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Delivery Costs and Cross-border e-Commerce in the EU Digital Single Market

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Abstract

This paper studies the effects of delivery costs on cross-border e-commerce flows in the EU. For this purpose, we use surveys carried out in 2015 on firms and consumers, to analyse the supply and demand side separately. The paper first offers some descriptive statistics on the issues of delivery and e-commerce. In addition, the paper provides some indirect and descriptive evidence about the effects of delivery costs on cross-border e-commerce. Finally, a more robust econometric analysis is carried out to assess the effects of a hypothetical reduction of concerns about delivery cost on cross-border e-commerce in the EU, from the perspective of both consumers and firms. On the consumers' side, the results indicate that concerns about long delivery times reduce expenditure in other countries more strongly if the consumer has had more experience with shopping in non-neighbouring countries. The results on the supply side indicate that removing delivery cost concerns would increase the overall number of firms selling online across the border by 6.2 percentage points. Similarly, an increase of 5 percentage points would be registered in the volume of online trade. Finally, we compute the implied reduction in cross-border trade costs that would result from a hypothetical policy intervention to eliminate these delivery cost concerns. We plug this trade cost estimate into a macro-sector multi-country CGE model. The macro-economic results indicate that, even though the impact on GDP would be tiny, an important effect would come from reduced overall price levels. Consumer prices would be significantly reduced due to a productivity shock in the retail sector.

1. Introduction

The growing penetration of e-commerce as a channel to purchase goods and services is changing the traditional relationship between retailers and consumers. In the old model, dominated by traditional bricks and mortar stores, consumers pay the implicit cost of delivery by visiting the stores, thereby incurring a transport cost and an opportunity cost. In most e-commerce transactions involving the delivery of physical items, however, consumers receive the goods in their homes, and have to pay a monetary delivery cost. Hence, to function well, an e-commerce sector needs an efficient and competitive parcels industry to help both consumers and firms to take advantage of the full potential of e-commerce, especially when transactions are cross-border.

E-commerce penetration [1] has increased considerably in the European Union and currently more than half of all Europeans engage in online shopping. In 2015, 53% said they buy online, compared to 42% in 2011. However, only 20% of Europeans have shopped online in another EU country, though is a substantial rise from 12% just four years ago in 2011. Cross-border e-commerce numbers indicate that the Internet does not automatically make borders disappear, as has been suggested by the idea of "the death of distance" (Cairncross, 2001) in the earlier days of the Internet. Although studies do find that the distance effect becomes a much smaller issue online than it is offline (Lendle et al., 2012), generally borders remain in internet browsing and e-commerce. Heterogeneous tastes and language barriers can partly explain this (Alaveras et al., 2014; Blum and Goldfarb, 2006; Gomez et al., 2014).

But despite cultural barriers, a study based on a consumer survey of EU online users found that "more choice" and "better quality" are the main drivers for cross-border e-commerce (Cardona et al., 2015a). This is not surprising: in a mystery shopping survey, where a list of 100 products were to be bought in a test domestically and cross-border from all EU countries, in 13 of these countries approximately half of the products were only available cross-border and not domestically (Meier-Pesti et al., 2009). This emphasizes the importance of cross-border shopping for product variety. Consumer welfare gains based on increased product variety can be substantial. A study based on the US book market alone quantified additional consumer welfare through product variety at USD 731 million to 1.03 billion in 2000 (Brynjolfsson et al., 2003). Due to price differences in the EU countries, full price convergence as a result of fully integrated e-commerce markets could yield an additional GDP increase of 0.02% (Duch-Brown and Martens, 2014).

The European e-commerce market is not completely seamless and different studies have looked into existing barriers. Delivery, the offline complement of e-commerce, surfaces again and again as a central obstacle, especially when we look at e-commerce of tangible goods. Evidence from a consumer survey carried out for the European Commission five years ago found that concerns regarding delivery and return possibilities may deter consumers from shopping online in another country (Civic Consulting, 2011). A similar consumer survey carried out last year confirmed this. The top three most named concerns when shopping cross-border within the EU were all delivery-related. 27% of Europeans have concerns about high delivery costs and 23% about long delivery times. For domestic e-commerce, on the other hand, the prime concern is that personal data may be misused (GfK, 2015).

Improving online access to digital goods and services is one of the three pillars of the Digital Single Market Strategy, one of the ten priorities for the Juncker Commission. The Digital Single Market Strategy committed the Commission to launching measures to improve the price transparency and regulatory supervision of cross-border parcel delivery in the first half of 2016. This study therefore will focus on the issue of delivery

[1] Measured in individuals who have bought at least once online within the last 12 months from http://ec.europa.eu/eurostat/web/information-society/data/database

and cross-border e-commerce and look into for which firms, distances and countries delivery is a particular obstacle. For this purpose we will use a firm survey and a consumer survey carried out 2015, to analyse the supply and demand side separately. In Section 2, we will briefly describe the data we use and then present some descriptive statistics on the issue of delivery and e-commerce. Section 3 provides some indirect and descriptive evidence about the effects of delivery costs on cross-border e-commerce. Section 4 assesses the effects of delivery costs on cross-border e-commerce in the EU, from both the consumers and firms' perspectives, based on the use of robust analytical techniques. Section 6 looks at what the macroeconomic effects would be of an effective policy which eliminates delivery concerns in the EU Digital Single Market. Finally, Section 6 offers some conclusions.

2. Data

To assess the effects of delivery costs for both consumers and firms, in this report we use data from a consumer survey and a firm-level questionnaire.

2.1 Consumer survey

Consumer data comes from a survey commissioned by the Directorate for Consumer Protection in the European Commission (DG JUST) (GfK, 2015). It was carried out by GfK in the first quarter of 2015 and covers a total of 23,599 respondents in the 28 Member States of the EU, who had been active online in the past 12 months. In order to ensure the socio-demographic representativeness of respondents, a sample was drawn at random from the online population using existing online panels. After fieldwork, weights were calculated based on Eurostat data to reflect the online population per country as accurately as possible.

The survey consisted of four blocks. The first block asked consumers what they bought online over the last 12 months, how often they did so and where, and how much they spent online. Online purchases were grouped into three categories (tangible goods, online services, digital content). For the purposes of this study and the issue of delivery, we focused on the first group only, which also included booking travels services or making reservations online. Figure 1 gives an overview of the product categories and their respective frequency of purchase. In total, 95% of online users bought a tangible good or an online service at least once in the last year. The second block asked them more specific questions about their last online purchases, including the online search processes, characteristics of the online shop and delivery. The third block asked them about their reasons for buying online; and the last block examined the obstacles that they faced in their online purchases. This block covered delivery problems, actions taken to remedy the problems, and concerns about buying online at home and abroad. The reasons for and concerns about buying online covered the three types of incentives discussed above: price, variety and transaction costs.

2.2 Firm questionnaire

The firm-level data used in this report were collected in the first quarter of 2015 by TNS on the basis of a questionnaire issued to a sample of 8,705 firms in 26 Member States. Since there is no inventory of the population of online firms in the EU or official statistics on online trade, there is no comparable data source on perceived barriers to cross-border e-commerce by firms in the EU. The data were first reported in the Flash Eurobarometer 413 (2015), and later they were used to provide evidence in support of the DSM strategy paper[2] and also in some of the accompanying documents (Duch-Brown and Martens, 2015; Cardona et al. 2015a). The sample included 400 firms for the larger Member States, 300 firms for Croatia and Slovenia, 200 firms for Latvia, Hungary,

[2] COM(2015) 192 final.

Bulgaria and 100 firms for Luxemburg, Estonia and Slovakia. The data covers four sectors: manufacturing, wholesale and retail trade, accommodation and food and information and communication. The data can be appropriately weighted to better represent the universe of European firms.

Some basic features of the sample of firms are presented in Table 1. Apart from country and sector, firm characteristics include age, size, type, activity and sales trend. Firm size is defined in terms of employment, and includes four categories: micro firms with 1 to 9 employees (56%) [3]; small firms with 10 to 49 employees (25%); medium-sized companies employing between 50 and 249 individuals (13%) and large firms with 250 or more employees (6%). The sample can be also split into two age groups, young firms created after 2009 (15%) and old firms already in operation before that date (85%). Firms can also be characterised by type: independent (82%), part of a national group (8%) or part of an international corporation (10%). The dynamics of firm performance is captured by sales trends. Firms were asked about the trend of their turnover from the moment of the interview back to January 2012: sales grew by more than 25% (12%); between 5 and 25% (32%); remained roughly the same (35%); decreased between 5 and 25% (16%); and decreased by more than 25% (5%). Finally, firms were classified by the nature of the online markets in which they operate. Firms can operate in several markets simultaneously, hence the sum of the shares does not add up to 100%. The questionnaire revealed that 62% of the firms sold goods to consumers or to other firms (75%); 9% sold digital services online to consumers or other firms (13%); 29% provided traditional services offline to consumers (29%) or other firms (39%).

Apparently, more firms are involved in Business-to-Business (B2B) than in Business-to-consumer (B2C) trade. Table 1 show that firms are more likely to buy online than to sell online. However, firms selling online are more likely to do so cross-border than firms purchasing online. The larger the firm, the more likely it is that it sells or buys online across the border. A firm is more likely to do cross-border e-commerce if it has expanded in the last two years –looking for new markets- and also if it has experienced difficulties with a declining turnover, in which case exports may be seen as a new source of revenues.

The questionnaire tackled two main blocks of online activities by firms: sales and purchases. Questions about online sales included the channel used (own website, small or large third party platforms, EDI-type transactions) and whether the firm sold domestically, across the border to other EU countries or to third countries (US, China, Japan, etc.). Firms engaged in e-commerce also responded to questions addressing the importance of some pre-defined barriers to cross-border sales. Questions about online purchases followed a similar structure, and were about the main channels used, the geographic origin and the barriers faced.

In the sample, 3,945 firms (45%) declared they used e-commerce to sell their products and/or services. Within this subset of firms, the most frequent channel used was the firm's own website (79%), followed by small platforms, large platforms and EDI-type transactions, used by 28%, 26% and 23% of firms selling online, respectively. Multi-channel strategies were used by 40% of the firms, and the remaining 60% only used one channel for their e-commerce sales.

The average share of online sales over total turnover (excluding firms with null share) was 25%, but the median was 10%. However, 7% of firms which sold online declared their turnover from online sales to be zero. In contrast, 5% of firms (165) were pure players: i.e. their online sales represented 100% of their total turnover. Firms were also asked about the geographic destination of their online sales. While 98% of the firms which sold online did so domestically, 50% sold their products online across the border to other EU Member States and 26% also to third countries. The breakdown of the turnover from e-commerce was as follows: on average, 81% came from online sales in

[3] The figure in parenthesis is the un-weighted share of firms in each category.

the domestic market, 14% from sales to other EU MS and the remaining 5% from third countries. In this last group, the US, Switzerland, Norway and Iceland were the most frequent destinations for online sales made by EU firms. In the case of cross-border e-commerce with other EU Member States, the average firm sold online to 4 different countries - Germany, the UK and Italy being the most frequent destination markets.

As regards online purchases, 7,156 firms (83%) said they purchased online. In this group, firms basically used the provider's website to buy online (68%). While the proportion of firms that used small platforms (39%) and large platforms (37%) were quite similar, the proportion of firms using EDI-type electronic transactions was rather low (20%). The proportion of firms which used just one channel to buy online was 57% - similar to that for selling, meaning that the remaining 43% of firms used the multi-channel strategy.

On average, the share of purchases online (excluding observations with zero value) was 23%, and the median was again 10%. In this case, 4% of firms, which said they bought online, indicated that their share of online purchases was 0%, while some 3% of firms declared that their share of online purchases was 100%. Similarly, we know whether the firms purchased online from their domestic providers or procured items from across the border. On average, the share of purchases from the domestic market accounted for 77% of purchases online, while 18% was from other EU Member States and 5% from third countries. In the case of online purchases, 93% of firms purchased online domestically, 49% purchased across the border from other EU Member States and 21% bought from third countries.

The data shows that there were some significant differences between selling and purchasing online. For all the Member States, firms are more likely to purchase online than sell online. As a matter of fact, in the majority of countries the proportion of firms purchasing online is above 80%. However, if we look at the cross-border dimension, this difference is no longer valid. First, for some countries the proportion of firms selling online across the border is higher than the proportion of firms buying online across the border. In addition, for the remaining countries the differences are much less pronounced than in the previous case. This indicates that while purchasing online is more frequent domestically, purchasing cross-border is as likely to face barriers as selling cross-border.

Table 2 shows some statistics by sector, weighted to better represent the overall EU picture. The accommodation and food sector has the highest engagement rate for sales, since 77% of online firms sell across the border. The equivalent for purchases is the information and communication sector, where 56% of firms purchase electronically across the border. The picture is the same if we look at the intensity of the cross-border activity: the accommodation and food sector has the highest share of e-commerce turnover from sales to other EU countries, while information and communication firms show the highest share of electronic purchases across the border over total electronic purchases. To sum up, this is a unique and rich dataset that provides useful evidence on the barriers to cross-border e-commerce sales and purchases in the EU.

3. Preliminary analysis: descriptive statistics

In this section, we provide some descriptive evidence on the effects of delivery costs on e-commerce, from the consumer perspective and the firms' perspective.

3.1 Consumers

In order to understand how delivery concerns affect e-commerce consumption decisions, we looked not only at this question, but also at how these concerns are related to the distance of the cross-border country. Is delivery also an important issue when buying in neighbouring countries or is it mainly related to buying from distant countries? In order to answer this question, we construct two distance measures for each consumer. Every

consumer surveyed was asked to name all the EU-countries in which they had shopped online within the last year. On this basis, we calculated: "non-neighbouring countries" and "distant countries". Both measures increase, the more consumers shop in distant countries.

Non-neighbouring countries (as a % of all EU countries) measured the share of non-neighbouring countries in relation to all the cross-border EU countries in which each consumers had bought online. This measure varied strongly between countries. Cyprus and Malta for example have no neighbouring countries and therefore by definition have a 100% share. Belgium, Luxembourg and Austria, however, carry out most of their cross-border e-commerce in neighbouring countries. For a full overview of the measure for all EU countries, see Table 3. For the regressions, the between country differences are controlled for through country-fixed effects.

'Distant country' is a binary variable that takes the value of 1 if the consumer engages in e-commerce with another EU country that belongs to its 8 most distant EU countries. While over 90% of cross-border online consumers in Malta buy in distant countries at least once, mainly because the UK is a popular country for web-shopping, only about 3% of Belgians or 4% of Portuguese have bought online in distant countries. On average, 31% of EU consumers with cross-border online shopping experience have also bought in a country categorised as distant.

In the GfK consumer survey, respondents were asked about their delivery concerns when shopping in another EU country. For the entire population, delivery-related issues ranked among the most named concerns. An overview of delivery concerns is given in Table 4. Additionally, we look into the concerns of the subsamples of respondents who have experience with cross-border shopping generally and in more distant countries, specifically. Overall, concerns slightly increase with experience. Shoppers are most concerned about delivery costs when they shop in countries that are non-neighbouring, but not necessarily distant. On the other hand, the biggest increase in concern about long delivery times is found among shoppers with experience of e-commerce in distant countries.

3.2 Firms

In order to better tackle the analysis of firms' perceptions of delivery costs as a barrier to cross-border e-commerce, we cleaned the database in several dimensions. First, since we want to concentrate on the physical delivery of goods, we removed from the database all service companies except those in the wholesale and retail trade sector. Hence, the modified database only included manufacturing and wholesale and retail. In these sectors, we kept companies selling physical goods, and removed those providing services exclusively. In what follows, we have also included in the tables results related to two additional barriers that are closely related to delivery, namely whether firms also perceive that i) guarantees and returns are too expensive, and ii) that resolving complaints and disputes cross-border is too expensive[4]. Moreover, we restrict the analysis to those firms that declared they were actively selling online across the border, (henceforth, these will be referred to as 'online exporters').

From Table 5, it is clear that firm size affects concerns about delivery. In this respect, only 13% of large firms declared that delivery was an important factor which affected cross-border e-commerce, while this figure for small[5] and medium-sized firms was 42% and 39%, respectively. Hence, the proportion of small and medium firms that perceive delivery costs to be an important factor which obstructs cross-border e-commerce is more than 3 times larger than the proportion of large companies. As regards returns,

[4] The variables related to these barriers refer only to firms that declare these to be of high importance.

[5] For the analysis, we have redefined the size category, merging the micro and small groups into just one, termed ***small***.

Table 5 indicates that 30% of small firms declare this to be an important barrier, against 17% of medium-sized firms and only 11% of large firms. With respect to disputes, again a higher proportion of small firms found this to be an important factor (30%). However, in this case, 21% of large firms also declared that this was a serious barrier.

However, there is no clear pattern by country. Table 6 ranks the Member States in terms of the percentage of each country's firms that said that delivery is a relevant issue which obstructs cross-border e-commerce. The countries with the lowest proportions of firms which assert that delivery concerns are important are Slovenia, Germany and Sweden. However, the countries where, on average, a high proportion of their e-commerce companies' state that delivery is an issue are France and Italy. This is a surprising result, given that these two countries have been members of the EU since the beginning and their economies are well integrated into the EU single market. There are several possible explanations for this. It might be indirect evidence of deficiencies in the delivery price setting mechanisms in those countries or alternatively it could be related to the structure of competition in their economies. The pricing strategies of national postal operators were analysed in depth in the context of the econometric study on parcel list prices (Université Saint-Louis Bruxelles, 2015). However, errors in sampling cannot be excluded as possible causes as there are no marked differences in the distribution of the French and Italian firms in terms of size and sector.

Table 7 indicates that there are no differences in terms of the age of the firms, for the three different barriers considered, except for disputes. In this case, a greater proportion of old firms have concerns about this issue than young firms. Table 8 shows that online exporters belonging to an international group tend to be less worried about delivery costs than independent firms, or those companies forming part of a national group. However, here we should observe a high correlation with size. As a matter of fact, if we check the data we can confirm that only 5.5% of small firms belong to an international group, 28.6% of medium sized and 42.2% of large firms. The internal dynamics of the companies also affect the perceptions about delivery costs. In this respect, Table 9 shows that the proportion of firms that are growing (have a positive sales trend) and declare delivery is very important is lower by 10 percentage points than the similar proportion of firms that show a negative sales trend.

There is also an important relationship with online trade intensity, reflected by the figures shown in Table 10. Firms that are exporting low volumes tend to declare that delivery is very important in a more intense way than firms that are exporting online a lot. For instance, for firms exporting online between 75 and 100 of their turnover from online activities, only 16% declare delivery is important, while for firms exporting between 1 and 25% the proportion is around 40%. More importantly, 50% of firms that do not export online say that delivery is very important. Overall, we can say that delivery is a deterrent that holds companies back from exporting online. The more European companies export online, the less they care about delivery costs. A similar conclusion can be reached if we look at the number of trade partners (Table 11), defined as the number of countries in which these companies export to. The more trade partners companies have, i.e., the higher the number of countries they export to, the less relevant is delivery as a barrier. This result also holds for the other two barriers considered in the table: returns and disputes. However, no significant differences are found when restricting the number of trade partners located in the EU, as Table 11 clearly shows.

Since we are focusing on physical delivery across borders of products sold online, unlike pure digital goods that can be delivered electronically, distance is still a relevant factor. In what follows, we look at different measures of distance. Table 12 uses contiguity to identify companies that are selling to neighbouring countries versus firms that are selling to more distant, non-neighbouring countries, independently of the physical distance travelled. Selling to neighbouring countries is in principle easier, since these countries are believed to share not only the border but also other cultural and economic interests,

and this is reflected in the data shown in Table 12. However, the difference with the countries that sell to non-neighbouring countries is minimal.

In Table 13, instead of relying on contiguity, we constructed a measure of distance for each firm based on the average distance from the country where the firm is located to each of the destination countries. Then, we defined three groups of countries: i) core, the group of countries with the minimum total distance, which include the Czech Republic, Austria, Slovakia, Slovenia, Germany, Hungary, Croatia, Poland, and Luxembourg; ii) periphery: those countries with the largest distances, which are Portugal, Ireland, Finland, Greece, the UK, Estonia, Spain, Bulgaria, and Sweden; and finally iii) middle countries (Netherlands, Belgium, Denmark, Italy, France, Lithuania, Romania, and Latvia). In principle, we would expect delivery concerns to be higher for periphery countries, but surprisingly the data in Table 13 shows that it is highest for the middle group. And this happens not only for delivery, but also for returns and disputes.

Finally, we also looked at the physical distance instead of the country groupings. We further divided the countries into four distance groups and computed again the proportion of firms that declared delivery was important. Again, as shown in Table 14, this is more important for intermediate distances than it is for the extreme distances. A priori, these results seem to indicate that that trading with close partners is easy in terms of access, distance, possible cultural links, and other factors already detected in trade theory. In addition, once a company has started trading with distant countries (i.e. periphery), there is a learning process and the costs of setting logistics have been already incurred. Companies already trading at long distances will be more concerned about reducing costs or making their lives easier, than delivery. The same happens to firms trading with neighbours. However, things seem quite different for companies engaged in intermediate-distance trade. This is not as easy as trading with close partners, nor does it imply significant investment for those companies already trading with very distant partners. However, without more detailed information or analysis, these conjectures cannot be confirmed nor rejected.

4. Towards more robust evidence: econometric modelling

In order to uncover more and detailed effects of the relationship between delivery concerns –both from the consumer side and the firm side- and cross-border e-commerce in the EU in this section, we performed a regression analysis.

4.1. Consumers

In Section 3.1, we looked into the concerns consumers have when buying cross-border and how this is connected to where and how distant the cross-border shops are. In this section, we dig deeper by relating the concerns and the distance to the actual expenditure of cross-border shopping and look at how the concerns affect consumption. In order to get robust results, we will statistically link the amount spent cross-border not only on concerns, but also on the main drivers for e-commerce. Furthermore, we control by ICT skills, demographics of education, age, gender, region and country of buyer.

The dependent variable in the regressions is the euro value of online purchases within the EU. The regression sample therefore only consists of consumers who have purchased at least once within the EU. Respondents were asked how many euros they had spent in the past 12 months on purchases from online sellers based in another EU country. In the underlying survey, this included expenditure on services (e.g. travel bookings). This introduces inaccuracy into the exercise, but as the bulk of the purchases are spent on tangible goods, we do not expect this to change the results substantially. Furthermore we logged the euro values, because the distribution of the amount spent was not linear.

For this purpose, we focus on delivery concerns. Table 15 compares the effect of concerns on expenditure when: (i) buying online domestically; and (ii) buying cross-border. The first column serves as a baseline comparison. Delivery times are negatively

correlated with expenditure on cross-border e-commerce, but "delivery costs" and "high return shipping costs", are positively correlated. These costs may be concerns resulting from high cross-border activity.

In a second step, we introduce an interaction among the two main delivery concerns (delivery times/delivery costs) with the distant measures (Table 16). The most interesting finding is that the concern for long delivery times will reduce the expenditure in other countries even more strongly, if the consumer has had more experience with shopping in non-neighbouring countries. Consumers who buy in distant countries are highly positively correlated with the amount of e-commerce expenditure. And this effect is positively reinforced for shoppers with concerns about high delivery costs. These first insights give an indication that distance and concerns matter, though conclusions on the direction of the influence cannot be drawn from these basic regressions.

The remaining explanatory variables are survey questions grouped into four categories: Concerns, Reasons, ICT use and Demographics. The "reasons" categories roughly correspond to the three economic motives for consumer consumption, we expect "reasons" variables to come with a positive sign in the regressions. The "concerns" category covers the residual uncertainty dimension of transaction costs, including factors such as trust, quality of the delivery and post-contractual uncertainties about application of consumer rights and settling disputes in online transactions.

4.2. Firms

Applying more robust techniques to check the exact relationship of delivery and the other related barriers on cross-border e-commerce, we ran some regressions using the firm-level data as well. In Table 17, we regress both the decision to sell online across the border and the volume of online exports to a series of control variables and firms' perceptions about barriers to cross-border e-commerce using the overall sample. As control variables, we include size, age, dummies controlling for the evolution of sales and the use of own website and/or platforms for online sales, and also sector dummies. As the table shows, delivery affects both negatively. The coefficients in the table are marginal effects, so we can say that removing delivery cost concerns would increase the overall number of firms selling online across the border by 6.2 percentage points. Similarly, an increase of 5 percentage points would be registered in the volume of online trade. The results with respect to the other barriers included indicate that guarantees and returns do not affect the decision to engage in online exports, but would help boost its volume by around 5 percentage points, should this barrier be effectively removed. The opposite result holds for disputes, which would encourage more firms to engage in cross-border e-commerce but would not increase the volume of online exports.

Table 18 looks at the decision to sell online across the border by firm size, and indicates that the effects are concentrated mainly in medium-sized firms. According to these results, removing delivery concerns as a barrier to online exports would not encourage either small or large firms to sell online across the border. However, the effect for medium-sized firms would be large, since the results indicate that the proportion of firms from this size category would increase by 20 percentage points. In this case, guarantees and returns have no effects, irrespective of the size group, consistent with the previous results. In the case of disputes, the effect of decision found in Table 17 is concentrated, according to Table 18, exclusively on small firms. The proportion of this type of firms would increase by 15 percentage points should the cost of cross-border complaints and disputes be sufficiently reduced.

However, when we look at the volume of cross-border e-commerce (Table 19), we detect a double effect on both small and medium firms. For those small firms already selling online across the border, their sales volumes could increase by around 5 percentage points if delivery costs concerns were effectively removed. Similarly, the corresponding figure for medium-sized firms would be around 12 percentage points. In this case, guarantees and returns would have a moderate impact on medium sized firms,

but quite a strong effect on the volume of cross-border e-commerce by large firms, 27 percentage points. Concerns about complaints and disputes would have no effect on the volume of cross-border e-commerce by firm size.

Finally, we also performed the exercise with the distance variable. Table 20 shows that removing delivery concerns would increase the number of firms selling online across the border in the periphery by 11 percentage points although the intensive margin (i.e. volume of sales) would not increase. In this case (Table 21), there is a significant effect for not so distant companies located in the middle countries, which would enlarge their sales by 7 percentage points, and also for firms located in the centre, which would increase their volume of online exports by 6 percentage points. When looking at the distances, guarantees and returns would not impact the decision to sell online across the border, but would help to improve the volume of sales for firms in the centre and in the middle, by 6 percentage points in both cases. Lastly, improving concerns about resolving complaints and disputes would have a relevant impact on all three groups, but especially on firms in the periphery, which would increase their participation in cross-border e-commerce by 17 percentage points. However, removing this barrier would not help to increase the volume of online exports.

5. Macroeconomic effects

As an additional exercise, we adopted a macroeconomic perspective. In order to do so, we relied on the results related to barriers to cross-border e-commerce by firms reported in Duch-Brown and Martens (2015) and combined them with the modelling strategy used by Cardona et al. (2015b). In a nutshell, the exercise worked as follows. We used data on perceived barriers to cross-border e-commerce by firms, particularly those related to delivery costs, as reported in Duch-Brown and Martens (2015). According to these authors, removing delivery concerns from e-retailers would probably increase cross border e-commerce by 4.3 percentage points. With these estimates, we computed the implied cross-border trade cost reduction that would result from a hypothetical policy intervention to eliminate these delivery cost concerns. We plugged this trade cost estimate into a macro-sector multi-country CGE model to estimate the impact of online retailing on consumers and producers, as in Cardona et al. (2015b). The interested reader can consult these sources for more detailed descriptions of the results. The database used is the same one that we have used here.

The macroeconomic model features two transmission mechanisms: cross-border trade and domestic competition in the retail sector. The first mechanism emphasizes cross-border competition: online trade reduces the cost for consumers to gather information on the available supply of products, and the costs for firms to access wider markets. We translated the drop in trade costs into a price reduction that made imported products more attractive for consumers. However, the new online technologies also impact domestic distribution networks, and so we modelled a second, more comprehensive mechanism whereby the reduction in the relative price of online imports put price pressure on domestic markets, reduced price margins in domestic retailing and led to an overall domestic price reduction. Since delivery and distribution costs constitute a substantial part of the total cost of consumer goods (Burstein et al, 2003; Francois and Wooton, 2001) we would not be surprised if a combination of increased efficiency and competition were to reduce cross-border margins. This second mechanism constitutes a productivity shock to the distribution services used for both domestic and cross-border supply of goods to consumers. It reduces trade costs for domestic producers of goods and thereby boosts their production and sales, including exports. The net domestic impact of e-commerce is an empirical question. It combines the negative effect of the price pressure on retail services output with the positive effect that the reduction in retail trade costs has on domestic producers. The trade cost shock due to a hypothetical effective policy to eliminate concerns about delivery costs increases consumer welfare and real consumption through price, income and substitution effects in the CGE model. These effects, in turn, would positively affect GDP. Possible exceptions would occur in

cases where domestic supply is not able to adapt to this increase in demand and the relative price effect for domestic and imported goods would be the increase in domestic demand being drained off to imports.

As can be seen from columns 5 and 6 in Table 22, the impact of both shocks on household consumption is positive. The retail efficiency effect is stronger however in many countries since it not only benefits consumers but also spreads throughout the economy to all sectors. For the EU28, this policy would boost household consumption by 0.03% of which 0.01% would come from the trade cost effect and the remainder from efficiency gains in distribution. Columns 3-4 of Table 20 summarise the overall impact on GDP and compare the different impacts across countries. The effect of the policy would be, for the aggregated EU28, an increase in GDP by a range of 0.005%. In this case, as the table shows, almost all the effect would come from the trade cost effects, the part attributable to the efficiency gains in distribution being rather low. Columns 1-2 show the corresponding data for the real national income. Hence, the table helps to illustrate the aggregate effects of all these transmission channels together in overall GDP and GNI effects. The net effect, both of the trade cost and the retail efficiency shock is always positive, although its magnitude is rather small for a few countries. The structure of GDP, the relative importance of external trade and the degree of competition in the domestic retail sector will be important factors in determining that outcome. These results imply that household consumption and the real national income will increase in absolute terms by EUR 2,307 billion and by EUR 2,372 billion, respectively.

Finally, an important effect comes from a reduced overall price level. The comparative statics exercise shows that, according to columns 8-9 of Table 22, consumer prices would be reduced by 0.03%. This would be due exclusively to the productivity shock in the retail sector because the reduction in consumer prices derived from trade costs only is close to zero. When only trade costs are considered, some countries even experience an increase – albeit small – in their consumer price indices. This result comes from the fact that under the current assumptions, the model is not able to capture differences in online vs. offline prices. However, once the effects of the margin squeeze in the retail sector are considered, this price effect propagates to other sectors producing a significant reduction in the price level.

6. Conclusions

In this paper, we have studied the effects of concerns about delivery costs on the flows of cross-border e-commerce in the EU. First, we provided descriptive evidence about the incidence, for both consumers and firms, of delivery costs as a barrier to online commercial transactions across the border. Second, we offered more analytic evidence on these relationships. Finally, we estimated the macro-economic impacts of a policy that would remove firms' delivery concerns.

The descriptive evidence on the consumers' side indicates that, on average 31% of EU consumers who have cross-border online shopping experience have also bought in a distant country. While over 90% of cross-border online consumers in Malta have bought in distant countries at least once, only about 3% of Belgians or 4% of Portuguese have bought online from remote locations.

Regarding firms, the descriptive evidence indicates that size is a relevant dimension for delivery. The proportion of small and medium-sized firms that perceive delivery costs to be a relevant factor which obstructs cross-border e-commerce is more than 3 times larger than the proportion of large companies. Moreover, the evidence shows that there are no differences in terms of the age of the firms. Online exporters belonging to an international group tend to be less worried about delivery costs than independent firms. The proportion of firms that are growing (have a positive sales trend) and declare that delivery is very important is lower by 10 percentage points to the similar proportion of firms that show a negative sales trend. Delivery is correlated with online trade intensity. Firms exporting low volumes tend to declare that delivery is very important in a more

intense way than firms that export large volumes online. Overall, we can say that delivery is a deterrent that holds companies back from exporting online. The more European companies export online, the less they care about delivery costs.

Analytical results on the consumers' side indicate that delivery times are negatively correlated with expenditure on cross-border e-commerce, but delivery costs and high return shipping costs, are positively correlated. These costs may be concerns resulting from high cross-border activity. Moreover, when incorporating an interaction between the two main delivery concerns with the distance measures, we have found that the concern about long delivery times reduces expenditure in other countries even more strongly, if the consumer has had more experience with shopping in non-neighbouring countries. Consumers who buy in distant countries are those with the highest amount of e-commerce expenditure. And this effect is positively reinforced for shoppers with concerns about high delivery costs.

From the firms' side, delivery negatively affects both the decision to sell across the border and the volume of online exports. Our results indicate that removing delivery cost concerns would increase the overall number of firms selling online across the border by 6.2 percentage points. Similarly, an increase of 5 percentage points would be registered in the volume of online trade. In terms of the size of the firms, the effects on the decision to sell online across the border are concentrated mainly in medium-sized firms. When we look at the volume of cross-border e-commerce, however, we detect a double effect on both small and medium-sized firms. For those small firms that already sell online across the border, their volume of sales could increase by around 5 percentage points if delivery costs concerns were effectively removed. Similarly, the corresponding figure for medium-sized firms would be around 12 percentage points.

Lastly, we also computed the macro-economic impact of removing delivery concerns. The results indicate that the impact on household consumption would be positive. For the EU28 a policy that effectively addresses this issue would boost household consumption by 0.03%. The impact on GDP, for the aggregated EU28, would be an increase of 0.005%. Finally, a reduced overall price level would have a considerable effect. The comparative statics exercise shows that consumer prices would be reduced by 0.03%, due to the productivity shock in the retail sector.

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Tables and figures

Table 1: Characteristics of firms doing e-commerce

	Selling		Buying	
	Total	Cross-border*	Total	Cross-border*
Age				
Old	41.6%	46.7%	85.6%	41.0%
Young	38.9%	53.2%	88.1%	47.6%
Size				
Micro	39.4%	47.2%	87.1%	41.1%
Small	44.9%	49.0%	82.5%	47.7%
Medium	56.1%	50.8%	77.3%	48.7%
Large	76.4%	60.3%	80.0%	59.8%
Type				
Independent	40.1%	47.5%	86.2%	42.0%
National group	47.7%	47.5%	85.9%	41.3%
International group	50.8%	52.8%	84.6%	51.2%
Activity				
Goods to consumers	48.5%	45.7%	83.9%	39.8%
Goods to firms	42.0%	46.3%	87.2%	45.1%
Digital services to consumers	67.7%	55.4%	83.1%	50.0%
Digital services to firms	53.5%	53.2%	87.9%	56.4%
Services to consumers	48.1%	53.1%	86.9%	42.3%
Services to firms	39.3%	53.2%	90.8%	47.2%
Sales trend				
Fall by more than 25%	45.8%	42.5%	88.2%	39.4%
Fall between 5% and 25%	43.0%	44.0%	83.7%	39.2%
Remained the same	36.5%	39.5%	87.0%	38.9%
Rise between 5% and 25%	42.4%	55.7%	85.5%	44.9%
Rise by more than 25%	44.2%	58.4%	89.8%	54.7%

* Cross-border figures are calculated with respect to the number of firms selling or buying online.
Note: Figures are computed using weights.
Source: own calculations with data from Eurobarometer 413.

Table 2: Cross-border e-commerce, by sector

	Engagement (%)		Intensity (share)	
	Selling	Buying	Selling	Buying
Total	47.8%	42.2%	10.3	12.2
Manufacturing	45.6%	40.7%	9.1	11.6
Wholesale and retail trade	36.7%	38.9%	5.9	12.9
Accommodation and food	76.7%	31.3%	23.9	7.2
Information and communication	57.0%	56.0%	12.4	13.7

Note: Figures are computed using weights.
Source: own calculations with data from Eurobarometer 413.

Table 3: Distance measures by country

Country	avg. % of e-commerce with non-neighbouring countries	% who order in distant countries
Austria	20.8%	25.3%
Belgium	19.0%	2.9%
Bulgaria	86.3%	72.7%
Croatia	89.7%	63.6%
Cyprus	100.0%	79.8%
Czech Republic	43.7%	46.4%
Denmark	71.2%	13.9%
Estonia	97.6%	16.5%
Finland	76.5%	21.8%
France	47.1%	11.9%
Germany	48.3%	15.6%
Greece	97.7%	77.9%
Hungary	73.3%	52.1%
Ireland	29.3%	8.0%
Italy	83.7%	60.8%
Latvia	90.6%	69.1%
Lithuania	90.1%	86.5%
Luxembourg	20.3%	9.9%
Malta	100.0%	98.4%
Netherlands	50.6%	18.5%
Poland	54.9%	66.6%
Portugal	74.8%	3.9%
Romania	90.1%	64.1%
Slovakia	32.1%	32.9%
Slovenia	58.3%	39.8%
Spain	76.8%	10.4%
Sweden	97.5%	22.3%
UK	91.4%	26.7%
EU-28	64.3%	30.6%

Note: Figures are computed using weights

Table 4: Delivery concerns by cross-border shopping experience

	(i) Full Population	(ii) Cross-border within EU	(iii) Non-neighbouring	(iv) Distant countries
Long delivery times	23.0%	25.8%	22.7%	27.4%
High delivery costs	27.3%	28.2%	30.5%	27.6%
Delivery arrangements not be convenient	6.7%	8.0%	7.2%	8.6%
Wrong or damaged products will be delivered	14.9%	16.2%	16.1%	18.4%
Products will not be delivered at all	15.3%	14.5%	13.8%	14.2%
High return shipping costs	23.7%	24.9%	26.4%	25.4%

Note: Concerns by full sample (i), for population with cross-border online shopping experience (ii), for cross-border shoppers that buy above average in non-neighbouring countries and (iv) who have bought in distant countries

Table 5: Share of online exporters perceiving barriers as important, by size

	Delivery	Returns	Disputes
Small	0.415	0.303	0.302
Medium	0.391	0.175	0.161
Large	0.130	0.107	0.207

Table 6: Share of online exporters perceiving barriers as important, by country

	Delivery	Returns	Disputes
SLOVENIA	0.208	0.099	0.076
GERMANY	0.220	0.205	0.216
SWEDEN	0.241	0.031	0.130
LITHUANIA	0.262	0.254	0.250
ESTONIA	0.265	0.063	0.011
FINLAND	0.270	0.094	0.131
LATVIA	0.273	0.126	0.303
NEDERLAND	0.274	0.156	0.069
DENMARK	0.277	0.154	0.115
AUSTRIA	0.287	0.244	0.257
BELGIUM	0.293	0.180	0.131
GREAT BRITAIN	0.316	0.179	0.070
CZECH REPUBLIC	0.372	0.248	0.353
IRELAND	0.374	0.090	0.114
POLAND	0.380	0.407	0.451
SPAIN	0.405	0.350	0.452
EU AVERAGE	0.407	0.294	0.294
LUXEMBOURG	0.423	0.279	0.320
SLOVAKIA	0.469	0.330	0.408
ROMANIA	0.470	0.397	0.363
CROATIA	0.499	0.315	0.275
GREECE	0.507	0.346	0.220
PORTUGAL	0.521	0.546	0.511
BULGARIA	0.546	0.466	0.366
HUNGARY	0.576	0.273	0.477
ITALIA	0.663	0.490	0.506
FRANCE	0.714	0.521	0.443

Table 7: Share of online exporters perceiving barriers as important, by age

	Delivery	Returns	Disputes
Old	0.412	0.294	0.311
Young	0.391	0.300	0.226

Table 8: Share of online exporters perceiving barriers as important, by type

	Delivery	Returns	Disputes
Independent	0.344	0.246	0.244
National group	0.373	0.307	0.225
International group	0.263	0.159	0.147

Table 9: Share of online exporters perceiving barriers as important, by sales trend

	Delivery	Returns	Disputes
Fall	0.484	0.344	0.327
More or less the same	0.440	0.328	0.314
Rise	0.360	0.262	0.290

Table 10: Share of online exporters perceiving barriers as important, by online trade intensity

	Delivery	Returns	Disputes
0	0.497	0.380	0.452
1 to 25	0.363	0.224	0.192
26 to 50	0.416	0.365	0.395
51 to 75	0.335	0.311	0.222
76 to 100	0.161	0.169	0.160

Table 11: Share of online exporters perceiving barriers as important, by number of trade partners

	Delivery		Returns		Disputes	
	Total	EU MS	Total	EU MS	Total	EU MS
1	0.369	0.380	0.333	0.315	0.297	0.303
2 to 5	0.393	0.373	0.229	0.227	0.215	0.216
6 to 10	0.269	0.369	0.176	0.192	0.205	0.236
More than 10	0.270	0.280	0.118	0.116	0.035	0.026

Table 12: Share of online exporters perceiving barriers as important, by location of trade partners

	Delivery	Returns	Disputes
Non neighbouring	0.434	0.317	0.318
Neighbouring	0.372	0.259	0.255

Table 13: Share of online exporters perceiving barriers as important, by geographic location of exporters

	Delivery	Returns	Disputes
Core	0.338	0.263	0.318
Middle	0.516	0.366	0.338
Periphery	0.395	0.273	0.244

This category is built summing the distances from capital of the origin country to the capitals of the destination countries. The core is composed of the countries with the lowest distance: Czech Republic, Austria, Slovenia, Slovakia, Germany, Hungary, Croatia, Poland and Luxembourg. Middle countries are the Netherlands, Belgium, Denmark, Italy, France, Lithuania, Romania, and Latvia. The periphery includes the remote countries: Portugal, Ireland, Finland, Greece, UK, Estonia, Spain, Bulgaria, and Sweden.

Table 14: Share of online exporters perceiving barriers as important, by average distance to trade partners

	Delivery	Returns	Disputes
Short	0.286	0.156	0.184
Medium –low	0.481	0.348	0.304
Medium –high	0.352	0.242	0.233
Large	0.340	0.211	0.189

Table 15: Intensive Margin of cross-border EU trade (volume of expenditure in €, OLS regression)

	Dependent Variable			
VARIABLES	Expenditure on Goods and Travel Services in other EU countries (in Euro)			
CONCERNS	(i)		(ii)	
Delivery				
Long delivery times	-0.0161	(0.0388)	-0.0919**	(0.0367)
Delivery costs or final price are higher than displayed on website/High delivery cost	-0.00350	(0.0436)	0.0859**	(0.0357)
Delivery arrangements of online sellers might not be convenient for me	-0.0882*	(0.0506)	0.0524	(0.0555)
Wrong or damaged products will be delivered	0.0331	(0.0372)	-0.0689*	(0.0415)
Products will not be delivered at all	-0.0511	(0.0413)	-0.0366	(0.0435)
High return shipping costs			0.130***	(0.0362)
Customer service				
Customer service is poor	0.141***	(0.0436)	0.0298	(0.0512)
It may be more difficult to solve any problems if something goes wrong			0.0456	(0.0375)
Returning a product I didn't like and getting reimbursed is not easy	0.0549	(0.0387)	-0.0891**	(0.0396)
Replacement or repair of a faulty product is not easy	0.0471	(0.0378)	0.0716*	(0.0385)
Payment				
The payment card details may be stolen	0.0316	(0.0386)	0.0864**	(0.0418)
My preferred payment method might not be accepted by online sellers	-0.0535	(0.0472)	-0.0513	(0.0541)
Trust				
Personal data may be misused	0.0232	(0.0379)	-0.0184	(0.0408)
Goods sold online might be unsafe/counterfeit	0.0137	(0.0402)	0.126***	(0.0451)
I don't trust the information provided to me online	-0.0657	(0.0643)	0.0123	(0.0598)
I don't trust the terms and conditions I have to agree with online	-0.0897	(0.0635)		
Consumer Rights				
I do not know what my consumer rights are when buying online	-0.0360	(0.0585)	0.00838	(0.0515)
There is a lower level of consumer protection when buying online	0.0860*	(0.0519)	-0.0771	(0.0567)
I don't understand the terms and conditions	-0.194***	(0.0744)	-0.0321	(0.0619)
Geoblocking				
I may not be able to access the service or the product may be incompatible			-0.201***	(0.0584)
Foreign sellers will not sell to me			0.0192	(0.0517)
I might be redirected to a website in my country of residence			0.0151	(0.0741)
I have too little information regarding offers from foreign sellers			-0.121**	(0.0546)
Other concerns	0.173*	(0.0897)	0.106	(0.124)
REASONS				
Price				
I find cheaper products online	0.0773**	(0.0347)	0.0952***	(0.0338)
Quality and variety				
I find better quality products online	0.0924	(0.0621)	0.119*	(0.0609)
I can find certain products only online	0.197***	(0.0378)	0.184***	(0.0367)
There's more choice online	0.118***	(0.0344)	0.114***	(0.0331)
Transaction				
I save time by buying online	0.0706**	(0.0346)	0.0852**	(0.0333)
I don't like going to shops	0.253***	(0.0502)	0.211***	(0.0486)
I can order at any time of the day/week	0.120***	(0.0350)	0.135***	(0.0339)
Products are delivered to a convenient place	0.108***	(0.0396)	0.130***	(0.0384)
I can return products easily	0.187***	(0.0543)	0.148***	(0.0528)
Information				
It's easier to compare prices online	0.129***	(0.0349)	0.141***	(0.0338)
It's easier to compare product information online	0.159***	(0.0410)	0.163***	(0.0396)
I can find more information online	0.0519	(0.0413)	0.0467	(0.0399)
I can find product reviews by other consumers	0.206***	(0.0398)	0.210***	(0.0386)
Other	0.306*	(0.157)	0.392***	(0.150)
ICT USE AND SKILLS				
hoursinternet	0.00548	(0.00495)	0.0101**	(0.00487)
socialnetwork	0.138***	(0.0390)	0.136***	(0.0379)
advanced	0.288***	(0.0346)	0.297***	(0.0335)
DEMOGRAPHICS				
age (in years)	0.0103***	(0.00139)	0.0101***	(0.00133)
gender (1=female)	-0.0947***	(0.0331)	-0.0949***	(0.0322)
Education (Base: Elementary School)				
Some Secondary School	0.159	(0.111)	0.204*	(0.106)
Graduation Secondary School	0.316***	(0.105)	0.365***	(0.100)
Graduaion College	0.532***	(0.106)	0.572***	(0.101)
Post-graduate Degree	0.708***	(0.109)	0.751***	(0.105)
Student	0.341***	(0.126)	0.388***	(0.122)
Other	0.422***	(0.158)	0.457***	(0.150)
Refusal	0.484**	(0.213)	0.399**	(0.192)
Region (Base=Rural)				
Town, Urban centre	0.152***	(0.0457)	0.207***	(0.0439)
Metropolitan zone	-0.0627	(0.0442)	-0.0486	(0.0426)
No. of languages spoken	0.228***	(0.0210)	0.215***	(0.0204)
Country Fixed Effects	YES		YES	
Constant	3.574***	(0.156)	3.538***	(0.147)
Observations	7,597		7,963	
R-squared	0.127		0.130	

Notes: Standard errors in parentheses, Significance Level at *** p<0.01, ** p<0.05, * p<0.1. Weights based on age, gender, and country applied. Version (i) concerns regarding buying online domestically. Version (ii) concerns regarding buying online in another EU country

Table 16: Intensive Margin of cross-border EU trade with distant measure interaction effect (volume of expenditure in Euro, OLS regression)

	Dependent Variable			
VARIABLES	Expenditure on Goods and Travel Services in other EU countries (in Euro)			
	Non-Neighbouring	Distant	Non-Neighbouring	Distant
CONCERNS	(i)	(ii)	(iii)	(iv)
Distance Measure (Non-neighbouring or Distant)	0.0508	0.314***	-0.00595	0.241***
Delivery				
Long delivery times	0.0804	-0.0593	-0.0652*	-0.0640*
Long delivery times* distant measure	-0.215**	-0.0155		
High delivery costs	0.0758**	0.0800**	0.0756	0.0110
High delivery costs * distant measure			-0.00574	0.230***
Delivery arrangements of online sellers might not be convenient for me	-0.0507	-0.0584	-0.0461	-0.0611
Wrong or damaged products will be delivered	-0.0976**	-0.103**	-0.0990**	-0.105**
Products will not be delivered at all	-0.0502	-0.0505	-0.0511	-0.0513
High return shipping costs	0.131***	0.129***	0.134***	0.131***
Customer service				
Customer service is poor	0.0639	0.0644	0.0664	0.0616
It may be more difficult to solve any problems if something goes wrong	0.0534	0.0569	0.0493	0.0595
Returning a product I didn't like and getting reimbursed is not easy	-0.0418	-0.0457	-0.0450	-0.0465
Replacement or repair of a faulty product is not easy	0.0863**	0.0861**	0.0871**	0.0864**
Payment				
The payment card details may be stolen	0.0845**	0.0856**	0.0857**	0.0868**
My preferred payment method might not be accepted by online sellers	-0.0943*	-0.102*	-0.0918*	-0.101*
Trust				
Personal data may be misused	-0.0197	-0.0173	-0.0195	-0.0182
Goods sold online might be unsafe/counterfeit	0.107**	0.103**	0.107**	0.0984**
I don't trust the information provided to me online	-0.0380	-0.0327	-0.0444	-0.0339
Consumer Rights				
I do not know what my consumer rights are when buying online	-0.00274	0.000795	-0.00702	-0.00180
There is a lower level of consumer protection when buying online	-0.0711	-0.0785	-0.0706	-0.0764
I don't understand the terms and conditions	-0.00509	-0.00323	-0.00431	-0.00323
Geoblocking				
I may not be able to access the service or the product may be incompatible	-0.198***	-0.209***	-0.202***	-0.201***
Foreign sellers will not sell to me	0.0121	0.00727	0.0131	0.00135
I might be redirected to a website in my country of residence	0.0560	0.0605	0.0546	0.0653
I have too little information regarding offers from foreign sellers	-0.147***	-0.136**	-0.143**	-0.133**
Other concerns	0.182	0.166	0.171	0.168
REASONS		All included		
ICT USE AND SKILLS		All included		
DEMOGRAPHICS		All included		
Country Fixed Effects	YES	YES	YES	YES
Constant	3.657***	3.596***	3.686***	3.626***
Observations	7,450	7,450	7,450	7,450
R-squared	0.124	0.130	0.123	0.131

Notes: Standard errors in parentheses, Significance Level at *** p<0.01, ** p<0.05, * p<0.1. Weights based on age, gender, and country applied. Version (i) and Version (iii) use the non-neigbouring distant measure, while version (ii) and version (iv) the distant country measure.

Table 17: Decision and volume, overall picture

	Decision	Volume
Size wrt small: Medium	0.0397	0.0608***
	(0.0384)	(0.0213)
Size wrt small: Large	0.0370	0.0546**
	(0.0477)	(0.0229)
Age	0.00734	0.0334
	(0.0381)	(0.0220)
Evolution wrt decrease in sales: remain the same	-0.0120	-0.00465
	(0.0383)	(0.0172)
Evolution wrt decrease in sales: Increase	0.0766**	0.0188
	(0.0346)	(0.0190)
Own website	0.0581*	-0.0259
	(0.0333)	(0.0207)
Small platform	0.0190	-0.0160
	(0.0303)	(0.0143)
Large platform	0.0770**	-0.0126
	(0.0315)	(0.0189)
EDI type transactions	0.0668**	0.0254**
	(0.0319)	(0.0107)
Sector wrt manufacturing: Wholesale and retail	-0.0668**	-0.0677***
	(0.0289)	(0.0139)
Delivery costs are too high	-0.0617**	-0.0503***
	(0.0299)	(0.0149)
Guarantees and returns are too expensive	-0.0115	-0.0463***
	(0.0346)	(0.0171)
Resolving complaints and disputes cross-border is too expensive	-0.114***	-0.00231
	(0.0334)	(0.0171)
Observations	1,241	1,241

Table 18: Delivery costs. Decision to sell online across the border by size

	Small	Medium	Large
Age	0.0132	-0.141	0.0100
	(0.0405)	(0.150)	(0.264)
Evolution wrt decrease in sales: remain the same	-0.00384	0.0369	-0.138
	(0.0441)	(0.101)	(0.109)
Evolution wrt decrease in sales: Increase	0.0854**	0.0766	-0.0624
	(0.0395)	(0.0944)	(0.107)
Own website	0.143***	0.0190	-0.294***
	(0.0407)	(0.0701)	(0.0963)
Small platform	0.0629*	-0.0822	0.0167
	(0.0361)	(0.0672)	(0.101)
Large platform	0.107***	0.0821	-0.0595
	(0.0366)	(0.0777)	(0.0967)
EDI type transactions	0.0317	0.0294	0.128
	(0.0403)	(0.0650)	(0.0819)
Sector wrt manufacturing: Wholesale and retail	-0.0474	-0.108	-0.105
	(0.0344)	(0.0689)	(0.0798)
Delivery costs are too high	-0.0246	-0.190***	-0.0956
	(0.0349)	(0.0686)	(0.0978)
Guarantees and returns are too expensive	-0.00679	-0.000412	-0.00270
	(0.0395)	(0.0913)	(0.111)
Resolving complaints and disputes cross-border is too expensive	-0.147***	0.0302	-0.0650
	(0.0373)	(0.0922)	(0.126)
Observations	928	200	113

Table 19: Delivery costs. Volume of online trade cross-border by size

	Small	Medium	Large
Age	0.0415**	-0.0896	-0.318
	(0.0209)	(0.103)	(0.196)
Evolution wrt decrease in sales: remain the same	0.000598	0.0453	-0.0797
	(0.0204)	(0.0608)	(0.0576)
Evolution wrt decrease in sales: Increase	0.00894	0.105	-0.0291
	(0.0190)	(0.0660)	(0.0743)
Own website	-0.00264	-0.0248	-0.0974**
	(0.0186)	(0.0418)	(0.0442)
Small platform	-0.00206	-0.0517	0.0235
	(0.0148)	(0.0502)	(0.0612)
Large platform	-0.0267	0.130***	-0.0876*
	(0.0193)	(0.0420)	(0.0483)
EDI type transactions	0.000171	0.0173	0.0880*
	(0.0186)	(0.0366)	(0.0500)
Sector wrt manufacturing: Wholesale and retail	-0.0462***	-0.159***	-0.103***
	(0.0163)	(0.0372)	(0.0349)
Delivery costs are too high	-0.0467***	-0.116***	0.0755
	(0.0144)	(0.0419)	(0.0607)
Guarantees and returns are too expensive	-0.0217	-0.0692**	-0.271***
	(0.0190)	(0.0332)	(0.0523)
Resolving complaints and disputes cross-border is too expensive	0.00575	-0.0126	-0.0959
	(0.0180)	(0.0374)	(0.0751)
Observations	928	200	113

Table 20: Delivery costs. Decision to sell online across the border by distance

	Centre	Middle	Periphery
Size wrt small: Medium	0.0720	0.0377	0.0114
	(0.0737)	(0.0643)	(0.0635)
Size wrt small: Large	-0.0785	0.00801	0.158**
	(0.0948)	(0.0776)	(0.0724)
Age	0.0198	0.0149	-0.0478
	(0.0637)	(0.0634)	(0.0701)
Evolution wrt decrease in sales: remain the same	-0.0678	-0.0561	0.112
	(0.0629)	(0.0665)	(0.0701)
Evolution wrt decrease in sales: Increase	0.0106	0.0767	0.177***
	(0.0586)	(0.0572)	(0.0627)
Own website	0.0794	0.0862	0.0195
	(0.0622)	(0.0564)	(0.0547)
Small platform	0.0473	0.0326	0.0177
	(0.0529)	(0.0563)	(0.0499)
Large platform	0.0385	0.0774	0.120**
	(0.0545)	(0.0546)	(0.0538)
EDI type transactions	0.108*	0.0156	0.0778
	(0.0599)	(0.0546)	(0.0521)
Sector wrt manufacturing: Wholesale and retail	-0.0742	-0.0618	-0.0731
	(0.0487)	(0.0511)	(0.0504)
Delivery costs are too high	-0.0466	-0.0395	-0.112**
	(0.0505)	(0.0519)	(0.0526)
Guarantees and returns are too expensive	-0.0454	-0.0523	0.0982
	(0.0550)	(0.0603)	(0.0662)
Resolving complaints and disputes cross-border is too expensive	-0.0978*	-0.113*	-0.170***
	(0.0539)	(0.0578)	(0.0634)
Observations	463	376	402

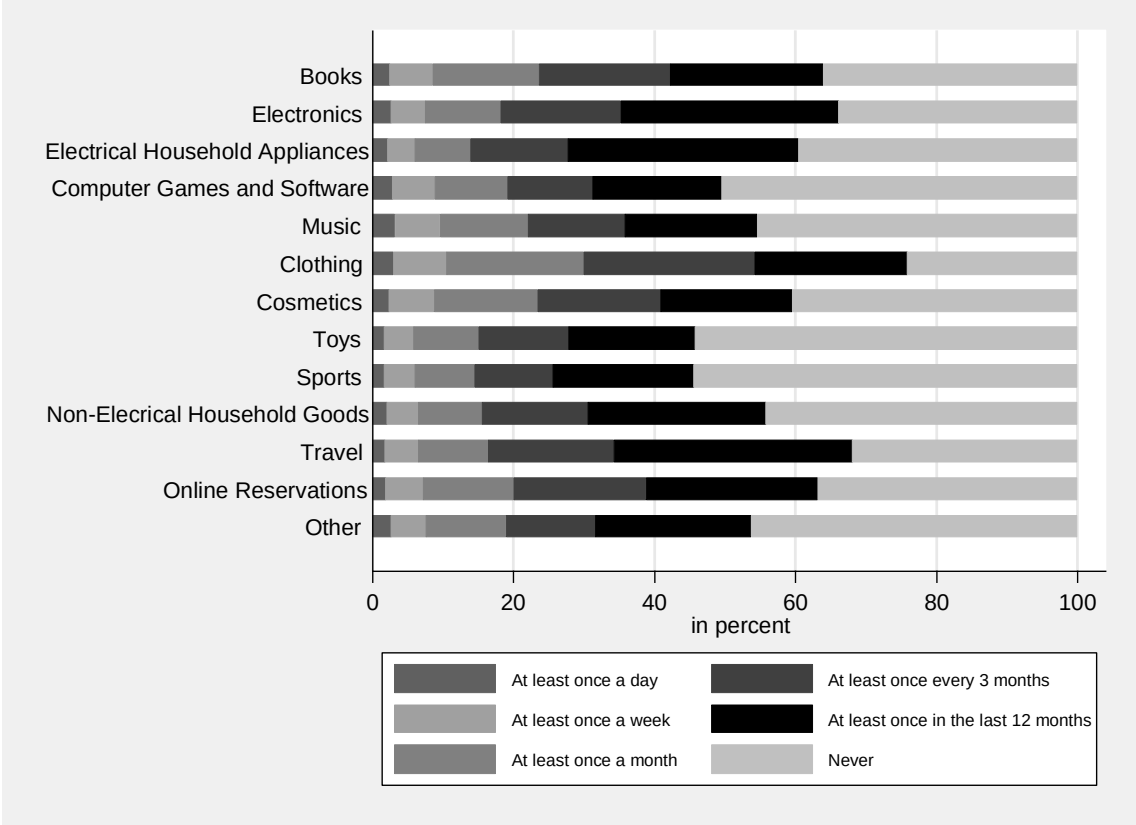
Table 21: Delivery costs. Volume of online trade cross-border by distance

	Centre	Middle	Periphery
Size wrt small: Medium	0.0875**	0.0600	0.0580
	(0.0430)	(0.0494)	(0.0373)
Size wrt small: Large	0.00836	0.0753***	0.0839*
	(0.0397)	(0.0277)	(0.0428)
Age	0.0700	0.000561	0.0160
	(0.0434)	(0.0288)	(0.0297)
Evolution wrt decrease in sales: remain the same	0.00207	-0.0273	0.0164
	(0.0294)	(0.0271)	(0.0247)
Evolution wrt decrease in sales: Increase	0.00174	0.00609	0.0572*
	(0.0282)	(0.0392)	(0.0317)
Own website	-0.0314	-0.0726***	0.0122
	(0.0295)	(0.0204)	(0.0279)
Small platform	0.00985	-0.0390	-0.0205
	(0.0300)	(0.0267)	(0.0159)
Large platform	-0.0269	-0.0494*	0.0344
	(0.0340)	(0.0283)	(0.0260)
EDI type transactions	0.0278	0.0351*	0.0318*
	(0.0248)	(0.0205)	(0.0183)
Sector wrt manufacturing: Wholesale and retail	-0.0633***	-0.0739**	-0.0805***
	(0.0181)	(0.0328)	(0.0302)
Delivery costs are too high	-0.0580**	-0.0692**	-0.0182
	(0.0226)	(0.0277)	(0.0214)
Guarantees and returns are too expensive	-0.0603*	-0.0636**	-0.0248
	(0.0363)	(0.0251)	(0.0323)
Resolving complaints and disputes cross-border is too expensive	-0.0124	0.0207	-0.0223
	(0.0246)	(0.0297)	(0.0387)
Observations	463	376	402

Table 22: Summary of Macroeconomic Effects (% change)

	Real National Income		GDP		Household Consumption		Consumer Prices		Exports (value)	
	cross-border only (1)	all on-line sales (2)	cross-border only (3)	all on-line sales (4)	cross-border only (5)	all on-line sales (6)	cross-border only (7)	all on-line sales (8)	cross-border only (9)	all on-line sales (10)
AT	0.01	0.03	0.005	0.005	0.01	0.04	0.00	-0.03	0.05	0.01
BE	0.05	0.02	0.032	0.003	0.06	0.02	0.00	-0.02	0.03	0.00
CY	0.01	0.02	0.009	0.002	0.01	0.02	0.00	-0.02	0.07	0.01
CZ	0.01	0.01	0.009	0.001	0.01	0.01	0.00	-0.01	0.03	0.00
DK	0.01	0.02	0.011	0.003	0.02	0.02	0.00	-0.02	0.06	0.00
EE	0.01	0.01	0.010	0.002	0.02	0.02	0.00	-0.02	0.06	0.00
FI	0.00	0.02	0.000	0.002	0.00	0.02	0.00	-0.02	0.03	0.01
FR	0.00	0.02	0.003	0.003	0.00	0.03	0.00	-0.02	0.02	0.01
DE	0.00	0.02	0.002	0.005	0.00	0.03	0.00	-0.02	0.03	0.01
GR	0.00	0.03	0.005	0.005	0.00	0.03	0.00	-0.02	0.08	0.01
HU	0.01	0.02	0.011	0.003	0.01	0.02	0.01	-0.02	0.02	0.00
IE	0.01	0.02	0.003	0.003	0.01	0.04	0.00	-0.03	0.04	0.01
IT	0.00	0.03	0.003	0.004	0.00	0.04	0.00	-0.04	0.05	0.00
LV	0.01	0.01	0.009	0.002	0.01	0.02	0.00	-0.01	0.03	0.00
LT	0.01	0.01	0.007	0.001	0.01	0.01	0.00	-0.01	0.01	0.00
LU	0.00	0.02	0.003	0.002	0.00	0.02	-0.01	-0.02	0.03	0.01
MT	0.01	0.02	0.009	0.007	0.02	0.02	0.00	-0.01	0.04	0.00
NL	0.01	0.02	0.006	0.003	0.01	0.03	0.00	-0.03	0.05	0.00
PL	0.01	0.01	0.005	0.002	0.01	0.02	0.00	-0.01	0.06	0.01
PT	0.00	0.03	0.002	0.004	0.01	0.03	0.00	-0.03	0.08	0.01
SK	0.00	0.01	0.003	0.002	0.01	0.02	0.00	-0.01	0.07	0.02
SL	0.02	0.02	0.019	0.009	0.02	0.03	0.00	-0.02	0.04	0.01
ES	0.00	0.04	0.003	0.007	0.00	0.06	0.00	-0.05	0.03	0.00
SE	0.00	0.01	0.002	0.002	0.00	0.02	0.00	-0.01	0.03	0.02
GB	0.00	0.04	0.002	0.007	0.00	0.05	0.00	-0.04	0.03	0.00
BU	0.01	0.01	0.000	0.002	0.01	0.02	0.00	-0.01	0.05	0.00
RO	0.01	0.01	0.003	0.000	0.01	0.01	0.00	-0.01	0.03	0.00
HR	0.00	0.01	0.002	0.002	0.00	0.01	0.00	-0.01	0.00	0.00
EU28	0.01	0.02	0.004	0.005	0.01	0.03	0.00	-0.03	0.04	0.01

Figure 1: Product Category and Frequency of Purchase (GfK Consumer Survey)



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