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Helping SMEs internationalise through trade facilitation

Javier López González,

Silvia Sorescu

OECD

OECD TRADE POLICY PAPER

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HELPING SMES INTERNATIONALISE THROUGH TRADE FACILITATION

Javier López-González and Silvia Sorescu (OECD)

Small and medium-sized enterprises (SMEs) play an important role in generating economic activity and employment in developing and developed countries. However, partly due to remaining at-the-border trade costs, SMEs continue to be less represented in international trade – as direct exporters or importers – than larger firms. Drawing on cross-country data from the World Bank Enterprise Survey (WBES), together with the OECD Trade by Enterprise Characteristics (TEC), this paper looks at the relationship between the trade facilitation environment – as measured through the OECD Trade Facilitation Indicators (TFIs) – and various measures of international engagement of SMEs. While there are differentiated impacts across firm size for different trade facilitation areas, the analysis shows that firms of all sizes across both developed and developing economies benefit from improvements in the overall trade facilitation environment, helping them export and import. However, on aggregate, smaller firms benefit more from improvements in the overall trade facilitation environment relative to large firms. The analysis also suggests that some trade facilitation measures matter more in addressing fixed versus variable costs for SMEs and provides some guidance as to what trade facilitation policy reforms might be prioritised.

Keywords: SMEs; exporting; importing; trade facilitation; trade costs; inclusive trade

JEL Codes: D22, F13, F14, F63, F68, L11, L25

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Key messages

SMEs and trade: What is the issue?

- Small and medium-sized enterprises (SMEs) play an important role in generating economic activity and employment in developing and developed countries. However, partly due to remaining at-the-border trade costs, SMEs continue to be less represented in international trade – as direct exporters or importers – than larger firms.
- Indeed, although they represent the majority of enterprises, SMEs are responsible for an average of 33% of exports in selected developed countries and 18% in selected developing countries.
- Albeit to a lesser extent, the same pattern emerges in terms of imports, with SMEs representing, on average, about 40% of imports in selected developed countries and 34% in a range of developing economies. While less studied in the literature, imports are an important part of the gains from trade for SMEs.

How can trade facilitation help reduce costs of trading for SMEs?

- Improvements in the trade facilitation environment have the potential to:
  - Increase the ability of SMEs to handle the fixed costs associated with crossing the border, helping them to become exporters and importers;
  - Reduce variable costs associated with sending and receiving goods across borders, thereby increasing the value of imports or exports;
  - Benefit SMEs more than they benefit large firms (on aggregate for developing economies and for specific measures in the case of developed economies).
- This means that trade facilitation reforms could not only lead to overall efficiency gains, but that they can also contribute to levelling the playing field between large and small firms.
- Of the range of trade facilitation reforms, measures such as streamlining of procedures, automation of the border process, simplification of fees, or consultations with traders appear to have the largest differentiated impacts on SMEs relative to larger firms.
- With upstream and downstream linkages to larger firms vital for many SMEs, improvements in the trade facilitation environment benefitting large firms can also support SMEs' indirect participation in international trade.

What can policy makers do?

- Continuing trade facilitation reforms in the areas covered by the WTO Trade Facilitation Agreement (TFA) and beyond, to promote increased benefits from international engagement for SMEs.
- Move towards more targeted approaches for SMEs – either linked to the design of trade facilitation programmes or relating to the broader business ecosystem – in view of helping smaller firms get up to speed, particularly in developing and emerging economies.

Executive Summary

Small and medium-sized enterprises (SMEs) are significant contributors to economic activity and employment in developed and developing countries. However, their participation in international trade, and therefore their ability to benefit from globalisation, remains limited relative to larger firms, it also differs markedly across levels of development. Indeed, despite representing the majority of enterprises, SMEs are responsible for an average of 33% of exports in selected developed countries, and only 18% of exports in selected developing countries. Where imports are concerned, a similar pattern emerges; SMEs represent, on average, 40% of *imports* in developed countries and about 34% in a range of developing countries.

Despite significant reductions in trade costs spurred by growing digital connectivity, the shipping of goods across borders still involves considerable to-the-border, at-the-border and beyond-the-border costs. At the border, firms engaging in trade are required to present the necessary documentation, comply with customs and other border agencies' procedures, and be subject to clearance and inspection processes. This range of procedures can be both product- and destination-specific, increasing the costs in terms of time and uncertainty of delivery. These costs can be particularly onerous for small firms, which lack specialised human resources to deal with such aspects and who may only ship infrequently or in small batches.

Survey observations and empirical analyses point to the importance of trade facilitation for firms engaging in international trade. But they also suggest that the impact of the trade facilitation environment can vary according to whether a firm is exporting or importing, as well as by its size. Potentially, this relates to the extent that trade facilitation measures affect the variable versus the fixed cost of engaging in trade.

In this context, the focus of this paper is on the specific external challenges that SMEs face when trading goods, relating, in particular, to trade costs at-the-border. The paper focuses on SMEs' international engagement both as exporters and as importers. The latter has been less explored in the empirical literature, but remains a fundamental aspect of the gains from trade for SMEs.

The analysis looks at a wide set of both developing and developed countries, through a combination of approaches and datasets. It draws on cross-country data from the World Bank Enterprise Survey (WBES), together with the OECD Trade by Enterprise Characteristics (TEC), with a view to assessing the relationship between the trade facilitation environment – as measured through the OECD Trade Facilitation Indicators (TFIs) – and various proxies for international engagement of SMEs.

Despite differences in the datasets used, several patterns in the relationship between SMEs and trade facilitation emerge. While there are differentiated impacts across firm size for different trade facilitation areas, the analysis shows that firms of all sizes from both developed and developing economies benefit from improvements in the overall trade facilitation environment, helping them to export and import. However, on aggregate, smaller firms appear to benefit relatively more from improvements in the overall trade facilitation environment than large firms.

The analysis also suggests that some trade facilitation measures matter more in addressing fixed costs *vis-à-vis* variable costs for SMEs, giving rise to differential impacts across the

intensive and extensive margins of trade. For example, across both developed and developing economies, measures such as the inclusion of SMEs in consultation processes or the efficiency of appeal procedures – measures which can be associated with higher *fixed* costs – have a greater impact on the *propensity or probability of firms to engage* in exporting and importing – that is, on trade at the *extensive margin*. In turn, measures such as fees and charges, streamlining of procedures and automating border processes, which tend to be associated with reductions in *variable* costs, have a bigger impact on the *export and import values* of firms – trade at the *intensive* margin.

Importantly, it is not only the trade facilitation environment in the domestic economy that matters. The environment that SMEs face in the exporting markets or in the origin economies of their imported inputs also affects their participation in, and gains from, trade. This underscores the potential of trade facilitation reforms to be a win-win outcome across countries, with benefits increasing if all countries act together. Moreover, improvements in the trade facilitation environment benefitting large firms might also support SMEs' indirect participation in international trade. Upstream and downstream linkages to larger firms can be vital for many SMEs, particularly in the context of global value chains (GVCs).

Ultimately, the analysis suggests that trade facilitation reforms are not only efficiency-enhancing for firms of all sizes, but they also promote more inclusive outcomes, by helping to level the playing field between large and small firms. However, in order to fully reap the benefits of trade for SMEs, reforms in the identified trade facilitation areas need to be complemented with reforms and investments in other areas linked to firms' capacity to take advantage of new trade opportunities, including provision of digital infrastructure and support with the adoption of new technologies, and development of skills.

1. Introduction

Small and medium-sized enterprises (SMEs)[1] are significant contributors to economic activity and employment in developed and developing countries.[2] However, their participation in international trade, and therefore their ability to benefit from globalisation, remains limited relative to larger firms (see ITC, 2015; OECD-WB, 2015; WTO, 2016; and OECD, 2017 for recent reviews). This might be especially true in manufacturing sectors where, despite significant reductions in some trade costs as a result of growing digital connectivity, shipping goods still incurs considerable to-the-border, at-the-border and beyond-the-border costs.[3] In relative terms, with SMEs operating at a smaller scale, these costs tend to represent a higher share of the value of their exports (OECD-WTO, 2015).

Among these trade costs, those incurred at the border can be especially onerous for SMEs (ITC, 2016). In this context, the recently adopted WTO Trade Facilitation Agreement (TFA) should help SMEs better access international markets by increasing the transparency and efficiency of customs and other administrative procedures. Indeed, implementation of the TFA is expected to benefit both developed and developing countries, reducing trade costs by 10% to 18% respectively (OECD, 2015a).[4] However, there is considerable interest in identifying whether these benefits accrue only to large firms, or if they are shared across firms of different sizes. There is also interest in identifying which specific measures might have the greatest potential to boost international engagement for SMEs.

Using the OECD Trade Facilitation Indicators (TFIs) and micro-level data, this paper proposes to deepen the current evidence base by identifying the specific trade facilitation policies that are important for the participation of SMEs in international trade through

[1] The term "small and medium enterprise" encompasses a broad spectrum of definitions which can vary across countries and regions. Most definitions are based on some combination of the number of employees, turnover and assets. Here the term is used broadly but in the empirical section a common definition is used to compare performance across countries even when these define SMEs differently.

[2] The empirical analysis in this paper will focus on groups of countries, based on the different datasets used. For the purposes of this analysis, the following groupings will be used: 'developing and emerging countries' cover the low income, lower-middle income and upper-middle income economies in the World Bank Enterprise Survey, as classified by the World Bank based on the income per capita; 'developed countries' cover the set of OECD and non-OECD EU economies available in the OECD Trade by Enterprise Characteristics database.

[3] While manufacturing sectors are highlighted, since these are the sectors that will largely be covered in the analysis (as discussed in section 5), trade costs also matter for agricultural and services sectors. Rouzet, Benz and Spinelli (2017) provide evidence on the services sectors, drawing on firm micro-data. Initial work on trade facilitation and perishables is also planned for the 2019-20 OECD Trade Committee Programme of Work and Budget (PWB).

[4] Analysis based on the OECD Trade Facilitation Indicators (TFIs) and the World Bank UN ESCAP country trade costs database. Range reflects both level of development, with lower income countries benefitting more, and extent of implementation of the Agreement.

exports and imports and across a range of developed and developing economies.[5] This will help identify the trade facilitation policy reforms most likely to deliver gains for SMEs seeking to benefit from globalisation.

To this end, this paper is organised as follows. The next two sections set the scene, identifying the importance of SMEs as economic actors and highlighting the challenges they face when engaging in international trade. Section 4 takes a qualitative analytical approach and discusses the scope of trade facilitation measures to address some of the challenges of internationalisation, identifying how different measures might be more or less helpful for SMEs. Section 5 focuses on the quantitative analysis and presents the proposed methodological approach and data used, along with the key results for SMEs and large firms. The final section discusses the main insights for policy derived from the empirical work.

[5] Existing empirical analysis lends support to the view that both large and small firms benefit from trade facilitation (for instance, Hoekman and Shepherd, 2013, 2015; Duval and Utoktham, 2014; Fontagné et al., 2016; WTO, 2016).

2. SMEs, trade and why we should care…

2.1. SMEs are under-represented in trade…

While across both developed and developing countries SMEs make up the majority of enterprises and employ most of the domestic workforce, they represent a lower share of value added and trade (Figure 1). This is because, amongst other things, SMEs tend to be less productive than larger firms, they have more limited access to capital markets for investment in new technologies, and they tend to find it harder to attract and retain talent (ITC, 2015).

However, changes in the global trading landscape, such as the rise of global value chains (GVCs) and the digital transformation, may offer SMEs new opportunities to integrate into the global economy. For instance, GVCs may allow SMEs to specialise in specific segments of production, rather than having to master all processes required to produce finished goods. Indeed, at the country level, participation in GVCs is associated with economic development through productivity growth, exports of more sophisticated products, and a less concentrated export basket (Kowalski et al., 2015).

There are, however, considerable differences in the degree of SME participation in international markets across developed and developing countries. For instance, SMEs represent, on average, 33% of exports in selected developed countries, but only 18% of exports in selected developing countries (Figure 1). This, in turn, might suggest the presence of different constraints to exploiting new opportunities across countries at different levels of development.[6]

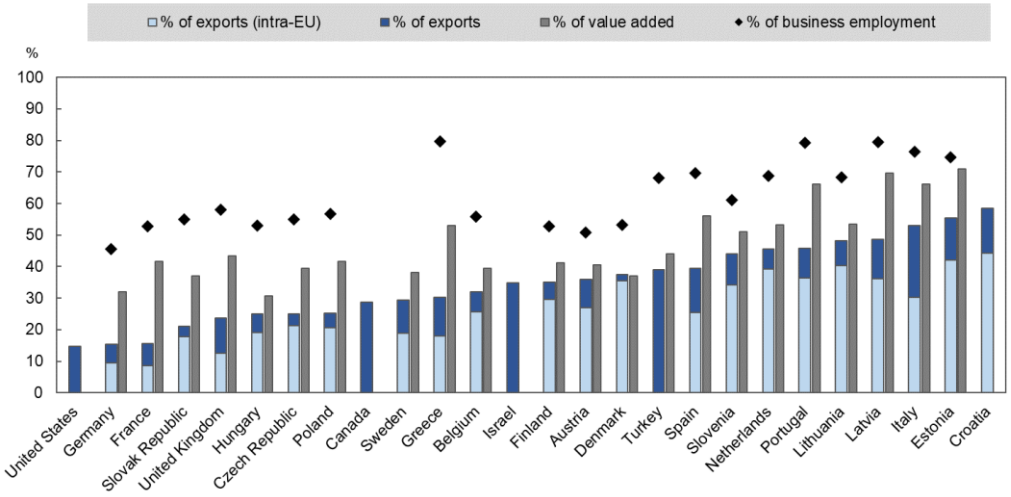
At the same time, SMEs represent a very heterogeneous group of firms, from local coffee shops to high-tech engineering companies or specialised artisanal producers. Opportunities to internationalise will thus also depend on the activities undertaken, and, often, on whether SMEs operate in tradable or non-tradable sectors.

Ultimately, whether or not SMEs can export matters because internationalisation can play a pivotal role in the economic development of firms. International exposure through exports is associated with more productive firms paying higher wages and generating more jobs (Wagner, 2012). But engaging in international markets is expensive – only the most productive firms can afford to do so (Melitz, 2003; Bernard et al., 2007). SMEs, which lack the ability to exploit economies of scale, tend to face higher trading costs relative to output – meaning that they can be disproportionately affected by tariff and non-tariff barriers to trade (WTO, 2016). This would help explain why SMEs display a lower propensity to export relative to larger firms. In addition to engaging in export markets directly, SMEs may also internationalise through indirect exports, or by supplying intermediate goods and services to, typically, larger domestic or foreign firms which then export (Box 1).

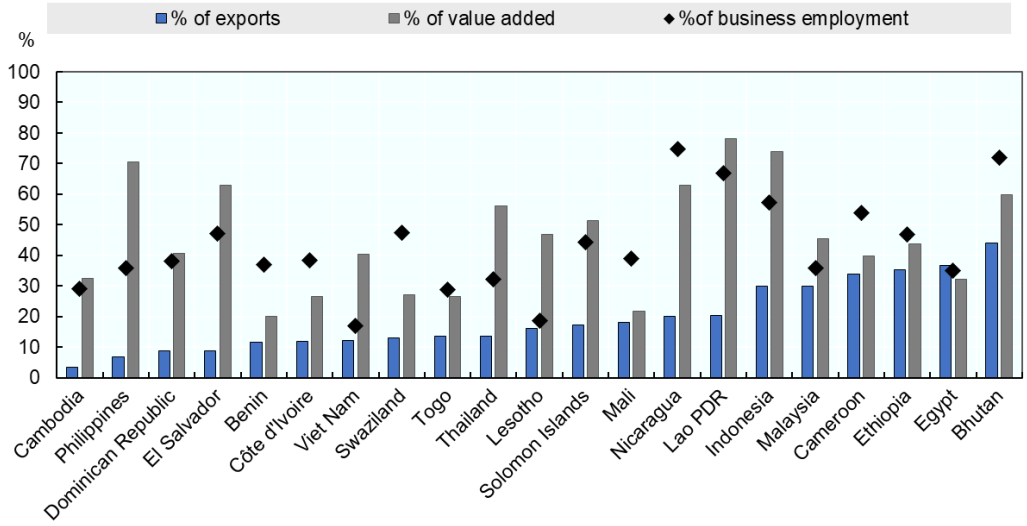
[6] It should be noted, however, that it is possible these differences might also be driven by different databases being used for the analysis of these two different groupings.

Figure 1. SMEs participation in exports in selected developed and developing economies

a. Selected developed economies: Shares in total exports, value added and employment (manufacturing, 2014)



b. Selected developing economies: Shares in total exports, value added and employment (manufacturing, 2015-16)

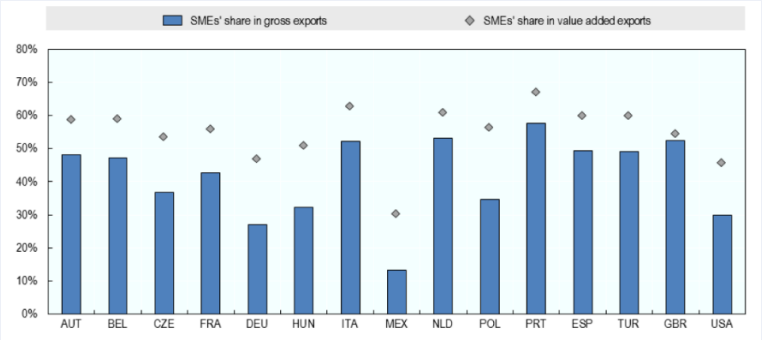


Note: Data cover manufacturing firms.
Source: Panel A: OECD Structural and Demographic Business Statistics (where available) and Trade by Enterprise Characteristics databases. Panel B: Authors' calculations from World Bank Enterprise Survey.

Box 1. SMEs and indirect exports

Recent evidence suggests that, in OECD countries, looking only at direct exports by SMEs under-represents the actual engagement of small firms in a country's gross exports (Figure 2). In Mexico, for example, SMEs account for less than 15% of gross exports, but for 30% of the total value added in the country's exports. In other terms, when the role of SMEs as suppliers of inputs to larger direct exporters is taken into account, the importance of SMEs as exporters doubles.

Figure 2. Direct and indirect exporting activity of SMEs in selected OECD countries, 2009

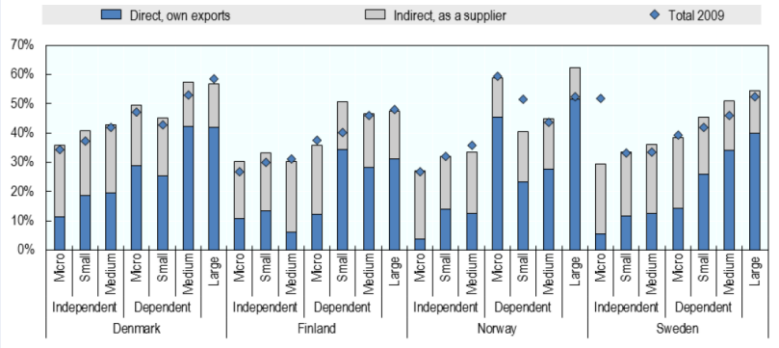


Source: OECD Trade by Enterprise Characteristics (TEC), Structural and Demographic Business Statistics (SDBS) and Intercountry Input-Output Trade in Value Added (ICIO/TiVA) Databases.

The significance of indirect channels is especially important for independent SMEs (i.e. those not owned by a larger domestic firm or foreign firm). For example, while only 3% of total value added generated by independent micro SMEs in Sweden is exported directly, an additional 25% of their value added is indirectly embodied in exports (Figure 3).[1]

Figure 3. Direct and indirect exporting activity of SMEs in Nordic countries

As a percentage of total value-added, 2013



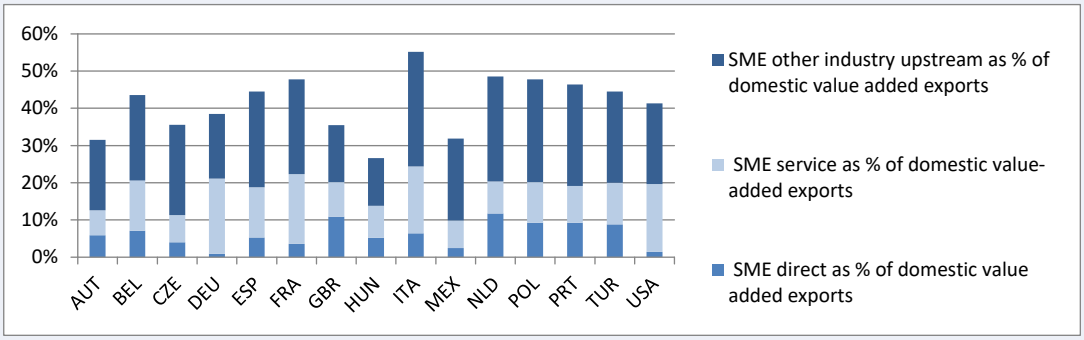
Source: Nordic countries in Global Value Chains (2016), OECD-Statistics Denmark.

Indirect exports by SMEs are particularly large in sectors where GVCs are important and where scale might play an important role. In the transport equipment sector, for example, SMEs accounted for over 40% of total US value added exported (Figure 4), with nearly all of that contribution reflecting the upstream component and services suppliers to the transport equipment industry. Upstream and downstream linkages with larger companies are important for SMEs across all sectors, providing new channels to access foreign markets (OECD-World Bank, 2015). Moreover, indirect exporting may

offer SMEs the opportunity to share some of the costs associated with engaging in export markets with larger firms, including those at the border.

Figure 4. Direct and indirect exporting in transport equipment

As a percentage of domestic value-added exported, 2009



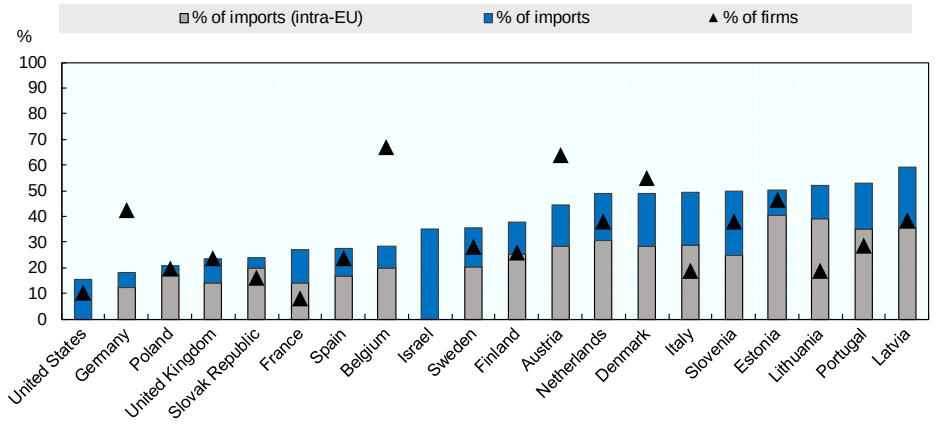
Note: [1]About 40% of those indirect exports occurred via other SMEs. Around half (54%) of SMEs' exports in value added terms is exported directly to foreign markets, but 18% reflects indirect exports through other SMEs and another 28% reflects exports via large firms.
Source: OECD (2015b).

But the benefits of internationalisation are not limited to exporting.[7] As importers, SMEs can gain access to more sophisticated and competitively priced intermediates to enable productivity gains and upscale or upgrade production (Bas and Strauss-Khan, 2013, 2014; Lopez-Gonzalez, 2017). Yet SMEs also seem to represent a low share of imports (relative to the number of SMEs within economies), albeit with notable differences across countries (WTO, 2016) (Figure 5). Overall, SMEs represent an average of about 40%, of imports in selected developed economies and 34% in a range of developing economies.

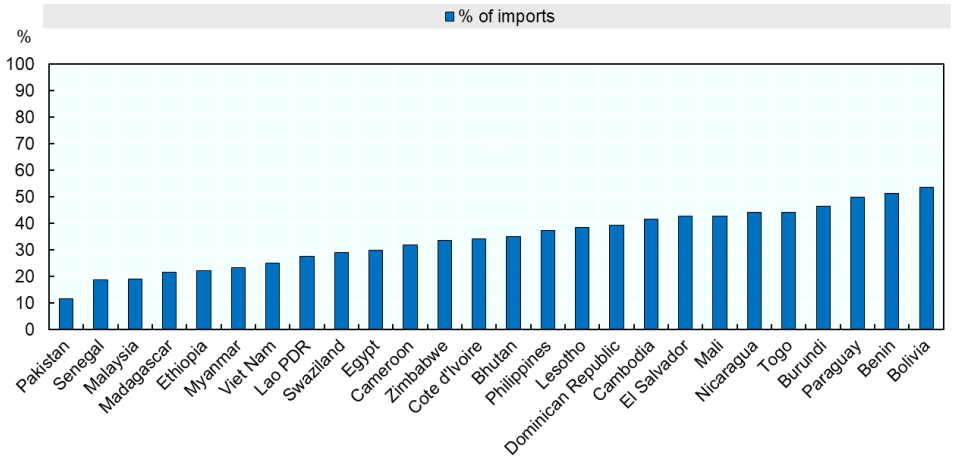
[7] SMEs can also internationalise through other channels, which go beyond the scope of this paper: through non-equity contractual arrangements or foreign direct investment (see Wermelinger, 2017).

Figure 5. SMEs participation in imports in selected developed and developing economies

a. Selected developed economies: Shares in imports and number of firms (manufacturing, 2014)



b. Selected developing economies: Shares of foreign inputs in total inputs (manufacturing, 2015-16)



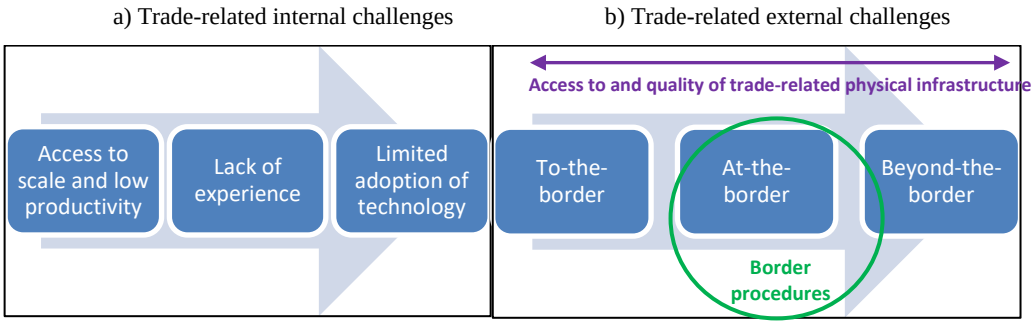
Note: Data cover manufacturing firms. Panel B: Comparable data on the share in total firms importing are not available as in panel A.
Source: Panel A: OECD Structural and Demographic Business Statistics (where available) and Trade by Enterprise Characteristics databases. Panel B: Authors' calculations from World Bank Enterprise Survey.

2.2. … in part due to barriers to SMEs internationalisation

An important question is what firms and policy-makers can do to promote further SME integration into global markets. While ICTs and the digital transformation have opened new opportunities for engaging in international trade, firms, especially SMEs, still face a range of challenges when internationalising. Some challenges are internal to the firm, others are external (Figure 6). Internal challenges refer to issues such as lack of scale or experience, low productivity and lagging adoption of technology. These are well documented in the literature (see, for example, WTO 2016 and OECD 2017). External challenges relate to the environment firms face when getting products to foreign markets.

These encompass a range of factors relating to the business environment, logistics and regulations, many of which can be trade-related.[8]

Figure 6. Internal and external challenges for firms in getting goods to markets



Note: The figure is for illustrative purposes and non-exhaustive; many other challenges arise, whether internal or external.
Source: Authors' elaboration.

At the border, firms are required to present the necessary documentation, comply with customs and other border agencies' procedures, and be subject to clearance and inspection processes. This range of procedures can be both product- and destination-specific, increasing the costs in terms of time and uncertainty of delivery, particularly for small firms lacking specialised human resources to deal with such aspects and who may only ship infrequently or in small batches (WTO, 2016; OECD-WTO, 2017). This is directly associated to trade facilitation, understood as transparent, predictable and straightforward border procedures that expedite the movement of goods across borders.[9]

Against this backdrop, the focus of the analysis in this paper is the specific external challenges that SMEs face when trading goods in terms of administrative procedures at the border and how these relate, in particular, to trade costs at-the-border (as highlighted in Figure 6).[10] In addition, the analysis also identifies how the at-the-border costs affect SMEs that are importing inputs for their production processes, an aspect less explored in the existing empirical literature.

[8] Of course, trade-related infrastructure matters as well: this can include, among others, roads, ports, airports infrastructure; ICT networks; or energy infrastructure.

[9] Trade facilitation measures can be undertaken along two dimensions: a "hard" dimension related to tangible infrastructure such as roads, ports, highways, telecommunications etc., as well as a "soft" dimension, which can be "narrow" – relating to administrative procedures at the border – or "broader", by encompassing other behind-the-border aspects such as non-tariff regulatory measures, and general impediments on doing business (OECD, 2018).

[10] The quantitative assessment in section 5 aims to also control for other selected internal and external challenges, subject to data availability.

3. What do we know about TF and SMEs?

3.1. Survey evidence

Available survey information provides an indication of the importance of border procedures for small and large firms relative to other perceived obstacles to trade (WTO, 2016). While such surveys are not directly comparable – due to different designs and sampling strategies – they offer *prima facie* evidence on perceptions of different trade costs for SMEs (generally relative to larger enterprises).

A review of firm-level surveys conducted by different international organisations and identifying the relative importance of certain non-tariff measures (NMTs) for both SMEs and large firms across developed and developing countries is provided in WTO (2016).[11] The evidence for developing countries highlights that unfamiliar and burdensome customs and bureaucratic procedures are among the top four obstacles firms encounter in international trade, together with limited information about the functioning of foreign markets; costly product standards and certification procedures; and poor access to finance and slow payment mechanisms.

Surveys conducted by the United States International Trade Commission (USITC) for US firms and by the International Trade Commission (ITC) for firms within the EU also highlight that, for SMEs, customs procedures (as a whole) rank among the top challenges firms face when either exporting to, or sourcing from, foreign markets. By contrast, for large US firms engaging in international trade, concerns regarding customs procedures are ranked behind other perceived impediments such as shipping costs, foreign regulations or foreign taxation issues (WTO, 2016)[12].

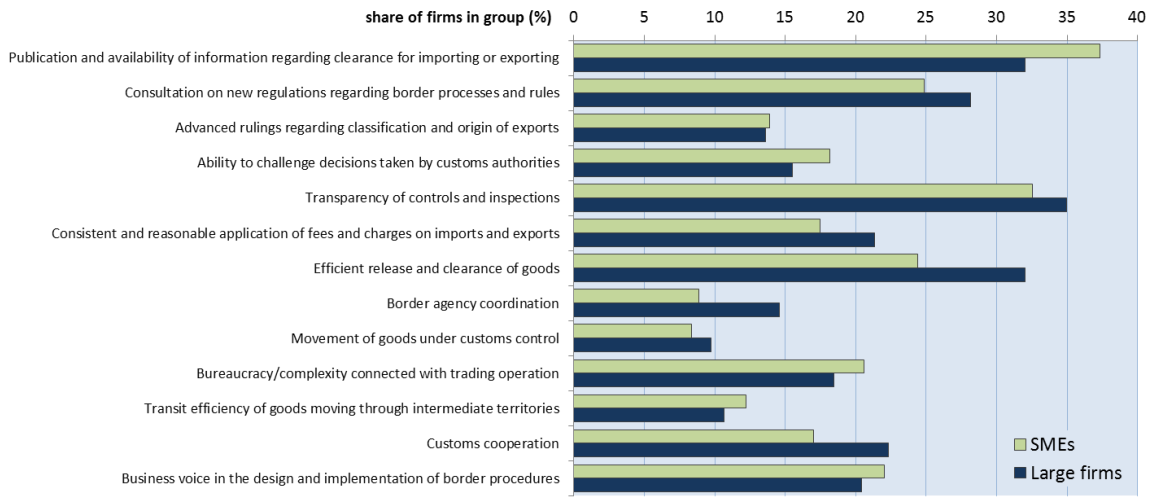
Surveys focusing on specific administrative procedures at the border, while more scarce, provide more granular insights into the priorities of large versus small enterprises in relation to specific improvements in border procedures. For example, in a recent ITC survey, publication and availability of information on clearance for exporting and importing were ranked first by SMEs, while large firms appear to be more concerned with issues relating to transparency of controls and inspections (Figure 7).[13] The efficient release and clearance of goods ranks fourth for SMEs, but second for large firms. Consultations on new trade-related regulations stand out as a priority for all firms and for SMEs in particular (OECD-WTO, 2015).

[11] It draws on firm level surveys conducted by The United States International Trade Commission (USITC), the European Commission (EC), the World Bank Group (WBG), the International Trade Centre (ITC) and the OECD in conjunction with the WTO.

[12] That said, ranking of concerns relating to border procedures can depend on the design of the survey as responses on costs are relative to a predefined, and sometimes not homogeneous, set of options.

[13] ITC defines large firms in this survey conducted under the Fifth Global Review of Aid for Trade as companies with more than 250 employees. The survey reflects responses of 418 SMEs [94 medium sized (between 50 and 250 employees), 161 small (between 10 and 50 employees) and 158 micro firms (less than 10 employees)] and 103 large firms (more than 250 employees).

Figure 7. Factors related to border procedures in which firms would most value improvements



Note: SMEs are defined as firms with less than 250 employees. The chart reflects responses of 418 SMEs and 103 large firms in a number of developing and developed economies participating to the ITC survey (conducted within the monitoring and evaluation exercise underlying the Fifth Global Review of Aid for Trade).
Source: OECD-WTO (2015) based on ITC Monitoring Survey (2015).

Differences in priorities across firm size are echoed in the 2015 Eurobarometer survey on electronic customs implementation across EU Members.[14] Firms of all sizes appear to experience considerable challenges in terms of submitting information electronically and encounter issues relating to the actual clearance process (Figure 8). However, as a whole, SMEs encounter more difficulties than large firms across all procedural and IT aspects linked to the e-Customs environment.

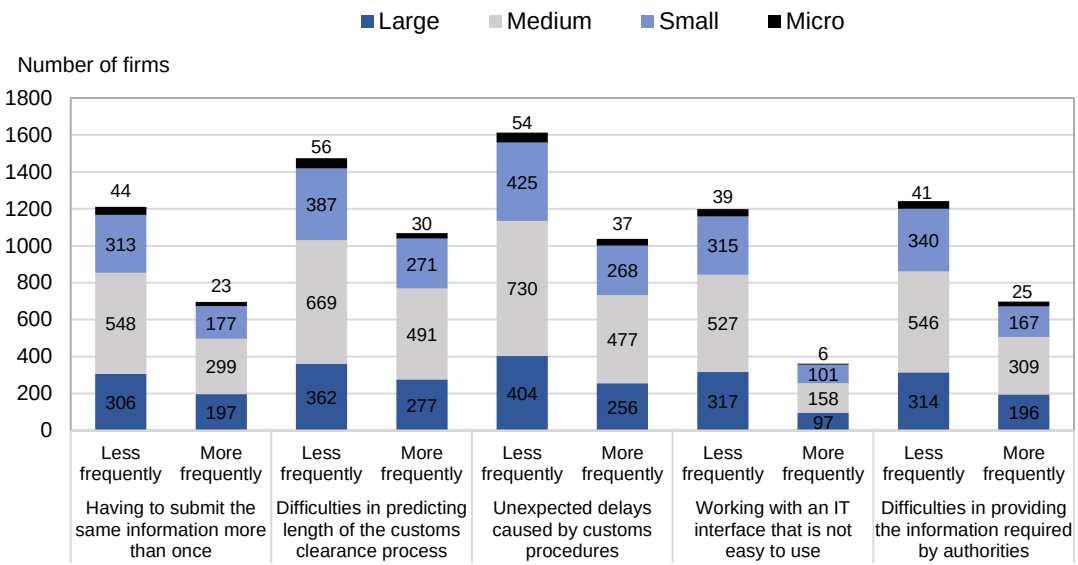
Insights from surveys conducted by companies or business associations also provide useful insights. For instance, a 2015 United Parcel Service (UPS) survey conducted on exporting European SMEs highlights that export regulations and customs European Union processes remain among the top concerns for firms exporting to markets outside the EU (UPS, 2015). In addition, a survey carried out by UPS in 2017 on Latin American SMEs importing from foreign markets reveals that clearing customs is one of the top five concerns in the supply chain in eight economies (Brazil, Chile, Colombia, Costa Rica, Mexico, Panama, Peru, and the Dominican Republic) for firms sourcing inputs from abroad for their production processes (UPS, 2017). A 2017 joint survey by Facebook, the OECD and the World Bank finds that customs regulations rank fourth among challenges to exporting, after finding business partners, market access, and regulatory differences.[15]

[14] The Union Customs Code (UCC) adoption and application as of 1 May 2016 completes the shift by customs to a paperless and fully electronic and interoperable environment with core values of simplicity, service and speed. The UCC represents the new framework Regulation on the rules and procedures for customs throughout the EU and covers most of the projects that were previously introduced by the e-Customs Decision.

[15] Responses to the survey were obtained from 49 081 SMEs, with a Facebook presence, in 42 countries during March-May 2017. From March-May 2017, approximately one in five SMEs

Figure 8. Survey of difficulties experienced by economic operators in the European Union with the e-Customs environment, 2015

By size of firm



Note: Analysis conducted on a sample of 2 651 firms, based on Eurobarometer 399 'The electronic customs implementation in the EU'. One firm may not have responded to all the areas highlighted in the figure.
Source: European Commission (2015).

In sum, the survey evidence suggests that: i) costs at the border represent an important constraint for SME internationalisation; and ii) of the at-the-border issues, with some variation, the most salient for SMEs appear to be the availability of information on administrative procedures in foreign markets, the submission of information electronically, and procedural aspects relating to the clearance of goods.

3.2. Quantitative evidence

Existing econometric evidence on the impact of trade facilitation on exports at the firm level supports the view that both large and small firms stand to benefit from trade facilitation. Using US Census Bureau data on SME and large firm merchandise exports to 25 destinations over ten years, Freund, Hufabauer and Jung (2016) show that a 1% increase in customs delays leads to a 0.5% reduction in exports, with similar impacts across small and large firms. Hoekman and Shepherd (2013, 2015), using the World Bank Enterprise Survey, also look at exporting firms and also find that reduced time to export boosts the export shares of small and large firms equally.

Li and Wilson (2009) find that, for Asian countries, improvements in certain trade facilitation aspects increase the probability that SMEs will become exporters. They emphasise that – compared to larger firms – SMEs benefit more from improving regulatory predictability and enhancing information technology services rather than from improved transportation infrastructure.

surveyed (19%) reported trading internationally, including 6% importing and exporting, 5% exporting exclusively, and 8% importing exclusively.

The impact, by firm size, of reduced time to export has also been examined in the context of the 2016 *WTO World Trade Report* (WTO, 2016). Using data from the World Bank Enterprise Survey, Han and Piermartini (2016) show that small firms benefit more than large firms from reductions in the time to export.[16] A reduction in the time it takes SMEs to export to the median level for all firms leads to an increase in the share of SME exports of 20%. For large firms, the reduction of time to export to the median would imply an increase in the share of exports over sales of 15%.

Duval and Utoktham (2014) extend the framework in Hoekman and Shepherd (2013) to include additional firm characteristics and external challenges affecting firm participation in direct exports and indirect exports (as a proxy measure for participation in international production networks). Focusing on a global sample of SMEs, the study finds that a one-day increase in the time taken to complete customs and related clearance processes reduces the likelihood that a firm will participate in either direct exports or production networks by approximately 0.4%.

Other studies use country-specific firm-level datasets. For instance, Volpe Martincus et al. (2015) estimate the effect of customs-related delays on firms' exports – including SMEs – based on Uruguay customs transaction data and find that such delays have a statistically significant negative effect on firms' foreign sales. This impact appears to be more prominent for sales to newer buyers and for time-sensitive goods.

The use of time to trade as a proxy for an economy's trade facilitation performance in studies such as Hoekman and Shepherd (2013, 2015) and Han and Piermartini (2016) makes it difficult to identify specific trade facilitation measures that would most help SMEs engage in export markets. To overcome this issue, Fontagné et al. (2016) use the OECD TFIs and firm-level customs data for French firms to examine how advances in different aspects of the trade facilitation environment in the importing country affect exporters of different sizes. They show that while, in general, all exporting firms gain from improved trade facilitation, the relative effects on small and large firms vary according to the type of trade facilitation measure. Small exporting firms benefit relatively more when trade facilitation improvements relate to information availability, advance rulings and appeal procedures. In comparison, large exporting firms appear to benefit relatively more when the importing country's facilitation reforms relate to the simplification of formalities (i.e. harmonisation of documents, automation of processes, and streamlining of border procedures).

In sum, while the quantitative evidence suggests that trade facilitation can help firms of all sizes, there is much less evidence on what specific measures are most helpful to firms of different sizes, or on the role that trade facilitation can play in importing across developed and developing countries. These issues are explored at greater length in the following sections.

[16] Background research for the 2016 *WTO World Trade Report* ("Levelling the trading field for SMEs").

4. Linking trade facilitation performance to SME engagement in international trade

4.1. How do different trade cost components matter for SMEs?

Both survey and empirical evidence point to the importance of trade facilitation for firms engaging in international trade. However, as discussed above, the impact of the trade facilitation environment might vary according to whether a firm is exporting or importing and according to its size. Identifying how different trade costs affect different modes of internationalisation according to firm size can usefully be framed in terms of the extent to which trade facilitation measures affect the *fixed* versus the *variable cost* of engaging in trade.

Fixed costs are those that remain constant regardless of the size or the quantity of shipments made. Often, they are incurred prior to selling the first unit of merchandise meaning that, once made, they cannot be recovered (also known as sunk costs).[17] Fixed costs are most likely to affect whether or not a firm engages in trade at all rather than the amount that the firm trades once it has decided to serve a market. By contrast, *variable costs* largely relate to the volume of trade, thereby mainly affecting the amount traded (rather than the decision whether or not to trade).[18]

One example of a fixed cost is the need to acquire knowledge about the documents needed to export. A firm may need to contact lawyers or customs brokers to identify the regulatory requirements in a particular country, but, once the firm is aware of these, it will not need to spend more money on knowledge acquisition each time it wants to export an extra unit. By contrast, variable costs only arise when there is trade. For instance, the costs associated to the fees and charges or the inspection incurred every time a shipment is made.

Melitz (2003) was one of the first to show how reductions in trade costs could help more firms become exporters. One key implication of Melitz's well-known model is that only the most productive firms are able to meet the costs of exporting, implying that benefits from internationalisation might be contingent on the size, or productivity distribution, of firms (see Bernard et al. (2012) for a synthesis of the related literature). In the Melitz model, smaller firms, which tend to have lower productivity, will struggle to meet the fixed costs of exporting and will therefore have a lower propensity to engage in trade.

Mounting evidence concurs with the idea that reductions in *fixed* trade costs can have different impacts on firms of different sizes (see WTO (2016) for a review of the literature). Existing empirical analysis also shows that established long-time market participants might be less sensitive to changes in fixed trade costs than new or relatively recent exporters (Berman and Héricourt, 2010; Fitzgerald and Haller, 2014). This is because established

[17] When exporting, these can be experienced as sunk entry costs, i.e. the costs of entering a market for the first time, and as fixed continuing costs, i.e. some of the costs of maintaining an activity on the export market (Berman and Héricourt, 2010).

[18] Melitz and Redding (2012) highlight that the implications of different micro-foundations for trade costs in models of firm heterogeneity remain under explored, including whether trade costs are sunk, fixed or variable; whether variable trade costs are *ad valorem* versus per unit; the role of intermediaries; and the role of transport costs versus information, advertising, marketing and other trade costs.

firms have already committed time and resources to establishing familiarity with and relationships within foreign markets, they have incurred the fixed costs of trading already. They are therefore likely to maintain such relations rather than pursuing new trading opportunities. Conversely, for new exporters, fixed trade cost reductions may present an immediate opportunity to grow by building new trading relationships in foreign markets.

By contrast, *variable* costs are more likely to impact firms equally, independent of their size. That said, this may not be the case when the responsiveness of import demand varies with the level of trade volumes. The literature finds that firms producing at relatively higher cost and exporting smaller trade volumes (arguably, the smaller and less productive firms in the Melitz framework described above) react more strongly to changes in variable costs, such as tariffs (Berman et al., 2012; Gopinath and Neiman, 2014; Spearot, 2013; WTO, 2016).

In sum, and all else being equal, reductions in fixed and variable at-the-border trade costs are likely to have different impacts on different margins of trade. Reductions in *variable* costs are most likely to affect the "*intensive*" margin of trade, meaning more of the same type of trade (Beverelli, Neumuller and Teh, 2015). By contrast, reductions in *fixed* trade costs will more likely be associated with growing trade at the "*extensive*" margin – meaning more firms engaging in trade.[19] With SMEs finding it more difficult to face fixed costs, in part due to lack of economies of scale, these firms might benefit more from trade facilitation reforms that target fixed costs.

Since trade facilitation is likely to influence both fixed and variable trade costs, it is expected to lead to changes in both the extensive and intensive margins of trade. The following section discusses the different measures contained in the TFIs that are most likely to affect the fixed and variable costs faced by SMEs when internationalising.

4.2. How do these relate to the Trade Facilitation Indicators?

While both survey and quantitative evidence largely concur on the importance of the overall trade facilitation environment for both small and large firms, the extent to which specific dimensions of trade facilitation affect their internationalisation is less clear-cut. Although the requirements to ship a specific product across borders are the same regardless of firm size, the degree of complexity of these requirements and the capacity of firms to address them will determine the ultimate costs imposed on a firm. Other defining parameters will include the volume and the frequency of shipping (Figure 9).

This section discusses the ways in which trade facilitation measures (Table 1), as captured by the OECD Trade Facilitation Indicators (Box 2), are linked to different components of trade costs. It focuses on the costs to SMEs when engaging in international trade and discusses how improvements in trade facilitation performance can reduce the fixed and variable costs of trading.

The linkages of specific trade facilitation measures to fixed versus variable trade costs do not always match perfectly and often overlap. Indeed, as highlighted in Figure 9 and discussed at greater length below, some policy areas can be more directly linked to fixed trade costs, others to variables costs, while other measures could potentially influence both.

[19] There are, of course, interesting issues on the role of trade facilitation on firms trading new products to new markets which are beyond the scope of this paper.

Box 2. OECD Trade Facilitation Indicators

The eleven OECD TFIs were developed in 2012 to support governments in their efforts to improve their border procedures, reduce trade costs and reap greater benefits from international trade. They currently cover the full spectrum of administrative procedures at the border for more than 160 countries across income levels, geographical regions and development stages. The TFIs are currently available for 2012, 2015 and 2017 (OECD, 2018).

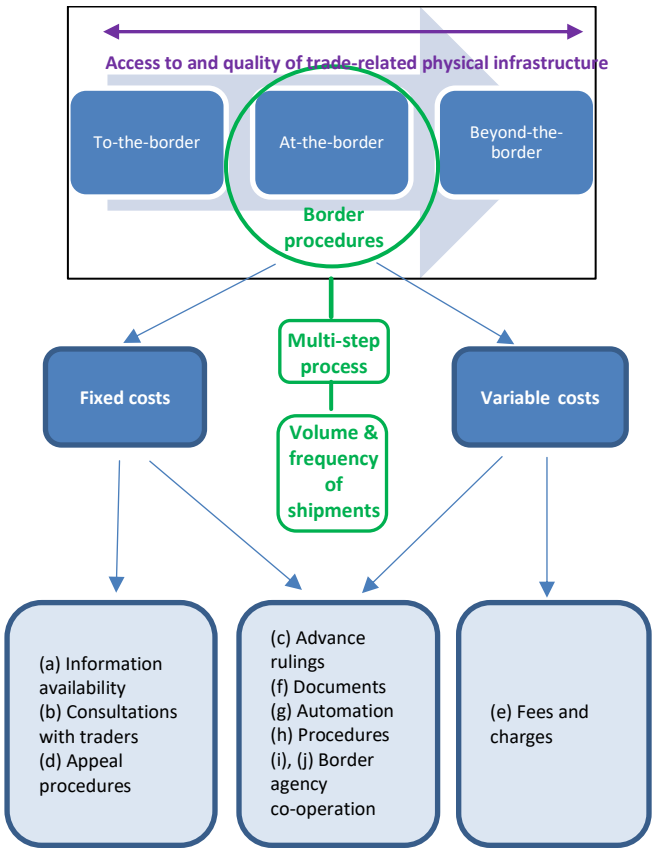
They follow closely the structure of the WTO TFA, but the families of measures in the TFA have been re-organised, in order to take into account similarities between measures, underlying shared components, as well as areas where further distinctions were warranted. An additional indicator going beyond the scope of the TFA was added to capture elements of good governance and impartiality of border administrations.

The TFIs are composed of a set of variables seeking to reflect not only the regulatory framework in the concerned countries, but delve, to the extent possible, into the state of implementation of various trade facilitation measures. Overall, the indicators measure the actual extent to which countries have introduced and implemented trade facilitation measures in absolute terms, but also their performance relative to others, using a series of quantitative measures on key areas of the border process. The TFIs take values from 0 to 2, where 2 designates the best performance that can be achieved.

Table 1. OECD TFIs: Overview of key dimensions and measures

Indicator	Key components
(a) Information availability	▪ publication of Customs and trade-related regulations and information, including through webpages on the Internet ▪ the existence and functioning of enquiry points ▪ specific functions for businesses (dedicated webpages/portals, manuals etc.)
(b) Involvement of the Trade Community (Consultations)	▪ structures for consultations ▪ established guidelines for consultations ▪ publications of drafts ▪ existence of notice-and-comment frameworks
(c) Advance rulings	▪ prior statements by the administration to requesting traders concerning the classification, origin, valuation method, etc., applied to specific goods at the time of importation ▪ the rules and process applied to such statements
(d) Appeal procedures	▪ the possibility and modalities to appeal administrative decisions by border agencies
(e) Fees and charges	▪ disciplines on the fees and charges imposed on imports and exports ▪ disciplines on penalties
(f) Formalities – documents	▪ acceptance of copies ▪ simplification of trade documents ▪ harmonisation in accordance with international standards
(g) Formalities – automation	▪ electronic exchange of data ▪ use of automated risk management ▪ automated border procedures
(h) Formalities – procedures	▪ streamlining of border controls (inspections, clearance) ▪ separation of release for clearance ▪ single submission points for all required documentation (single windows) ▪ post-clearance audits ▪ the existence and functioning of Authorised Operators (AOs) programmes
(i) Internal co-operation	▪ control delegation to Customs authorities ▪ co-operation between various border agencies of the country
(j) External co-operation	▪ co-operation with neighbouring and third countries
(k) Governance and impartiality	▪ transparency of customs structures and functions ▪ accountability and ethics policy

Figure 9. Linking trade facilitation measures and trade transaction costs



Note: The figure is for illustrative purposes and non-exhaustive.
Source: Authors' elaboration.

Some trade facilitation measures can be more directly linked to fixed trade costs…

For instance, *information availability* (indicator (a) in Table 1), relates to easy access to 'complete and accurate trade information', a factor that can significantly reduce informational constraints, especially important for SMEs seeking to engage in export and import markets (see ITC, 2016 and WTO, 2016). The aspects captured in this indicator broadly refer to the documents, forms and information that must be presented when goods cross borders; the procedures that must be followed; the fees that must be paid; or how goods are treated at the border.

As such, *information availability* is more likely to affect the fixed cost element of trade costs reflecting that, the biggest challenge for a firm is to be able to identify the types of documents it needs to fill-in when starting to export or import from a specific market. It is less likely to need to face such informational costs again every time it engages in a trade transaction within that same market. The existence and effective functioning of enquiry points and the way in which information is made available are also likely to have an incidence on fixed costs. Immediate access to import/export requirements and forms from a distance, without the need to physically visit government agencies' offices, can reduce the time and cost of obtaining information (ITC, 2016).

The ways in which information is made available will also matter. Publishing or distributing this information at the customs offices or via official journals is not the same as providing access to laws and regulations, import/export requirements and forms via an Internet webpage or portal, publishing practical guides or step-by-step descriptions of import, export and transit procedures in English or one of the other WTO languages. This can significantly decrease the need for SMEs to hire local specialists to determine basic import or export requirements across different countries (ITC, 2016) allowing SMEs to benefit at the extensive margin.[20]

Other measures – such as those covered in TFI (b) *consultations* with traders or TFI (d) *appeal procedures* – might also be more likely to influence firms' fixed costs of trading. This is because they can raise awareness of, and reduce uncertainty related to, the rules that apply when goods are traded, helping minimise the risks of incurring undue sunk costs. Moreover, being able to participate in regular consultation mechanisms may provide SMEs with the opportunity to bring to the attention of the relevant authorities and other stakeholders issues related to border procedures of particular concern to them, to receive feedback from authorities, and to discuss possible solutions. These mechanisms may also allow SMEs to provide feedback on new or revised policies, practices or regulations that authorities may have under consideration and allow their concerns to be taken into account at the design stage.[21] Similarly, SMEs may think twice about engaging in cross-border trade where the procedures for resolving disputes with Customs – for example, related to tariff classification, customs valuation or other matters affecting duty and tax on imported goods – are unclear and complex.

… while others can potentially have a higher impact on variable trade costs

By comparison, measures such as *fees and charges* (TFI (e)) may entail a larger variable cost component. SMEs may need to pay fees and charges with every shipment, and they may benefit when border-related fees and charges are both reduced in number and simplified in structure. In addition, where adequate notice is given of upcoming changes to border fees, SMEs may be able to calculate with greater certainty and better adjust to the costs of importing and exporting.

… in others fixed and variable trade costs come together

Other measures, such as *advance rulings* (TFI (c)) can be linked to both fixed and variable trade costs. For one, the request for an advance ruling has several fixed-cost characteristics, as it entails a steep learning curve for being able to submit the documentation; and, in many countries once obtained, it is valid for a certain period as long as circumstances surrounding the concerned product have not changed. In addition, the existence of efficient advance ruling systems allowing SMEs to know, with certainty, the tariff classification of goods,

[20] As they grow, some SMEs can still choose to hire service providers handling administrative procedures at the border, particularly if they need to manage increasing transactions. While there can be differences in the types of costs faced between SMEs that handle the procedures at the border directly compared to those that outsource this work, it is not possible to distinguish in this analysis between firms – small or large - according to their needs of using such services.

[21] The 2017 UN Global Survey on Trade Facilitation and Paperless Trade Implementation highlights that the inclusion of SMEs as key members in National Trade Facilitation Committees (NTFCs) is very much work in progress across all regions covered (Asia-Pacific, Latin America and the Caribbean, Europe and Central Asia, and Sub-Saharan Africa).

the duties to be paid and/or other customs matters, may speed up clearance, reduce warehousing fees, and accelerate deliveries (ITC, 2016). Firms, including SMEs, have to deal with these aspects at every shipment. In this sense, this trade facilitation dimension might also be important for SMEs that require timely access to foreign inputs for further processing.

The number and complexity of the documents required for clearance (as captured by TFI (f) on *documents*) will also capture elements of both fixed and variable costs. On the one hand, SMEs can have a larger, one-time sunk cost of learning how to fill in the forms. The magnitude of this fixed cost component will however depend on the number of documents required and on whether an SME is exporting or importing. In this sense, the use of international standards by customs and other border authorities in the design of national trade documentation can help businesses in lowering the (sunk) costs of preparing such documents when dealing with different trading partners.

On the other hand, firms can also incur variable costs, even in the case of standardised documents, particularly when trading different products and volumes across different markets. Here, regulations on the use of copies of supporting documents can affect the business costs of compliance.[22] If an SME is able to submit the original of a document required by different border authorities just once, it will avoid the time and cost of resubmitting this to each authority separately. The requirement to submit the original of a supporting document can in itself delay the release of goods and these delays may be unnecessary where the authority can be assured that the electronic or paper copy is an authentic reproduction of the original (ITC, 2016).

Procedural aspects (TFI (h)), which have to be met each time a shipment crosses a border, are mainly a part of the variable costs an SME incurs when exporting or importing, although they also carry a fixed cost element related to learning how procedures operate. Most measures covered generally refer to efficiency-related benefits of trade facilitation. Such measures include, for instance, pre-arrival processing, separation of release from clearance, operational risk management systems, or post-clearance audits. These measures are intended to reduce unnecessary delays at the border. For instance, the existence and effective functioning of pre-arrival processing will allow an SME to submit all documents required for clearance to Customs before the goods arrive and thus reduce or eliminate altogether charges incurred in delays and handling goods. Another example is the separation of release from clearance. Since Customs only needs to verify whether the imported goods can be admitted in order to release them, SMEs avoid the costs of holding or storing goods at the port or terminal until the completion of all Customs processing and verification steps (ITC, 2016).

Other more complex measures, such as Authorised Operators[23] (AOs) (which are also part of TFI (h) on *procedures*), can address both elements of fixed and variable costs for SMEs.

[22] The terms and conditions under which traders may use copies of supporting documents should be set out in the regulations or administrative instructions of Customs and the other relevant border authorities.

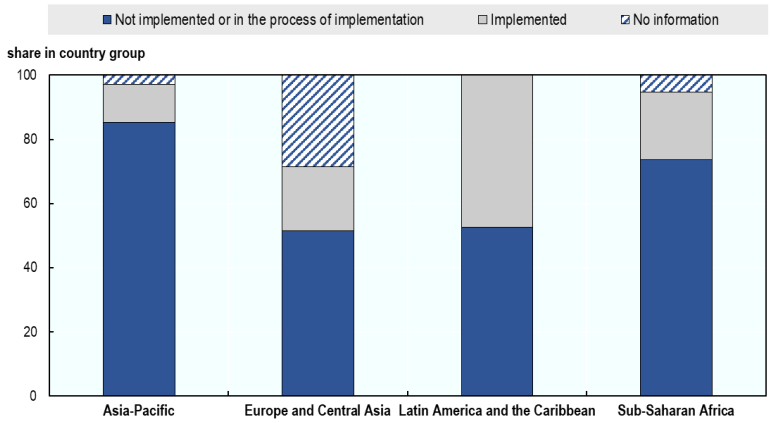
[23] The WTO TFA provides for 'Authorized Operators' (AOs) programmes, covering traders that meet specific criteria, including a record of compliance with Customs and other related regulations, a system of managing records for necessary internal controls, financial solvency and supply chain security. The TFA encourages WTO Members to develop Authorized Operator schemes on the basis of international standards. The WCO SAFE Framework sets out global standards for launching and maintaining an Authorized Economic Operator (AEO) programme.

Once an SME qualifies for AO status, its import and export transactions can derive a wide range of trade facilitation benefits, according to the specific design of the AO programme. For instance, they can be subject to fewer customs checks; fewer formalities; simplified procedures; payment-related simplifications; rapid clearance etc. – all potentially reducing firms' variable transaction costs. However, SMEs can also incur fixed (and variable) costs in obtaining and maintaining the AO certification, related to the application and documentation preparation, or the internal compliance review. Moreover, SMEs can incur continuing costs related to the monitoring and maintenance of the firm's on-going compliance with AO criteria (ITC, 2016).

As in the case of the inclusion of SMEs in the process of consultations, the implementation of specific measures that could enable SMEs to become AOs remains a work in progress for most economies across various regions (Figure 10) (UNESCAP, 2017). Recent survey evidence highlights the importance of designing communication strategies targeting SMEs for AO programmes; these should explain the clear, tangible and demonstrable benefits of being an AO as well as show how the benefits can be greater than the cost for the firm over the long-run, so as to provide the necessary incentives for SMEs to apply (Annex A).

Figure 10. Specific measures enabling SMEs to more easily benefit from AO schemes

Share in country group



Note: The specific measures refer to reaching out and consulting with the SME community regarding the challenges and opportunities provided by AO programmes as well providing support with respect to the application and certification processes.
Source: UN Global Survey on Trade Facilitation and Paperless Trade Implementation 2017, https://unnext.unescap.org/AP-TFSurvey2017/global.html.

Automation (TFI (g)), can also play a supporting role in helping SMEs reduce both fixed and variable transaction costs. When SMEs are able to submit all Customs documents electronically, they can save time and costs of clearance on every shipment. Further efficiencies can be created where Customs and other border agencies allow electronic submission of supporting documents (including, for instance, invoices, bill of lading, licenses). Information technologies that support the functioning of risk management systems, Electronic Data Interchange (EDI) systems or Single Window systems can create a 'facilitating digital ecosystem' for small businesses with transaction cost reducing potential (Duval, Utoktham and Kravchenko, 2018).

While the trade-related 'hard', automated infrastructure is key to speeding up and dematerialising processes, this needs to be complemented by the capacity of SMEs to access and use the systems or portals that would expedite such administrative processes. First, in terms of SMEs' own access to 'hard' infrastructure, while SMEs will still incur fixed cost elements in setting up the necessary infrastructure that would allow them to link up to a paperless environment, the existing "digital enabling environment" matters.

There is also a connectivity gap between SMEs and larger firms. Data on ICT access by business for a sample of OECD economies show that small firms not only remain disadvantaged with respect to access to a broadband connection (panel A in Figure 11), but even more so with respect to the quality of connections when compared to large firms (panel B in Figure 11). There are also significant differences across countries at different levels of development. Affordable high-speed Internet access is currently only available for about 15% of the world's population, mostly in developed economies.[24] Moreover, in developing countries, Internet access provided by mobile networks is preferred to fixed broadband services due to affordability. However, the average price of a fixed broadband plan is twice that of a comparable mobile broadband plan[25]; in low-income countries, it can be three times higher (ITC, 2018).

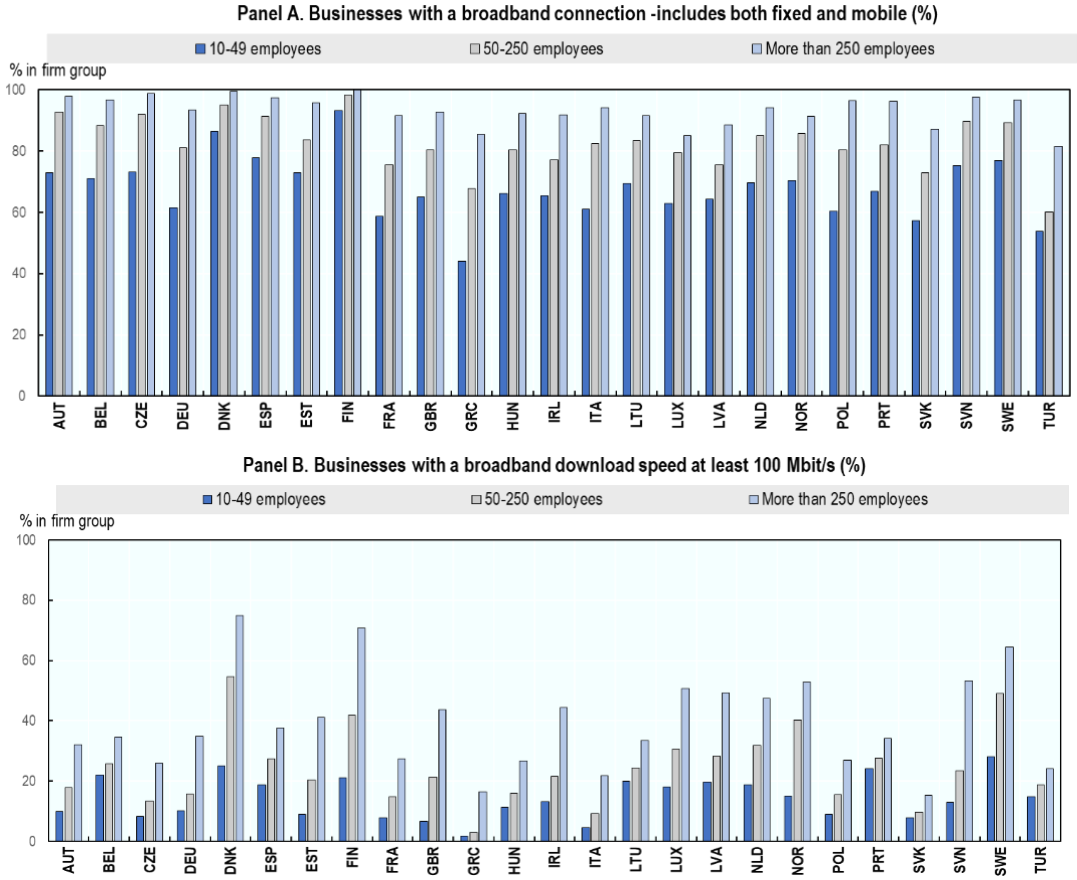
The costs of training staff to use these systems must also be taken into account, as well as the fact that automation generates fixed continuing costs related to operating and updating systems, in addition to initial development and implementation costs. The net operating cost reductions arise when the transition to electronic customs operations simplifies the customs compliance process, resulting in lower overhead costs and allowing some staff to be reallocated to other tasks. Customs and other border agencies can play a key role by providing technical consultation and training services, such as progress that appears to have been made in the case of Single Windows in economies where these systems are being put into place or already operational (Figure 12) (UNESCAP, 2017).

Last, and in line with procedural aspects discussed earlier, *inter-agency co-operation* (TFI (i) and TFI (j)) and *governance* (TFI (k)) are likely to mainly have an impact on SMEs' variable costs, that is, each time a shipment crosses a border. Improvements to aspects such as institutional, legal and regulatory frameworks; procedures for co-operation; communication and information exchange between border agencies; infrastructure and equipment can increase operational efficiency by removing redundant or sequential controls and duplicative documentation requirements. Requests to businesses to submit the same data on multiple occasions entail cost implications for economic operators compelled to use multiple systems or entering information manually. Efforts to deepen cross-border agency co-operation through automation are important and underway in many countries, but remain incomplete. Domestic inter-agency co-operation on AO certification as well as cross-border mutual recognition agreements (MRAs) can further help SMEs in terms of faster and less costly clearance (OECD, 2018).

[24] ITC (2018) based on the World Bank 2016 World Development Report *Digital Dividends*.

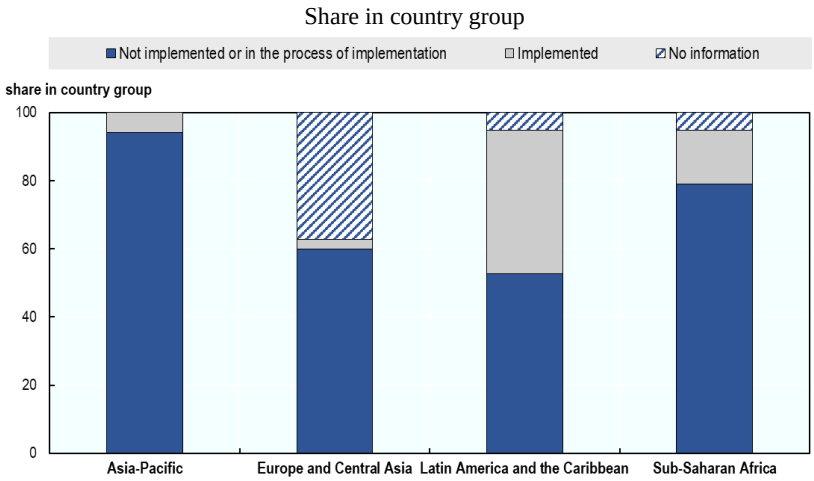
[25] While fixed connections could be preferred for filling-in and submitting online forms, mobile connections are increasingly being used for searching and extracting information on necessary documentation, procedures, fees etc. (Meltzer, 2014).

Figure 11. Gateway to Customs and other border agencies systems: Broadband connections by firm size, 2016



Source: OECD (2018), *ICT Access and Usage by Businesses* statistics.

Figure 12. Actions taken to increase the accessibility of Single Windows to SMEs



Note: Such actions include providing technical consultation and training services to SMEs on registering and using the facility.
Source: UN Global Survey on Trade Facilitation and Paperless Trade Implementation 2017, https://unnext.unescap.org/AP-TFSurvey2017/global.html.

5. Insights from cross-country firm-level data

The aim of this section is to identify how specific at-the-border issues affect SME exporting and importing activities across developed and developing countries. This will help provide policy guidance on the impact of trade facilitation reform on SME internationalisation through trade in view of identifying priority areas for reform.

5.1. Data, method and challenges

The ability and speed at which firms are able to comply with border procedures will depend on individual firm characteristics and the volume and frequency of shipments. The analysis therefore relies on identifying comparable information on the participation of firms in trade across a range of developed and developing countries. This requires drawing on different databases, the advantages and limitations of which are detailed in Figure 13.

For developing countries, the analysis draws on the World Bank Enterprise Survey (WBES) which has an extensive geographic (131 000 firms in 139 economies[26]), sectoral[27] (mainly manufacturing) and time coverage (from 2008 to 2017). It allows identifying whether firms are SMEs or large and provides data on whether an individual firm is an exporter or an importer. Firms with up to 19 employees are categorised as small, those with 20 to 99 as medium, while those with more than 100 employees as large firms.

Such detailed firm-level data are however not available for a wide range of developed countries; hence, the developed country analysis draws on the OECD Trade by Enterprise Characteristics (TEC) data. It covers 28 OECD and 5 non-OECD EU countries for the period 2008-16. The TEC dataset contains information on trade engagement across different categories of enterprises, detailing aggregate export and import values across different sectors, as well as the number of exporting and importing enterprises.[28] Firm size, in terms of employees, is identified according to four intervals: up to 9; 10-49; 50-249 – defined as micro, small and medium enterprises respectively – and more than 250 employees, representing large firms. By contrast to the WBES data, TEC data are available in aggregate form at country and sector level. [29] They also only cover trading firms.

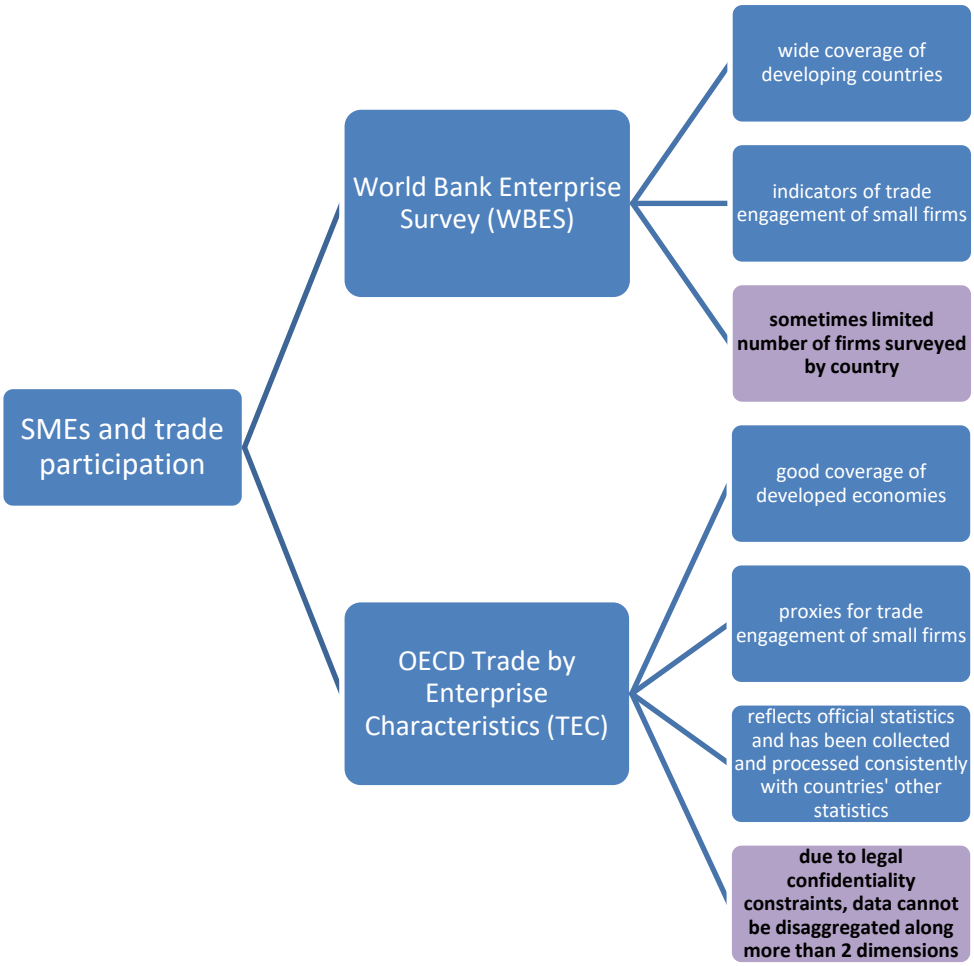
[26] These include 14 low-income economies and 33 lower-middle income economies (as classified using the World Bank income classification).

[27] Manufacturing sectors include: textiles, leather and garments; food processing; metals and machinery; electronics, chemicals and pharmaceuticals; wood and furniture; non-metallic and plastic materials; auto and auto components.

[28] The OECD collects the information in co-operation with Eurostat, directly from National Statistical Offices (NSOs). To create TEC data, NSOs have to attribute trade flows to enterprises with different characteristics by merging data on international trade (usually customs data) with business register information at the individual enterprise level. More detailed information is available at http://www.oecd.org/sdd/its/trade-by-enterprise-characteristics.htm.

[29] This implies that the individual trading partners are not available. It is only possible to distinguish between aggregate exports (imports) that are destined to (originating from) the EU market versus aggregate exports (imports) that are destined (originating) altogether to (from) trading partners situated outside the EU area. This allows undertaking robustness checks within the regression analysis (Annex C provides further details on the approach).

Figure 13. Drawing on different datasets to identify SMEs engagement in international trade



Source: Authors' compilation.

One important limitation of the WBES for the purposes of this analysis is the imperfect overlap between the TFI coverage and specific country firm-level data.[30] This implies that the work is undertaken using cross-sectional rather than panel techniques – making it hard to establish causal relations between the variables of interest. Still, the results are able to explore correlations, providing meaningful insights to a topic that is, to date, not well researched. In the case of the TEC dataset, there is a better overlap between the firm-level information and the TFIs in terms of time coverage.

Another limitation relates to the difficulty of separating trade costs according to whether they are fixed or variable. Also, as detailed in the previous section, how these are linked with trade facilitation measures is far from being clear cut, posing some challenges for the empirical analysis.

[30] There is a one-year overlap for 92 countries, with a two-year overlap for nine countries (see Table A1.1). However, even when countries appear more than once in the dataset, it is not possible to create a true firm-level panel, because anonymous firm identifiers are year specific, which makes it impossible to identify whether a particular firm has been interviewed more than once. The analysis remains thus cross-sectional in essence.

Lastly, a common limitation applies to both the WBES and TEC. These datasets do not identify the origin and destination of imports or exports by firm size, at a sectoral level (indeed, firm-level data seldom do).[31] This implies that the analysis using the WBES and TEC is not be able to directly observe how destination- or origin-specific trade facilitation measures affect SMEs, depending on whether they are exporting or importing. It will thus need to rely on proxy measures for the trade facilitation environment faced when importing and exporting.

There are also other caveats related to the empirical strategy and interpretation of results. With varying approaches to data collection, the indicators of trade engagement by firms are not directly comparable across the different income categories. The definition of an SME varies across individual countries, [32] reflecting diverse economic circumstances or fiscal realities and, while common within datasets used, differs across these. This makes arriving at fully comparable information between the datasets challenging.

The empirical analysis in this section builds on the quantitative frameworks developed in Hoekman and Shepherd (2013, 2015), Han and Piermartini (2016) and Fontagné et al. (2016) (described in section 3.2). It links, through regression analysis, the OECD TFIs with indicators of firms' engagement in international trade, as available in the WBES and TEC databases, in order to identify: i) how the trade facilitation policy environment can affect firms of different sizes; and ii) the differentiated impacts of specific border procedures on SMEs, with a view to helping better target policies seeking to promote further benefits for SMEs through trade facilitation reforms.

5.2. Trade facilitation and developing countries

To identify how trade facilitation affects the nature and evolution of trade by SMEs in developing countries, two indicators of trade participation are used. The first relates to the *extensive margin* of trade and is a binary variable capturing whether a firm is an exporter or an importer. The second relates to the *intensive margin* capturing the extent of firms' engagement in international trade. On the export side, this concerns the percentage of an establishment's total sales accounted for by direct exports; on the import side, it is the percentage of an establishment's total material inputs and supplies which are of foreign origin. Since the level of sales and inputs used are also available, the value of direct exports and imports can be derived for some firms.[33]

[31] As highlighted in Figure 10, a disadvantage of TEC is that due to legal confidentiality constraints, statistical offices cannot provide data disaggregated along more than two dimensions. This implies that data are available by firm size and partner country, or by firm size and industry, but not in combination. Notwithstanding, the TEC data by firm size and partner country is used to proxy for the trade facilitation environment in the partner country (as detailed in Annex B).

[32] According to the OECD and the European Union, and SME is a firm which has less than 250 employers. In the United States, an SME is defined as a firm with less than 500 employees. In Southeast Asia, the definition also varies across country. For instance, Indonesia uses turnover or net assets to categorise firms by size. Thailand uses a combination of employment and turnover with different cut-offs across sectors of activity (e.g. lower employment limits for wholesale and retail) (Lopez-Gonzalez, 2017).

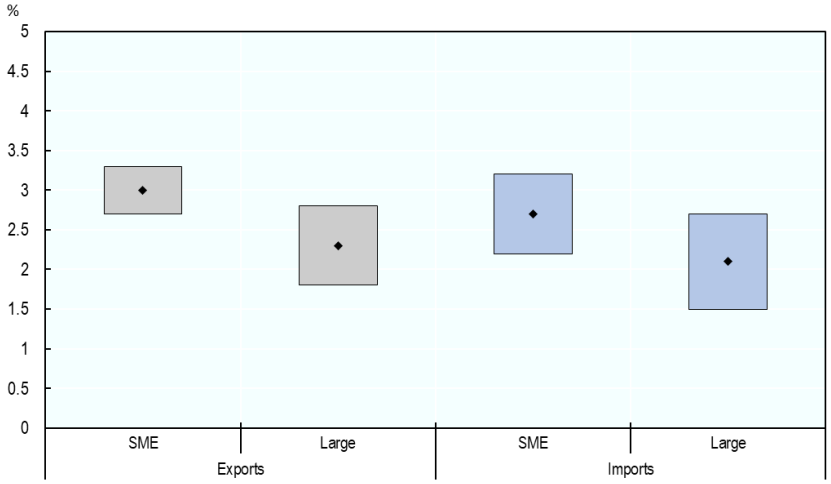
[33] However, the quality of data on the level of sales of exporting firms and on the cost of raw materials and inputs used in production during the last fiscal year is less good than the other variables, which overall reduces the number and reliability of observations.

This allows the analysis to focus on firms' international engagement as well as their actual export and import value (the empirical approach is described in Annex B). In order to better identify, and increase the variance of, the trade facilitation environment, the TFIs' country-specific dimensions are interacted with firm-level measures accounting for the extent to which customs and trade-related regulations are perceived as an obstacle to trade (drawing on the well-established Rajan and Zingales (1998) approach; see also Nunn (2007) and Manova (2008)).[34] In addition to the TFIs, the regressions also include a number of firm-level controls, such as: the age of the firm; its number of employees; the share of foreign inputs used in production; whether the firm has a credit line, a webpage and foreign ownership.

The results show that an overall improvement in the trade facilitation environment has the potential to benefit both SMEs and large firms seeking to export and import in the developing and emerging countries covered (Figure 14). Indeed, an improvement in the overall TFI increases the probability that both SMEs and large firms become importers or exporters. However, it appears to increase the probability that SMEs engage in trade by more than it increases the probability that large firms become importers or exporters (Annex B). At the same time, the trade facilitation policy environment in destination/origin markets also seems to have a bigger impact on SMEs than on larger firms.

Figure 14. Trade facilitation policy environment supporting SMEs versus large firms in developing economies

Effect of a 0.1 TFI improvement (average index of all 11 trade facilitation areas) on the probability of becoming an exporter or an importer



Note: The figure presents percentage improvements in the probability to export (import) from marginal effects of the probit model(s). The shaded area refers to the 95% confidence interval around the estimated indicator effect.
Source: Authors' estimations based on the World Bank Enterprise Survey data.

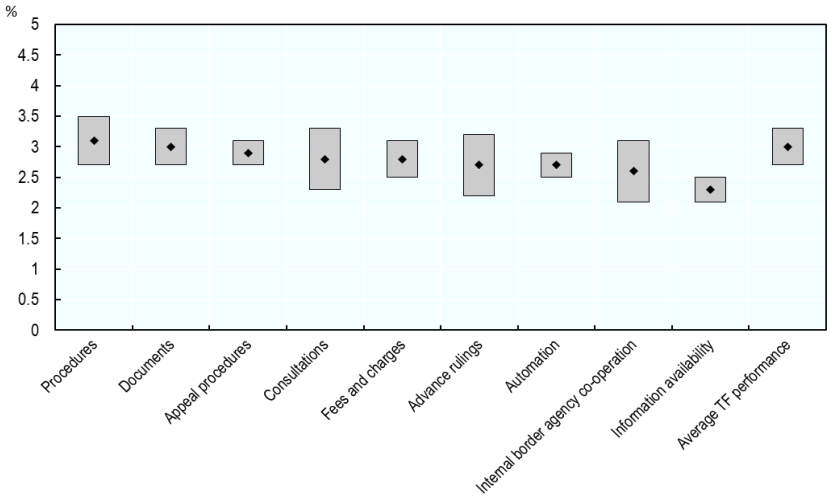
Where the role of specific trade facilitation dimensions on exports is concerned (Figure 15), the analysis shows that, in many areas, SMEs stand to benefit from trade facilitation through similar mechanisms and to a similar extent as large firms. Consultations, appeal procedures, streamlining of procedures and documents seem to affect SMEs' probability to

[34] This approach allows both the dependant and explanatory variables to vary at sector-level.

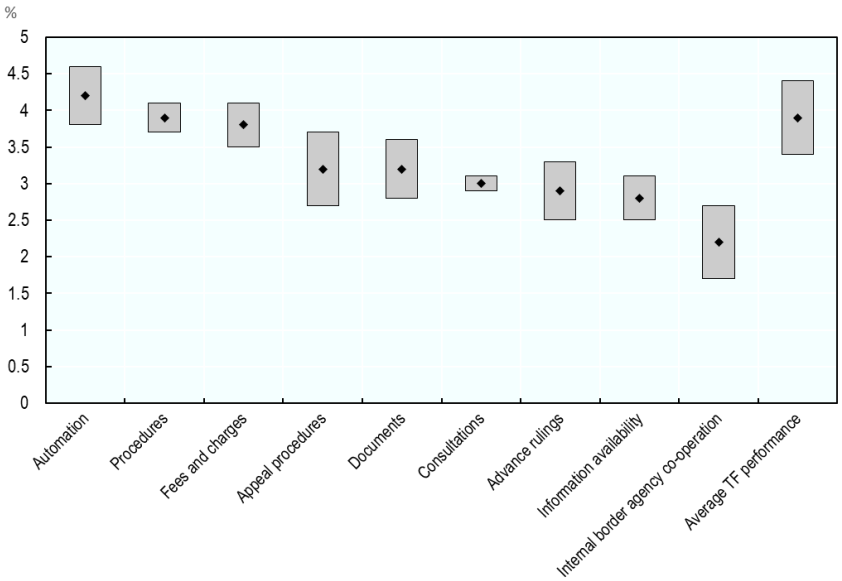
export – the extensive margin – most. By contrast, fees and charges, automation and streamlining of procedures affect the value of exporting, or the intensive margin, most.[35]

Figure 15. Trade facilitation policy factors underpinning SMEs exports in developing economies

Panel A: Effect of a 0.1 TFI improvement (by area) on the probability of becoming an exporter



Panel B: Effect of a 0.1 TFI improvement (by area) on the value of exports



Note: Panel A presents percentage improvements in the probability to export from marginal effects of the probit model; Panel B presents percentage improvements in the propensity to export from marginal effects of the fractional logit model. The shaded area refers to the 95% confidence interval around the estimated indicator effect.
Source: Authors' estimations based on the World Bank Enterprise Survey data.

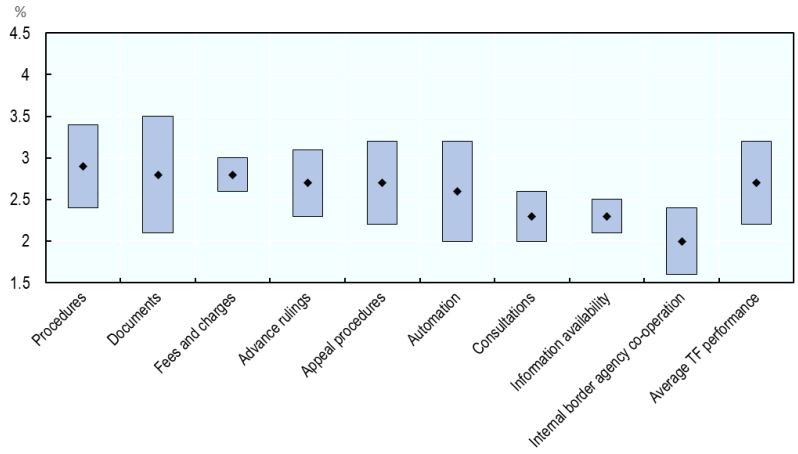
[35] It is worth noting that the data on the intensive margin is not as good as that of the extensive margin. The WBES has more information on whether a firm is exporting or not than on the share that exports occupy in overall sales.

The results also confirm the importance of other organisation-specific factors on SMEs' exporting behaviour. The most important dimensions resulting from the current assessment are its size (in terms of number of employees) and the number of years in business. Less robust results emerge when using measures of the actual level of exports, largely because the data for this dependent variable is more limited and less reliable. [36]

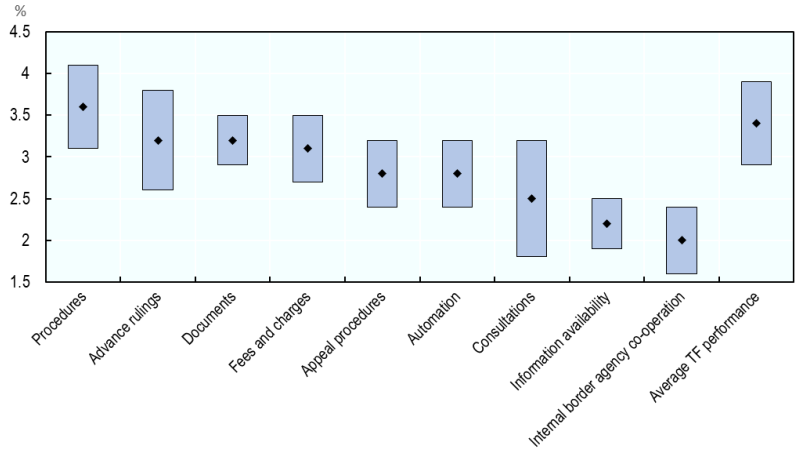
In terms of specific measures that affect SME imports, results are broadly in line with those for exports, although magnitudes differ somewhat (Figure 16). For instance, for the extensive margin (that is, the probability that firms import), fees and charges and advance rulings seem to matter more than was the case for exports. At the intensive margin, the value of imports, procedures and advance rulings are most important – and automation much less important – than was the case with exports.

Figure 16. Trade facilitation policy factors underpinning SMEs imports in developing economies

Panel A: Effect of a 0.1 TFI improvement (by area) on the probability of importing



Panel B: Effect of a 0.1 TFI improvement (by area) on the value of imports



Note: Panel A presents percentage improvements in the probability to export from marginal effects of the probit model; Panel B presents percentage improvements in the propensity to export from marginal effects of the fractional logit model. The shaded area refers to the 95% confidence interval around the estimated indicator effect.
Source: Authors' estimations based on the World Bank Enterprise Survey data.

[36] When using the level of exports as dependant variable, the coefficients for several indicators are not significant.

Once again, less robust results are obtained when using the actual level of imports as outcome variable, largely due to the quality of data for this dependent variable, with this being computed from the level of inputs costs during the latest financial year.[37]

5.3. Trade facilitation and developed countries

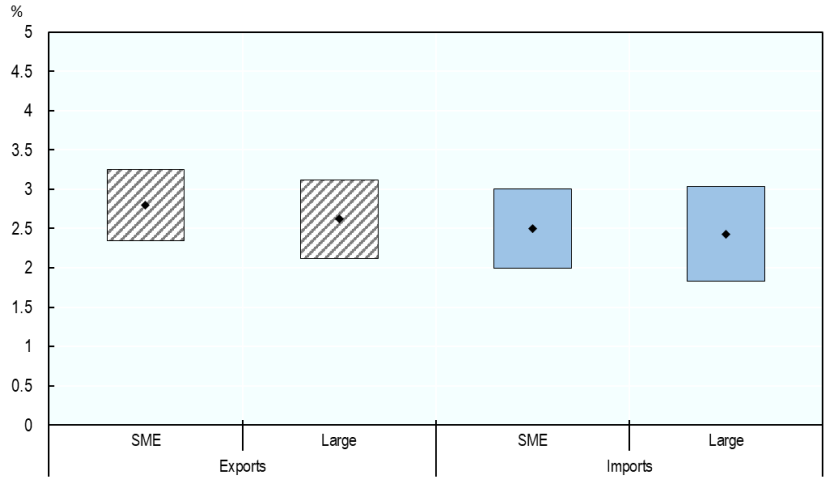
As was the case in the previous section, the econometric analysis in this section aims to assess the impact of specific trade facilitation measures on SME internationalisation, but it uses the TEC data to extend the analysis to developed countries. However, since the TEC data are different and available only at an aggregate level, the analysis uses slightly different measures of engagement.

Broadly, TEC data enable the examination of aggregate export and import values and of numbers of firms participating in trade across different size categories. In this respect, changes in export and import values can be used to proxy changes in trade at the *intensive margin*. In turn, changes in the number of firms participating in trade provide a measure of changes in trade at the *extensive margin* – a measure that is different to the participation rates used in the previous section (a description of the TEC datasets and methods used for the analysis is provided in Annex C).

Across the set of developed economies considered, the analysis reveals that positive changes in the overall trade facilitation policy environment are associated with positive changes in the propensity and value of exports and imports irrespective of firm size (Figure 17). Compared to the case of developing countries however, improvements in the trade facilitation environment appear to have an equivalent effect on both SMEs and larger firms.

Figure 17. Trade facilitation policy environment supporting SMEs versus large firms in developed economies

Effect of a 0.1 TFI improvement (average index of all 11 trade facilitation areas) on the export and import engagement (proxied by the share of exporting/importing firms)



Note: The figure presents percentage improvements in the probability to export (import) from marginal effects of the fractional logit model. The shaded area refers to the 95% confidence interval around the estimated indicator effect.
Source: Authors' estimations based on the Trade by Enterprise Characteristics data.

[37] Less robust results refer to coefficients for several indicators not being significant throughout the various robustness checks.

In terms of specific measures that affect SMEs exports (Figure 18), those areas that appear to contribute most to reducing fixed transaction costs, encouraging firms to start exporting (Figure 18a), include: consultations, fees and charges, automation, and streamlining of procedures. In turn, the simplification and streamlining of procedures, fees and charges, and the automation of border processes result most conducive for increases in exports (Figure 18b) – the intensive margin of SME exports (Annex C).

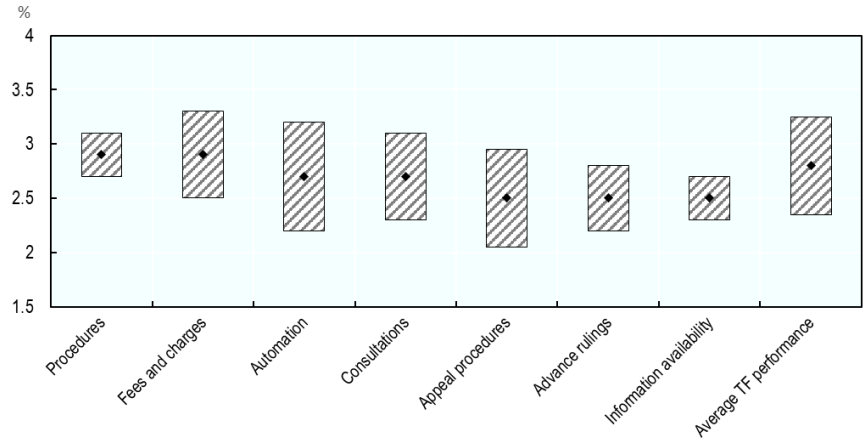
The trade facilitation environment faced in foreign markets also matters for the extensive margin of SME exports, particularly in the areas of: information availability, appeal procedures, advance rulings, and streamlining of procedures. The impact of other areas such as market size and distance is also shown to be significant: that is, the propensity to export is positively linked to the size of the export market, but negatively linked to distance (as expected).

Results for areas such as documents and border agency co-operation are less robust across the different specifications. One of the factors that could explain this is that the performance of developed economies is already much better when compared to developing economies, leaving less margin for improvement. Therefore, the indicators for these dimensions could fail to fully capture the challenges faced by SMEs in these areas across developed economies.

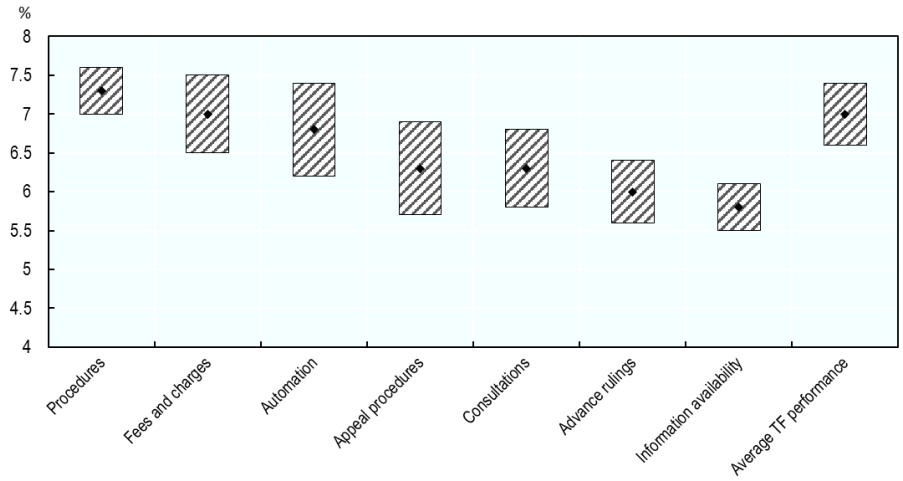
In terms of imports, the results show a positive association between international engagement via imports for measures such as advance rulings, procedures and fees and charges for both the intensive and extensive margins of SME imports (Figure 19). There are however some differences across firm size: information availability and consultations appear to matter more for small than for large firms (Annex C).

Figure 18. Trade facilitation policies underpinning SMEs engagement in exports in developed economies

Panel A: Effect of a 0.1 TFI improvement (by area) on the export engagement (proxied by the share of exporting firms)



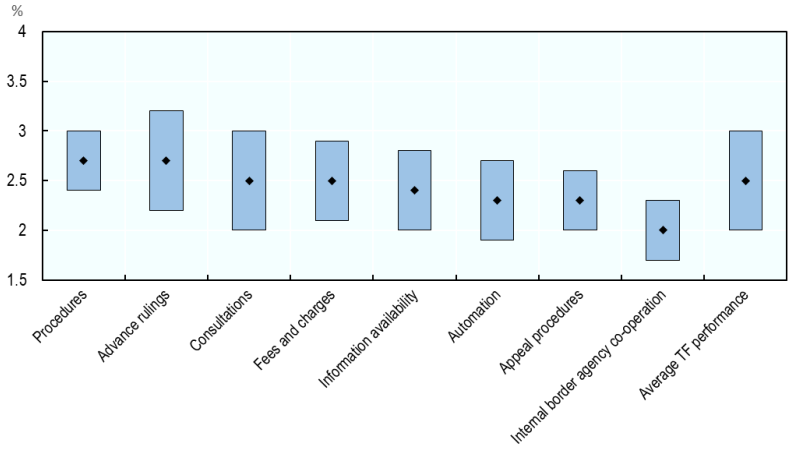
Panel B: Effect of a 0.1 TFI improvement (by area) on the level of exports



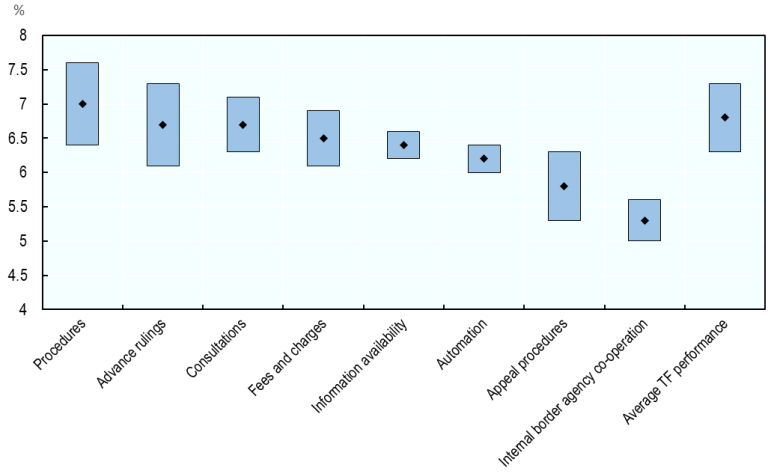
Note: Panel A presents percentage improvements in the propensity to export from marginal effects of the fractional logit model. The shaded area refers to the 95% confidence interval around the estimated indicator effect.
Source: Authors' estimations based on the Trade by Enterprise Characteristics data.

Figure 19. Trade facilitation measures supporting international engagement of SMEs via imports in developed economies

Panel A: Effect of a 0.1 TFI improvement (by area) on the import engagement (proxied by the share of importing firms)



Panel B: Effect of a 0.1 TFI improvement (by area) on the level of imports



Note: Panel A presents percentage improvements in the propensity to export from marginal effects of the fractional logit model. The shaded area refers to the 95% confidence interval around the estimated indicator effect.
Source: Authors' estimations based on the Trade by Enterprise Characteristics (TEC) data.

6. What policy makers can do: Conclusions and ways forward

Previous studies have highlighted that cumbersome procedures at the border constitute key bottlenecks to SME internationalisation. There has been, however, less empirical evidence on which specific policy areas matter more for SMEs when exporting or importing. As a result, it has hitherto been difficult to link trade facilitation reform efforts to specific challenges faced by SMEs engaging in international trade. Moreover, existing analysis has paid less attention to SMEs as importers, in spite of the importance of accessing new and more competitively-priced inputs for to enhance competitiveness in domestic and foreign markets (Bas and Strauss-Khan, 2013 and Lopez-Gonzalez, 2017).

Against this backdrop, this paper looks at a wide set of developing and developed countries to assess the relationship between the trade facilitation environment – as measured through the OECD TFIs – and various proxies for SME engagement in international trade.[38]

While impacts differ across firm size, the analysis shows that all firms stand to benefit from trade facilitation, whether in developed or developing countries, both in terms of imports and exports and at the intensive and extensive margins.

The trade facilitation measures covered by the TFIs capture aspects of fixed and variable costs of engaging in international trade. When put in relation to indicators of the international engagement of firms, the analysis reveals that some measures matter more in addressing fixed versus variable costs for SMEs. For instance, across developing and developed countries, measures such as the inclusion of SMEs in consultation processes or the efficiency of appeal procedures appear to have a higher impact on whether or not SMEs engage in exporting. In turn, measures such as fees and charges seem to have more of an effect on the volume or value of exports of such firms. Measures such as the streamlining of procedures and automating border processes also appear to have a greater impact on the level of exports than on the probability of becoming an exporter in the first place.

When importing, advance rulings appear to matter more for the volume of imports relative to the propensity to start using foreign inputs. Advance rulings also have an impact on the propensity of firms to export, highlighting the importance of access to foreign inputs for firms exporting further and potentially engaging in GVCs.

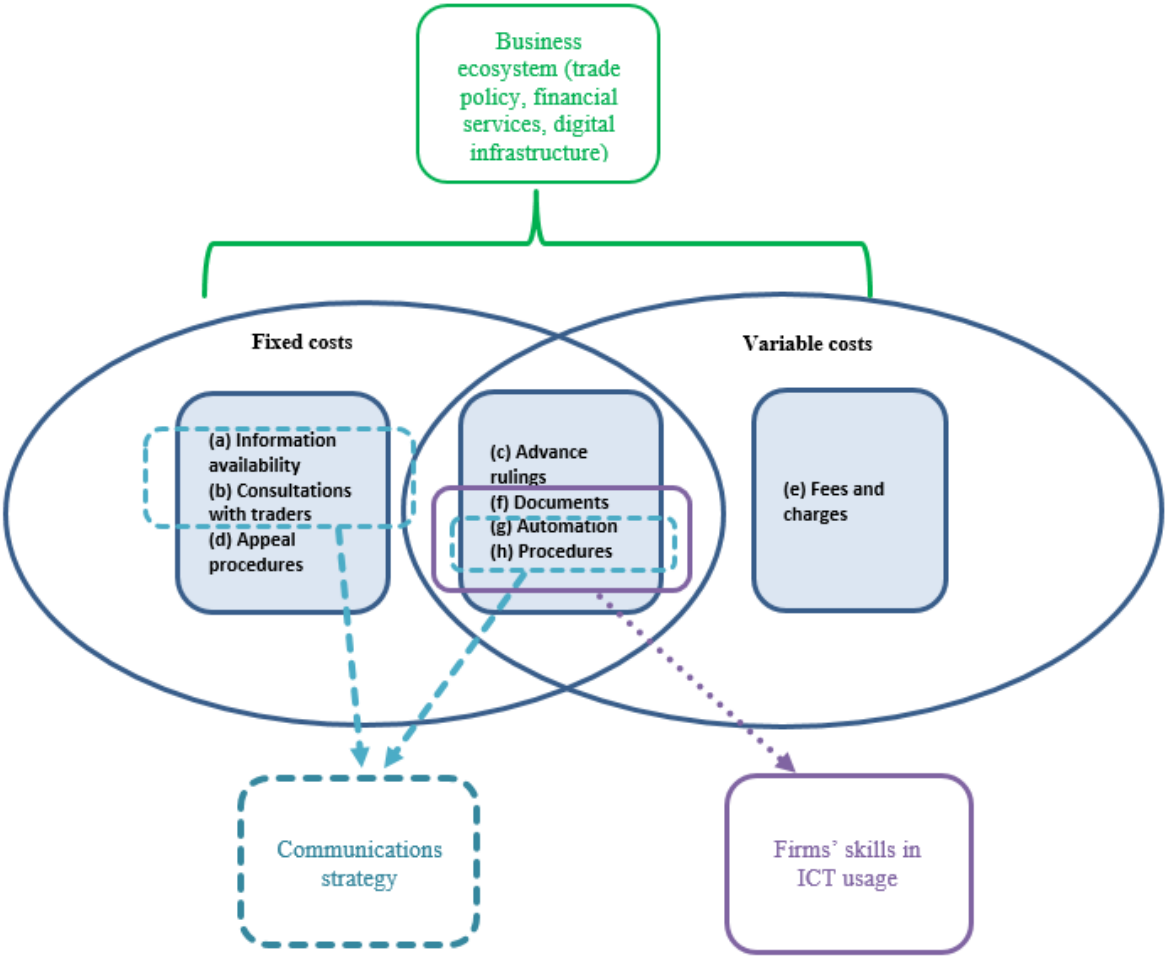
The results also suggest that it is not only the domestic trade facilitation environment in the exporting or importing country that matters but also those faced in the exporting markets or in the origin economies of the imported inputs.

While much of this paper focuses on trade facilitation policies, the analysis also underscores that, for trade facilitation reforms to serve as a tool for enhancing the competitiveness of SMEs, they need to be complemented by action in other areas, notably linked to firm capacity and the business environment in both domestic and foreign markets.

[38] The analysis in this paper provides a cross-country perspective on the trade facilitation areas that could help SMEs internationalise – as exporters or as importers – by making procedures at the border more efficient and addressing some of the at-the-border costs. Further research delving into the interlinkages between at-the-border and behind-the-border bottlenecks and the ways these relate to trade costs are beyond the scope of this paper. Looking into these issues would require access to more granular firm-level data as well as additional cross-country information on the policy environments.

In terms of firms' capabilities, skills are particularly relevant; for the business ecosystem, the analysis highlights the importance, in both developing and developed economies, of trade policy (tariffs), and the financial and digital infrastructure (Figure 20 summarises the linkages between the different areas highlighted by the analysis).

Figure 20. Trade facilitation strategies for helping SMEs to benefit from internationalisation



Note: The figure is for illustrative purposes and non-exhaustive. The dotted arrows link trade facilitation dimensions to other specific areas of action which could enhance their efficiency.
Source: Authors' compilation.

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Annex A. The inclusion of SMEs within AOs programmes: Insights from the APEC Authorised Economic Operators Compendium

Cross-country information regarding the extent to which SMEs participate in AEO programmes or the magnitude of costs of their participation remains very scarce. However, a 2016 survey on Authorised Economic Operator programmes in APEC economies (APEC, 2016) highlighted several best practices regarding the inclusion of SMEs, spanning across two main areas:

Reach and consult with the SME community

- In *Australia*, the engagement of SMEs during the design phase of the AEO programme through a formal consultative working group with SMEs to design the "Outcomes-Based Approach" used in the security standards. By ensuring there was SME buy-in from the beginning, Australia was able to address concerns about the program targeting big businesses without a sufficient return on investment for SMEs.
- *Singapore*'s programme involves reaching out to SMEs by explaining the benefits of certification as well as how these could outweigh the costs of certification.
- In the *United States*, experts from Supply Chain Security in the Customs and Border Protection conduct targeted outreach to SMEs to explain the eligibility criteria and application process.

Provide support with respect to certification

- *Japan* provides support for certification particularly for the SMEs operating as logistics service providers through customs-business partnerships.
- *Korea* offers expedited AEO certification examinations to SMEs through multiple procedural preferential provisions, including a 'priority audit'. Firms that show a lack of personnel and financial resources can be exempt from some of the certification fees. Additionally, larger firms sign Memorandums of Understanding with their SME partners to support their AEO certification.
- In *New Zealand*, Customs has dedicated staff accompanying SMEs throughout the steps of complying with the minimum standards and security arrangements for obtaining the certification.

Annex B. World Bank Enterprise Survey (WBES) dataset: Empirical analysis

A. Exports

For an individual firm, three aspects are considered: the impacts on the probability of exporting, on the export propensity, and on the level of exports.

In terms of firms, sector and time coverage, the analysis is conducted along the following dimensions:

- *Firms*: for SMEs (0-100 employees) versus large firms (more than 100 employees)
- *Countries*: there is a one-year overlap for 92 economies, with a two-year overlap for nine economies (as listed in Table A B.1)
- *Sectors*: manufacturing sub-sectors (basic metals and metals products; fabricated metals products; mining related manufacturing; non-metallic mineral products; petroleum products, plastics and rubber; chemicals and chemical products; chemicals, plastics and rubber; electronics; electronics and communications equipment; wood products and furniture; furniture; machinery and equipment; motor vehicles; motor vehicles and transport equipment; paper and publishing; textiles; textiles and garments; garments; leather products.
- *Time*: pooled data covering 2012, 2015 and 2016, as most country-firm surveys are available for years close to these. The surveys that are available for the years in between are linked to the closest period. Considering that the TFI data is not available for all years and regulation is to a large extent persistent over a period of a few years, the 2012, 2015 and 2017 TFIs values are used for the periods in-between. The regressions are also tested on separate cross-sections by year and results are robust.

Table A B.1. WBES country surveys coverage in the analysis

Country	WBES year
Albania	2013
Angola	2010
Antigua and Barbuda	2010
Argentina	2010
Armenia	2013
Azerbaijan	2013
Bangladesh	2013
Barbados	2010
Belarus	2013
Belize	2010
Benin	2016
Bhutan	2015
Bolivia	2010, 2017
Bosnia and Herzegovina	2013
Botswana	2010
Bulgaria	2013
Burundi	2014

Country	WBES year
Cambodia	2013, 2016
Cameroon	2016
China	2012
Colombia	2010
Costa Rica	2010
Côte d'Ivoire	2016
Croatia	2013
Czech Republic	2013
Dominican Republic	2016
Ecuador	2010
Egypt, Arab Rep.	2016
El Salvador	2010, 2016
Eswatini, Kingdom of	2016
Ethiopia	2011, 2015
Georgia	2013
Ghana	2013
Honduras	2010
Hungary	2013
India	2014
Indonesia	2015
Jamaica	2010
Jordan	2013
Kazakhstan	2013
Kenya	2013
Kyrgyz Republic	2013
Lao PDR	2016
Latvia	2013
Lebanon	2013
Lesotho	2016
Lithuania	2013
Madagascar	2013
Malawi	2014
Malaysia	2015
Mali	2010, 2016
Mexico	2010
Moldova	2013
Mongolia	2013
Montenegro	2013
Morocco	2013
Myanmar	2014, 2016
Namibia	2014
Nepal	2013
Nicaragua	2010, 2016
Nigeria	2014
North Macedonia	2013
Pakistan	2013
Panama	2010
Papua New Guinea	2015
Paraguay	2010, 2017
Philippines	2015
Poland	2013
Romania	2013
Russian Federation	2012
Rwanda	2011
Senegal	2014
Serbia	2013
Slovak Republic	2013
Solomon Islands	2015
Sri Lanka	2011
Sudan	2014
Sweden	2014
Tajikistan	2013
Tanzania	2013
Thailand	2016
Togo	2016
Trinidad and Tobago	2010
Tunisia	2013

Country	WBES year
Turkey	2013
Uganda	2013
Ukraine	2013
Uruguay	2010
Venezuela	2010
Viet Nam	2015
Zambia	2013
Zimbabwe	2011, 2016

Note: The economies in bold are covered by the OECD TEC dataset and covered by the analysis described in Annex C. The analysis with WBES incorporates the low income, lower-middle income and upper-middle income economies (based on the World Bank income per capita classification) covered by the WBES.
Source: Own tabulation based on WBES.

A1. Probability of being an exporter

If the export status of a firm is given by Y_i, then the probability of exporting is defined as a function of the trade facilitation performance, other control variables, and a series of country, time, industry fixed effects controlling for unobserved factors. A probit model is used for the estimation.

$$\text{prob}(Y_{fikt} = 1) = f(TFI^*_{it}, C_{ifkt},\ \rho_i, \gamma_t, \mu_k) \text{ (i)}$$

In order to increase the variability of the variable capturing the trade facilitation environment, the TFI measure (TFI^*_{it}) is alternatively interacted with two firm-level measures ($obstacletrade_{ifkt}$). These measures account for the extent to which customs and trade-related regulations are an obstacle to trade or for the extent to which transport is an obstacle (the scale for these measures is: 'no obstacle'; 'minor obstacle'; 'major obstacle'; 'very severe obstacle').[39]

ρ_i, γ_t, μ_k denote the exporter, year and sector fixed effects, respectively.

Other control variables included in the vector C_{ifkt} are:

- the age of the firm (age);
- total number of full-time employees (adjusted for temporary workers) (*size_num* and *size_num*^{2});
- whether the firm has an internationally-recognized quality certification (*ISO*);
- the share of material inputs and supplies of foreign origin in the last fiscal year (*shareforints*);
- having a line of credit or loan from a financial institution (*linecredit*);
- share of the firm owned by private foreign individuals, companies or organisations (*foreignshare*);
- number of years of experience of the top manager (*manexp*);
- purchase of fixed assets in the last fiscal year (*purchfixassets*);
- whether the firm has a website (*webpage*)

[39] Robustness checks are undertaken with this measure as control, but this specification is preferred as it increases the variance of the facilitation explanatory variable; the interaction accounts for the objective policy factor as reflected by the indicators in conjunction to the burden perceived at firm level.

SMEs versus large firms

When ran for all firms, the regression also includes a dummy variable accounting for whether a firm is an SME (SME) and an interaction term between the SME dummy and the TFI variable, for which a positive coefficient would mean that SMEs are more responsive to that trade cost:

$$\text{prob}(Y_{fikt} = 1) = f(TFI^*_{it}, C_{ifkt}, SME_f\ , TFI^*_{it} * \ SME_f\ , \rho_i, \gamma_t, \mu_k)$$

Regression (i) is also tested alternatively on the sample of SMEs and large firms.

Proxying for the trade facilitation environment in export markets

The WBES data on exports do not allow identifying the destination of exports. As this impedes for the analysis to directly observe how destination-specific trade facilitation measures affect SMEs, a trade-weighted measures of the overall trade facilitation environment is constructed. First, the destination country of the exports – by country of origin of a firm – is identified through the UN Comtrade database, which introduces a proportionality assumption. Then, a proxy for the trade facilitation environment faced by the exporting firms in the destination economies of their exports is constructed as a trade-weighted average of the TFIs characterising those destination economies.

Table A B.2. 2 Probability of exporting: Summary* across trade facilitation measures

Dep. Variable: Dummy = 1 if firm f is exporting			
	(1) All	(2) SME	(3) Large
TFI (a) exp	0.105*** (0.005)	0.104*** (0 .006)	0.073*** (0.009)
TFI (b) exp	0.121*** (0.006)	0.126*** (0.007)	0.084*** (0.011)
TFI (c) exp	0.115*** (0.007)	0.119*** (0.008)	0.099*** (0.013)
TFI (d) exp	0.122*** (0.006)	0.125*** (0.007)	0.089*** (0.011)
TFI (e) exp	0.128*** (0.006)	0.132*** (0.007)	0.083*** (0.010)
TFI (f) exp	0.133*** (0.007)	0.135*** (0.008)	0.122*** (0.013)
TFI (g) exp	0.108*** (0.006)	0.120*** (0.007)	0.104*** (0.011)
TFI (h) exp	0.135*** (0.007)	0.141*** (0.008)	0.098*** (0.012)
TFI (i) exp	0.104*** (0.006)	0.113*** (0.008)	0.087*** (0.012)
TFI (j) exp	0.113* (0.098)	0.115* (0.098)	0.092* (0.097)
TFI (k) exp	0.111*** (0.005)	0.114*** (0.007)	0.092*** (0.015)
Avg_TFI exp	0.122*** (0.006)	0.132*** (0.008)	0.097*** (0.012)
SME* Avg_TFI exp	0.031*** (0.007)		
SME	-0.012*** (0.011)		

Dep. Variable: Dummy = 1 if firm f is exporting			
	(1) All	(2) SME	(3) Large
Firm controls	Yes	Yes	Yes
Country, time and sector FE	Yes	Yes	Yes

Note: The 11 TFI indicators are interacted with the firm-level measure accounting for the extent to which customs and trade-related regulations are an obstacle to trade and alternatively introduced in the regression analysis. Regressions apply probit and include country, time and sector fixed effects. Robust standard errors clustered by exporter country reported in parentheses. ***; **;* significant at the 1%, 5% and 10% level respectively. The robustness checks covering the full sample of firms also consider the inclusion of a SME dummy interacted with the indicators.
* Conducting the regression analysis using the 11 indicators (plus an index of the average performance), which includes the different robustness checks regressions, yields a very large set of regression results. For ease of reference, the key results for trade facilitation measures are reported in this current version of the paper. Other results can be made available on request
Source: Authors' estimations based on WBES data.

A2. Export propensity

The export propensity (Eifkt) is represented by the share of direct exports in the total sales of a firm. This is expressed as a function of the same explanatory variables as in A1.

As the dependent variable is bounded between zero and unity, an OLS estimation can yield biased results. A fractional logit estimator is therefore used.

$E_{fikt} = f(TFI^{*}_{it}, C_{ifkt}, \rho_i, \gamma_t, \mu_k)$ (ii)

Table A B.3. Export propensity: Summary across trade facilitation measures

Dep. Variable: The share of exports in total sales of firm f			
	(1) All	(2) SME	(3) Large
TFI (a) exp	0.096*** (0.009)	0.098*** (0 .007)	0.068*** (0.012)
TFI (b) exp	0.115*** (0.007)	0.118*** (0.004)	0.082*** (0.009)
TFI (c) exp	0.102*** (0.011)	0.114*** (0.010)	0.085*** (0.015)
TFI (d) exp	0.128*** (0.004)	0.131*** (0.006)	0.091*** (0.010)
TFI (e) exp	0.131*** (0.010)	0.139*** (0.008)	0.111*** (0.013)
TFI (f) exp	0.127*** (0.006)	0.128*** (0.005)	0.122*** (0.010)
TFI (g) exp	0.138*** (0.008)	0.153*** (0.006)	0.129*** (0.009)
TFI (h) exp	0.133*** (0.011)	0.146*** (0.010)	0.125*** (0.013)
TFI (i) exp	0.073*** (0.010)	0.086*** (0.009)	0.066*** (0.012)
TFI (j) exp	0.069* (0.112)	0.077* (0.103)	0.053 (0.213)
TFI (k) exp	0.084*** (0.010)	0.088*** (0.009)	0.080*** (0.011)
Avg_TFI exp	0.133*** (0.008)	0.148*** (0.006)	0.112*** (0.011)

Dep. Variable: The share of exports in total sales of firm f			
	(1) All	(2) SME	(3) Large
Firm controls	Yes	Yes	Yes
Country, time and sector FE	Yes	Yes	Yes

Note: The 11 TFI indicators are interacted with the firm-level measure accounting for the extent to which customs and trade-related regulations are an obstacle to trade and alternatively introduced in the regression analysis. Regressions apply fractional logit and include country, time and sector fixed effects. Robust standard errors clustered by exporter country reported in parentheses. ***; **;* significant at the 1%, 5% and 10% level respectively. The robustness checks covering the full sample of firms also consider the inclusion of a SME dummy interacted with the indicators.
Source: Authors' estimations based on WBES data.

A3. Level of exports

Similar to the approaches in A1 and A2, the firm-level size of exports is expressed as a function of the trade facilitation performance, other control variables, and a series of country, time, industry fixed effects controlling for unobserved factors.

$\ln(X_{fikt}) = f(TFI^*_{it}, C_{ifkt}, \rho_i, \gamma_t, \mu_k)$ (iii)

A Poisson Pseudo Maximum Likelihood (PPML) estimator is preferred to OLS, as this has the advantage of incorporating the zero observations where there are no firms within a specific size class exporting, in addition to the fact that it helps provide unbiased estimates in the presence of heteroscedasticity.

Table A B.4. Level of exports: Summary across trade facilitation measures

Dep. Variable: Exports of firm f			
	(1) All	(2) SME	(3) Large
TFI (a) exp	0.115* (0.089)	0.118* (0 .097)	0.109 (0.272)
TFI (b) exp	0.121 (0.277)	0.127 (0.264)	0.112 (0.269)
TFI (c) exp	0.122 (0.241)	0.124 (0.250)	0.115 (0.265)
TFI (d) exp	0.144 (0.263)	0.141 (0.255)	0.144 (0.241)
TFI (e) exp	0.145 (0.266)	0.153 (0.261)	0.137 (0.253)
TFI (f) exp	0.130* (0.096)	0.135** (0.055)	0.128* (0.084)
TFI (g) exp	0.175* (0.088)	0.183* (0.095)	0.141* (0.098)
TFI (h) exp	0.147* (0.099)	0.158* (0.097)	0.139* (0.103)
TFI (i) exp	0.099 (0.315)	0.106 (0.309)	0.096 (0.302)
TFI (j) exp	0.103* (0.082)	0.117* (0.073)	0.093 (0.253)
TFI (k) exp	0.092** (0.050)	0.109** (0.067)	0.085 (0.211)
Avg_TFI exp	0.168** (0.087)	0.172** (0.075)	0.155** (0.071)

Dep. Variable: Exports of firm f			
	(1) All	(2) SME	(3) Large
Firm controls	Yes	Yes	Yes
Country, time and sector FE	Yes	Yes	Yes

Note: The 11 TFI indicators are interacted with the firm-level measure accounting for the extent to which customs and trade-related regulations are an obstacle to trade and alternatively introduced in the regression analysis. Regressions apply PPML and include country, time and sector fixed effects. Robust standard errors clustered by exporter country reported in parentheses. ***; **;* significant at the 1%, 5% and 10% level respectively. The robustness checks covering the full sample of firms also consider the inclusion of a SME dummy interacted with the indicators.
Source: Authors' estimations based on WBES data.

B. Imports

For an individual firm, three aspects are considered: the impacts on the probability of importing foreign inputs and on the share of imported inputs.

B1. Probability of importing foreign inputs

A similar framework as for exports in A1 is used to identify the potential determinants of the probability of importing foreign inputs to be used in firms' production.

The control variables included here are:

- the age of the firm (age);
- total number of full-time employees (adjusted for temporary workers) (*size_num* and *size_num*^{2});
- having a line of credit or loan from a financial institution (*linecredit*);
- share of the firm owned by private foreign individuals, companies or organisations (*foreignshare*);
- number of years of experience of the top manager (*manexp*);
- purchase of fixed assets in the last fiscal year (*purchfixassets*)

The WBES data on imports do not allow identifying the origin of the imported inputs. As this impedes for the analysis to directly observe how origin-specific trade facilitation measures affect SMEs' imports, a trade-weighted measures of the overall trade facilitation environment is constructed. First, the origin countries of the imports – by country of destination of a firm – is identified through the UN Comtrade database. Then, a proxy for the trade facilitation environment in the origin economies of firms' imported inputs is constructed as a trade-weighted average of the TFIs characterising those origin economies.

Table A B.5. Probability of importing: Summary across trade facilitation measures

Dep. Variable: Dummy variable = 1 if firm f is importing inputs			
	(1) All	(2) SME	(3) Large
TFI (a) imp	0.095*** (0.006)	0.098*** (0 .005)	0.078*** (0.009)
TFI (b) imp	0.098*** (0.011)	0.105*** (0.011)	0.066*** (0.015)
TFI (c) imp	0.108*** (0.010)	0.112*** (0.009)	0.087*** (0.015)
TFI (d) imp	0.103*** (0.009)	0.108*** (0.008)	0.078*** (0.012)
TFI (e) imp	0.118*** (0.008)	0.125*** (0.005)	0.080*** (0.011)
TFI (f) imp	0.122*** (0.010)	0.128*** (0.009)	0.117*** (0.015)
TFI (g) imp	0.101*** (0.005)	0.107*** (0.004)	0.085*** (0.013)
TFI (h) imp	0.129*** (0.008)	0.137*** (0.005)	0.092*** (0.010)
TFI (i) imp	0.087*** (0.009)	0.093*** (0.007)	0.075*** (0.011)
TFI (j) imp	0.087* (0.101)	0.089* (0.103)	0.064* (0.111)
TFI (k) imp	0.088*** (0.007)	0.088*** (0.006)	0.084*** (0.007)
Avg_TFI imp	0.123*** (0.009)	0.129*** (0.006)	0.099*** (0.011)
SME* Avg_TFI imp	0.026*** (0.009)		
SME	-0.009*** (0.013)		
Firm controls	Yes	Yes	Yes
Country, time and sector FE	Yes	Yes	Yes

Note: The 11 TFI indicators are interacted with the firm-level measure accounting for the extent to which customs and trade-related regulations are an obstacle to trade and alternatively introduced in the regression analysis. Regressions apply probit and include country, time and sector fixed effects. Robust standard errors clustered by exporter country reported in parentheses. ***; **; * significant at the 1%, 5% and 10% level respectively. The robustness checks covering the full sample of firms also consider the inclusion of a SME dummy interacted with the indicators.
Source: Authors' estimations based on WBES data.

B2. Share of imported inputs

A similar framework as for exports in A2 is used to identify the potential determinants of share of foreign inputs imported. The same set of control variables as in B1 is used here.

Table A B.6. Import propensity: Summary across trade facilitation measures

Dep. Variable: The share of imported inputs in total inputs used by firm f			
	(1) All	(2) SME	(3) Large
TFI (a) imp	0.099*** (0.006)	0.118*** (0 .005)	0.075*** (0.009)
TFI (b) imp	0.103*** (0.011)	0.122*** (0.010)	0.078*** (0.015)
TFI (c) imp	0.132*** (0.009)	0.137*** (0.007)	0.096*** (0.012)
TFI (d) imp	0.101*** (0.011)	0.127*** (0.007)	0.082*** (0.015)
TFI (e) imp	0.130*** (0.007)	0.131*** (0.004)	0.085*** (0.012)
TFI (f) imp	0.129*** (0.011)	0.134*** (0.008)	0.128*** (0.014)
TFI (g) imp	0.114*** (0.009)	0.126*** (0.007)	0.085*** (0.011)
TFI (h) imp	0.134*** (0.006)	0.143*** (0.005)	0.087*** (0.009)
TFI (i) imp	0.095*** (0.011)	0.099*** (0.010)	0.064*** (0.013)
TFI (j) imp	0.073* (0.151)	0.098* (0.133)	0.055* (0.164)
TFI (k) imp	0.092*** (0.007)	0.111*** (0.006)	0.083*** (0.007)
Avg_TFI imp	0.138*** (0.010)	0.141*** (0.008)	0.088*** (0.011)
Firm controls	Yes	Yes	Yes
Country, time and sector FE	Yes	Yes	Yes

Note: The 11 TFI indicators are interacted with the firm-level measure accounting for the extent to which customs and trade-related regulations are an obstacle to trade and alternatively introduced in the regression analysis. Regressions apply fractional logit and include country, time and sector fixed effects. Robust standard errors clustered by exporter country reported in parentheses. ***; **; * significant at the 1%, 5% and 10% level respectively. The robustness checks covering the full sample of firms also consider the inclusion of a SME dummy interacted with the indicators.
Source: Authors' estimations based on WBES data.

B3. Level of imported inputs

A similar framework as for exports in A3 is used to identify the potential determinants of share of foreign inputs imported. The same set of control variables as in B1 is used here.

Table A B.7. Level of imported inputs: Summary across trade facilitation measures

Dep. Variable: Imports of firm f			
	(1) All	(2) SME	(3) Large
TFI (a) imp	0.110 (0.206)	0.122* (0 .095)	0.107 (0.219)
TFI (b) imp	0.133 (0.291)	0.125 (0.310)	0.143 (0.315)
TFI (c) imp	0.149* (0.099)	0.151* (0.097)	0.146* (0.092)
TFI (d) imp	0.131 (0.249)	0.137 (0.237)	0.129 (0.315)
TFI (e) imp	0.138 (0.267)	0.148 (0.244)	0.135 (0.212)
TFI (f) imp	0.149* (0.097)	0.153* (0.098)	0.148* (0.094)
TFI (g) imp	0.131 (0.299)	0.128 (0.317)	0.135 (0.311)
TFI (h) imp	0.154** (0.046)	0.161** (0.055)	0.147** (0.049)
TFI (i) imp	0.105 (0.291)	0.119 (0.310)	0.099 (0.293)
TFI (j) imp	0.105* (0.101)	0.108* (0.093)	0.105* (0.104)
TFI (k) imp	0.113** (0.047)	0.122** (0.046)	0.094 (0.199)
Avg_TFI imp	0.144** (0.050)	0.158** (0.048)	0.128** (0.051)
Firm controls	Yes	Yes	Yes
Country, time and sector FE	Yes	Yes	Yes

Note: The 11 TFI indicators are interacted with the firm-level measure accounting for the extent to which customs and trade-related regulations are an obstacle to trade and alternatively introduced in the regression analysis. Regressions apply PPML and include country, time and sector fixed effects. Robust standard errors clustered by exporter country reported in parentheses. ***;**;* significant at the 1%, 5% and 10% level respectively. The robustness checks covering the full sample of firms also consider the inclusion of a SME dummy interacted with the indicators.
Source: Authors' estimations based on WBES data.

Annex C. Trade by Enterprise Characteristics (TEC) dataset: Empirical analysis

A. Exports

The TEC data allows the analysis to be conducted on a five-year panel (2011-15) as well as at a disaggregated sectoral level. However, the dataset does not allow identifying the specific destination of exports (Table A C.1). Therefore, different TEC datasets are merged in order to also construct a proxy for the trade facilitation environment faced by exporting firms in their destination markets. The empirical analysis also includes several other control variables such as market size, distance, market access, and business use of ICT, which may impact the propensity of firms to export.

Table A C.1. Selected TEC datasets

TEC dataset	Data fields						
	Reporter	Partner	Flow	Firm size class (by number of employees)	Sector	Year	Key indicators
Trade by size classes and detailed economic sector	26 OECD countries; 6 non-OECD EU countries	Intra-EU; Extra-EU; Total	Exports; Imports	0-9; 10-49; 50-249; 250+; unknown[1]	Agriculture, forestry, and fishing; Mining and quarrying; 24 manufacturing sectors (ISIC Rev. 4 2-digit)	Annual data for 2011-15 available for most countries	Number of trading enterprises; Number of total enterprises; Trade Value
Trade by partner countries and size class	26 OECD countries; 6 non-OECD EU countries	26 OECD countries; 6 non-OECD EU countries; Brazil; Indonesia; India; Russian Federation; South Africa; Argentina; China; Saudi Arabia	Exports; Imports	0-9; 10-49; 50-249; 250+; unknown	Industry; Trade and repair; Other sectors		Number of enterprises; Trade Value

Note: [1]Unmatched cases relate to smaller enterprises, as the small average trade values for these unallocated firms suggests.
Source: OECD Trade by Enterprise Characteristics (TEC).

Additional robustness checks are carried out. For instance, in order to increase the variance of TFIs at a sectoral level, the indicators are also interacted with share parameters that capture in which sectors firms may be more dependent on efficient border procedures in order to engage in international trade. Following Blyde and Molina (2013) (and in line with the Rajan and Zingales (1998) approach), the proxy for the industry dependence on trade

facilitation is a measure of industry sensitivity to shipping times constructed by Hummels and Schaur (2012). The rationale is based on the idea that rapid delivery requires an efficient trade facilitation environment and therefore, industries that are sensitive to shipping times are also sensitive to efficient border procedures. For instance, some industries can be more sensitive to shipping times than others.

Other tests include introducing some regressors (such as the TFIs) with the values of period t-1 to address any potential endogeneity concerns.

A1. Number of SMEs exporting versus large firms

I. Disaggregated firm and sector level

The empirical analysis relates the number of SMEs exporting to the exporter country's trade facilitation performance, while controlling for other potential determinants. TEC data on trade by firm size classes and detailed economic sector provides the number of exporting micro, small, medium, and large firms in selected economies, years and manufacturing sub-sectors.

The individual export country destination is not available. It is only possible to distinguish between exports that are destined to the EU market versus exports that are destined altogether to trading partners situated outside the EU area. When ran without distinguishing between the two aggregate destinations, the equation only includes the exporter country's trade facilitation performance (i).

$N_{fikt} = f(TFI^*_{it}, C_{it}, \rho_i, \gamma_t, \mu_k)$ (i)

where N_{ikt} is the *number* of exporting enterprises of the total number of firms; TFI^*_{it} is the trade facilitation performance by area in exporter i; the vector C_{it} summarises a set of additional control variables:

- GDP as a proxy for market size (World Bank Development Indicators);
- Indicators for business usage of Information and Communications Technology (OECD ICT Access and Usage by Businesses statistics): businesses with a broadband connection (fixed and mobile) and businesses with a downloading speed of at least 100 Mbit/s – by firm size: 0-49 employees; 50-249 employees; more than 250 employees.

The type of firm is indicated by the subscript f; ρ_i and γ_t denote exporter and year fixed effects, respectively. The equation also includes sector fixed effects μ_k when the model is ran with the manufacturing sub-sectors.

In terms of firms, sector and time coverage, the analysis is conducted along the following dimensions:

- *firms*: for SMEs (0-249 employees) versus large firms (more than 250 employees), as well as for different categories of SMEs, namely at the level of micro (0-9 employees), small (10-49 employees), medium (50-249 employees) firms
- *countries*: 33 economies (listed in Table A3.2)
- *sectors*: alternatively at the level of total goods trade, at the aggregate level of manufacturing goods trade, and by manufacturing sub-sectors
- *time*: a pseudo-panel covering 2011-15 - considering that the TFI data is not available for all years and regulation is to a large extent persistent over a period of a few years, the 2012 and 2015 TFIs values are used for the periods in-between

SMEs versus large firms

When ran for all firms, the regression also includes a dummy variable accounting for whether a firm is an SME (SME) and an interaction term between the SME dummy and the TFI variable, for which a positive coefficient would mean that SMEs are more responsive to that trade cost: $N_{fikt} = f(TFI^*_{it}, C_{it}, SME_f, TFI^*_{it} * SME_f, \rho_i, \gamma_t, \mu_k)$ (i)

Regression (i) is also tested alternatively on the sample of SMEs and large firms (as well as for micro, small and medium firms).

A Poisson Pseudo Maximum Likelihood (PPML) estimator is preferred to OLS, as this has the advantage of incorporating the zero observations where there are no firms within a specific size class exporting, in addition to the fact that it provides unbiased estimates in the presence of heteroscedasticity.

Table A C.2. Countries and years covered using the OECD TEC datasets

Country	2011	2012	2013	2014	2015	Manufacturing sector (ISIC Rev.4 2-digit)
AUT	x	x	x	x	x	Yes
BEL	x	x	x	x	x	Yes
CAN	x	x	x	x	x	no
BGR	x	x	x	x	x	Yes
CYP [a]	x	x	x	x	x	Yes
CZE	x	x	x	x	x	Yes
DEU	x	x	x	x	x	Yes
DNK	x	x	x	x	x	Yes
ESP	x	x	x	x	x	Yes
EST	x	x	x	x	x	Yes
FIN	x	x	x	x	x	Yes
FRA	x	x	x	x	x	Yes
GBR	x	x	x	x	x	Yes
GRC	x	x	x	x	x	Yes
HRV	x	x	x	x	x	Yes
HUN	x	x	x	x	x	Yes
IRL	x	x	x	x	x	Yes
ISR [b]	-	-	x	x	x[1]	Yes
ITA	x	x	x	x	x	Yes
LTU	x	x	x	x	x	Yes
LUX	x	x	x	x	x	Yes
LVA	x	x	x	x	x	Yes
MEX	-	-	-	-	x[2]	no
MLT	x	x	x	x	x	Yes
NLD	x	x	x	x	x	Yes
POL	x	x	x	x	x	Yes
PRT	x	x	x	x	x	Yes
ROU	x	x	x	x	x	Yes
SVK	x	x	x	x	x	Yes
SVN	x	x	x	x	x	Yes
SWE	x	x	x	x	x	Yes
TUR	x	x	x	x	x	Yes
USA	x	x	x	x	x	Yes

[a]. Footnote by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognizes the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of United Nations, Turkey shall preserve its position concerning the "Cyprus" issue.
Footnote by all the European Union Member States of the OECD and the European Commission: The Republic of Cyprus is recognized by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.
[b] The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.
[1] The number of trading enterprises is available for 2016 instead of 2015.
[2] The number of total enterprises is only available for 2009.
Note: The sub-sectors covered differ by country.
Source: Authors' compilation based on TEC data.

II. Proxying for the trade facilitation environment in export markets

The TEC dataset on "Trade by partner zones and countries and economic sector" reports aggregate firms' exports in industrial goods by individual trading partner. In order to reflect the trade facilitation environment faced when exporting, a proxy is constructed for the trade facilitation performance in the reporter's firms trading partners as a trade-weighted TFI* (TFI*jt) intra- and extra-EU (ii). distij is similarly constructed for denoting the average distance between the exporting economy and its trading partners intra- and extra-EU.

$$N_{fikt} = f(TFI^*_{it},\ C_{it},\ TFI^*_{jt}, C_{jt}, dist_{ij}, \rho_i, \gamma_t, \mu_k, \Theta_j) \text{ (ii)}$$

where Nikt is the number of exporting enterprises of the total number of firms; TFI*it is the trade facilitation performance by area in exporter i; the vector C_{it} summarises a set of additional control variables on the exporter side (GDP as a proxy for market size; indicators of business usage of ICT); the vector C_{jt} contains controls for the environment faced when exporting, constructed in a similar manner as the trade-weighted TFI^*_{jt}:

- GDP as a proxy for market size (World Bank Development Indicators);
- Indicators for business usage of Information and Communications Technology (OECD ICT Access and Usage by Businesses statistics): businesses with a broadband connection (fixed and mobile) and businesses with a downloading speed of at least 100 Mbit/s – by firm size: 0-49 employees; 50-249 employees; more than 250 employees.
- Tariffs faced, with two variables are alternatively tested:
  - Average tariffs at ISIC Rev. 3 2-digit manufacturing sectors (WITS TRAINS database)
  - Foreign market access indicator from the World Economic Forum Enabling Trade Index (assesses tariff barriers faced by a country's exporters in destination markets. It includes the average tariffs faced by the country as well as the margin of preference in destination markets negotiated through bilateral or regional trade agreements, or granted in the form of trade preferences)

ρ_i, γ_t , μ_k denote exporter, year and sector fixed effect, respectively. Θ_j is a dummy variable denoting the importer market (extra- versus intra-EU).

For EU Members, it is possible to identify directly through the database the aggregate destination (extra- and intra-EU). For the non-EU economies, the aggregate destination is identified using a proportionality assumption based on the trading partners identified using the TEC dataset on 'Trade by partner countries and size class'.

Table A C.3. Number of exporting firms: Summary across trade facilitation measures

Dep. Variable: Number of exporting firms			
	(1) All	(2) SME	(3) Large
TFI (a) exp	0.250* (0.084)	0.265* (0 .076)	0.249** (0.094)
TFI (b) exp	0.304*** (0.012)	0.310*** (0.009)	0.295*** (0.015)
TFI (c) exp	0.298*** (0.008)	0.309*** (0.007)	0.291*** (0.012)
TFI (d) exp	0.312** (0.048)	0.316** (0.041)	0.294** (0.049)
TFI (e) exp	0.341*** (0.008)	0.352*** (0.006)	0.328*** (0.010)
TFI (f) exp	0.238 (0.281)	0.278 (0.259)	0.256 (0.301)
TFI (g) exp	0.328*** (0.011)	0.337*** (0.008)	0.325*** (0.013)
TFI (h) exp	0.352*** (0.010)	0.378*** (0.009)	0.344*** (0.016)
TFI (i) exp	0.317 (0.383)	0.324 (0.381)	0.312 (0.362)
TFI (j) exp	0.318 (0.397)	0.328 (0.295)	0.291 (0.323)
TFI (k) exp	0.241*** (0.011)	0.243*** (0.010)	0.229*** (0.015)
Avg_TFI exp	0.358*** (0.006)	0.365*** (0.006)	0.341*** (0.009)
Exporter country controls	Yes	Yes	Yes
Country, time and sector FE	Yes	Yes	Yes

Note: The 11 TFI indicators are alternatively introduced in the regression analysis. The destination TFIs are trade-weighted averages using exports destination values from TEC. Regressions apply PPML and include country, time and sector fixed effects. Robust standard errors clustered by exporter country reported in parentheses. ***; **; * significant at the 1%, 5% and 10% level respectively. The robustness checks covering the full sample of firms also consider the inclusion of a SME dummy interacted with the indicators.
Source: Authors' estimations based on TEC data.

A2. Share of SMEs exporting in the total number of firms

I. Detailed sector level

Similar to A1.I, the equation relates the share of SMEs exporting in the total number of enterprises (including non-traders) to the exporter country's trade facilitation performance, while controlling for other potential determinants (iii). TEC data on trade by size classes and detailed economic sector provides the number of exporting SMEs (micro, small, and medium) and the total number of enterprises in selected economies, years and manufacturing sub-sectors.

$$\ln(x_{fikt}) = f(TFI^*_{it}, C_{it},\ \rho_i, \gamma_t, \mu_k) \text{ (iii)}$$

where x_{ifkt} is the share of exporting enterprises of a specific size class out of the total number of firms; GDP_{it} is a proxy for the market size; TFI^*_{it} is the trade facilitation performance by TF area in exporter i; ρ_i, γ_t , μ_k denote exporter, year and sector fixed effects, respectively.

In terms of firms, sector and time coverage, the analysis is conducted in the same way as in A1.I.

As the share of firms is bounded between zero and unity, the fractional logit estimator is preferred to OLS or PPML.

II. Proxying for the trade facilitation environment in export markets

The analysis is conducted in a similar manner as in A1.I, with the inclusion of a proxy for the trade facilitation performance in the reporter's firms trading partners (iv).

$$\ln(x_{fijkt}) = f(TFI^*_{it}, C_{it}, TFI^*_{jt}, C_{jt}, dist_{ij}, \rho_i, \gamma_t, \mu_k, \Theta_j) \text{ (iv)}$$

Table A C.4. Share of exporting firms in total firms: Summary across trade facilitation measures

Dep. Variable: Share of exporting firms			
	(1) All	(2) SME	(3) Large
TFI (a) exp	0.210** (0.035)	0.225** (0 .029)	0.189** (0.038)
TFI (b) exp	0.229*** (0.008)	0.231*** (0.005)	0.185*** (0.011)
TFI (c) exp	0.222*** (0.010)	0.229*** (0.009)	0.191*** (0.012)
TFI (d) exp	0.218** (0.038)	0.234** (0.032)	0.188** (0.041)
TFI (e) exp	0.239*** (0.008)	0.246*** (0.005)	0.217*** (0.009)
TFI (f) exp	0.207 (0.231)	0.218 (0.218)	0.153 (0.248)
TFI (g) exp	0.238*** (0.008)	0.244*** (0.006)	0.215*** (0.009)
TFI (h) exp	0.249*** (0.004)	0.258*** (0.003)	0.225*** (0.008)
TFI (i) exp	0.205 (0.253)	0.221 (0.241)	0.177 (0.253)
TFI (j) exp	0.211 (0.198)	0.214 (0.185)	0.172 (0.213)
TFI (k) exp	0.215*** (0.009)	0.218*** (0.008)	0.185*** (0.013)
Avg_TFI exp	0.248*** (0.006)	0.255*** (0.008)	0.221*** (0.012)
SME* Avg_TFI exp	0.135 (0.211)		
SME	-0.033** (0.048)		
Exporter country controls	Yes	Yes	Yes
Country, time and sector FE	Yes	Yes	Yes

Note: The 11 TFI indicators are alternatively introduced in the regression analysis. The destination TFIs are trade-weighted averages using export destination values from TEC. Regressions apply fractional logit and include country, time and sector fixed effects. Robust standard errors clustered by exporter country reported in parentheses. ***;**;* significant at the 1%, 5% and 10% level respectively. The robustness checks covering the full sample of firms also consider the inclusion of a SME dummy interacted with the indicators.
Source: Authors' estimations based on TEC data.

A3. Value of firms' exports

I. Firms' exports at detailed sector level destined to the EU market and outside the EU market

Following Freund, Hufbauer and Jung (2016) and Hoekman and Shepherd (2013, 2015), the equation relates the value of SMEs exports to the exporter market size (measured by the exporter GDP) and the exporter's trade facilitation performance (v).

$$\ln(X_{fikt}) = f(TFI^*_{it},\ C_{it},\ \rho_i,\ \gamma_t\ ,\mu_k\ )\ \text{(v)}$$

where X_{ifkt} is the value of exports of firms from a specific size class out of the total number of firms; GDP_{it} is a proxy for the market size; TFI^*_{it} is the trade facilitation performance by TF area in exporter i; ρ_i, γ_t, μ_k denote exporter, year and sector fixed effects, respectively.

In terms of firms, sector and time coverage, the analysis is conducted in the same way as in A1.I and A2.I.

The analysis takes into account both the total value of firms' exports in a given market and sector, and the probability that such sales are observed. To this end, zero trade flows are imputed to markets which are not served in a given year and sector. To obtain non-biased estimates in this setting, a Poisson Pseudo Maximum Likelihood (PPML) estimator is preferred to OLS.

II. Proxying for the trade facilitation environment in export markets

The analysis is conducted in a similar manner as in A1.I, with the inclusion of a proxy for the trade facilitation performance in the reporter's firms trading partners (vi).

$$\ln(X_{fijkt}) = f(\ TFI^*_{it}\ ,\ C_{it},\ TFI^*_{jt}, C_{jt},\ dist_{ij},\ \rho_i,\ \gamma_t,\ \mu_k,\ \Theta_j\ )\ \text{(vi)}$$

III. Introducing sector dependence on efficient trade facilitation

Following Blyde and Molina (2013), the equation below also incorporates a proxy for the industry dependence on efficient trade facilitation (i.e. the measure of industry sensitivity to shipping times constructed by Hummels and Schaur (2012)) (vi). The time sensitivity measure (s_k) is available at the 4-digit level of the Harmonized System. It is thus first converted to the 4-digit ISIC level using a concordance table and then aggregated at the 2-digit ISIC Rev. 4 level, by taking simple averages of the index within each 2-digit ISIC category. A new variable is introduced as the product between TFI^*_{it} and s_k – the coefficient for this variable indicates whether countries with adequate trade facilitation environments export more in sectors that are more dependent on efficient measures.

$$\ln(X_{fijkt}) = f\ (TFI^*_{it},\ C_{it},\ TFI^*_{jt},\ C_{jt},\ dist_{ij},\ TFI^*_{it} * s_k,\ \rho_i,\ \gamma_t,\ \mu_k,\ \Theta_j)\ \text{(vi)}$$

Table A C.5. Level of exports: Summary across trade facilitation measures

Dep. Variable: Level of exports			
	(1) All	(2) SME	(3) Large
TFI (a) exp	0.218** (0.025)	0.231** (0 .021)	0.203** (0.029)
TFI (b) exp	0.231*** (0.008)	0.244*** (0.006)	0.222*** (0.010)
TFI (c) exp	0.228*** (0.006)	0.231*** (0.004)	0.199*** (0.010)
TFI (d) exp	0.232** (0.035)	0.241** (0.034)	0.192** (0.041)
TFI (e) exp	0.241*** (0.009)	0.258*** (0.005)	0.229*** (0.011)
TFI (f) exp	0.231 (0.228)	0.238 (0.217)	0.195 (0.236)
TFI (g) exp	0.243*** (0.008)	0.249*** (0.006)	0.228*** (0.011)
TFI (h) exp	0.258*** (0.005)	0.266*** (0.004)	0.232*** (0.009)
TFI (i) exp	0.213 (0.248)	0.251 (0.215)	0.183 (0.253)
TFI (j) exp	0.241 (0.199)	0.253 (0.195)	0.177 (0.241)
TFI (k) exp	0.215*** (0.009)	0.218*** (0.008)	0.185*** (0.011)
Avg_TFI exp	0.249*** (0.009)	0.257*** (0.005)	0.214*** (0.011)
Exporter country controls	Yes	Yes	Yes
Country, time and sector FE	Yes	Yes	Yes

Note: The 11 TFI indicators are alternatively introduced in the regression analysis. The destination TFIs are trade-weighted averages using export destination values from TEC. Regressions apply PPML and include country, time and sector fixed effects. Robust standard errors clustered by exporter country reported in parentheses. ***; **;* significant at the 1%, 5% and 10% level respectively. The robustness checks covering the full sample of firms also consider the inclusion of a SME dummy interacted with the indicators.
Source: Authors' estimations based on TEC data.

B. Imports

B1. Number of SMEs importing

The analysis for imports is conducted in a similar manner as for exports in A1, using the number of firms importing by size class as dependent variable.

Table A C.6. Number of importing firms: Summary across trade facilitation measures

Dep. Variable: Number of importing firms			
	(1) All	(2) SME	(3) Large
TFI (a) imp	0.309** (0.048)	0.316** (0 .055)	0.308** (0.061)
TFI (b) imp	0.321*** (0.006)	0.339*** (0.007)	0.285*** (0.011)
TFI (c) imp	0.341*** (0.007)	0.346*** (0.007)	0.338*** (0.011)
TFI (d) imp	0.281** (0.049)	0.298** (0.051)	0.276** (0.068)
TFI (e) imp	0.307*** (0.010)	0.318*** (0.009)	0.305*** (0.011)
TFI (f) imp	0.323 (0.401)	0.341 (0.403)	0.296 (0.395)
TFI (g) imp	0.299*** (0.006)	0.308*** (0.006)	0.294*** (0.008)
TFI (h) imp	0.354*** (0.009)	0.362*** (0.007)	0.324*** (0.011)
TFI (i) imp	0.247* (0.087)	0.299* (0.075)	0.233* (0.079)
TFI (j) imp	0.284 (0.305)	0.281 (0.278)	0.276 (0.301)
TFI (k) imp	0.251*** (0.008)	0.285*** (0.006)	0.243*** (0.012)
Avg_TFI imp	0.338*** (0.011)	0.347*** (0.009)	0.335*** (0.013)
Importer country controls	Yes	Yes	Yes
Country, time and sector FE	Yes	Yes	Yes

Note: The 11 TFI indicators are alternatively introduced in the regression analysis. The destination TFIs are trade-weighted averages using firms' imports origin from TEC. Regressions apply PPML and include country, time and sector fixed effects. Robust standard errors clustered by exporter country reported in parentheses. ***; **;* significant at the 1%, 5% and 10% level respectively. The robustness checks covering the full sample of firms also consider the inclusion of a SME dummy interacted with the indicators.
Source: Authors' estimations based on TEC data.

B2. Share of SMEs exporting in the total number of firms

The analysis for imports is conducted in a similar manner as for exports in A2, using the share of firms importing by size class as dependent variable.

Table A C.7. Share of importing firms: Summary across trade facilitation measures

Dep. Variable: Share of importing firms			
	(1) All	(2) SME	(3) Large
TFI (a) imp	0.214** (0.045)	0.218** (0 .046)	0.191** (0.059)
TFI (b) imp	0.216*** (0.006)	0.228*** (0.007)	0.175*** (0.011)
TFI (c) imp	0.221*** (0.007)	0.237*** (0.008)	0.199*** (0.013)
TFI (d) imp	0.218** (0.045)	0.234** (0.034)	0.188** (0.038)
TFI (e) imp	0.214*** (0.006)	0.225*** (0.005)	0.208*** (0.006)
TFI (f) imp	0.244 (0.291)	0.238 (0.311)	0.276 (0.285)
TFI (g) imp	0.211*** (0.006)	0.217*** (0.006)	0.203*** (0.008)
TFI (h) imp	0.238*** (0.005)	0.243*** (0.004)	0.214*** (0.008)
TFI (i) imp	0.213* (0.087)	0.219* (0.091)	0.213* (0.085)
TFI (j) imp	0.234 (0.201)	0.238 (0.249)	0.266 (0.223)
TFI (k) imp	0.201*** (0.009)	0.205*** (0.008)	0.184*** (0.013)
Avg_TFI imp	0.237*** (0.006)	0.241*** (0.008)	0.215*** (0.012)
SME* Avg_TFI imp	0.129 (0.208)		
SME	-0.063** (0.093)		
Importer country controls	Yes	Yes	Yes
Country, time and sector FE	Yes	Yes	Yes

Note: The 11 TFI indicators are alternatively introduced in the regression analysis. The destination TFIs are trade-weighted averages using firms' imports origin from TEC. Regressions apply fractional logit and include country, time and sector fixed effects. Robust standard errors clustered by exporter country reported in parentheses. ***; **;* significant at the 1%, 5% and 10% level respectively. The robustness checks covering the full sample of firms also consider the inclusion of a SME dummy interacted with the indicators.
Source: Authors' estimations based on TEC data.

B3. Value of firms' imports

The analysis for imports is conducted in a similar manner as for exports in A3, using the value of firms' imports (by size class) as dependent variable.

Table A C.8. Level of imports: Summary across trade facilitation measures

Dep. Variable: Level of imports			
	(1) All	(2) SME	(3) Large
TFI (a) imp	0.208** (0.038)	0.229** (0 .035)	0.197** (0.053)
TFI (b) imp	0.221*** (0.010)	0.235*** (0.009)	0.209*** (0.014)
TFI (c) imp	0.233*** (0.009)	0.247*** (0.007)	0.225*** (0.011)
TFI (d) imp	0.207** (0.045)	0.219** (0.044)	0.185** (0.059)
TFI (e) imp	0.228*** (0.009)	0.234*** (0.005)	0.221*** (0.009)
TFI (f) imp	0.233 (0.299)	0.245 (0.294)	0.216 (0.315)
TFI (g) imp	0.225*** (0.006)	0.227*** (0.005)	0.208*** (0.008)
TFI (h) imp	0.242*** (0.009)	0.255*** (0.004)	0.219*** (0.013)
TFI (i) imp	0.201 (0.249)	0.219 (0.242)	0.213 (0.254)
TFI (j) imp	0.218 (0.313)	0.238 (0.312)	0.266 (0.319)
TFI (k) imp	0.226*** (0.011)	0.235*** (0.009)	0.199*** (0.015)
Avg_TFI imp	0.234*** (0.006)	0.249*** (0.008)	0.205*** (0.012)
Importer country controls	Yes	Yes	Yes
Country, time and sector FE	Yes	Yes	Yes

Note: The 11 TFI indicators are alternatively introduced in the regression analysis. The destination TFIs are trade-weighted averages using firms' imports origin from TEC. Regressions apply PPML and include country, time and sector fixed effects. Robust standard errors clustered by exporter country reported in parentheses. ***; **;* significant at the 1%, 5% and 10% level respectively. The robustness checks covering the full sample of firms also consider the inclusion of a SME dummy interacted with the indicators.
Source: Authors' estimations based on TEC data.