There Goes Gravity: How eBay Reduces Trade Costs*

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Abstract

We compare the impact of distance on international trade flows, a standard proxy for trade costs, on eBay and offline considering the same set of 62 countries and goods, matching eBay categories to product codes in the HS 6-digit classification. We find the effect to be on average 60 percent smaller on the eBay online platform than offline. The difference in distance effects is not explained by the correlation of distance with other trade-cost variables such as common legal systems and languages, colonial links, transport costs, and trade agreements. We argue using interaction variables that it is rather explained by a reduction of information and trust frictions that occurs online. This suggests an important role of technology in helping overcome market and government failures and make trade more efficient.

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1 Introduction

In the 1990s many commentators believed that with advances in transport and communication technologies, geographic distance between countries would soon no longer hinder international transactions (e.g. Cairncross 1997). But despite some anecdotal evidence in support of the "death of distance" hypothesis (e.g. Friedman 2005), there is a large number of academic papers suggesting that distance is "thriving", not "dying". For example, Disdier and Head (2008), using a meta-analysis based on 1,000 gravity equations, found that the estimated coefficient on distance has been slightly on the rise since 1950. Chaney (2011) argues that the need for direct interactions between trading partners, as first highlighted by Rauch (1999), explains why distance still matters for trade. Similarly, Allen (2011) suggests information frictions account for 93 percent of the distance effect. But why are advances in technology not substituting for direct interactions, and hence reducing the impact of distance? The obvious place to search for an answer to this question is in online markets.

In this paper we examine the role of technology in reducing trade costs using data on eBay trade flows. Founded in 1995, eBay is the world's largest online marketplace, connecting millions of buyers and sellers globally on a daily basis. By allowing sellers to upload their products online and simply wait for buyers, it has drastically reduced the search and matching costs highlighted by Rauch (1999) and Chaney (2011) as important impediments to trade. Sellers no longer need to make multiple phone calls, write emails, attend trade fairs and networking events. While buyers still incur search costs, these are brought down to a simple internet search uncorrelated with how remote markets are. As argued by Hortacsu et al. (2009), the main benefit of the Internet as a trade facilitator is to reduce search costs, and it is reasonable to think of these marketplaces as "frictionless" in this regard.

Hortacsu et al. (2009), using a sample of within-US eBay transactions, showed that the coefficient on distance on trade was much smaller online than offline. But as highlighted by the authors, several caveats make the comparison with offline trade imperfect. One is that the products traded on eBay are mainly household durables, and thus extrapolations to other categories of goods are not possible. The other is that the demographic characteristics

of the users are online-specific and not representative of the offline world. Another caveat is that international search costs are very different from those within the US. Hortacsu et al. (2009) do provide international evidence using MercadoLibre, another online market, though the latter only covers 12 Latin American countries.

Our dataset allows us to overcome these critiques and compare the impact of distance on trade flows on eBay and offline considering the same set of countries and goods. It covers all eBay transactions, disaggregated into 40 product categories, between 62 countries (representative of 92% of total world trade) during 2004-2009. To create the best-possible counterfactual, we first drop the years 2008 and 2009, the crisis years of the Great Trade Collapse.[1] We also drop from our eBay data all transactions that were concluded via auctions (60 percent of eBay traded value), as well as those sold by consumers (we focus only on sellers defined as businesses). We thus focus on firm exports through set-price mechanisms, which is closer to the standard practice offline. We then match eBay product categories to product descriptions in the 6-digit level HS classification. Since it was impossible to match some eBay categories to HS codes, we dropped those goods from our eBay aggregate.[2]

Prima-facie evidence from our sample suggests that the absence of search costs on the eBay platform does reduce the importance of distance. Figure 1 illustrates the relationship between trade flows and distance on eBay in the left panel and offline in the right panel. The slope is flatter for eBay trade flows. This confirms the prediction of Chaney (2011), namely that in a world where direct interaction between potential suppliers and buyers is not necessary, the role of distance in explaining trade flows is smaller. However, even if the importance of distance is 60 percent smaller on eBay, suggesting search costs are drastically reduced, it still matters significantly. Hortacsu et al. (2009) attributed the remaining effect to trust, arguing that people trust their neighbors more than people further away. Blum and Goldfarb (2006), who show gravity holds in the case of website visits, argue this is because distance proxies for taste similarity.

[1] Abstracting from that period allows us to get rid of some undesired complications, but in the robustness section we include those years as well.

[2] Both our eBay and matched offline data include used goods. In the robustness section we test for differences in distance effects across used and new goods using 2008 data, the only year for which we have the split into used and new goods.

To identify as precisely as possible the effect of distance we thus use a gravity framework and control for other standard gravity trade costs such as the absence of a common language, a common legal system, a border, a colonial history, or a free-trade agreement. We also control for bilateral shipping costs, which are included in our eBay dataset. While the effect of distance declines online after introducing these other trade-cost variables, the relative importance of distance online and offline is unchanged, with distance mattering 63 percent less online than offline.

We perform a number of robustness checks. First, we show that using OLS or a Poisson pseudo-maximum likelihood model yields similar results. Then we show the results hold when using more liberal counterfactuals, using all eBay flows and all comtrade flows. Results also hold when looking at only new goods, or only used goods, or even when looking at auction transactions. Interestingly the distance coefficient online is larger for old goods and auction transactions than for new goods and set-price transactions, suggesting that information frictions may indeed be behind the decline in the distance coefficient. We also run our gravity model by eBay category and show that distance matters more offline for all bar one category (collectibles).

In order to understand what is driving the world-flattening brought about by eBay we interact the distance coefficient with indicators of the level of corruption and information frictions at the country level. We find that the eBay reduction in the marginal effect of distance on bilateral trade flows is largest in exporting countries with high levels of corruption and low levels of popularity as measured by Google search results. This suggests that the slow death of distance online is driven by a reduction of both trust and information frictions. We also find that the distance differential is highest for country pairs that do not share a language, hence when information and trust frictions are highest.

To examine further whether eBay reduces search and trust costs associated with product differentiation for which there is more need for information (Rauch 1999), we construct two measures of trademark intensity that vary across eBay categories, as all the matched HS codes fall into the 'differentiated' category in Rauch's classification. We also used the elasticity of substitution estimates of Broda and Weinstien (2006) to capture the degree of

product homogeneity within each SAP-product category by taking the median estimated elasticity of the HS 6 digit lines falling in each SAP-product category. Our first measure is taken from the WIPO Global Brand Database which contains around 660,000 records relating to internationally protected trademarks. We base our trademark intensity measure on the number of registered brands per keyword search, where the keyword is the eBay category. For example, there are 605 registered brands that match the keyword 'music', and 284 that match 'electronics'. We take the log of this number and suggest that the higher it is, the lower the need for information and trust. The rationale is that brands provide product information and reliability. In their absence consumers have to do more intensive search and be more diligent. Our second indicator comes from our eBay data and measures the intensity of complaints by trademark owners to eBay about potential non-authorized transactions. We take the ratio of the number of companies who complain over total listings per category as an indicator of trademark intensity. The more complaints, the more branded the products. We find that eBay reduces the impact of distance most for products that are trust- and information intensive, i.e. when trademark-intensity is low. Similarly, in the last panel we see that the largest differences in the distance coefficient online and offline is to be expected for more differentiated goods, i.e., those where the elasticity of substitution is smaller.

To show that buyer- or seller-selection effects do not drive these differences in the effect of distance, we show that the marginal effect of distance on bilateral trade is not affected by the level of internet penetration or income inequality in the buyer. The idea here is that in highly unequal societies only a few privileged international buyers have access to internet and buy on eBay. We indeed find the biggest differences in distance effects in unequal countries with low internet penetration, suggesting part of the difference may reflect a selection of buyers. Still, we find that even in the most equal countries with high internet penetration, the distance effect is still statistically smaller online. The same selection mechanism but on the exporter side could also be driving the difference. To check for this we interact distance with GDP of the exporter. The idea is that in bigger countries firms are bigger and more international, hence we should expect that if a selection of international sellers on eBay

explain the difference, it should be weakest in big exporters. This is indeed what we find. Still, the distance effect is statistically smaller in all but the very biggest country.

We conclude with an estimate of the gains from trade brought about by technology. Using ..., we find that ...

The reminder of the paper is organized as follows. In section 2 we provide some descriptive statistics regarding international trade flows on eBay. Section 3 presents our empirical strategy and section 4 the results. Section 5 presents the trade gains from world flattening. Section 6 concludes.

2 International trade on eBay: Descriptive statistics

The sample covers all eBay trade flows between 62 developing and developed countries over the period 2004-2009. These 62 countries, identified in Figure 2 , represent around 92 percent of offline world trade in 2008. Total cross-border flows were on average USD 6 billion per year over the period, representing only 0.06 percent of world trade. The correlation between the logs of total offline and total eBay trade is 0.71, suggesting trade patterns are geographically similar online and offline. Still, since we want to compare online and offline trade flows as precisely as possible, we focus on the period 2004-2007 to abstract from special experiences during the Great Trade Collapse of 2008-2009.[3] To improve the matching between online and offline flows we only look at eBay flows sold by businesses, and get rid of all imports purchased via auctions, which are prevalent on eBay but quite uncommon offline.[4]

Our dataset also allows us to match goods traded online and offline. It covers all eBay transactions disaggregated into 40 product categories that we match with product codes at the 6-digit level of the HS classification (our matching table is available upon request). Since it is impossible to match some eBay categories to HS codes, we dropped those goods from our eBay aggregate. This allows us to have an offline eBay-image with the same goods, similarly distributed across categories, as our eBay trade flow (Figure 3). It is also

[3]For example goods shifting, trade finance problems, or new protectionist pressures.

[4]The share of sales undertaken by consumers is 66 percent and the share of sales through auctions is 65 percent. Once we exclude both we are left with 15 percent of total eBay's cross border flows.

important to note that the selected HS categories all fall into the "final good" category of the WTO's Trade Policy Review classification, and are all classified as "consumer goods" in the BEC classification, which clearly corresponds to the type of goods traded online. All HS 6-digit lines also fall in the differentiated goods category in the Rauch SITC-based classification(1999).

The matching of goods traded online and offline is crucial because it allows us to control for the potential differences in trade costs associated with differences in the composition of goods traded online and offline.[5] Tickets to sport-events traded online for example are likely to be very sensitive to distance whereas exports of rare-earth which are only produced in a few countries, but consumed all over the world are likely to be not very sensitive to distance. If the tickets tend to be traded online and rare-earth offline (which is very likely), then differences in the marginal impact of distance on traded flows will be totally explained by the nature of these two goods, and not by information and communication technology.

As a further check that product selection is similar online and offline, we estimate the elasticity of substitution associated with these products online and offline. This step is important as different elasticity of substitutions could be behind the difference in distance effects (see Archanskaia and Daudin 2012). Indeed the coefficient in front of each trade cost variable in the gravity equation is a combination of the trade elasticity (i.e., the elasticity of trade with respect to trade costs) which depends on the elasticity of substitution, and the elasticity of total trade costs with respect to each trade cost variable. Thus, a smaller coefficient on distance for online flows could simply signal that the bundle of online products has a lower elasticity of substitution than the offline bundle. To estimate the elasticity of substitution we assume that trade costs online and offline are Gamma distributed with shape parameter k^f, where f is the type of flow, but identical scale parameter. Then using existing estimates of the elasticity of substitution for aggregate trade flows, we can back up consistent estimates of the elasticity of substitution online and offline using the fact that the variance of a gamma distributed variable is proportional to the mean by a factor equal to the scale parameter.

[5] See Berthelon and Freund (2008) or Carrère et al. (2009) for a discussion of the impact of the composition of trade on the role of distance.

Results suggest that for an estimate of the aggregate elasticity of substitution at 5 (see Eaton and Kortum, 2012), the online elasticity of substitution equals 4.5, whereas the offline elasticity of substitution equals to 5.6. This estimate is pretty close to the median estimate of HS 6 digit goods in our bundle by Broda and Weinstein (2006) of 5.9. Moreover, while the online and offline elasticities of substitution are statistically different from zero at the 5 percent level, they are not statistically different from each other. This comforts us in our matching of online and offline products, and suggests that statistical differences in the estimated coefficients of the gravity equation will be due to the contribution of these variables to trade costs, rather than to differences in the elasticity of substitution. For a detailed description of the methodology to estimate the online and offline elasticities of substitution, see section 5.

Our eBay data also includes data on average bilateral ad-valorem shipping costs. While we do not have an equivalent for offline flows, in the case of US imports we do have data on freight and insurance costs from the online platform provided by USITC. When plotting these costs against distance (see Figure 4)we find that for both online and offline flows, shipping costs are uncorrelated with distance, even though shipping costs seem to be much higher online.[6] This suggests that the introduction of observable shipping costs in the gravity equation, which are often omitted due to lack of data, is not going to explain the importance of distance in the gravity equation. But this is a testable hypothesis at least in the online sample.

Offline trade data and trade cost variables come from the usual sources and are described in the Data Appendix.

3 The empirical model

Our starting point is the gravity model which suggests that bilateral trade between two countries is proportional to their economic mass and the multilateral resistance indices of

[6]Using data on all country pairs online gives a similar picture.

the importer and the exporter,[7] and inversely proportional to trade costs between the two countries, often approximated by their geographic distance (see Anderson and Van Wincoop (2003) for an elegant derivation):

$$(1) \quad m_{ij} = \frac{y_i y_j}{y_w} \left(\frac{t_{ij}}{P_i \quad _j} \right)$$

where m_{ij} are imports of country i from country j, y_i is total income in importing country i, y_j is total income in exporting country j, y_w is total world income, t_{ij} are trade costs between country i and country j,   is the trade cost elasticity of bilateral imports,[8] and P_i and $\ _j$ are the multilateral resistance terms in the importing (inward) and exporting (outward) country, respectively.[9]

We follow the literature and model bilateral trade costs (t_{ij}) as a function of geographic distance and other trade cost variables:

$$(2) \quad t_{ij} = D_{ij}{}^{D} T_{ij}{}^{T} \ {}_{ij} e^{NB_{ij} \ NB} e^{NC_{ij} \ NC} e^{NCL_{ij} \ NCL} e^{NCLS_{ij} \ NCLS} e^{NFTA_{ij} \ NFTA}$$

where all   s are parameters, D_{ij} is geographic distance between countries i and j, T_{ij} are shipping costs between countries i and j, $\ _{ij}$ are bilateral tari   imposed by country i on exports from j, NB_{ij} is a dummy variable taking the value 1 when countries i and j do not share a border, NC_{ij} is a dummy variable taking the value 1 when countries i and j did not share a colonial link, NCL_{ij} is a dummy variable taking the value 1 when countries i and j do not share a common language, $NCLS_{ij}$ is a dummy variable taking the value 1 when countries i and j do not share a common legal system, and $NFTA_{ij}$ is a dummy variable taking the value 1 when countries i and j are not part of the same Free Trade Agreement.[10]

[7] The multilateral resistance terms are weighted-average of price indices in the importer and exporter's trading partners.

[8] Given by 1 - σ in Anderson and Van Wincoop (2003) where σ is the elasticity of substitution between different import sources in the importing country.

[9] The expressions for the inward and outward multilateral resistance terms are $P_i = \left[\sum_j (t_{ij}/\Pi_j)^{\epsilon} \frac{y_j}{y_w} \right]^{1/\epsilon}$ and $\Pi_j = \left[\sum_i (t_{ij}/P_i)^{\epsilon} \frac{y_i}{y_w} \right]^{1/\epsilon}$.

[10] Note that we measure the absence of common language, common legal system, colonial links or trade agreements, rather than their presence as in most of the literature. This has no consequences for the estimates, but it allows to interpret these variables as trade costs (like distance) rather than trade-enhancing

We then substitute (2) into (1) and take logs on both sides to obtain:

$$\ln(m_{ij}) = \ln(y_i) + \ln(y_j) - \ln(y_w) + {}_{D}\ln(D_{ij}) + {}_{T}\ln(T_{ij}) + \ln({}_{ij}) + {}_{NB}NB_{ij} + {}_{NC}NC_{ij} + {}_{NCL}NCL_{ij} + {}_{NCLS}NCLS_{ij} + {}_{NFTA}NFTA_{ij} + - \ln(P_i) - \ln({}_{i}) \quad (3)$$

where all s are parameters to be estimated and ${}_k = {}_k$, where k is the subscript indicating the different trade cost variables. Because we are interested in understanding the variation of different s offline and online, and because P_i and ${}_i$ are not observable (and difficult to estimate) we proceed as in much of the empirical literature and control for the multilateral resistance terms (and y_i and y_j) including importer i and exporter j fixed effects.

A stochastic fixed-effect version of equation (3) is our baseline specification to understand the importance of different trade costs offline and online. We estimate them separately for online and offline flows, but also appending the offline and online data so that we can directly test whether coefficients are statistically different online and offline by introducing an eBay dummy that we interact with each of the trade cost variables. If the interaction term is statistically significant then the coefficients are statistically different online and offline. In both cases we allow for importer and exporter fixed effects to be different online and offline.

4 Results

Table 1 provides the results of our baseline estimation of (3). The elasticity of distance is almost three times smaller online than offline. This supports Chaney's (2011) hypothesis that a large part of what drives the distance coefficient in the gravity framework are associated with search costs, which vanish on a platform such as eBay.

Columns (2) and (5) of Table 1 provide the estimates of (3) including the other usual trade costs variables. When we introduce these additional trade costs, the coefficient on distance declines both online and offline. Still it remains around three times smaller online suggesting a flatter world on the eBay platform.

variables.

Some interesting patterns emerge regarding the other trade cost variables. Common legal systems, trade agreements, colonial links and borders seem to matter much more offline. On the other hand the absence of a common language seem to matter more online than offline. We test for the statistical significance of these differences by appending the online and offline datasets and estimating the gravity equation including interactions of each trade costs with an eBay dummy which takes the value of one if the flow on the left-hand side is the eBay flow and zero if it is the eBay-image. As argued above we also include importer-eBay and exporter-eBay fixed effects that control for any country-specific difference between importers and exporters online and offline. As seen in Table 3, we find that the difference in the effect of distance is statistically significant. What's more, we find that the absence of colonial links and common legal systems also matter significantly less online. Hence technology reduces the distortions caused by historical legacies. We find no significant difference in the effect of free-trade agreements, borders, or languages. [11]

Columns (3) and (6) add shipping costs to the set of explaining variables. Since these are not available for offline data, they are not usually included in gravity estimates. But since our eBay data includes shipping costs, we include this bilateral ad-valorem average as a control both online and offline where it may also be a valid proxy for shipping costs. Surprisingly, we find no significant effect for shipping costs, and our results are unaffected by this inclusion, which can be explained by the fact that shipping costs are not necessarily correlated with distance. Adding other controls such as bilateral average tariffs or trade-restrictiveness indices does not affect the results.

Columns (7) and (8) provide the results using the Poisson pseudo-maximum likelihood estimator which was suggested for gravity models by Santos Silva and Tenreyro (2006) to control for the presence of zeros and heteroscedasticity. Again we find that distance matters more offline. The estimated distance elasticity is of -0.29 on eBay and -0.66 offline.

We then proceed to estimating gravity equations per eBay category and using the specification of column (2) of Table 1 to check that our result is not driven by a bundle composition effect within the online and offline bundles. Results, using both OLS and

[11] In alternative specifications we also include the average bilateral tariff and a measure of trade restrictiveness. These inclusions do not change the results.

Poisson pseudo maximum likelihood, summarized in Figure 5, show that distance always has a bigger effect offline, being on average 2.5 times bigger. Estimating the average effect using OLS and importer-category and exporter-category fixed effects yields coefficients of -0.287 online and -1.167 offline (columns 1-2 of Table 5).

In Table 2 we include the results of various other robustness checks. As an important part of eBay trade is in used goods (25 percent) or occurs through auctions (65 percent) we replicate Table 1 disaggregating imports into used vs. new goods (this is done on a 2008 cross section because it is the only year for which we have the used versus new good information) and auctions vs. direct sales. We also report results when looking at all trade flows reported on comtrade, i.e. not just the eBay image. Results are consistent across aggregations suggesting that across all types of ebay flows distance matters less. Interestingly, the distance coefficient is smaller for new than for used goods, and for goods sold through auctions than for goods sold through set-price transactions. Thus when information is more difficult to obtain regarding the quality of the goods or the price at which it will be sold (i.e. in the case of used goods and auction transactions) distance seems to matter more, suggesting that the reason the distance coefficient declines for eBay is because it help reduce information asymmetries.[12]

The final two columns of Table 2 verify whether seller reputation matters for the impact of distance on trade flows by comparing the distance coefficient for powersellers and non-powersellers on eBay. Indeed, online platforms adopt mechanisms to overcome the incentives for opportunistic behavior in global markets where buyers and sellers do not necessarily meet repeatedly by adopting mechanism that reveal the past behavior of traders. eBay powerseller status is one of these mechanisms. It certifies that the seller has received 98% positive feedback, has been active for more than 90 days, has completed at least 100 transactions or transactions worth at least $3000 during the past year, and complies with eBay policies.[13] Seller reputation is in principle much more important than buyer reputation on eBay as all transactions are of the "cash-in-advance" type where the buyer first pays, and

[12] We also run the same specification for C2C flows and perhaps surprisingly found a similar distance elasticity as for B2C flows of around -0.5.

[13] See eBay's website for more details here: http://pages.ebay.com/sellerinformation/sellingresources/

needs to then wait for the seller to send the right goods, with the correct characteristics on time. The last two columns of Table 2 look at whether the impact of distance on trade flows is different for powersellers than non-powersellers. If the distance coefficient partly captures trust in the distant seller, and if the powerseller mechanism were to be effective, then we would expect a stronger distance coefficient for transactions undertaken by non-powersellers. As predicted, we find that distance does not affect powersellers as much. We tested for the statistical significance of the difference on the distance coefficient of powersellers by appending the powerseller and non-powerseller data and interacting each of the trade cost variables with a dummy indicating whether the flow involves powerseller or not. The only statistically different coefficient at the 5 percent level is for the distance coefficient as shown in Table 4.

To further examine whether eBay reduces search costs associated with product information as suggested by Rauch (1999), we construct two measures of trademark intensity to capture the presence of product information in each sector.[14] Our first measure of trademark intensity is taken from the WIPO Global Brand Database which contains around 660,000 records relating to internationally protected trademarks. We base our trademark intensity measure on the number of registered brands per keyword search, where the keyword is the eBay category. For example, there are 605 registered brands that match the keyword 'music', and 284 that match 'electronics'. We take the log of this number and suggest that the higher it is, the lower the need for product information in that sector. The rationale is that if the search costs lowered by eBay are related to product information, we should find eBay to reduce the role of distance most in categories with low trademark intensity where asymmetric information regarding product characteristics is stronger. Our second indicator comes from our eBay data and measures the intensity of complaints by trademark owners to eBay about potentially illegal transactions. We take the share of companies who complain in total eBay listings per category as an indicator of trademark intensity. The more complaints, the more branded the products. The results of the estimation of these two regressions can be found in columns (3) and (4) Table 5. Again, we find that eBay reduces the impact of distance

[14] The use of Rauch (1999) classification into homogenous and differentiated goods is not a possibility in our sample as all SAP categories fall within the differentiated-good category.

most for products that are trust- and information intensive, i.e. when trademark-intensity is low. This suggests that part of the reduction in the distance coefficient online is indeed due to the reduction in information asymmetries regarding product characteristics. This is confirmed by Figure 6 that show eBay is particularly efficient at reducing the distance effect for products with low trademark intensity, and hence require more information.

In order to further understand the mechanisms through which eBay reduces the impact of distance on bilateral trade flows, we explore the extent to which the distance coefficient changes as the level information and trust frictions vary. We first interact distance with the common language dummy. As information and trust frictions should be lower between countries that share a common language even if they are faraway from each other (e.g. Canada and Australia), we expect distance to matter less. We do the same with the colonial, legal-system, FTA, and border dummies. To do this we introduce interaction variables in the specification of column (2) in Table 1. Results of all our interaction tests are reported in Table ??. We find that the distance-effect difference is significantly bigger for countries that do not share a language, suggesting trust and information frictions, as captured by the no-common-language dummy, are indeed the channels through which technology assassinates distance, assassinates distance, as can be seen from the first panel in Figure 7. We also find that technology reduces the distance effect most when countries do not share colonial history or have a trade agreement, while the difference doesn't seem to depend on legal systems.

To investigate this further we interact distance with measures of corruption from the World Governance Indicators and of country information as measured by Google search results of the buyer and the seller country names. The marginal effects of distance as a function of corruption or country information in the importing and exporting country are reported in Figure 8. The higher the level of corruption in the importing or the exporting country, the larger the difference of the distance coefficient between online and offline flows. Similarly, the lower the degree of country information the larger the difference of the distance coefficient between online and offline flows. Thus the reduction in the distance coefficient is largest when the importer and/or the exporter are located in countries with high levels of corruption and for which there is little information available.

The difference in the effect of distance could be due to a selection of 'international' buyers rather than a 'technology' effect. While the appended model including importer-eBay and exporter-eBay fixed effects partly corrects for these selection effects, these buyer and seller characteristics might also affect the impact of trade costs if for example online buyers tend to be richer and rich individuals prefer purchasing goods from faraway countries. Ideally, we would like to observe individual characteristics of buyers online and offline, but we do not have access to that data. Thus, we check for this possibility by examining whether distance matters less online no matter the level of income inequality and internet penetration in the buyer country. The idea is that in highly unequal societies with low internet penetration only a few privileged international buyers have access to internet and buy on eBay. As reported in Figure ??, we find the biggest differences in distance effects in unequal countries and in countries with low internet penetration, suggesting part of the difference may reflect a selection of "international" buyers online. Still, we find that even in the most equal or most internet-penetrated countries, where the online and offline buyers are plausibly most similar, the distance effect is still statistically smaller online. This confirms technology has a distance-reducing impact beyond importer selection. The same selection mechanism but on the exporter side could also be driving the difference. To check for this we interact distance with the GDP of the exporter as well as exporter internet penetration. The idea is that in bigger countries firms are bigger and more international, hence we should expect that if a selection of international sellers on eBay explain the difference, it should be weakest where exporters are big. This is indeed what we find. As for internet penetration, we find that the difference in distance effects is biggest in low internet-penetrated countries, suggesting again a selection of "international" exporters online in those countries explain some of the difference in distance effects. Still, the distance effect is statistically smaller in all but the very biggest country and the most internet-penetrated.

5 Who benefits from world flattening?

In order to estimate the gains that would result if distance mattered offline the same as as online, we first need to calculate the change in bilateral trade shares using our gravity estimates. We can then predict the change in intra-national trade that would occur following the change in trade costs, which using Arkolakis, Costinot and Rodr guez-Clare (2012) formula allow us to compute the welfare gains.

The percentage change in trade flows can be obtained from differentiating (1):[15]

$$(4) \quad d\ln(m_{ij}=y_i) = d\ln t_{ij} - d\ln P_i - d\ln P_j$$

Thus, to obtain estimates of the percentage changes in bilateral trade shares we need estimates of , and the percentage change in t_{ij} and P_i. We borrow estimates of from the literature. According to Eaton and Kortum (2012) the best existing estimates for aggregate trade flows are around -4.

To obtain consistent estimates of $d\ln t_{ij}$ we run a log-linearized version of equation (1) for offline and online data where any importer or exporter-invariant term is replaced by importer and exporter fixed effects. This allows us to circumvent the problem of estimating non-linearly the price indices while obtaining consistent estimates of $\ln(t_{ij})$ for both offline and online data. But we need $d\ln t_{ij}$, which captures the change in trade costs if we were to face offline the same trade-reducing effect of distance as online. This is simply given by $\left[\ {}^{\text{online}}_{D} - \ {}^{\text{offline}}_{D}\right] \ln D_i j$.

To estimate the last two terms in equation (4) we need estimates of percentage changes in price indices in each economy following the shock given by the change in the importance of distance in explaining trade flows. It is impossible to solve for these changes in prices analytically as we do not have closed form solution for price indices, but as in Anderson and van Wincoop (2003) we can solve for each economy's price index using the formulas given in

[15] This assumes that all countries are infinitely small so that changes in their nominal income tend to zero $d\ln y_j$, and we set the average wage in the world as the numéraire so that with only one factor of production (labor) in fixed supply we have that $d\ln\, y_w = 0$.

footnote (9). For that we need estimates of trade costs (levels) offline and after the shock. We obtain consistent estimates of the former by running a log-linearized version of equation (1) with importer and exporter fixed effects using aggregate trade flows. We then divide this estimate of $\ln(t_{ij})$ by to obtain a consistent estimate of $\ln(t_{ij})$. We then simply take the exponential to obtain a consistent estimate of t_{ij} which we can then plug into each price index equation (we obviously have as many price indices as we have countries). We then solve the system of 62 equations for the price index in each of the 62 countries.

In order to obtain a consistent estimates of t_{ij} after the shock we can use our result above that $d\ln t_{ij} = \left[{}^{\text{online}}_{D} - {}^{\text{offline}}_{D} \right] \ln D_{ij}$. This implies that the new bilateral trade costs can be proxied by:

$$(5) \quad t_{ij}^{\text{new}} = t_{ij}\,(1 + d\ln t_{ij}) = t_{ij}\,\frac{1 + \left[{}^{\text{online}}_{D} - {}^{\text{offline}}_{D} \right] \ln D_{ij}}{}$$

With the new trade costs we can then solve for the aggregate price indices using aggregate trade flow data as before. The percentage change in price indices before and after the shock give us $d\ln P_i$. With all this information we can then compute $d\ln m_{ij}/y_i$

Arkolakis, Costinot and Rodríguez-Clare (2012) formula then provide a simple way of estimating the welfare change due to trade cost shock, as our modeling assumptions are within their general framework. Indeed, they show that for a broad class of models where consumers have Dixit-Stiglitz preferences, there is a single factor of production, there are linear cost functions, and perfect competition or monopolistic competition the change in real income following a trade cost shock is given by:[16]

$$(6) \quad W = 1 - \left(\frac{1}{1 + d\ln(m_{ii}/y_i)} \right)^{1/}$$

And we have all the necessary estimates to implement (6) to provide welfare estimates associated with the adoption of online distance effects for aggregate offline trade. One

[16] See proposition 1 in Arkolakis et al. (2012).

important implicit assumption we have been making is that the elasticity of substitution for online and o ine ows is not di erent from each otherwise. Otherwise the percentage changes in trade costs cannot be approximated by simply looking at the di erence in coe cients as $_D$ = $_D$. And therefore di erences in epsilon would be contaminating di erences in $_D$. To check that this is not the case we rst test that elasticities of substitution online and o ine are not statistically di erent from each other.

5.1 Estimates of the elasticity of substitution online and offline

Let us assume that for aggregate o ine trade ows $\ln(t_{ij})$ is generated by a Gamma distribution with scale parameter equal to and shape parameter equal to k:

$$(7) \quad \ln(t_{ij}) \sim \frac{1}{{}^{k}\ (k)} (\ln(t_{ij}))^{k-1} e^{\frac{-\ln(t_{ij})}{\theta}}$$

We can estimate k using the third moment of the empirical distribution of $-\ \ln(t_{ij})$. Indeed, the skewness of the a Gamma distribution is given by $2 = \sqrt{k}$.[17] Indeed if $\ln(t_{ij}) \sim\ (k;\ ) \leftrightarrow -\ \ln(t_{ij}) \sim\ (k; -\ )$.[18]. The mode of the Gamma distribution is then given by $(k-1)$. Using the mode calculated from the empirical distribution of $-\ \ln(t_{ij})$, we can then back up using our estimate of k and existing estimates in the literature of that we set equal to -4.

Then assuming that the log of trade costs online and their image ow o ine are also drawn from a Gamma distribution with the same parameter, we can estimate the online and matched o ine elasticities of substitution by noting that the ratio of the variance to the mean of a Gamma distribution is given by the scale parameter of the Gamma distribution. Thus, for online and image o ine ows $=$ var($-\ \ln(t_{ij})$)=mean($-\ \ln(t_{ij})$) where the empirical distributions of $-\ \ln(t_{ij})$ for online and o ine image ows are estimated using a log-linearized version of equation (1) with importer and exporter xed e ects. From the above equation

[17]The empirical distribution is of $-\epsilon\ln(t_{ij})$ is consistently estimated as above using a log-linearized version of (1 estimated with importer and exporter fixed effects.

[18]Note that the scale parameter has to be multiplied by -ϵ in the Gamma function, as ϵ, which is the trade elasticity is necessarily smaller than zero to be economically meaningful.

it is easy to solve for = 1 − in online and o ine ows:

$$(8) \qquad = 1 + \frac{\text{Var}\,[-\ \ln(t_{ij})]}{\text{mean}\,[-\ \ln(t_{ij})]}$$

This procedure yields an estimate for the elasticity of substitution for online ows equal to -4.5, and an estimate for the image o ine ow equal to -5.6. The current best estimate of is around 5 (if $= -4$), i.e., in between our online and matched o ine estimates. Moreover, the estimate for the matched o ine ows is not far from the median of the estimates of Broda and Weinstein (2006) for HS 6 digit products falling in our matched SAP-categories.

To check that our elasticities of substitution are statistically di erent from zero, but not statistically di erent from each other we construct bootstrapped standard errors where we take into account not only the sampling error, but also the error associated with the estimates of the o ine aggregate trade ows elasticity of substitution. For the latter, we assume that is normally distributed with mean -4 and a variance equal to 1. The bootstrapping yields a standard error equal to 0.9 for the estimate of $^{\text{online}} = 4.5$ and a standard error equal to 1.1 for an estimate of $^{\text{online}} = 5.6$. Thus, these elasticities are not statistically di erent from each other or from the estimated $= 5$ for aggregate o ine ows.

Finally, we can perform an additional external test of our assumption that $\ln(t_{ij})$ is Gamma distributed with coe cient equal to . Indeed, with an estimate of $= -4$, and an estimate we can construct $\ln(t_{ij})$ and using a Kolmogorov-Smirnov test of equality-of-distributions check whether $\ln(t_{ij}) \sim (k = ; =)$.[19] The value of the Kolmogorov-Smirnov statistic (D) is close to zero and therefore we cannot reject at the 5 percent level the null hypothesis that $\ln(t_{ij})$ is Gamma distributed with shape parameter $k =$ and scale parameter $=$ as estimated from the empirical distribution of $\ln(t_{ij})$.

[19] For a discussion of the Kolmogorov-Smirnov test see Chakravarti, Laha, and Roy (1967).

5.2 Welfare gain results

6 Concluding Remarks

On eBay, the world is atter, but not completely at. More interestingly eBay reduces the e ect of distance on trade ows most where it is most needed: in remote countries with bad institutions. Thus, the reduction in trade costs brought by online market platforms such as eBay are promising is promising in terms of the potential for technology to help sellers and consumers in poor countries integrate into the global economy.

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Data Appendix

Below we discuss variable construction and data sources for all variables used in the empirical sections. The appendix Table provides descriptive statistics for each variable.

- Distance (D): Distance between two countries based on bilateral distances between the largest cities of those two countries, those inter-city distances being weighted by the share of the city in the overall country's population. Source: CEPII Distances database.

- Transport or shipping cost (T): Ad-valorem shipping costs as a share of product price (logged). Source: eBay.

- No Border (NB): dummy variable indicating whether the two partners share a border. Takes the value 1 when the two partners do not share a border. Source: CEPII Distances database.

- No Colony (NC): dummy variable indicating whether the two countries have ever had a colonial link. It takes the value 1 when the two trading partners do not share a colonial link. Source: CEPII Distances database.

- No Common Language (NCL): dummy variable indicating whether the two countries share a common o cial language. It takes the value 1 when the two trading partners do not share a common language. Source: CEPII Distances database.

- No Common Legal System ($NCLS$): dummy variable indicating whether the two countries have the same legal origin. It takes the value 1 when the two partners do not share a legal origin. Source: CEPII Gravity database.

- No FTA ($NFTA$): dummy variable indicating whether the two countries have a free-trade agreement declared at the WTO. It takes the value 1 when the two partners do not have a free-trade agreement. Source: WTO.

- Corruption (C): Negative of control-of-corruption which captures perceptions of the extent to which public power is exercised for private gain, including both petty and

grand forms of corruption, as well as "capture" of the state by elites and private interests. Source: Kaufmann et al. (2010).

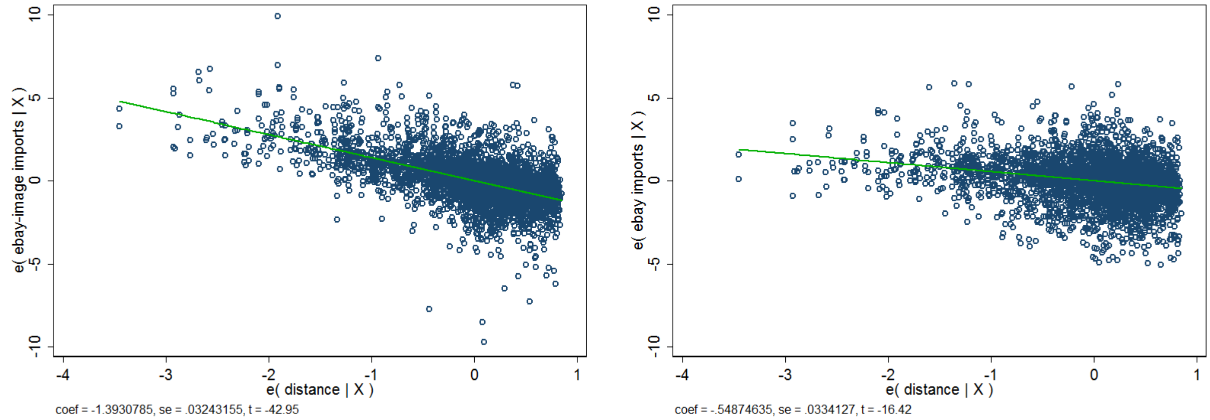
- Google coverage (G): Log of the number of results of a Google search for the country name in English . Source: Google.
- Trademark Intensity (VERO) ($VERO$): Share of companies who complain about parallel imports on eBay. Source: eBay.
- Trademark Intensity (WIPO) ($WIPO$): Log of the number of registered brands per keyword search, where the keyword is the eBay category. Source: WIPO Global Brands Database.
- eBay imports: Total eBay imports in current US dollars. Source: eBay.
- eBay-image imports: Total bilateral imports in HS codes corresponding to eBay categories in current US dollars. Source: Comtrade
- O ine imports: Total bilateral imports in current US dollars. Source: Comtrade
- Powerseller status (PS): Dummy indicating whether the exporters had a power seller status on eBay. Source: eBay.
- Gini (Gini): Gini coe cient of income inequality. Source: World Bank World Development Indicators.

Appendix Table
Descriptive statistics

	Obs.	Mean	Std. Dev.	Min	Max
eBay imports (USD)	3763	175459	1735773	0	59980892
Offline imports (thousand USD)	3763	449023	3167586	0	146648430
Distance (log km)	3778	8.24	1.04	5	10
No Common Legal System	3778	0.76	0.43	0	1
No Colony	3778	0.97	0.17	0	1
No Common Language	3778	0.94	0.24	0	1
No Border	3778	0.95	0.21	0	1
No FTA	3778	0.59	0.49	0	1
Shipping cost	3745	2.74	0.58	-0.1	11
Tariff	3361	1.07	0.96	0	3

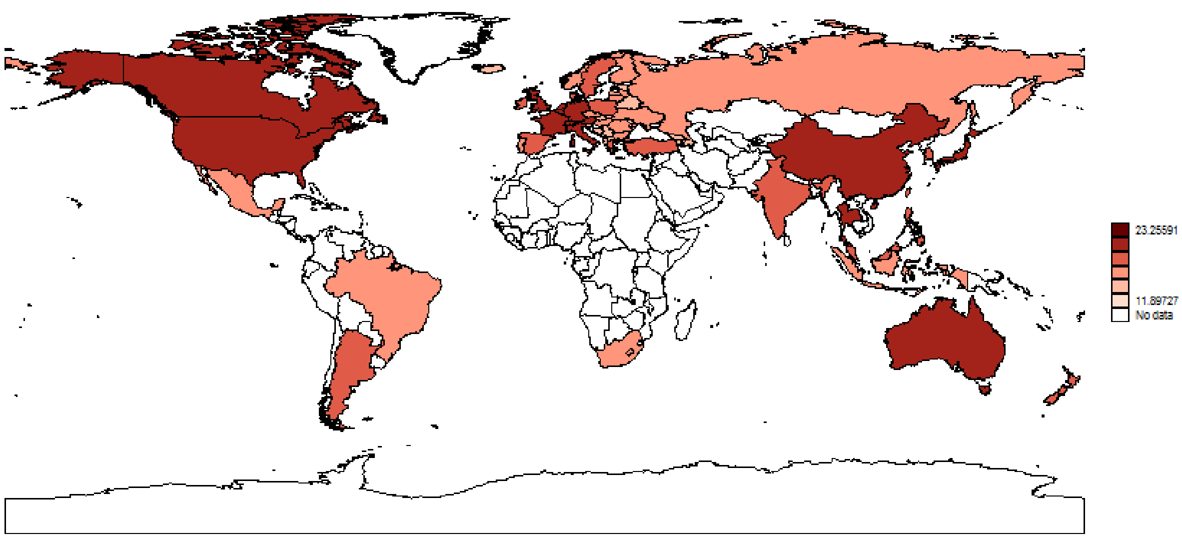
Source: See Data Appendix for a description of variable construction, data sources and symbols used in the rest of the paper.

Figure 1
The importance of distance with and without search costs



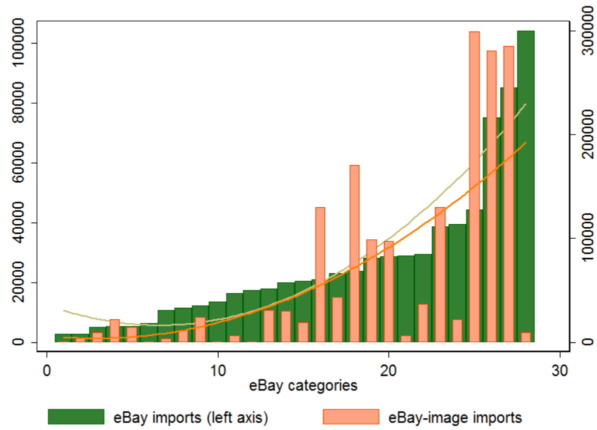
Note: O ine bilateral trade data is from UN Comtrade for 62 countries which represent more than 92 percent of world trade and is restricted to the set of goods which are traded on the eBay platform. eBay bilateral trade data is from eBay for the same set of countries. Distance is from CEPII and is measured as the bilateral distance between the capitals of the two trading partners weighted by the share of the capital's population in the total population of the country.

Figure 2
Country coverage



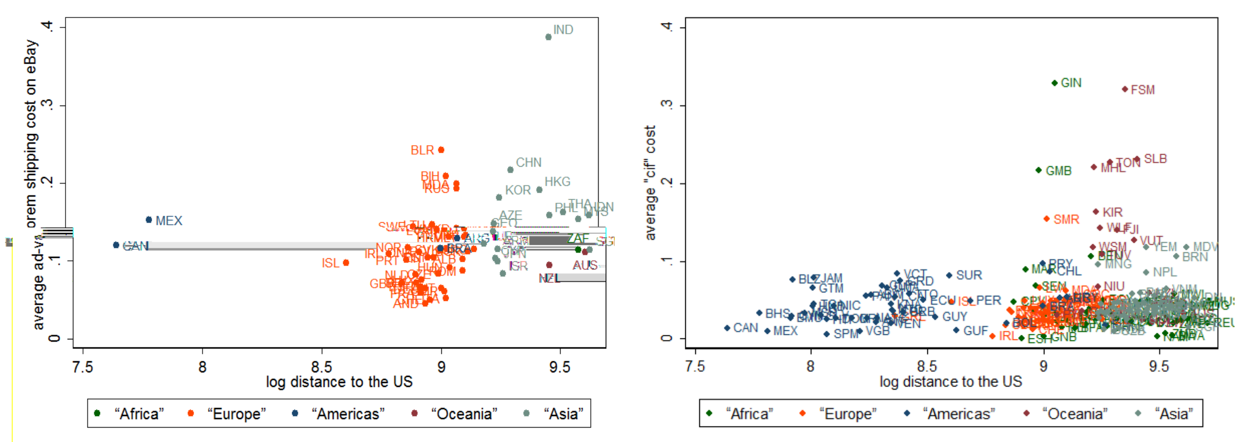
Note: The intensity of the red color signals the value of the log of eBay exports

Figure 3 Distribution across eBay categories



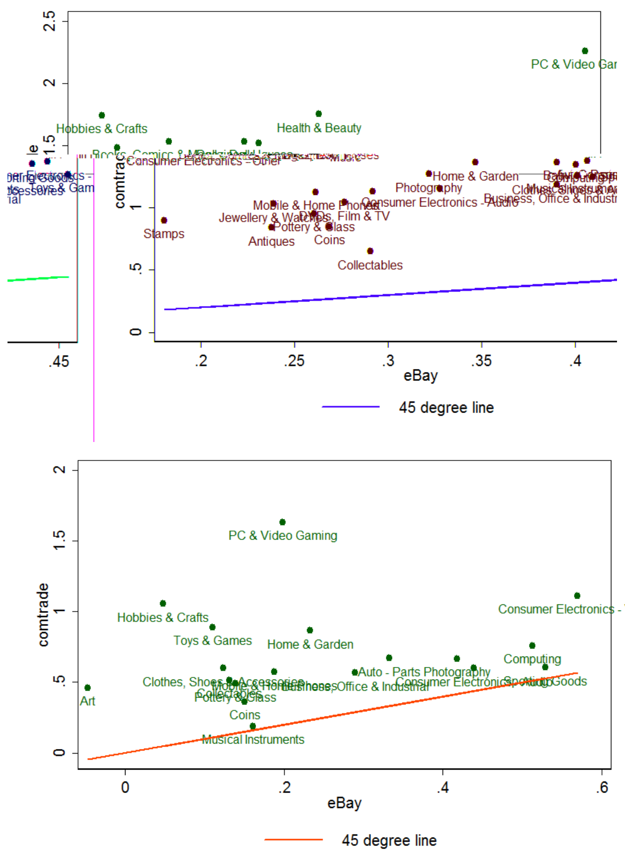
Note: The lines are quadratic ts.

Figure 4
Distance and shipping costs o ine and online



Sources: USITC and eBay

Figure 5
Distance coe cient by eBay category

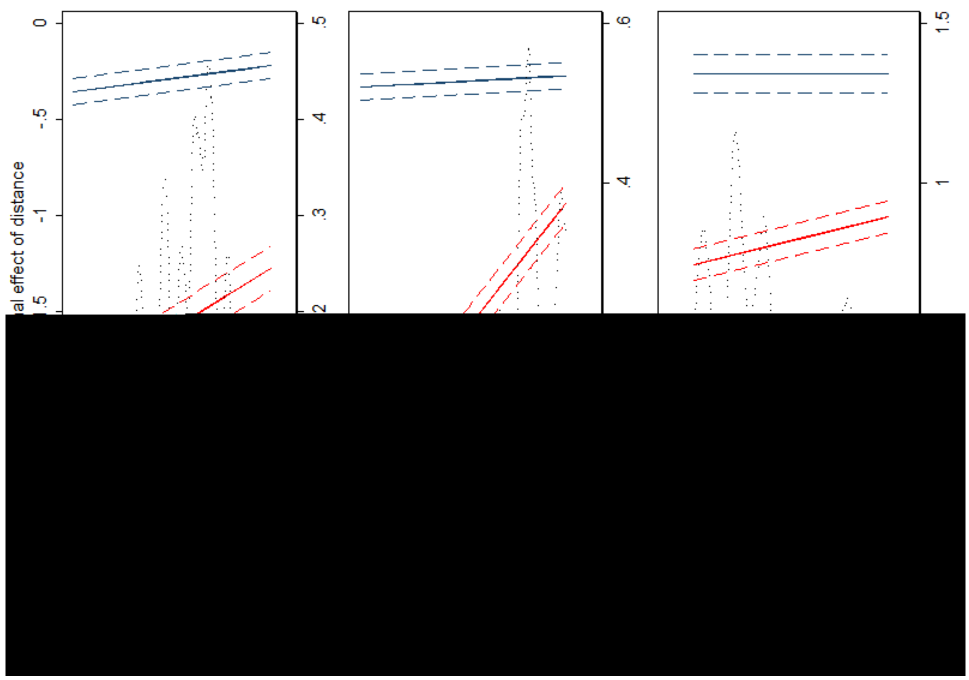


OLS coe cients

Poisson coe cients

Note: Each distance coe cient is estimated in a separate regression with a speci cation identical to the one reported in column (2) of Table 1.

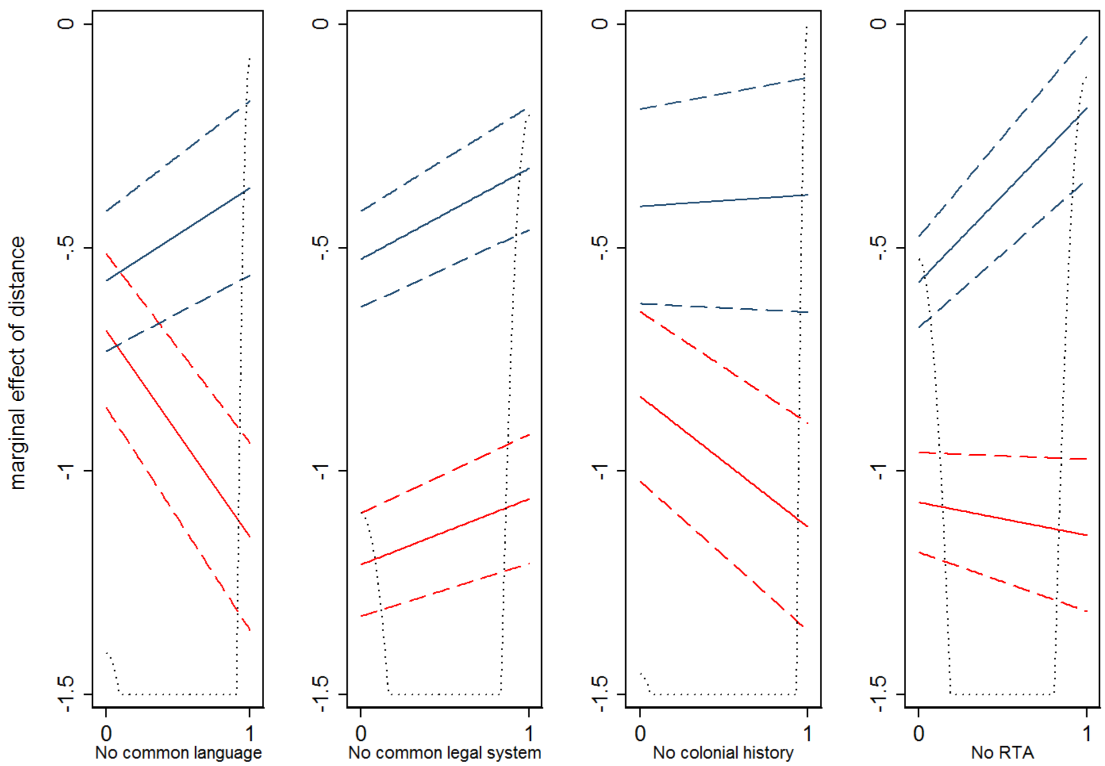
Figure 6
Distance coe cients vs. trademark intensity and heterogeneity



[redacted]

Note: These marginal e ects are estimated using a speci cation similar to the one reported in column (3-6) of Table 5. The dotted lines give the kernel density estimate of the x axis variable. The dashed lines are the 95 percent con dence interval.

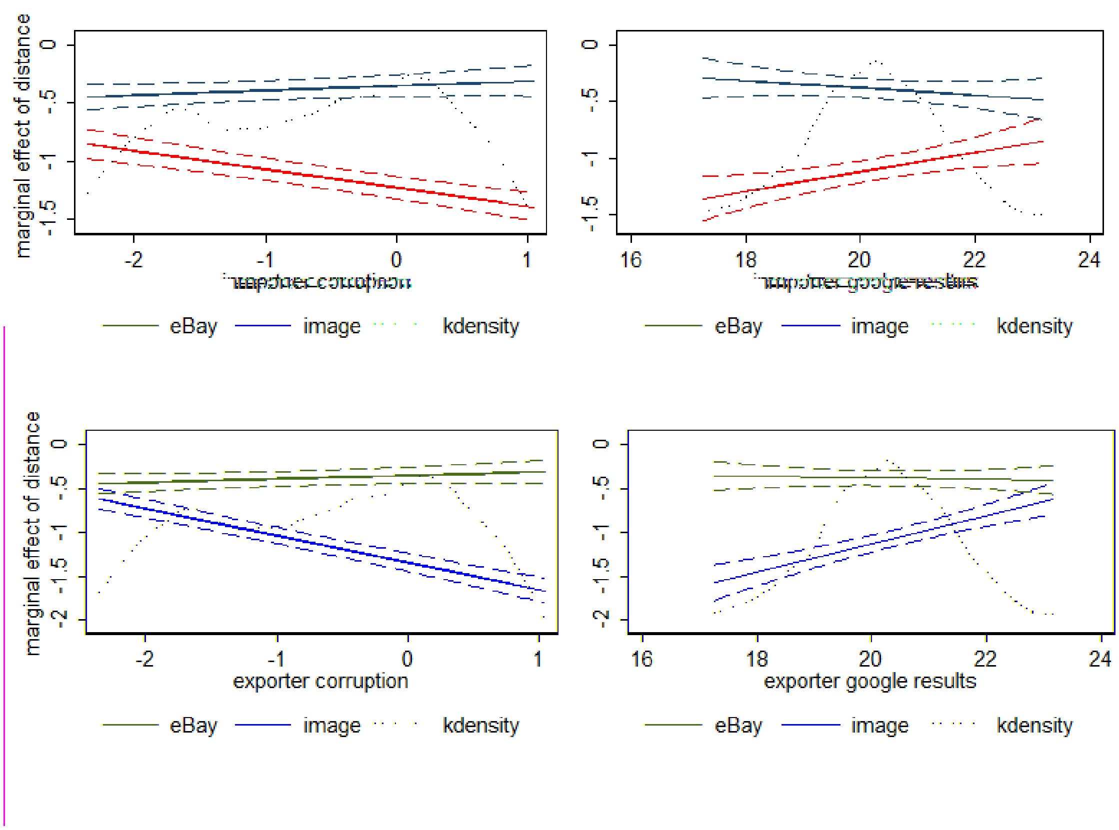
Figure 7
Information and trust and the distance e ect on trade



Note: These marginal e ects are estimated ... The dotted lines give the kernel density estimate of the x axis variable. The dashed lines are the 95 percent con dence interval.

Figure 8

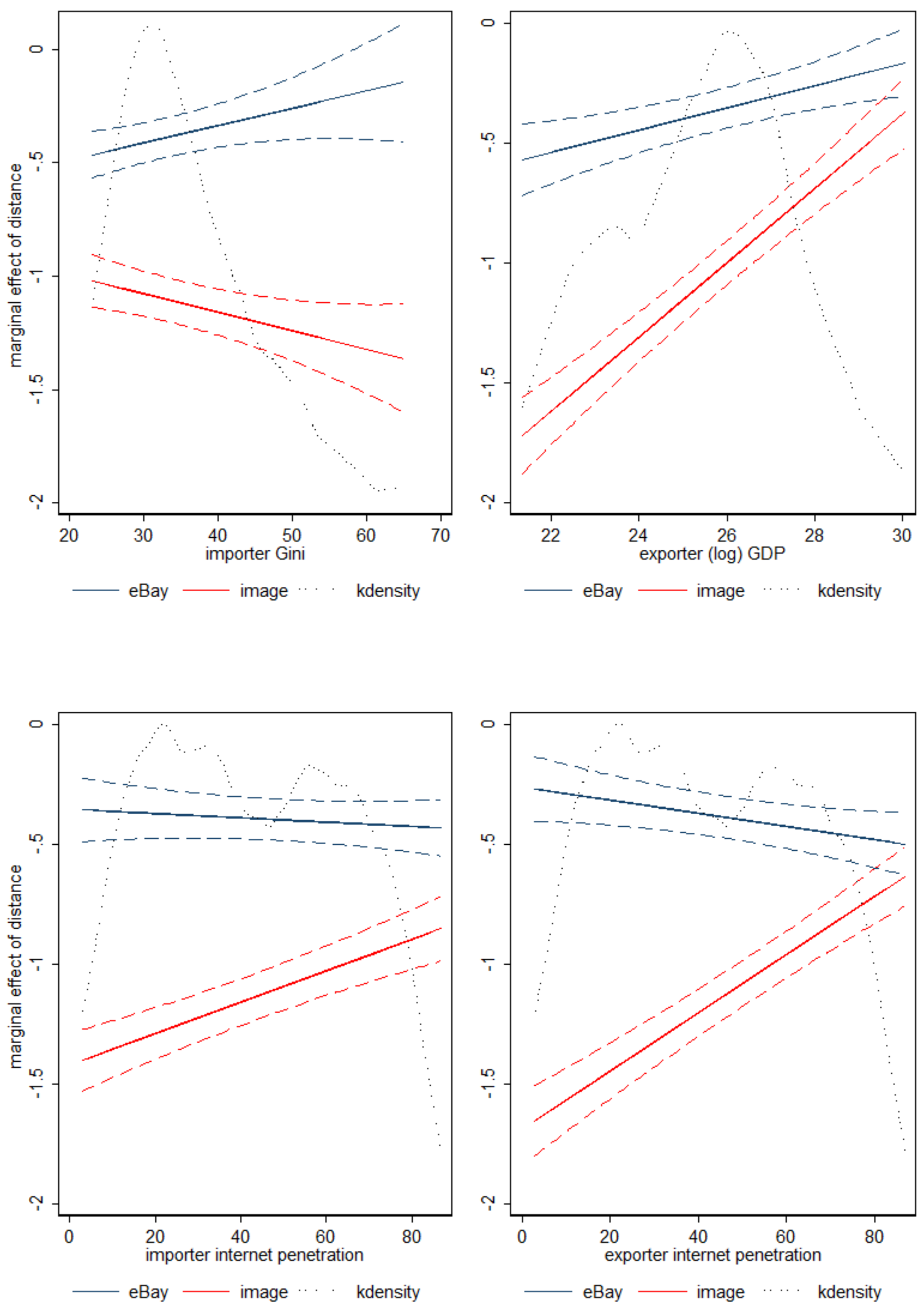
Corruption, Google popularity and the distance e ect on trade



Note: These marginal e ects are estimated ... The dotted lines give the kernel density estimate of the x axis variable. The dashed lines are the 95 percent con dence interval.

Figure 9

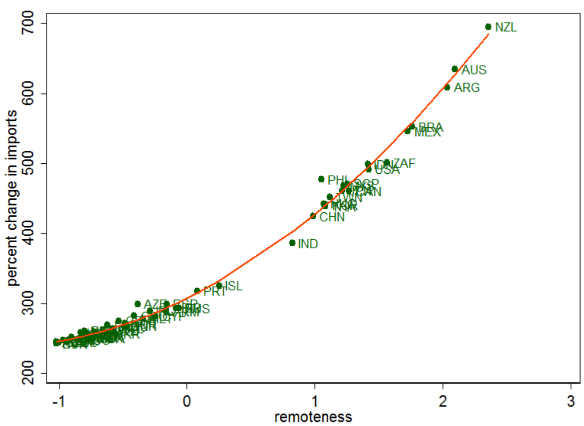
Self-selection: The role of internet penetration, importers' income inequality and exporters' GDP



Note: These marginal e ects are estimated ... The dotted lines give the kernel density estimate of the x axis variable. The dashed lines are the 95 percent con dence interval.

Figure 10

Trade gains from world attening



Note: Remoteness is calculated as the GDP-weigthed average distance to all trading partners. The increase in imports is calculated bilaterally and corresponds to the change that would be observed if o ine traders were to face the distance coe cient measured online. It is then aggregated across all trading partners.

Table 1

Trade cost and gravity online and o ine

	(1) eBay	(2) eBay	(3) eBay	(4) eBay (Poisson)	(5) offline image	(6) offline image	(7) offline image	(8) offline image (Poisson)
Distance	-0.549***	-0.383***	-0.382***	-0.299***	-1.393***	-1.107***	-1.092***	-0.663***
	(0.0323)	(0.0419)	(0.0435)	(0.0925)	(0.0353)	(0.0475)	(0.0483)	(0.0456)
No common legal sys.		-0.304***	-0.237***	-0.272***		-0.577***	-0.578***	-0.379***
		(0.0547)	(0.0536)	(0.102)		(0.0536)	(0.0537)	(0.0591)
No colony		0.146	0.0940	-0.287**		-0.418***	-0.422***	0.0300
		(0.135)	(0.133)	(0.125)		(0.158)	(0.157)	(0.109)
No common language		-0.475***	-0.486***	-0.933***		-0.195*	-0.200*	0.218**
		(0.0937)	(0.0938)	(0.139)		(0.106)	(0.105)	(0.0956)
No border		-0.153	-0.137	-0.762***		-0.366**	-0.333**	-0.285***
		(0.124)	(0.122)	(0.137)		(0.144)	(0.144)	(0.0895)
No FTA		-0.161**	-0.181**	-0.359**		-0.320***	-0.297***	-0.430***
		(0.0796)	(0.0795)	(0.151)		(0.0872)	(0.0876)	(0.0830)
Shipping costs			0.0527				-0.0835	
			(0.0708)				(0.0687)	
Observations	3,763	3,763	3,733	3,763	3,763	3,763	3,733	3,763
R-squared	0.874	0.877	0.882		0.851	0.859	0.859	

Source: All regressions are estimated using an importer and exporter fixed effect linear model. The figures in brackets are robust standard errors, and * stands for statistical significance at the 10 percent level, ** for statistical significance at the 5 percent level and *** for statistical significance at the 1 percent level.

Table 2

Testing di erences in gravity coe cients

	Distance	No common legal system	No colony	No common language	No border	No FTA
Gravity coe cient	-1.119***	-0.584***	-0.408*	-0.210	-0.353*	-0.314***
	(0.100)	(0.0945)	(0.222)	(0.175)	(0.206)	(0.110)
Interaction with eBay dummy	0.711***	0.318*	0.596*	-0.239	0.231	0.107
	(0.136)	(0.167)	(0.318)	(0.240)	(0.273)	(0.204)

The dependant variable is log imports. Regression estimated using importer-eBay and exporter-eBay fixed effect linear model. The figures in brackets are robust standard errors, and * stands for statistical significance at the 10 percent level, ** for statistical significance at the 5 percent level and *** for statistical significance at the 1 percent level.

Table 3

Robustness checks: trade cost and gravity for di erent types of eBay ows

	(1) eBay total	(2) comtrade total	(3) New goods	(4) Used goods	(5) Auctions	(6) Non-auctions	(7) Consumer sellers	(8) Powersellers	(9) Non-Powersellers
Distance	-0.446***	-1.352***	-0.408***	-0.573***	-0.490***	-0.335***	-0.535***	-0.355***	-0.461***
	(0.0306)	(0.0495)	(0.0393)	(0.0470)	(0.0287)	(0.0327)	(0.0574)	(0.0362)	(0.0393)
No common legal sys.	-0.143***	-0.569***	0.0295	-0.165***	-0.114***	-0.0567	-0.460***	-0.251***	-0.324***
	(0.0372)	(0.0554)	(0.0475)	(0.0580)	(0.0343)	(0.0397)	(0.0703)	(0.0456)	(0.0481)
No colony	-0.341***	-0.325*	0.00399	-0.238*	-0.375***	-0.131	-0.180	-0.330***	-0.269**
	(0.0937)	(0.170)	(0.122)	(0.131)	(0.0851)	(0.102)	(0.175)	(0.123)	(0.113)
No common language	-0.366***	-0.340***	-0.432***	-0.245***	-0.339***	-0.379***	-0.498***	-0.268***	-0.297***
	(0.0656)	(0.113)	(0.0850)	(0.0936)	(0.0587)	(0.0728)	(0.128)	(0.0738)	(0.0868)
No border	-0.275***	-0.243*	-0.362***	-0.102	-0.265***	-0.345***	-0.133	-0.258**	-0.268***
	(0.0845)	(0.146)	(0.107)	(0.124)	(0.0752)	(0.0936)	(0.156)	(0.107)	(0.104)
No FTA	-0.122**	-0.191**	-0.0598	-0.228**	-0.0546	-0.126**	0.0337	-0.264***	-0.0681
	(0.0545)	(0.0932)	(0.0728)	(0.0895)	(0.0566)	(0.0588)	(0.101)	(0.0699)	(0.0716)
Observations	3,778	3,778	3,740	3,740	3,740	3,740	3,763	3,778	3,778
R-squared	0.913	0.799	0.881	0.818	0.920	0.910	0.791	0.893	0.871

Source: All regressions are estimated using an importer and exporter fixed effect linear model. The figures in brackets are importer- and exporter-clustered standard errors, and * stands for statistical significance at the 10 percent level, ** for statistical significance at the 5 percent level and *** for statistical significance at the 1 percent level.

Table 4

Testing di erences in gravity coe cients for PowerSellers

	Distance	No common legal system	No colony	No common language	No border	No FTA
Gravity coe cient	-0.461***	-0.324***	-0.269**	-0.297***	-0.268***	-0.0681
	(0.0393)	(0.0481)	(0.113)	(0.0868)	(0.104)	(0.0716)
Interaction with PowerSeller dummy	0.106**	0.0731	-0.0611	0.0291	0.00982	-0.195*
	(0.0534)	(0.0663)	(0.167)	(0.114)	(0.149)	(0.100)

The dependant variable is log of eBay imports. Regression estimated using importer-PS and exporter-PS fixed effect linear model. The figures in brackets are robust standard errors, and * stands for statistical significance at the 10 percent level, ** for statistical significance at the 5 percent level and *** for statistical significance at the 1 percent level.

Table 5
Product information and distance online and o ine

	(1) eBay	(2) image	(3) eBay	(4) eBay	(5) image	(6) image
Distance	-0.287***	-1.167***	-0.0914***	-0.439***	-0.714***	-1.897***
	(0.0190)	(0.0182)	(0.0191)	(0.0187)	(0.0196)	(0.0196)
No common legal sys.	-0.328***	-0.726***	-0.313***	-0.302***	-0.712***	-0.705***
	(0.0241)	(0.0241)	(0.0236)	(0.0229)	(0.0248)	(0.0233)
No colony	-0.251***	-0.855***	-0.245***	-0.271***	-0.859***	-0.817***
	(0.0523)	(0.0541)	(0.0524)	(0.0513)	(0.0553)	(0.0516)
No common language	-0.434***	-0.0731*	-0.539***	-0.574***	-0.0863**	-0.0898**
	(0.0365)	(0.0417)	(0.0365)	(0.0356)	(0.0422)	(0.0399)
No border	-0.849***	-0.693***	-0.880***	-0.896***	-0.717***	-0.691***
	(0.0482)	(0.0470)	(0.0490)	(0.0479)	(0.0484)	(0.0460)
No FTA	0.0494	-0.296***	0.0190	0.0122	-0.278***	-0.307***
	(0.0357)	(0.0319)	(0.0346)	(0.0337)	(0.0332)	(0.0312)
Distance × TM-complaint			0.0212***		0.0541***	
			(0.000647)		(0.000781)	
Distance × TM-WIPO				0.0216***		0.0815***
				(0.000546)		(0.000845)
Constant	9.088***	23.33***	8.780***	8.686***	23.25***	23.50***
	(0.137)	(0.133)	(0.133)	(0.130)	(0.137)	(0.130)
Observations	49,591	73,614	41,205	41,705	64,850	70,598
R-squared	0.053	0.172	0.085	0.099	0.223	0.271

Note: All regressions are estimated using deviations from the mean. The figures in brackets are robust standard errors, and * stands for statistical significance at the 10 percent level, ** for statistical significance at the 5 percent level and *** for statistical significance at the 1 percent level.

Table 6
Disentangling the mechanisms

	(1) ebay	(2) ebay	(3) ebay	(4) ebay	(5) ebay	(6) image	(7) image	(8) image	(9) image	(10) image	(11) ebay	(12) ebay
distw	-0.574***	-0.525***	-0.407***	-0.576***	-1.122***	-0.686***	-1.209***	-0.832***	-1.070***	-1.201***	-0.353***	-0.353***
	(0.0800)	(0.0549)	(0.111)	(0.0519)	(0.140)	(0.0879)	(0.0590)	(0.0969)	(0.0570)	(0.174)	(0.0478)	(0.0482)
dist_language	0.209***					-0.462***						
	(0.0753)					(0.0799)						
no_comleg	-0.329***	-1.944***	-0.306***	-0.324***	-0.308***	-0.522***	-1.762***	-0.559***	-0.573***	-0.577***	-0.320***	-0.320***
	(0.0563)	(0.409)	(0.0554)	(0.0552)	(0.0549)	(0.0536)	(0.411)	(0.0539)	(0.0543)	(0.0541)	(0.0555)	(0.0548)
no_colony	0.128	0.111	-0.0492	0.174	0.0822	-0.377**	-0.443***	1.818**	-0.423***	-0.426***	0.138	0.138
	(0.136)	(0.136)	(0.906)	(0.137)	(0.132)	(0.161)	(0.160)	(0.793)	(0.159)	(0.156)	(0.135)	(0.136)
no_comlang_off	-2.205***	-0.542***	-0.478***	-0.494***	-0.422***	3.623***	-0.243**	-0.158	-0.191*	-0.188*	-0.460***	-0.460***

	(13) ebay	(14) ebay	(15) image	(16) image	(17) image	(18) image	(19) ebay	(20) image	(21) ebay	(22) ebay	(23) image	(24) image
distw	-0.225	0.246	-1.342***	-1.227***	-4.356***	-2.836***	-1.561***	-5.013***	-0.262***	-0.354***	-1.687***	-1.418***
	(0.471)	(0.523)	(0.0531)	(0.0493)	(0.572)	(0.572)	(0.348)	(0.365)	(0.0704)	(0.0690)	(0.0762)	(0.0672)
dist_language												
no_comleg	-0.306***	-0.311***	-0.456***	-0.514***	-0.541***	-0.558***	-0.273***	-0.452***	-0.328***	-0.290***	-0.528***	-0.547***
	(0.0555)	(0.0555)	(0.0545)	(0.0542)	(0.0543)	(0.0544)	(0.0566)	(0.0549)	(0.0558)	(0.0556)	(0.0555)	(0.0552)
no_colony	0.142	0.130	-0.354**	-0.386**	-0.337**	-0.374**	0.149	-0.385**	0.102	0.160	-0.380**	-0.375**
	(0.136)	(0.136)	(0.155)	(0.157)	(0.158)	(0.159)	(0.135)	(0.159)	(0.134)	(0.139)	(0.156)	(0.160)
no_comlang_off	-0.474***	-0.472***	-0.315***	-0.256**	-0.214**	-0.204*	-0.505***	-0.265**	-0.448***	-0.514***	-0.281***	-0.252**