



### **TOWARDS "TRADE POLICY ANALYSIS 2.0"**

*FROM NATIONAL COMPARATIVE ADVANTAGE TO  
FIRM-LEVEL TRADE DATA*

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#### *Abstract*

*This paper makes the case for the need to "upgrade" current analytical tools used for trade policy analysis and complement them with more detailed firm-level data. Such an upgrade should be based on the latest intellectual advancements in trade theories and the latest firm-level trade statistics that are now becoming widely available. An upgraded "Trade Policy Analysis 2.0" could contribute to several trade policy priorities and to a better understanding of the benefits from international trade for firm competitiveness, job creation and consumer welfare.*

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## 1. TRADE REALITIES AND THEORIES: THE ROLE OF GLOBALIZATION AND TECHNOLOGICAL PROGRESS

**I**nternational trade is present in everyone's life. Be it the fruits we have at breakfast or the electrical devices we use, our daily routine depends on complex trade flows and production processes scattered across multiple countries that hardly get noticed by the final consumer. To cater to a globalized economy, thousands of companies around the world sign business deals every day, either as exporters or importers. Trade flows have evolved over time and are becoming increasingly intricate, with countless parts and components crossing multiple borders at different stages of production along global supply chains, before reaching the final consumer.

*Detailed firm-level trade data on actual shipments, by exporting and importing firms, with specific product characteristics are publicly available*

International trade was revolutionized by the introduction of the standardized container, which led to a considerable reduction in shipping costs (Levinson, 2006). An entire logistics industry is in place to make sure over 30 million containers are shipped seamlessly annually so that our daily routines unfold smoothly. The revolutionary technological changes did not stop with the invention of the container. Today, a limited but growing number of these containers are equipped with sophisticated global tracking technologies (GPS, radio frequency identification, satellite communications, etc.) that can locate products and shipments in real time, optimizing supply chains and inventories for the ultimate benefit of consumers. Detailed firm-

level trade data on actual shipments, by exporting and importing firms, with specific product details and their port of origin and entry are publicly available. The data does not stop at the docks: producers can track in real-time their stocks on each supermarket's shelf and plan the next shipment to make sure consumers do not face shortages, while avoiding waste and costly warehousing. Firms engaged in global supply chains and those specialised in logistics have developed detailed classifications that allow the identification of producers, the location of their production facilities and the most detailed product characteristics about brands, quantity (weight, number of units, pack sizes), quality (concentration levels of various key ingredients) as well as pricing, delivery and invoicing information.

These "globalization examples" are meant to offer a quick snapshot of the realities of world trade, as it happens. But is this multifaceted reality fully accounted for in trade theories and well reflected in the statistical and analytical support available to trade policy makers?

Over time, trade theories have made major strides in capturing such diverse realities. For a long period trade theory was elaborated not so much on the trading firm (exporter/importer) but on much more aggregate concepts and had to assume a number of simplifying assumptions. The traditional trade theory was based on concepts like national comparative advantage or factor endowments. For decades trade analyses were run based on the Ricardian and Heckscher-Ohlin models. In those models it was not



really the firms but nations that engaged in trade. The "new trade theory" developed by Krugman (1979) won him the Nobel Prize and introduced new useful concepts that brought theory closer to the realities of international trade: consumers love product varieties and firms produce differentiated products under increasing returns to scale. For policy and empirical purposes, "new trade theory" models and analyses added useful insights but they did not really distinguish between firms within sectors in terms of their characteristics and ability to export. It was only with the emergence of "new new trade theory" articulated by Melitz (2003) and subsequently developed by other trade economists (e.g. Bernard et al. 2007) that the firms became central in explaining trade flows, just as in the generic examples offered above.

In a less dramatic way than the containerization of international trade, the "new new trade theory" represented a "revolution" for trade theories and their ability to capture the detailed firm-level trade reality, by putting an emphasis on the central role of firm heterogeneity and by using newly available firm-level trade datasets. Several interesting findings came to the fore based on these new theoretical and empirical analyses. For instance, it became much clearer that not all firms can become exporters - only those that have a certain productivity threshold can engage successfully in trade. Also noteworthy, trade liberalization leads to Schumpeterian "creative destruction" and increases average sectoral productivity but exporting also involves considerable sunk costs and therefore only a small proportion of total existing firms succeed to engage in trade.

*Thanks to the new firm-level trade data "revolution", trade models come nowadays much closer to business realities*

*The traditional analytical tools we have at our disposal have great strengths but they remain imperfect*

The new firm-level trade datasets that are already publicly available allow researchers to identify and analyse each and every shipment of the 30 million containers trade around the world by carrier, port of departure and destination, countries, description of products and commodities at the most detailed level (e.g. 8 or 10 digit national tariff line level), equipment type, size, weight, value, currency used, shipper and consignee's street, city, zip code, plus any other detail contained in the entire bill of lading. One can also match this information with the most important firm characteristics (e.g. from publicly available balance sheets) that have an impact on export performance. So thanks to the new firm-level trade data "revolution", available trade models come nowadays much closer to business realities.

But what difference did all these major improvements - either in trade realities or theories - make for trade policy analysis?

The answer depends perhaps on a case by case basis. However, by and large, it is fair to say that such technological and analytical developments offer an untapped analytical potential that could lead to better informed trade policy making. It is time trade policy analysis moves closer to where the action is and benefits more from firm-level trade data and related developments. For some, such benefits may not be obvious and therefore a few examples may help to illustrate this point. While it is true that trade



policy is by nature conducted at an aggregate level whereby various trade rules cannot be adapted to the specific needs and economic circumstances found at firm-level, it is also true that trade negotiations cannot remove all possible trade barriers, notably in many key areas like non-tariff measures covered by EU deep and comprehensive free trade negotiations. Prioritisation of those non-tariff measures maximising the benefits of EU trade policy in line with the objectives set out by EU leaders would therefore benefit from having access to the wealth of information that firm-level trade data has generated. Tariffs are well known and their reduction subject to little uncertainty in FTA negotiations but insufficient information regarding the most difficult trade barriers, notably NTBs, is still a prevalent characteristic of trade policy making.

*Firm-level trade data offer a unique opportunity for policy analyses to better document the role of trade as an engine for growth and job creation in Europe*

The traditional analytical tools we have at our disposal (such as the standard computable general equilibrium (GCE) models widely used for trade policy analysis) have great strengths, notably at estimating the macro-economic effects of trade policy, but they remain imperfect. Current tools tend to work well at aggregate level and whenever more detailed analyses are necessary they tend to be difficult and expensive.<sup>1</sup> For instance, firm-level surveys that may provide an indication of the incidence of non-tariff barriers across different types of firms (small vs. large, existing vs. potential exporters) are difficult to run on a representative sample. Econometric estimates of the costs of non-tariff barriers may offer an alternative to firm-level survey, but such estimates are not always robust or accurate enough for policy making purposes.<sup>2</sup> Current tools are imperfect not only with regard to ex-ante policy impact assessments but also when it comes to monitoring and ex-post evaluation of trade agreements.

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<sup>1</sup> Partial equilibrium modelling and econometric analyses can be carried out at tariff line level but they still work on aggregate data and contain a lot of heterogeneity, either in terms of specific products or firm characteristics.

<sup>2</sup> The TTIP negotiations - arguably the most important EU bilateral trade policy initiative – offer a good example. As part of its regular stakeholder consultation process, the European Commission has launched an online survey to gather additional firm-level information on NTBs facing EU exports to the US. But despite the high visibility of these negotiations, it only triggered a small response rate from among the 700 000 extra-EU exporters and many other potential exporters.



## 2. THE NEW POLITICAL CHALLENGES: THE BLURRING LINE BETWEEN TRADE AND OTHER DOMESTIC ECONOMIC POLICIES

**F**irm-level theoretical and empirical analyses have demonstrated that export performance is critically determined by firm characteristics such as ability to innovate, productivity, firm size, corporate governance, skills and labour market, the overall domestic business environment, etc. But few, if any, trade policy analyses have been conducted at firm-level. Moreover, there is growing consensus that trade policy needs to be well embedded within this broader set of economic policies, as recently reiterated by EU political leaders. Therefore, firm-level trade data that are becoming more common provides a unique opportunity for trade policy analyses to contribute to the operationalization of new political imperatives and for trade policy to act as a strong engine for growth and job creation in Europe.

*Firm-level trade statistics may be the new frontier of an enhanced data-driven trade policy making*

*Comprehensive firm-level trade statistics could greatly facilitate the monitoring the implementation of various trade policy instruments*

Such political priorities can be better matched by new evidence-based policy recommendations and initiatives that can benefit from the most comprehensive databases with trade flows at firm-level. Firm-level trade statistics may be the new frontier of an enhanced data-driven trade policy making, similar to recent analytical developments underpinning other public policies and many corporate decisions. Big data is making major inroads in economics (Einav and Levin, 2014) and produced already a shift in the way policy decisions are made, with major improvements in the efficiency of such policies, working smarter and doing more with fewer resources (e.g. from detecting flu outbreaks quicker to improving public health risk assessments, or crime prevention). Nowadays farmers use satellite data to decide which crops to plant, firms launch new products based on social media trends, and firms can organise a global supply chain on cloud computing.<sup>3</sup> Even in the developing world, specialists analysing newly available firm-level data started to formulate better-informed policy advice (see for instance Bhagwati and Panagariya, 2012) and concrete policy responses to food shortages, drought, epidemics and educational gaps in poor countries.<sup>4</sup> The European Commission has already

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<sup>3</sup> Various press articles also reported recently that corporate analysts are using real-time satellite imagery of supermarket parking lots to predict future sales and corporate earnings, detailed imagery of cropland around the planet to predict grain prices, or truck traffic data to and from key production facilities to predict future export flows.

<sup>4</sup> For a number of interesting anecdotal evidence on the use of mobile phone data in designing public policy responses in developing countries, see Talbot (2013).



identified firm-level statistics and "big data" as a major EU policy priority. Eurostat has worked since 2008 (Decision No 1297/2008/EC) on a Programme for the Modernisation of European Enterprise and Trade Statistics) on "connecting the dots" at firm level between national and EU sources.<sup>5</sup> The United Nations has also launched a programme on big data for official statistics.

Firm-level trade data has the potential to improve trade policy analysis just as these new datasets led to major improvements in other public policies. Firm-level trade data can bring benefits at all levels of analytical support to trade policy-making. Ex-ante analyses may benefit from more specific data offering additional insights to current analytical tools. For narrowly defined policy questions that have small or no major macroeconomic or "general equilibrium" effects, firm-level analyses could better inform policy makers

*Firm-level trade statistics can also improve ex-post assessments of trade agreements*

in the middle of difficult negotiations (e.g. knowing whether a particular non-tariff barrier is more important than another, deciding which NTB cost reduction mechanism leads to a balanced outcome that maximises firm-level benefits without compromising on other societal objectives, etc.). Monitoring the implementation of various trade policy instruments can also be greatly facilitated by comprehensive firm-level trade statistics. The recent example of EU-Korea FTA demonstrated that the more ambitious a deep and comprehensive FTA is, the more resource-intensive its implementation becomes, notably on those thorny issues of regulatory cost reductions where information is imperfect and difficult to obtain.

*Firm-level trade data would allow a more refined assessment of the impact of future trade policy initiatives*

Firm-level trade data allows a more refined assessment of the future impact of trade policy initiatives on the extensive margin of newly exporting firms. Trade policy analyses need to pay more attention to firms that are prevented from expanding abroad by existing barriers and could become successful exporters once trade barriers will have been reduced by trade negotiators. Since a large proportion of EU exporters sell their products to only a handful of markets outside the EU (Cernat et al, 2014), such firms are quite vulnerable to unforeseen trade policy changes in their trading partners. Entry and exit into a particular export market can be quite costly, and export volatility at firm-level can be a major deterrent of national export performance. Hence "the importance of being earnest" in maintaining a constant presence in export markets may actually involve large sunk costs. Trade policy can reduce such entry sunk costs, but it would be important to know better which specific measures are most costly. This is typically done through firm-level surveys. However, surveys can only be used most effectively when combined with a comprehensive firm-level trade database.

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<sup>5</sup> The European Commission has also launched under the FP7 programme a "Policy Making 2.0" research project aimed at providing concrete recommendations on the potential use of existing and future ICT and "big data" technologies for policy-makers to improve their work.



Firm-level trade statistics can also improve ex-post assessments. A typical question raised about the benefits of FTAs is how many jobs were actually created as a result of increased bilateral trade. Current analytical tools have several limitations in establishing a causal relationship between the existence of an FTAs and labour market changes (new job creation, job reallocation within and across sectors, etc.). Some policy instruments, such as the European Globalization Fund (EGF) are specifically designed to deal with adjustment costs and facilitate the reinsertion in the labour market of those negatively affected by globalisation. In itself, the EGF enhances the coherence and synergies between trade and other EU policy instruments. Knowing the firm-level characteristics of those EU enterprises negatively affected by globalization and the key factors that facilitated the re-insertion of workers benefited from EGF measures can provide valuable lead indicators and "best practices" that can feed back into trade policy making.

Last but not least, detailed firm-level trade data might also improve communication, leading to a more meaningful engagement with stakeholders and thus reduce public misperceptions about trade policy. In the current political context public support for trade policy is often elusive, making the case for the ongoing mega-FTA negotiations with strategic partners politically more difficult than it should be. Arguing the case for trade at firm-level would address these misconceptions. For many stakeholders, current EU trade policy initiatives are not always seen as an important booster to economic recovery in Europe. Certain stakeholders are wary of adverse consequences and the public debate around trade policy is usually monopolised by certain narrow topics. A broad-based firm-level approach to trade policy might offer a more fact-based dialogue.

Firm-level trade data would quickly generate a rich dataset since Europe has over 700'000 exporting firms, with the vast majority of them being small and medium sized enterprises (Cernat et al, 2014). Trade policy analyses are hardly sufficiently disaggregated for individuals and communities to relate to its predicted impacts. For instance, in the case of products already fully liberalised under the EU-Korea FTA (KOREU), EU exports increased much more than same product exports to countries with which Europe does not have and FTA. More of this type of detailed evidence is needed to show that EU FTAs are well negotiated and that trade policy can provide tangible benefits for the EU economic recovery within a short period of time. And such an increase was not at the expense of lower quality product standards or other societal costs. But individuals find it hard to relate strongly with abstract trade gains that are not directly linked to their daily lives. Why should a particular country or societal group be in favour of trade liberalisation if there is little information about what trade policy can bring to *them* as opposed to *Europe*?

*Detailed firm-level trade data would lead to a more meaningful engagement with stakeholders and reduce public misperceptions about trade policy*

If firm-level trade statistics would be used more systematically, then trade policy could "come to your town". Such firm-level trade statistics would, for instance, be able to indicate clearly how many firms in a particular community find it easier to export to or import from Korea as a result of KOREU, or how much their exports to Korea increased once the FTA has been implemented. Firm-level trade statistics might bring familiar logos and company names into the picture and citizens would relate more closely



with exporting firms where either themselves or people they know personally are probably employees. Such type of firm-level trade statistics could also facilitate the identification of case studies of interested enterprises willing to advocate how they managed to become exporters, increase sales, or expand labour force.

### **3. TOWARDS TRADE POLICY ANALYSIS 2.0: TAKING ADVANTAGE OF EXISTING FIRM-LEVEL TRADE DATA**

One of the main objectives of EU trade policy is to create new business opportunities for over 2 million importing and exporting firms in Europe. If those firms, and the tens of millions of workers they employ, are the primary beneficiaries of EU trade policy, it would be a major improvement in the robustness of trade policy analyses if "the firm" was the underlying unit of analysis. Therefore, the first thing one should do is to take advantage of the firm-level trade data made available in the public domain by customs administrations around the world. These databases are already compiled and exploited by trade facilitation services companies that try to improve business contacts and promote transparency on new market opportunities for potential exporters.

*In "Trade Policy Analysis 2.0" the unit of analysis would shift from countries and sectors to exporting and importing firms*

Trade policy makers can also tap into these publicly available databases. The new databases with trade in goods and firm characteristics that Eurostat has been compiling for a while (and the intention to improve similar data for trade in services) offer new analytical potential. The data available from Eurostat Trade by Enterprise Characteristics (TEC) database suggests that 60% of all exporting firms depend on exports to only one or two extra-EU markets (Cernat et al, 2014). Having detailed

information on the actual exporting companies, the products exported, and their destinations contribute to shaping future trade policy priorities at different levels (both negotiations and implementation priorities).

Based on recent advances in macro-statistics and the creation of new databases (e.g. WIOD and TiVA) GVCs became a major theme in trade policy discussions but without, so far, generating major trade policy changes. Partly the reason for it was the inability of current analytical tools to offer detailed insights, given the very aggregate nature of these macro-statistical databases. But there are good news coming from the real global supply chains. Firms managing supply chains rely on various standard, universal product codes and global databases developed by the logistic industry that allows GVC participating firms (e.g. suppliers of components and final assembly firms) to know exactly the brand, variety, quality, dimensions, essential product characteristics, and price range of billions of traded products. Such detailed databases could considerably transform the way trade policy analysis is



conducted. In "Trade Policy Analysis 2.0" the unit of analysis shifts from countries and sectors to exporting and importing firms. Once the actual exporters and importers become the unit of analysis, firm-level trade data will also provide a much more refined product disaggregation.

Currently, the most disaggregate cross-country international trade statistics use the Harmonised System classification (HS) at 6 digits. National customs have products defined even more narrowly at eight or ten digit tariff line levels, for instance, but these product codes differ across countries and it is usually hard to come up with accurate concordance tables and do proper comprehensive analyses beyond HS6 product categories. Trade defence actions or WTO trade disputes, let alone sensitive tariff lines in bilateral or plurilateral negotiations, often boil down to very detailed products for which HS6 trade statistics are too aggregate. Within each HS6 codes product differentiation is considerable: the same HS6 code could cover for instance an entire shelf in supermarkets, despite huge variety in product qualities or functionalities.

In "Trade Policy Analysis 2.0" the unit of analysis moves from HS6 product classification to real product codes, the so-called Global Trade Item numbers (GTINs) that are used routinely by companies trading along the supply chain. Such GTIN-based trade statistics do not just simply record "milk exports" but would contain many product attributes and differentiate for instance organic, low-fat goat milk with added vitamin D in a 6-pack of 0.33l plastic bottles by firm A from a 1-liter regular soymilk carton by company B. Similarly such GTIN trade statistics can differentiate between an entire car brake system or just the brake disks, pads, cylinder, etc. Unlike traditional trade statistics it will not only indicate country of origin but also the manufacturer, quality levels (basic vs. premium quality brand, original equipment manufacturer), engine or transmission type (if relevant).

*A more "personalized" trade policy advice at firm level has the potential to increase exports in existing and new markets*

A growing number of academic articles have already been published using such barcode retail data but, despite an important analytical potential, very few have actually addressed questions relevant for trade policy analysis. Knowing for instance why hundreds or thousands of companies export successfully a product in one country and not in others (or why some EU exporters do not take advantage of preferential trade rules in FTAs) may prove extremely useful for creating new business opportunities and generate more jobs in Europe. Sometimes there can be good economic reasons for such export gaps and the non-existence of trade flows is no anomaly. Other times however trade is perfectly feasible but transactions are hampered by trade barriers that can be tackled by trade negotiators. To detect such "actionable trade gaps" from aggregate trade statistics is quite difficult. Experience has shown that obtaining detailed and accurate information from a large, representative number of exporters that spontaneously manifest themselves whenever they are faced with trade barriers is equally difficult. Therefore having a more systematic use of publicly available firm-level trade data would improve the accuracy of trade policy analysis. In return, a more "personalized" trade policy advice at firm level has the potential to improve business awareness and increase exports in existing and new markets, thus



contributing directly to a more rapid economic recovery and job creation in Europe, making a stronger case for the importance of EU trade policy.

*Firm-level trade statistics would allow a better calibration of current trade policy in line with global value chains, an issue of growing importance*

Firm-level data could also improve our understanding in other trade-related policy areas. The overwhelming role of international investment in generating the current levels of globalization is generally absent from the standard models used for policy assessment. The interplay between trade and investment negotiations therefore requires a similarly rigorous analytical approach. The important role of foreign affiliates sales (Lakatos and Fukui, 2013) and the fact that two-way traders are generally more productive than those firms engaged only in exporting (Kasahara and Lapman, 2013) are only two additional examples that calls for the need to better understand which own import barriers actually dampen EU export competitiveness. The major role of global supply chains in shaping trade patterns also triggered a debate about the need for a major "upgrade" in multilateral trade towards a new "WTO 2.0" set of rules dealing with the intricate interaction between investment, services and intellectual property (Baldwin, 2012). The growing importance of intermediate services exported "in a box" as part of processed goods (Cernat and Kutlina-Dimitrova, 2014) also require further reflection on how to bridge the various gaps between GATS and GATT rules.

The conditions under which export-driven productivity increases can occur (and their expected magnitude) are important elements for policy makers. The status of direct exporter as opposed to indirect exporters (those that export through wholesalers and intermediaries) may have an impact on this productivity gains and the existing firm-level trade statistics can distinguish between direct exporters and wholesalers, thus narrowing down the impact of trade policy to different types of companies engaged in international trade.

Furthermore, unlike the parameters underlying more aggregate trade analyses, not all companies in a sector will face similar opportunities. In each economic sector in fact, whether offensive or defensive vis-à-vis a particular trade negotiations, there will be firms that stand to gain and others that may be negatively affected. The internal disagreement between such firms within various sectoral associations makes industry consensus in favour of trade policy more difficult. The same split assessment can occur not only in terms of support for trade liberalization generally speaking but also on more detailed and technical issues such as rules of origin or the estimation of direct and indirect spillover effects from trade liberalisation, notably in the case of NTB reductions.

*Firm-level trade statistics and greater feedback from EU exporters will ensure FTA provisions offer the best opportunities for trading firms today and in the future*

Firm-level trade statistics could lead to a much better calibration of current trade policy in line with global value chains, an issue of growing importance. Knowing for instance that a large share of exporting firms to a particular FTA partner require considerable inputs from a third country would then allow a much better understanding of the specificities of rules of origin that should be put in place, to ensure a



satisfactory preference utilisation rate. Current rules of origin and their conditions on what is an originating product for the purposes of an FTA may not seem constraining. But past beyond macro-level figures, the reality can vary greatly across sectors and products, whenever production is fragmented globally. Applying such common metric across all FTA negotiations will generate a good data-driven comparative framework. Firm-level trade statistics and greater feedback from a large sample of EU exporters would allow greater confidence that each FTA provision is well equipped to deliver the best opportunities for trading firms today and in the future. New micro-policy indicators (e.g. identifying regional exporting clusters, detailed GVC linkages at firm level, the role of product standards or procedural bottlenecks, etc.) can be derived to improve monitoring and implementation of various trade policy instruments. These micro-indicators based on detailed firm-level data could be cross-linked and corroborated to ensure greater coherence between current and future trade policy initiatives.

The "new new trade theory" models also make the important distinction between the extensive and intensive margins in international trade. Currently, the impact of trade policy initiatives is implicitly based most of the time on the intensive margin. But in a multi-product firm-level trade model, the effects can be more complex: new product varieties and new exporting firms (large and small) may be part of international trade. The leap towards "Trade Policy Analysis 2.0" does not mean that current analytical tools should be discarded, quite the contrary. The current CGE trade models and their standard Armington structure offer a solid analytical basis and contain the seeds for their own evolutionary course towards greater policy relevance. New theoretical discussions and the wealth of empirical firm-level data<sup>6</sup> used to enhance the "gravity-model" and extend the standard CGE model (e.g. using partial equilibrium-CGE combinations or other types of micro-simulation models embedded in a CGE approach) make the goal of building an integrated CGE model "at firm level" well-suited for policy analysis look more attainable than a couple of years ago.

The introduction of containers revolutionized shipping and reduced international trade costs. The introduction of firm characteristics into trade models revolutionized trade theory and the increasing availability of firm-level data revolutionized empirical trade analyses. Finally, the massive trade information "by container" being made available and the big data approach stand to revolutionize economics, as well as public policies and corporate strategies. In some domains, this big data-driven approach is already becoming part of the mainstream. Will all these fundamental factors revolutionize the analytical support to trade policy making towards a more systematic use of firm-level trade data? Based on the arguments presented above, most probably the question is not "whether" but "when".

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<sup>6</sup> See for instance Mayer, Melitz and Ottaviano (2011) and the research work programme funded by the European Commission under the EFIGE project.



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