefore, the financial cost of removing or reducing these barriers is arguably relatively low, compared to some of the cost implications regarding the facilitation of trade in goods, such as the building of high-quality hard infrastructure. However, the political cost of services liberalisation is likely to be higher. Many services industries are indeed prone to market failures, hence may give rise to rent extraction behaviours, which are politically hard to change. Telecommunication and transport services that are linked to mass infrastructure are common cases of natural monopoly, while imperfect and asymmetric information issues arise in the case of lawyers, doctors, insurance, etc. Regulation is thus needed for both efficiency and equity objectives.[15]

Non-discriminatory regulations, privatisation, market liberalisation and pro-competitive policies are commonly held to bring large benefits. They first improve the concerned industries' productivity, which in turn promotes economic growth. For instance, Raballand and Macchi (2009) claim that breaking cartels and introducing competition in the trucking services industry through less restrictive and more transparent operational rules is as strong a pre-requisite as hard infrastructure in order to lower transport prices and improve services' quality. OECD (2008b) argues that services trade liberalisation can also enhance patterns of comparative advantage: manufacturing industries that are efficient in organising their production will gain from cheaper, offshore supply of intermediate services, while countries that rely on a large services supplier base but are less efficient in the productive use of services for manufacturing would shift from exporting services-intensive manufactured products to exporting stand-alone services to manufacturing firms abroad. Many case studies also show that the liberalisation in services FDI translated into more performing downstream manufacturing industries. Finally, potential gains from liberalisation and regulatory reform can be amplified when initiated within trade agreements, towards a harmonised system. Indeed, Nordas and Kox (2008) provide robust evidence that regulatory heterogeneity across countries is a barrier to trade in services in its own right, whatever the mode of supply that is ultimately retained.

Though reducing services trade costs is in general unambiguously trade-enhancing, there seems to be also largely heterogeneous effects according to sectors. In a recent work, OECD document TAD/TC/WP(2012)33 estimates the marginal impact of services quality and services trade liberalisation on product differentiation (as measured by the Grubel-Lloyd intra-industry trade index) and export prices, in representative manufacturing sectors. The clothing, electronics and motor vehicles sectors (versus pharmaceuticals, rubber and plastics) are found to be the most sensitive to trade performance in the transport, telecommunications and banking services. Consistently with previous remarks, in general, the richer the country, the larger the marginal impact of services performance in these sectors.[16]

15 On the political economy of services trade liberalisation and regulatory reform, see, among others, Francois and Hoekman (2010) for a literature review and Hoekman and Mattoo (2011) for recent developments on Doha negotiations.

16 Similarly, Ferro et al. (2011) find that a 10% increase in aid for ICT increased manufactured exports by 0.3%, while aid to the energy services sector had a much larger impact of 6.8%. They also find that support to banking services will lead to a significant increase in manufactured exports whereas the impact of aid to the business services sector was not statistically significant. Their estimates also display wide variation across regions and income groups. In Sub-Saharan Africa, the sectors for which aid had the largest (and significant) impact were energy, ICT, and banking services, with a 10% increase in aid associated with increases of manufacture exports of 6.4%, 4.8% and 2.2%, respectively.

Policies (or their removal) addressing barriers to services trade are also determined by the interactions between different modes of supply in each service sector. For instance, the impact of (de)regulatory policies may be magnified when conducted simultaneously on complementary modes of supply, as facilitating the use of one mode also makes other modes relatively more attractive. In line with most of the empirical literature, OECD (2009b) find that restrictions to services trade in one mode of supply generally have negative implications in other modes as well. In the same vein, Topalova and Khandelwal (2010) noted that, in the case of India, industries that reaped the largest gains from trade liberalisation reforms corresponded to the sectors where deregulation and liberalisation of FDIs were the biggest. Barriers to foreign direct investment can thus directly hamper direct cross-border trade services.

For least developed and developing countries, however, such reforms may prove difficult to implement and enforce. If the marginal benefits of liberalising services trade are low (compared to those attainable by rich countries) whereas the political cost is relatively high, incentives to undertake regulatory reforms may be poor. Giving priority to other trade cost components may thus be viewed as both more beneficial and more feasible, encouraging policymakers in developing countries to postpone reforms in the area of services trade. However, as many studies emphasise, and as will be argued in section 4, the success of cost-reducing endeavors in other policy areas will strongly depend on the availability and quality of side-services, such as transportation and communication. Thus, even if the payoffs may appear only in the long term and at later stages of development, facilitating services trade through liberalisation, privatisation and non-discriminatory reforms, may prove to be crucial for overall trade, growth and development processes.

Trade finance

On the international trade chain, one of the "earliest" determinants of the ability to trade and a significant trade cost component (as understood in a broad sense) is the availability of and access to trade finance. Trade finance is at the core of international exchanges of goods and services between firms. It includes a wide list of payment instruments such as letters of credit, export credits insurance, cash-in-advance payments, etc., that allow differed payments in the short or medium/long terms.

The fall in trade volumes that followed the 2008-2009 financial crisis has generated new interest in the influence of the availability and cost of (short-term) trade finance on trade flows. During this period, trade finance fell by 25% (while world trade declined by 29% in only four months between September 2008 and January 2009). When economic conditions and global demand fall, financial intermediaries may be less willing to lend to traders and more tempted to raise the rate at which they lend. Such a sudden raise in trade costs, financial constraints and liquidity shortages, may in turn discourage firms to export/import and diminish the volume of remaining exchanges, thus impede trade flows overall. Using GMM estimates on quarterly panel data for 43 countries between 2005 and 2009, OECD (2010a) estimates that, indeed, in times of crisis, the availability of trade finance significantly impacted trade: a 1% decline in trade finance is associated with a 0.39% drop in imports, 0.17% in total trade. These impacts were however three times smaller in "normal" circumstances, but remained statistically significant.

The impact of trade finance on trade flows can be strongly exacerbated by the time needed to ship a good from the origin country to its buyer. Indeed, longer time-to-ship increases the probability that a financial incident takes place and that the importer defaults. Berman et al. (2012) model and estimate this "amplification effect" of time-to-ship on trade finance. In their

model, time is not only a trade cost component, but it also raises the elasticity of export volumes with respect to the probability of default. On both aggregated and disaggregated data, they find such positive and significant magnification effects during several distinct episodes of the financial crisis. The induced fall in trade takes place at both the intensive margin (lower volumes of trade finance obtained at higher prices) and the extensive margin (higher probability of exiting the export market).

A related trade cost component is the financial uncertainty induced by exchange rates volatility. Sudden variations in exchange rate levels induce an extra cost for traders, thus have potentially strong impacts on trade flows and volumes. Reviewing the dedicated empirical literature, OECD (2011f) conclude that the impact of exchange rates variability and levels on trade flows is unclear and that the evidence is rather inconclusive. Their own econometric investigation on China, the Euro zone and the United States, also finds a minimal effect at the sectoral level and rather highlights the differential impacts of exchange rates volatility depending on the bilateral relation considered, the applied regime, the composition of traded goods, trading firms' size, the tariff structure, etc. They argue that the increasing integration of supply chains also complicates the analysis of the trade impacts of exchange rate volatility, as import content of many exports is high.

Transparency and the business environment

As this section has already argued, steady declines in tariff rates have gradually brought to light more complex regulations and trade restrictions such as non-tariff measures, and have exacerbated the impact of murky border procedures and customs operations (see section 3.C). Preferential treatments of imports are sometimes unknown or misunderstood by the traders themselves, while lack of information on foreign regulations prevents exporters from prospecting on new market opportunities. For governments, low levels of transparency make difficult the design of trade policy.

Access to information and knowledge is a well-known case of public goods, as it is both non-rival and non-excludable.[17] As extensively demonstrated by economic theory, information asymmetries give rise to principal-agents problems (moral hazard, adverse selection, etc.) and cause market failures, thus calling for public intervention. The increasing promotion of transparency mechanisms at regional and multilateral levels, such as in WTO discussions, aims to respond to such needs.

Examining transparency provisions in 124 regional trade agreements, OECD document TAD/TC/WP(2011)28/REV1 identifies three main channels through which such provisions may reduce trade and business costs. Transparency first reduces money and time costs to investigate applied regulations, exemptions, and so on, for trading firms seeking to enter a new (foreign) market. Conceived as a market-entry cost, opacity has the same economic effect as protectionism. Unsurprisingly, these costs to entry are more detrimental to small and medium-sized firms, and increase with regulatory heterogeneity. Second, transparency strengthens the overall quality of institutions and the business climate, as measured in many governance indicators, two factors that in turn promote both the quantity and quality of trade. Last, under a political economy perspective, transparency helps promote bilateral trade relations through coordination and co-operation, reduces the occurrence of disputes among partners and eases their settlements. Transparency mechanisms also appear to be especially critical factors for trade in services.

17 The consumption of a unit of the good does not reduce the units available for other users, and it is not possible to include some users while excluding others from the good.

Based on selected case studies, the OECD has provided evidence that improved transparency and visibility at all stages of the design of domestic regulations could help minimise the impact or even remove many barriers to trade, result in considerable savings for both private businesses and public administrations, and ensure the predictability of the business environment (OECD, 2011b). In this regard, the use of information and communications technologies (ICT) proves to be highly valuable in disseminating the publication of trade-related regulations, and is argued to bring benefits that often more than fully compensate the engaged resources.

As suggested above, transparency provisions also participate in building trust among trade partners and improve the overall business climate. In the trade literature, such improvements have often been mentioned to have a large, significant and positive impact on the trade performance. The influence of institutions over productivity, income levels and the overall economic performance has been extensively documented (among others, see Acemoglu et al., 2001; Hall and Jones, 1999). Focusing on the trade channels of such a relation, Anderson (2001) and Anderson and Marcoullier (2002) show that poor levels of contract enforcement, partial and opaque public policies all raise transaction costs and significantly reduce volumes of trade. Using a gravity model framework on 25 EU countries, Butter and Mosch (2003) find that both indices of formal and informal trust matter for trade, though the causality remains unclear in their estimations. Interestingly, Portugal-Perez and Wilson (2012) find that the marginal benefits of improvements in an aggregate "business environment" indicator (built on indices of irregular payments, favouritism, government transparency and measures against corruption) decrease as a country's per capita income level rises.

B. Connecting the stakeholders: Transport infrastructure and logistics

As illustrated in Figure 1, once "behind-the-border" impediments to trade have been dealt with, one crucial cost component intervenes at the intersection with downstream stages of the trade chain, namely transport infrastructure and logistics services. Because they are transversal to all stages of the international trade chain, from the producer to the final consumer via customs, hard infrastructure and logistics are often viewed as one of the most important pre-requisites to make the whole supply chain efficient.

Many OECD studies have indeed explored the link between time and trade. The quality and price of logistics services and hard physical infrastructure behind the border is, for all modes of transport (roads, railroads, air and sea), at least as important in determining time to trade as trade facilitation measures relating to customs operations and administrative procedures at the border (reviewed in Section III.C). Time delays in carrying goods from the producer to the border, and from the border to the final user, can hinder trade even more significantly than tariffs (Hummels, 2001; Djankov et al., 2006). In addition, time not only affects trade volumes, but also the probability that firms will enter the export market at all (OECD, 2006b), in particular as regards small and medium-sized enterprises and exporters of time-sensitive products.

Transport infrastructure, including "the availability of pallets, shipping containers, vehicles, corridors and terminals", is the most costly but also the most significant component of transport costs[18]. Poor infrastructure has been documented to be especially detrimental to low-income and landlocked countries that rely on third, transit countries to carry goods to their

18 The World Bank's *Logistics Performance Indicators, Doing Business, World Development Indicators,* the World Economic Forum's *Global Competitiveness Index* and *Global Enabling Trade Index,* among other sources, provide several indices of transport infrastructure quality for a large sample of countries.

final consumer. For instance, Freund and Rocha (2010) find that transit delays, due to poor road quality and insecurity, are a far stronger barrier to Africa's exports than documentation and customs handling delays. They estimate that a one day increase in inland transit reduces the value of African exports by 7%. Likewise, Wilson and Portugal-Perez (2012) suggest that improvements on physical infrastructure, proxied in a single index by the quality of ports, airports, roads and railroads, bring the greatest benefits in terms of export performance. Furthermore, gravity-based estimates show that, although the marginal effect of physical infrastructure is *increasing* with per capita income levels, it remains positive large and significant at all levels of developments. Simulations show that investments in physical infrastructure (to the level of the regional top performer) bring the greatest trade gains in magnitude even for developing economies, suggesting that building high-quality hard transport infrastructure should be a high priority.

Trade logistics are specific to each mode of transport. Maritime transport dominates by far all other modes of transport as 90% of world trade in volume and 80% in value, is carried out by sea. In spite of technology improvements, maritime transport costs have not declined over the last twenty years and still amount to an ad valorem equivalent of 6% of the import's value[19]. The quality of port infrastructure and maritime transport are thus key to facilitating international trade (Bonigen and Wilson, 2008). For instance, OECD (2011a) finds that a one day decrease in time spent at sea could increase trade by about 4.5%. Alternatively, a 10% increase in maritime transport costs is associated with a 6 to 8% decrease in trade, other things being equal. They also find that middle-income countries gain more from improvements in port infrastructure than do low income nations, a result they mostly explain by the low level of security and poor business climate in the latter group. Using detailed data on the costs of shipping a standard container from Baltimore to many destinations around the world, Limao and Venables (2001) find an elasticity of trade flows to transport cost of around -3. Finally, Duval and Utoktham (2011) find that, for Asian countries' trade, port efficiency (liner shipping connectivity) explains as much as about 25% of the total variance of a comprehensive trade cost measure (see section 2).

Airborne merchandise are often higher value goods than those carried by sea, and it is common that air freight charges as a proportion of the traded good value are less important. The marginal benefit of improving airport infrastructure on trade flows increases with countries' per capita income. However, low-income landlocked countries (thus with no sea access) may reap large gains from investments in airport logistics (OECD, 2011a).

Road infrastructure is of crucial importance for intra-continental trade and landlocked economies. For example, Shepherd and Wilson (2006) use gravity simulations on detailed road transport data to show that ambitious investments in road quality within the Eastern Europe and Central Asia (ECA) region could raise regional trade by as much as 50%, to which transit countries bring the greatest contributions, thus highlighting large spillover effects and the importance for policy of adopting a regional, integrated approach. Using a similar methodology, Buys et al. (2006) find that improvements in the road network between 83 main cities in Sub-Saharan Africa could raise overland trade by about USD 250 billion over 15 years, far outweighing the estimated USD 35 billion cost for roads' upgrading and maintenance. Consistently, using an index of road quality in both exporting and importing countries, Coulibaly and Fontagné (2006) estimated a positive and significant return of paved roads on trade flows.

19 See TAD/TC/WP(2009)7/REV1 or TAD/TC/WP(2008)10/FINAL *Clarifying Trade Costs in Maritime Transport* for a review of the evolution of maritime transport costs over time and between different regions and products.

In addition to the provision of high-quality physical infrastructure and storage facilities, lowering transport costs also require the provision of efficient and competitive logistics services auxiliary to all modes of transport (cargo handling, storage, etc.), freight transport services and related. OECD (2006b) argues that liberalising such services would bring considerable gains in competitiveness, especially for small and medium-sized enterprises that would benefit from lower entry costs on the export market. Internationally fragmented supply chains also exacerbate these potential gains. OECD (2006b) illustrates the importance of logistics services for a country's export performance, showing how in Bulgaria and the Dominican Republic, the presumed advantage provided by their proximity to large demand markets (Western Europe, the United States) may not translate into comparative advantages for their textiles and apparel industry if both countries fail to provide high-quality logistics services that ensure short and predictable delivery times. Based on export data of 194 countries to the United Kingdom, Australia and Japan, the authors' cross-sectional gravity-based estimates support these conclusions: in all of their specifications, the lead time to export has a statistically significant and negative impact on both the probability to enter the export market and export volumes. These results underscore how weak logistics services can undermine export sectors' competitiveness.

Similarly, several voices now claim that inefficient logistics services are today a greater constraint to Sub-Saharan African (SSA) trade than physical infrastructure *per se* (World Bank, 2012b). In this regard, a pro-competitive environment among transport service providers is critical in order to pass the benefits of improved infrastructure onto consumers and translate lower transport costs into lower prices. Comparing the West and Southern African regions, Raballand and Macchi (2008) illustrate how a competition-unfriendly system in the former induces far higher transport prices than the pro-competitive environment prevailing in the latter. Likewise, OECD (2006b) advocates for more pro-competitive policies in the case of cargo shipping, seaport and airport services. Raballand and Macchi emphasise that "trade logistics is a fertile ground for rent-seeking activities:" the occurrence of roadblocks and associated corruption and bribery, as well as lack of protection along the road, remain strongly inhibiting factors for the existence and the magnitude of trade flows. However, these areas may prove to be more difficult and costly to address in reforms, given political economy factors.

Overall, even though building efficient transport infrastructure and logistics services obviously bears substantial financial and sometimes political cost, the benefits and spillovers to be expected are – though hard to estimate – arguably high, especially for developing countries. In particular, most of the above-mentioned studies highlight the fact that the estimated positive impact of improved transport conditions is larger for exports than imports, at both the intensive and extensive margins (Portugal-Perez and Wilson, 2012; OECD, 2011a; Freund and Rocha, 2010). Furthermore, high-quality transportation services are an indispensable condition for low-income and landlocked countries to attain fundamental development objectives, such as food security: transport costs contributed significantly to the sharp rises in agricultural commodity prices until their 2008 peak and endangered the situation of some net food importers (OECD, 2009d). In Sub-Saharan Africa, intra-regional trade of food staples is considerably hindered by high transport costs and insufficient levels of investment in modern shipping and truck industries. This strongly prevents surplus staples to reach locations where demand is high (World Bank, 2012b).

C. Crossing the border: Trade facilitation in the narrow sense

Current negotiations on trade facilitation in the Doha Development Agenda (DDA) are restricted to those impediments and inefficiencies that goods have to incur when crossing the border, irrespective of upstream and downstream trade cost components. Formally, their mandate is to clarify and improve Article V on transit, Article VIII on fees and formalities and Article X on the publication and administration of trade regulation, of the General Agreement on Tariffs and Trade (GATT). The focus on other at-the-border trade transaction costs (TTCs) owes a lot to the important reductions of tariff barriers brought by previous rounds of negotiations.

For a physical good, crossing the border at a customs checkpoint is often synonymous with non-negligible amounts of documentation, customs compliance costs, and lengthy administrative procedures before clearance. One recurrent expression in the trade facilitation literature is that cumbersome border procedures "thicken" borders. They are especially high in developing countries, and detrimental to both North-South and South-South trade. OECD analysis (brought together in the 2009 publication *Overcoming Border Bottlenecks* and forming the basis of this section) has provided a wide range of estimates on how much these TTCs impede formal trade flows.

Are trade facilitation effects equally distributed?

TTCs vary to a certain extent depending on a country's per capita income level: generally, richer countries obtain greater scores on survey-based indicators of border process quality (OECD, 2009, chap. 1). In particular, Sub-Saharan African countries present longer delays and more numerous documents and signatures by officials for both exports and imports. On a panel of more than 100 countries, Wilson and Portugal-Perez (2012), consistently find that developing countries would gain more from improvements in "border efficiency" (built here from the number of documents and days to export and import), whose marginal benefit is found to be decreasing as countries' per capita income levels rise. Because developing countries trade relatively more (time-sensitive) agricultural products and have relatively more small-scale exporters, they are the nations with the largest room for improvements and gains to reap from reductions in TTCs. Nevertheless, these positive correlations between border process quality and per capita GDP do not necessarily imply a general causation as a handful of countries with low per capita incomes perform relatively well.

It is also generally assumed that TTCs vary depending on the traded products. In particular, trade facilitation literature considers that agro-food products face higher TTCs than manufacturing goods, due to more stringent and numerous border procedures, physical inspections and sanitary and phytosanitary requirements and to the perishable nature of many agricultural products which entail a higher sensitivity to delivery delays. Raw materials are subject to strict export restrictions and procedures including warehousing, yard procedures, pre-shipment inspections and export taxes (for recent developments on export restrictions, see for instance TAD/TC/WP(2012)23/REV1 *Economic of Export Restrictions as applied to Industrial Raw Materials*).

Finally, TTCs vary considerably depending on the trading firm's size. Marginal customs compliance and documentation costs are commonly found to be decreasing with a firm's size, due to stronger knowledge and practice of customs procedures, financial capacities and stability, etc. Compared to SMEs, large-scale traders seem to benefit from 30%-50% lower TTCs, depending on estimates.

Direct, indirect and hidden costs

Among TTCs, a common distinction is usually made between direct TTCs, namely those related to border and customs procedures, and indirect and hidden TTCs, including delays at the border, opportunity costs, bribery, corruption and informal trade. Existing literature commonly estimates that direct TTCs amount to 2-15% of the value of traded goods, while indirect TTCs range between 1% and 24% of that value (OECD, 2009, chap.1). CGE-based simulations have highlighted that indirect costs, modelled by an iceberg-type representation, would be by far the greatest contributors (up to 80%) to the welfare gains associated with a reduction in overall trade costs at-the-border.

Indirect trade transaction costs include all procedural delays, inventory and opportunity costs induced by lengthy and cumbersome trade procedures at the border. For instance, long waiting times induce depreciation costs that can be particularly large for perishable and time-sensitive products such as fresh agricultural products, goods meant for immediate use like newspapers or goods that are highly cyclical in consumption, in other words all goods whose elasticity of demand with respect to time is high. They can also represent losses of business opportunities for traders: inventory-holding diverts capital resources from other productive uses and requires larger buffer stocks at final destinations. Contrary to some reductions in direct TTCs that can lower demand for outsourced logistics services and compress trade tax revenue for governments through lower fees and charges, lower indirect TTCs correspond to pure efficiency gains, hence greater welfare improvements.

In addition to direct and indirect TTCs, traders, customs and other border agencies are also often faced with issues of corruption, bribery, smuggling and insecurity at the border. Hidden transaction costs significantly reduce international trade as they act as a tax on trade than can be as significant as tariffs. They offer a simple alternative explanation to product differentiation models of trade, in order to explain why high-income countries with good institutional support trade much more with each other than with Southern countries, in spite of what factor endowments would suggest (Anderson and Marcouillier, 2002).

Hidden costs can be substantial and recurrent, especially in developing countries, and can provide incentives to trade informally. For instance, informal cross-border trade in Sub-Saharan Africa has been documented to represent a significant proportion of the overall regional trade. For instance, in 2006, Uganda's informal export flows amounted to 86% of official exports (OECD, 2009c). Sub-Saharan African informal cross-border trade is mainly composed of staple food commodities and low quality consumption items, sometimes exceeding formal flows in these products. It is often conducted by individual traders and micro-, small and medium-sized enterprises, for which cumbersome formal trade procedures are relatively more costly.

The explanation of why traders choose informality can be found in a simple cost-benefit approach: in some countries, trading formally induces large transaction costs and small benefits compared to informal exchanges. The costs of formality are not only made of all the components mentioned previously, such as official import/export duties and taxes – that can attain especially high levels on selected commodities – complex and non-transparent regulatory measures, long and inefficient border procedures, etc. They also include significant risks of predation, bribery, theft and other "facilitation payments" by customs officials, and low levels of security. 'If I am born again, I want to come back as a customs official", said an anonymous Thai businessman[20]. A 2006 World Economic Forum (WEF) survey indicated that

20 Source: Gatti (1999).

corruption remains one of the most important barriers to doing business in Africa. On the other hand, weak law enforcement and poor levels of sanctions and penalties make the relative cost of informality and customs evasion more rewarding for traders. Smuggling can be simply more worthwhile (OECD, 2009, chap.4).

Hidden transaction costs act as a strong barrier to formal bilateral trade in developing countries (Shepherd, 2009; de Jong and Bogmans, 2011), thus hamper economic growth and development. They first distort competition and hinder competitiveness in the formal sector. 40% of manufacturing firms in developing countries consider the competition from informal trade and the disproportionate tax burden on them as one of the top three obstacles to doing business and a significant disincentive to invest in the formal economy (OECD, 2009c).

Second, informal trade deeply erodes the tax base and governments' revenue. Trade taxes are an important, indeed often the largest, contributor to public revenue and state budgets in developing countries. Over the last forty years, however, continuous reductions in tariff rates, have contributed significantly to the steady decline in tax revenue in these countries (Cagé and Gadenne, 2012)[21]. From this perspective, customs modernisation measures that ensure more accurate reporting of the good's value, detect fraud and tackle smuggling, can be seen as a major avenue for mitigating the "fiscal cost of trade liberalisation" in developing countries. In some countries, revenue losses from inefficient border procedures are estimated to exceed 5% of GDP. This indicates the large potential for improvements in a country's public revenue of trade facilitation measures that raise the costs of informality and provide incentives to formalise. Case studies actually reveal that the enhancement of government revenue is often one of the primary motivations behind trade facilitation and customs modernisation programmes.

The gains from trade facilitation

How much would countries and traders gain from lower TTCs driven by trade facilitation policies? Facilitation endeavours at the border are considered as one of the low-hanging fruits of trade liberalisation, not only because, linked to a specific point of the trade chain, they are easier to identify and to target, but also because they are undertaken primarily for each reforming country's own sake and not as a concession for the country's trading partners. The OECD has recently developed a battery of Trade Facilitation Indicators (TFIs) to estimate the impact on TTCs of specific trade facilitation measures negotiated in the WTO. Analysis based on the TFIs shows that, for OECD countries, measures that could help achieve the most significant reductions in TTCs relate to the streamlining of border *procedures* through practices such as single windows or pre-arrival processing; the provision of *advance rulings; automated* processes and risk management*;* and the streamlining of *fees and charges (*OECD, 2011e). On the other hand, non-OECD countries' TTCs are more affected by changes in transparency and *information availability,* and by the harmonisation and simplification of *documents*, although *automated* processes and risk management, the streamlining of border *procedures*, and good *governance and impartiality* play also a very important role (TAD/TC/WP(2012)24). TFIs estimates suggest that the potential for trade cost reduction on these factors amounts to 10% of total trade costs for OECD members (14% for trade in manufacturing), and between 13 and 15.5% for non-OECD countries. Based on a direct

21 In 1975, trade taxes accounted for a third of total tax revenue in low-income countries, a fifth in middle-income countries, against 2% only in high-income countries. Until the years 2000, while tariff declined continuously, the share of trade taxes in total tax revenue, as well as total tax revenue itself, fell by an equivalent of 2 percentage points of GDP in both low-income and middle-income groups, while rich countries more than compensated lower trade tax revenue by increase in domestic taxation.

measurement approach (see above, section II), these estimates can be considered as relatively modest assessments of the full cost-reduction potential.

Product-specific analysis on a sample of agricultural (coffee, tea, cocoa, spices) and manufactured products (textiles, apparel and clothing) estimated that a 10% reduction in the number of documents needed to import could increase trade by 11.1%, while similar 10% reductions in the number of days and signatures needed to import would result in 6.3% and 9.9% trade increases respectively (OECD, 2009, chap.2). Such elasticities are usually smaller for low-income countries than for OECD members, indicating that greater efforts are needed to close the gap with the world average, in particular with respect to South-South trade. Finally, computable general equilibrium (CGE) models also find that high gains can be had from reductions in TTCs: a 1% reduction in transaction costs would increase world income by USD 40 billion, with no losers, of which two thirds would accrue to developing countries (OECD, 2009, chap.1).

Improving border efficiency: What costs for what benefits?

How costly is it for countries to improve border efficiency and reduce trade transaction costs? It appears that many trade facilitation measures have the advantage of addressing the three dimensions described above – direct, indirect and hidden TTCs – altogether. For instance, reducing and automating the number of requested documents to be filled in at the border lowers the risks of unexpected time delays. But it also reduces the relative cost of trading formally and the number of face-to-face interactions and associated opportunities for rent seeking.

Automation, which broadly refers to the use of information and communication technology (ICT) in customs procedures, is usually considered to be one of the most powerful tools for increasing customs efficiency and reliability. However, it also entails a substantial financial cost, and often represents around two thirds of the total cost of customs reform. For instance, the implementation cost of the widespread ASYCUDA automatic system is normally estimated at around USD 2 million, and requires at least as much in regular updates and maintenance. In practice, the implementation cost of automation varies a great deal and depends also on whether countries chose to develop their own system. The cost of automation depends not only on the country's state of supporting infrastructure, but also on its degree of development and coverage. The segment of customs clearance on which automation focuses, from risk-management practices, pre-clearance processing, post-clearance audits or the establishment of automated single-window enquiry points, is of great importance in determining the system's cost (OECD, 2009, chap.5).

In addition, automation often needs to be complemented and/or preceded by deep changes in regulation, such as tariff structure simplification and WTO-compliant customs valuation methods, by strong institutions and by a legal system that can guarantee contracts' enforcement, transparent and impartial applications of policy. Organisational reforms of customs are also often needed, especially in developing countries, through greater financial resources and budgetary autonomy, improved education, salary and professionalism of customs agents, etc (OECD, 2009, chap. 4). Some of these elements cost relatively little to implement and can have immediate effects, such as the publication of information or co-operation between operating agencies (OECD, 2006a).

Even though the costs of implementing, operating and maintaining automated systems are substantial, anecdotal evidence suggests that savings stemming from automation largely exceed, and quickly and durably recoup the costs. Customs clearance time appears to have shrunk in many countries after introducing automation. For instance in 1997, 132 hours were

needed to clear a good in Morocco, while less than an hour was sufficient in 2002 under an automated system. Likewise, automation helped Costa Rica to reduce its average clearance time from 144 hours to 12-15 minutes within six years. As indicated previously, such time savings at the border can result in substantial increases in trade flows, which, in turn, participate to greater potential for economic growth and development.

Moreover, customs reform, and automation in particular, allow significant productivity gains at customs, which translate into business savings for private agents, which are often estimated to largely outweigh implementation costs. Chile's USD 5 million reform in 1998 was recouped by an estimated USD 1 million business savings each month. The cost-benefit assessment for the United States Automated Commercial Environment (ACE) estimated that the government's related USD 1 billion investment would save USD 22.2 billion for businesses and USD 4.4 billion for the US Customs Service over 20 years. Singapore's USD 11 million TradeNet system saved traders around USD 1 billion a year in internal productivity savings.

Trade facilitation also translates into gains for public agents through more efficient and reliable trade tax collection, which is, as highlighted above, of crucial importance for developing countries' state budget. By reducing the number of face-to-face interactions and the level of direct and indirect transaction costs, they act as a strong anti-corruption, anti-smuggling and tax base enlargement force. The OECD has extensively reviewed a number of Country case studies show that trade facilitation reforms bring a net positive effect on the collection of trade taxes (see Table 3.7 in OECD, 2009, chap. 3), whatever the breadth and depth of modernisation initiatives[22]. Peru offers a particularly telling illustration: following customs reforms launched in 1990, customs revenue increased by 327% between 1990 and 1996, in spite of reductions in duties and tariffs between 15% and 35%.

Furthermore, trade facilitation presents significant benefits for regional integration between Southern countries and for South-South trade, as these trade relations often display the highest levels of trade transaction costs in terms of administrative procedures, time spent at the border, tax evasion, smuggling and informal trade. As a recent World Bank report stated, removing barriers to intra-regional trade in food staples in Africa could greatly help the continent to achieve self-sustained food security (World Bank, 2012).

Finally, it is important to emphasise that exports potentially benefit at least as much as imports from trade facilitation measures. Results from the Trade Facilitation Indicators clearly demonstrate that low-income countries' exports benefit as much and significantly as imports from customs modernisation (TAD/TC/WP(2012)24). This arguably goes through two channels. First, faster and clearer border procedures lower the *entry* cost to export, thus fostering the emergence of new product-destination export lines. Second, in a context of the increasing prevalence of Global Value Chains (to which we will return later), smoother flows of imports can offer access to new, cheaper intermediate inputs and act as vehicle for technological and know-how transfers, thus contributing to the competitiveness of exports. Thus, the facilitation of imports may promote exports at both the intensive and extensive margins. It is today almost a truism to say that hindering your imports is in the end equivalent to taxing your exports.

22 Although these figures should be taken with care as changes in customs revenue may be due to many other, contemporaneous political and economic forces, a few examples include Angola, Jamaica or Bolivia, which increased their customs revenue by 150%, 110% and 25% respectively, a few years after the launching of customs expansion and modernisation programmes.

Overall, trade facilitation and customs modernisation programmes, through automation initiatives and supporting at-the-border infrastructure and institutions, seem to bring long-term benefits, for both public and private agents, while implementation costs are often borne only once and quickly recouped by large gains in productivity, public revenue and export competitiveness.

D. Reaching the final user: "beyond-the-border" cost factors

As noted in Section III.A, most "behind-the-border" cost factors affect both imports and exports. Thus, all the points expressed in that section are just as relevant once the border and customs procedures have been carried out. Likewise, transport infrastructure matters as much in the destination country and until delivery to the final user is accomplished.

A few peculiarities are nevertheless identifiable on the importer side. First, before goods reach the final consumer, most of them pass through the distribution and retail services sector. As underscored by OECD (2008a), there are strong relationships between the sector's features and the volume and composition of traded goods, in particular due to the increasing internationalisation of retailers, the proliferation of private labels and standards, and trends in market structure and technology over the last two decades. From a trade cost perspective, the increasing market concentration of the retail sectors seems crucially important as it brings another potential source of discrepancy between trade costs and prices. Improvements in information and communication technologies, consumers' taste for product variety and the increasing integration of logistics, marketing and sometimes product design services into retailers' core activities – trends that are commonly summarised in the concept of "lean retailing" – have expanded the scope for economies of scale in the sector. The resulting more concentrated market has allowed retailers to exert market power on both consumers and suppliers. Competition policy instruments should be used to ensure that costs savings are effectively passed on to consumers. Using a zero-inflated gravity model[23] on OECD countries' imports from 144 trading partners, OECD (2008a) finds that both ownership and geographical concentration measures have a negative and significant impact on imports of food products. For non-food products however, only the measure based on retailers' market shares was negatively associated with imports, while the geographical concentration had a positive impact on trade flows.

In addition, it is important to recall that the context of increasing internationalisation of the supply chain, impediments to imports are at least as harmful for trade expansion, economic growth and development objectives as costs to exports. OECD (2011c) recalls Krugman's meaningful words: "Even more fundamentally, we should be able to teach students that imports, not exports, are the purpose of trade. That is, what a country gains from trade is the ability to import things it wants. Exports are not an objective in and of themselves: the need to export is a burden that a country must bear because its import suppliers are crass enough to demand payment".

23 Standard log-linear gravity equations indeed lose information as zero trade flows are dropped. The dependent variable being only bilateral trade *contingent* on existing trade relationships, OLS estimates are likely to suffer from sample selection bias as many of the usual controls (markets' size, bilateral distance, etc.) may be correlated with the probability of being in the sample. Zero-inflated models using Poisson pseudo maximum likelihood (PPML) estimators provide unbiased and efficient estimates that account for such sample selection. They are also less restrictive than Heckman's sample selection model as they do not impose any exclusion restriction or selection variable.

In the literature, the role of imports on a country's export competitiveness is increasingly recognised. It goes first through pro-competitive effects. For example, Amiti and Khandelwal (2012) underline two competing effects of liberalising imports. On one hand, the greater extent of competition results in a discouragement effect for export products whose quality is far from the world technology frontier. On the other hand, it provides incentives to exporters whose good is closer to the technology frontier to upgrade the quality of their product in order to escape this new competition. Second, it goes through a broader access to high-quality, low-cost intermediate inputs: Feng, Li and Swenson (2012) recently found that Chinese manufacturing firms significantly improved their export performance when they relied more on imports of intermediate inputs. Finally, foreign imports are also vehicles of foreign technology and can have significant positive impact on a country's aggregate productivity (see Hallaert et al., 2011, for a review).

To summarise this section, there is nothing in favour of asymmetric trade facilitation policies along the supply chain, both at the border and around the border. Governments should not be tempted to promote more efficient infrastructure, services, procedures and regulations only for exports and not for imports. With respect to export competitiveness objectives, there is more to lose than to gain in restricting the domestic economy's access to foreign imports.

IV. Synergies in trade facilitation policies: The case for a holistic approach

Based on numerous OECD studies, the previous section has reviewed the state of evidence with respect to the various trade cost components all along the international trade chain: at the border, behind or beyond the border, and specific to both trade in goods and services. It has exposed policy options and, when possible, the cost of realising them, for each of these cost components.

However, it may be of limited relevance for policymakers to take these components in isolation. Precisely because they belong to a single international supply chain, trade cost factors are likely to interact and not to be independent, all the more in light of the operation of modern global value chains (GVCs) that presumably multiply these interactions. It would thus be erroneous to simply sum all the above estimates and orders of magnitude in order to get a definitive idea on how much trade costs amount overall. Inter-related cost components imply that removing one barrier at a given link of the trade chain may translate into zero benefits, or even raise new trade costs, if not accompanied by improvements downstream and upstream. As the opening quote of this paper suggests, inefficiency at one link of the chain may fully prevent improvements on other links to pay off. If this is the case, and as many OECD studies advocate, policymakers need to adopt a holistic approach that embraces the whole chain in order to facilitate trade in goods and services.

This section thus aims to answer the following questions. Are trade cost factors substitutes, complements or are they independent? Can lowering trade costs in one area raise new trade costs in another? On the contrary, are they rather likely to decrease together? Can trade facilitation policy reforms undertaken in isolation be effectively trade- and growth-enhancing?

Trade cost factors as complements

As suggested in previous sections, in many respects, "at-the-border", "getting-to-the-border" and "beyond-the-border" cost factors may be viewed as complementary components. Complementary factors suggest that reducing one cost factor while maintaining the others at constant levels is not a very efficient way to cut total costs. Applied to objectives of trade facilitation and promotion of economic growth, it implies that reducing trade costs at a given

link of the international trade chain is a necessary condition, but often an insufficient one, if not accompanied by complementary reforms on other trade cost factors. The most effective cost-reducing approach is to address barriers to trade together in a comprehensive manner, although addressing selected barriers still has advantages over inaction, especially if those barriers are quite central or transversal in the supply chain. At the core of these complementarities are transport infrastructure and logistics services, which intervene at all stages of the supply chain. Many of the complementarities between trade cost components involve transport to some extent.

For instance, improvements in hard infrastructure may fail to improve the overall trade effectiveness if not accompanied by well-performing, competitive transport and logistics services (Arvis et al., 2007). While railroads networks have drastically improved in Sub-Saharan Africa and resulted in transport costs that are not remarkably higher than in Western Europe, at least on the main international corridors, it is still excessively costly to ship goods in some African regions where cartels and monopolies prevail. Appropriate regulation, through pro-competitive policies for instance, must guarantee that lower transport costs, subsequent to upgraded infrastructure or less frequent roadblocks for instance, are indeed translated into lower transport prices (Raballand and Macchi, 2009; World Bank, 2012). The benefits of high-quality roads are thus fully realised only when the regulatory environment ensures high-quality and low-prices services.

Similarly, in spite of modernised inland transport infrastructure, it may take as long as before to carry a good from producer to final consumer if the amount of unnecessary administrative procedures and physical interferences and inspections at customs are not reduced in parallel and if goods remain immobilised at borders for excessive amounts of time. Conversely, customs administration modernisation and newly trained staff may not make as much difference as they potentially could if port, airport and warehousing facilities are not upgraded, or if communication networks are poorly developed. It should be highlighted that engaging in reforms solely in one area without implementing complementary measures may increase the financial cost, while the realisation of benefits is below potential. In a worst case scenario, this may add to a country's debt burden with little improvements in trade effectiveness (OECD, 2009, chap. 4)

Such complementarities between "hard" and "soft" infrastructure are often demonstrated empirically. For instance, Portugal-Perez and Wilson (2012) add in their two-stage gravity model several interaction terms between composite indices of the business environment and physical infrastructure on the one hand, and border efficiency and ICT infrastructure on the other hand. These terms appear positive and statistically significant, confirming these complementarities.

In addition, the increasing prominence of Global Value Chains (GVCs) raises unambiguously the magnitude and importance of these interactions and complementarities, as well as the price for considering trade cost factors in isolation. As goods and services cross borders multiple times, and thus incur trade costs multiple times as well, maintaining inefficient trade procedures is increasingly costly for firms COM/DCD/TAD/RD(2012)2/RD4). Even if import tariff rates have on average reached low levels, their cumulated cost can be substantial. Likewise, NTMs at every stage of the internationally fragmented production process may accumulate along the supply chain (Ferrantino, 2012). As the import content of export products is ever rising in the light of operation of GVCs, a country's impediments to imports turn to be ultimately a tax on its own exports, and obstacles to its competitiveness. Global Value Chains thus add a "multiplier effect" or "amplification effect" on all policy and non-policy barriers to trade.

Global Value Chains, and the associated increase in the foreign content of domestic export products, have also reinforced the complementarities between trade policies, not only between bilateral trade partners but also with respect to third countries that are involved upstream in the chain (TAD/TC/WP(2012)31). National policies that ignore this new intensity of interdependent supply chains, the internationalisation and fragmentation of the production process, and that still conceive trade as competition on finished products entirely produced domestically, have become obsolete and are likely to fail. Protection against foreign imports may be more than ever detrimental to domestic producers as they are increasingly reliant on imported products. As international competition takes place at the level of tasks, pro-competitive national policies also need to be conceived at this level. However, whether the internationalisation of the production process requires the internationalisation of trade policymaking (in the sense of multilateral or regional rather than unilateral decisions) remains unclear. Unilateral trade liberalisation may still represent a first-best policy choice.

Trade cost factors as substitutes

The previous section argued that policies that improve the performance of one specific link in the trade chain may be inefficient if other cost components are neglected. Is this always the case, or can certain trade cost components be viewed as substitutes, in the sense that reducing costs at one link of the chain may raise costs in others, holding total costs constant? In other words, to what extent and under which circumstances is a poor (good) performance in one area "compensated" by a good (poor) performance in another? Note that trade cost measuring approaches that aggregate various trade cost components implicitly assume that these components are substitutes.

One likely example is a situation of rent extraction, associated with several of the trade cost components reviewed above. If reducing rent at one link of the chain increases the incentives to extract rent at subsequent or earlier stages, then cost-reducing trade policies may simply result in distributional shifts with no compression in total trade costs. For instance, the provision to (monopolist) trucking operators of a more secure environment in order to reduce all hidden costs they are subjected to – corruption and bribery at customs and roadblocks – may ultimately provide them more degrees of freedom to raise their mark-ups and charge higher transport prices to final customers.

Shifts in rent extraction power could also take place with respect to customs and border procedures. For instance, in order to clarify the interactions between traders and authorities, some countries have transferred the responsibility of the preparation of documents and/or electronic submissions, payment of taxes and duties, etc., from customs officials to private customs brokers. However, if customs brokerage businesses benefit from monopoly power and are protected from potential competitors due to sunk entry costs, the incentives to charge high prices and to provide low-quality services are in the end unchanged. In such case, the rent extraction power has just been displaced from public to private agents but is far from being eliminated.

In both these cases, the upholding of trade costs at an overall constant level is directly linked to the failure to address monopolistic behaviour, confirming that the trade chain cannot be stronger than its weakest link. Trade cost components are strongly interdependent and move together (their cross elasticity is different from zero). As trade within global value chains has reinforced these interdependencies, an integrated approach that includes all the links of the trade chain seems in any case indispensable before engaging into reforms. In the process of designing policy, it is necessary to assess whether reducing trade costs at one point

of the chain will not be frustrated by complementary barriers, nor that it will only displace the burden to other cost channels.

From cost components to underlying causes

Looking back at the various cost components enumerated in previous sections, several dimensions of trade costs can be identified that recur along the whole trade chain. These can be interpreted as "underlying" or "primary" sources of trade costs. Identifying the major underlying sources of trade costs can help prioritise the policy reforms meant to reduce these costs and enhance the efficiency of the international trade chain.

The first primary factor identified relates to issues of (un)certainty, (un)predictability and (un)reliability in delivery, transport delays and/or payments, which are largely related to indirect cost components. These concerns are commonly mentioned as one of the main hindering factors of trade flows in business surveys, and are often a central and explicit motive of international and regional trade agreements. Yet, uncertainty may rise at many different points all along the supply chain**.** Risks of corruption and bribery at the borders, insecurity, roadblocks and checkpoints on transit routes, terms-of-trade and exchange rates volatility, non-transparent legislations and trade regimes, political risks, etc., are as many sources of variation and uncertainty about what shipping a good from the producer to its final user will actually cost.

If agents – producer, consumer or intermediates – are risk-averse, the degree of uncertainty can have significant negative impacts on the volume and frequency of international transactions. When entry to export markets involves sunk costs, uncertainty holds up or even prevents prospective exporters from investing (Handley and Limao, 2012), while established exporters may restrict their trade volumes. Based on a standard trade model, Limao and Maggi (2012) add on this argument by showing that the cost of policy uncertainty (and the gains of managing uncertainty through trade agreements) becomes relatively more important as conventional trade barriers gradually fall and countries are more integrated.

The second major underlying factor relates to the discrepancy between trade costs and trade prices that trading firms have to incur, due to numerous windows of opportunity for intermediaries to extract rent all along the trade chain. Rent extraction represents in many regards a direct cost for trade operators. Whether rent extraction is due to uncompetitive regulations, to monopolistic powers in the transport, customs brokerage, telecommunication, or financial services sectors, to corrupt customs officials or to informal smugglers, it often adds a significant burden on both exporters and importers. As already suggested, rent extraction strongly complicates the design of remedial policies because they have to ensure that when reducing/removing rent at some point of the chain they do not generate new rent-seeking behaviours at other points.

The third underlying source of trade costs and of difficulties in addressing them is related to the political economy of trade policy. Despite the fact that the benefits of participation to international trade on income levels and growth are widely acknowledged, policymakers may opt for policies that depart from a presumably optimal free trade regime in order to serve political economy considerations under the pressure of vested interests. These policies may tend to favour certain groups by transferring resources (through subsidies and taxes, market access restrictions, protectionist regulations), display partisan preferences, or promote re-election. They may also interact with policy preferences of various types of private interest groups like lobbies, political parties, unions, consumers' associations, etc. As Rodrik (1995) reminds us, trade policy instruments are far from being distribution-neutral, and plenty of

trade models have exposed how organised groups or individual voters can influence the income-distribution consequences of trade flows. In order to internalise political-economy considerations in the design of policies meant to facilitate trade, the reciprocal causation between trade flows, trade costs and trade policy need to be kept in mind.

V. A conceptual framework for policymaking: The trade costs diagnostics

The necessity, exposed in section IV, to adopt a comprehensive view on trade costs all along the international trade chain does not however mean that all issues/components should be addressed evenly and at the same time. With respect to many dimensions, trade costs, as well as the marginal benefits associated with their reduction, vary according to a country's per capita income level, stage of development, institutions, geopolitical and business climate, as underlined in previous sections. In addition, countries differ in financial, institutional and political implementation capacities (OECD, 2006a; OECD, 2009, chapter 6), while the intensity of trade constraints is often noticeably different for exports and imports (OECD, 2011c).

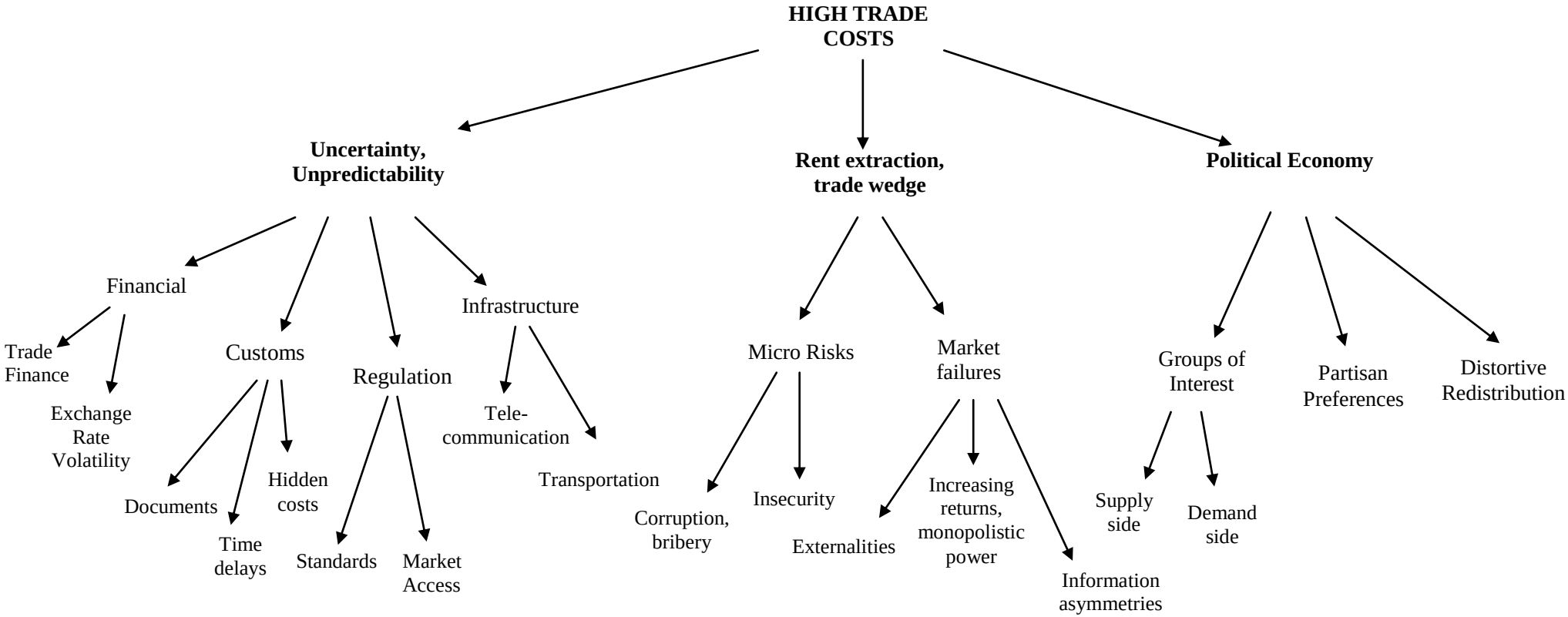
Therefore such variation rather calls for a pragmatic case-by-case policy approach, instead of mechanically replicating "best-practices" that tend to overlook the idea that trade costs may be generated by all sorts of different reasons.[24] Appropriate policies are almost always context specific; the prioritisation and sequencing of reforms should be designed in order to accommodate each country's specificities.

The prime determinants of trade costs matter, and a diagnostics framework in the spirit of Hausmann, Rodrik and Velasco's methodology on "Growth Diagnostics" (Hausmann et al., 2005) could help policymakers identify them in the specific circumstances of their country.[25] The conceptual advantage of a diagnostics approach, as summarised in Figure 3, is that it gives priority to identifying the most *binding* constraints, or, more precisely, the ones binding disproportionately, the ones whose relaxation will bring the biggest returns. At their core is the identification of what we called the "primary" or "underlying" causes of trade costs, that run through most if not all stages of the international trade chain.

24 This trend is partly attributable to the widespread and popular use of international benchmarking and rankings – like many of the indicators mentioned in previous sections – in order to asses a country's relative performance.

25 OECD (2009f) and OECD (2011c) have also applied the "growth diagnostics" framework to the specific issue of trade costs, in order to explain developing countries' poor trade performance, of which trade costs are only one aspect.

Figure 3. From cost components to trade costs diagnostics



The aim of this section is not to tell policymakers *what* they should target as a priority, but rather *how* they should think of the international trade chain and what questions they should ponder in order to build the appropriate policy agenda and, ultimately, reduce trade costs in a cost-effective manner.

The "trade costs diagnostics" approach suggested here is fundamentally a top-down sequence of questions. In order to identify, in a particular country setting, what is the most binding constraint to trade along the supply chain, or in other words, what is the most binding factor causing trade costs, one first needs to identify the most important underlying factor among a multitude of possibilities. These underlying sources are not inferred from any theoretical considerations, but instead from what appear to be recurrent causes across all the trade cost components reviewed.

One issue with this first set of underlying constraints is that they are not directly amenable to policy interventions. It is thus necessary to gradually narrow down the set of constraints so as to locate, along the trade chain, what is the component to be addressed as a priority by policy and that can be directly targeted. In doing so, interactions with other cost factors and national implementation capacities are accounted for.

The trade costs diagnostic approach can be summarised in the following sequential questions:

a) *What* is the underlying source of trade costs?
b) *Where* it is *primarily* and most heavily located in the trade chain?
c) *What* is the implementation cost of relaxing the constraint, given national capacities?
d) *What* is the impact of remedial policies at this given point on downstream/upstream links?
e) *How* much is the cost factor dependent on partners' trade policies, in a context of vertical specialisation/GVCs and regional integration?

a) What is the underlying source of trade costs?

This first, crucial question can be reformulated into the following: how can policymakers identify and target the most binding factor at the origin of trade costs? In Figure 2, and from the evidence previously reviewed, it is suggested for instance that uncertainty in deliveries or rent-seeking behaviours belong to this first set of underlying, recurrent constraints to trade. Nonetheless, other potential factors could also be in play. In their "mindbook for growth diagnostics", Hausmann, Klinger and Wagner (2008) put forward four criteria, which constraints to a given problem have to respond to be potentially binding.[26] Adapted to the issue of trade costs, these criteria could help policymakers identify various potential constraints and then test what are the most binding among them, in a country's given context. The criteria could be applied at various stages of the decision tree, until one reaches the level of trade cost components that are actually targetable by policy. Corroborated by quantitative and qualitative evidence, they would propose a pragmatic approach towards designating cost factors whose relaxation will be the most effective, and allow ranking them according to their degree of policy priority.

26 The authors argue that convictions can be pertinently and simply upgraded following the well-known Bayesian inference framework (meant to calculate, given occurrences in prior trials, the likelihood of a target occurrence in future trials). Using the framework would allow assessing the differential "significance" of multiple hypotheses or potential explanations, based on their subjective probability of being the actual cause of a particular problem. From the comparison of these multiple hypotheses, the set of possible causes can gradually be narrowed down.

The first criterion is that "*the shadow price of the binding constraint is high*", i.e. that supplying more of the constrained input (f.i. transport infrastructure or services, trade finance, etc.), will translate into significant reductions of trade costs. A high shadow price would indicate that relaxing the constraint (monopolistic rents, bribery, excessive administrative procedures, etc.) would have a large impact. Although this shadow price is most of the time unknown, it can be inferred from actual or implicit market prices, taken for instance from econometric regressions results. For instance, if the low quantity of available trade finance is believed to be a constraint to trade and to raise trade costs, but it appears that the real interest rate is actually very low on the market, then scarce demand might be the cause instead of scarce supply. In this case the judgment should be revised and trade finance not be seen as a binding constraint. International comparisons can be used in order to assess what is the probability of having very high real interest rates.

Second, "*movements in the constraint should produce significant movements in the objective*", i.e. relaxing the constraint should be largely trade costs reducing. Following the previous example, would reducing the real interest rate promote trade flows? Here again, cross-country comparisons, case studies, country-specific knowledge and econometric regressions (with robust identification strategies) can provide some elements for answer.

Third, if the constraint is binding, "*agents in the economy should be attempting to overcome or bypass the constraint*". Private importers and exporters are the first agents to be aware of the constraints that obstruct their economic activity. They also develop a wide range of approaches in order to minimise and possibly bypass these constraints. For instance, cumbersome administrative procedures and risks of corruption and bribery by customs officials could encourage informal trading in order to avoid these costs (OECD, 2009c; OECD, 2009, chap.4). Similarly, with respect to trade finance, small traders may choose, due to credit constraints or administrative barriers, to turn towards informal sources of financing. In this regard, business surveys may prove to be extremely useful in order to assess what stakeholders consider as the most inhibiting factors.

Finally, "*agents less intensive in,* or less subject to, *a binding constraint should be more likely to survive and thrive, and vice versa*", i.e. traders that are less affected by a particular cost factor should be doing better than those who are highly exposed to that factor. Also, looking at the characteristics and circumstances of the most successful parts of the economy can be informative of the constraints that affect areas that are doing poorly. With respect to trade cost components, firms which trade extensively in time-sensitive products or firms that are highly intensive in R&D, etc., all display very different levels of performance and "resistance" to trade costs.

b) Where is this source primarily located in the trade chain?

While Figure 1 provides a narrative storyline of what are the various obstacles that traders have to face when engaging in the trade chain, sequentially from the producer to the final user via borders, underlying sources of trade costs do not occur in chronological order, but can influence multiple stages of the chain at the same time. In order to identify the main cost factors that should be addressed by policymakers as a priority, Figure 2 attempts to represent them along a decision tree.

It is noticeable that on Figure 2, a single cost factor can intervene at various stages of the trade chain. For instance, the costs which are related to the exertion of a monopolistic power, and ultimately to the discrepancy between trade costs and trade prices, may be the fact of freight services providers behind-the-border (on the export or import side, or both), of telecommunication services firms, of customs brokers at the border, of trade finance operators,

etc. Conversely, it should be understood that the various branches in the decision tree exposed in Figure 2 are not strictly exclusive from one another.[27] Several of the identified cost factors overlap and will translate into closely related policy actions, as is the case for issues of hidden costs and insecurity for instance.

The second step of the trade costs diagnostics would thus be to determine *where* on the trade chain the binding constraint intervenes and *who* are the stakeholders to be targeted by policy.

c) What is the implementation cost of relaxing the constraint, given national capacities?

Once determined the policy priorities to be addressed, given a country's circumstances and stage of economic development, and the parts of the trade chain which are disproportionately affected, the next step is to put things under the perspective of national implementation costs and capacities. The prioritisation of reforms as defined by the trade costs diagnostics needs to be appreciated and, perhaps, re-examined under the pragmatic light of feasibility (OECD, 2006a). On the whole, the most important cost factors, as defined by the trade cost diagnostics exercise, will not necessarily be the easiest to remove given national capacities, although there are areas which are potentially highly beneficial in terms of trade cost reductions without being taxing on national resources and implementation capacities (see in particular the OECD Trade Facilitation Indicators). It is thus relevant to complement and upgrade the top-down diagnostics approach with more bottom-up analytical tools, such as cost-benefit analysis, in order to account for such resources dimension.

Indeed, the various trade costs factors reviewed through this study display varying levels of implementation costs and weigh differently on domestic capacities. Reforms to deal with rent seeking behaviour may be financially less demanding than transport infrastructure improvements, but at the same time less consensual and politically more difficult to address. Likewise, as the *intensity* of a single cost factor differs across countries, so do required expenses to address that factor. For instance, preliminary evidence on the costs of implementing trade facilitation measures at the border in a few developing countries illustrates this disparity (TAD/TC/WP(2012)25).

Essentially, a tension exists between the need to consider the trade chain as a whole, the definition of policy priorities, and their practical feasibility. In the case of a developing country with strong budgetary constraints which get in the way of eliminating the most binding constraint, is it still worthwhile to address second-order constraints, which are less costly and within the reach of policymakers? Arguing that trade cost components are connected into a single chain that requires all links to function together, does it pay off to dedicate efforts and resources in the removal of a constraint if complementary and perhaps more binding cost factors cannot be eliminated?

The answer to this question is probably positive, as, even if cost factors are strongly inter-dependent and to a great extent complementary, it cannot be argued that they are *perfect* complements, i.e. that the removal of second-order constraints will be totally ineffective where the most binding cost factors cannot be addressed previously. In addition, improving the performance of second-order constraints magnifies the benefits to be expected from further

[27] Dixit (2007) argues that a cross table would be a more accurate representation of the Bayesian inference framework, where a set of multiple causes crosses a set of multiple effects to form a cluster of conditional probabilities.

efforts dedicated to the removal of the most binding cost factors. The argument that governments should seek to target the most binding constraint in the trade chain as a matter of priority should not be used as a pretext for inaction when this is not feasible in practice. Furthermore, in light of limited domestic budgets and resources, the trade costs diagnostics may also help to mainstream and clarify aid for trade objectives, which precisely aim at helping developing countries to build and consolidate their trade-related capacity[28].

d) What is the impact of remedial policies at this given point on downstream/upstream links?

Section IV has underscored the interdependencies between most trade cost components and the need to adopt a holistic approach that embraces the whole trade chain in order to facilitate the international circulation of goods and services. Short of repeating this analysis here, it is crucial for policymakers to account for and keep these inter-relations in mind when undertaking the design and prioritisation of reforms. Not only should the most binding constraints, which are at the reach of governments given their national implementation capacities, be targeted first. Priority should also be given to these trade cost components that are more likely to trigger a virtuous circle along the trade chain by raising the incentives (for both private and public agents) to reduce trade costs at other links of the chain.

e) How much is the cost factor dependent on partners' trade policies, in a context of production fragmentation and regional integration?

By definition, a "trade chain" makes the connection between bilateral trading partners located in two or more countries. Thus, improving the overall effectiveness of the chain is likely to require co-operation between and simultaneous efforts from all parties, as unilateral endeavours to reduce trade costs may be (at least partly) hindered by obstacles dependent on one of the other partners. The fragmentation of the production process has multiplied the number of operators and countries taking part into a product's life cycle and intensified trade policies' interdependencies. In addition, regional trade agreements (RTAs) have proliferated worldwide, partly in response to the slow progress observed at the multilateral level. This economic and policy interconnectedness raises the question of the optimal level of cost reduction interventions, all along the trade chain: unilateral, regional, or multilateral?

Document TAD/TC/WP(2012)31 maintains that, to some extent, in a context of global value chains, the increasing import content of exports and general importance of imports in a country's competitiveness, would argue in favour of undertaking unilateral actions and being the "first movers" in facilitating the circulation of goods and services. "*Global value chains seem to have weakened the case for reciprocal trade liberalisation*", and this seems applicable to every dimension of trade costs.

On the other hand, several of the trade cost components reviewed in this study precisely depend on the level of co-operation between countries or lack thereof, such as regarding the harmonisation of regulatory standards. However, whether this international co-operation should best take place at a multilateral or regional level remains unclear. While multilateral agreements remain first-best options, regional agreements may be seen as more feasible as

28 For instance, document COM/DCD/TAD(2012)12 proposes a framework for the management of aid for trade, whose first level displays a wide menu of possible direct objectives (and related indicators to measure the achievement of these objectives) that aid for trade could target, in order to reach trade and development intermediate and final outcomes. However, such a menu does not tell how to rank, categorize and discipline these objectives according to their degree of policy priority.

they imply a limited number of partners. On the other hand RTAs entail a stronger risk of bias towards the preferences of the stronger partner (Disdier et al., 2012).

VI. Conclusion

Understanding trade costs is essential for elaborating policy interventions meant to reduce such costs. Past OECD Trade Committee work has offered insights into cost factors across the entire trade chain, i.e. not only when goods and services are crossing borders, but also getting goods and services to the border for export and from the border for import.

At the border the focus has been mainly on costs generated by the procedures and regulations of Customs and other border agencies. It has, for instance, estimated that a border-related cost reduction equivalent to 1% of the value of world trade would generate welfare gains of about USD 40 billion worldwide, with most of the gains accruing to developing countries (OECD, 2009). Among these, indirect costs that cover all procedural delays at customs, associated inventory holding and opportunity costs for trading firms and commonly estimated to range between 1-24% of the value of traded goods would be the greatest contributors to cost reductions at the border, as they mostly correspond to pure efficiency gains. Finally, hidden costs, such as smuggling, informal trade, bribery and corruption at the border contribute to the loss of customs tax collection, which can sometimes exceed 5% of GDP in developing countries. Implementation costs seem circumscribed and quickly recouped by the significant long-term gains in productivity, public revenue and export competitiveness for both public and private agents.

Behind-the-border trade costs, both at the exporting or importing side, concern to a large extent domestic, regional or international regulation and standards for goods and services, whose trade and welfare impacts can be substantial. In addition to non-tariff measures, OECD studies have also highlighted the strong potential of transparency measures and improvements in the business environment in reducing barriers to trade, at a particularly low implementation cost. The expanding role of information and communication technologies (ICT), financial intermediation, distribution and business services in world integration and manufacturing industries' productivity and competitiveness have made services a full-fledged component of modern definitions of trade costs and trade facilitating policies. Finally, hard trade infrastructure (roads, railroads, seaports and airports) and logistics services are also viewed as a major component of trade costs through their impact on time and represent a particularly important determinant of the supply chain's efficiency by linking stakeholders at all stages.

Could all these estimates and knowledge be reconciled into a single trade costs figure? The overview of OECD findings suggests that trade cost components should not be simply summed up without due account of their interactions. In light of the integration of modern global value chains and in a world where goods and services cross borders multiple times, such interactions have become even more important. Thus, efficient design and implementation of reforms has to account for the fact that all cost components belong to a single supply chain and that most of them are interrelated so that they affect the chain not only directly but also indirectly through their influence on the other components. For instance, improvements in hard infrastructure such as railroads cannot translate into time savings if not accompanied by efficient logistics services, professional customs officials, and adequate competition in transport services. The increasing prevalence of GVCs strongly raises the penalties for maintaining inefficient trade procedures and amplifies the need to account for policy synergies. However, the link of trade facilitation to specific points of the trade chain, which make it easier to identify and target interventions, as well as the significantly positive

cost-benefit ratio of trade facilitation interventions, suggest that endeavours at the border offer immediately available and significant benefits.

Most underlying causes of trade costs run through most if not all stages of the international trade chain. Many trade cost components boil down to issues of uncertainty, or, on the contrary, reliability and predictability in delivery: policymakers thus need to address them in a comprehensive manner. Similarly, by reducing the incentives to extract rents at one link of the chain, say informal cross-border trade, one has to insure that these rents are not just shifted to subsequent stages, for instance within a monopolistic transport services sector. Policies to address costs and facilitate trade thus need to be thought of in a holistic way, as many OECD studies have already suggested. Taking into account these complementarities may also suggest that cost-reducing approaches should not be defined by this or that component but on the contrary be structured by the specificities of the trade chain in question.

At the same time, countries at different stages of development have specific circumstances and implementation capacities that need to be considered. The sequencing of reforms and policy measures should take these specificities into account in order to efficiently reduce trade costs.

The diagnostics approach elaborated in this paper proposes a pragmatic tool to identify the most binding barriers to trade and prioritise policy reforms meant to reduce trade costs. Such prioritisation needs to account for the inter-dependences between all cost factors and between countries' trade policies in a context of fragmented supply chains, and should be revised according to countries' resources, institutions and implementation capacities.

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