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ANALYSIS OF THE GEO-BLOCKING MECHANISM IN THE CONTEXT OF PRICE DIFFERENTIATION IN CROSS-BORDER E-COMMERCE IN THE EUROPEAN UNION. POLAND'S PERSPECTIVE

EXPERT OPINION COMMISSIONED BY THE MINSITRY FOR FOREIGN AFFAIRS

analysis average business buy commerce companies competitive
consumer cost countries cross-border demand
differences differentiation due e-commerce
eu european factors geo-blocking given goods higher increase
internet level location market model obtained oligopoly online power
practices **price** producer product purchasing sale services
shop single states study transaction union values variables web websites

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Vocabulary

IP address: number assigned to a network interface (e.g. for a router) which enables identification of user's location

B2B: business relation of the *Business to Business* type, where one enterprise is the supplier, and the other – the recipient

B2C: business relation of the *Business to Consumer* type, where the enterprise is the supplier, and the consumer – the recipient

reservation price: maximum price, at which the consumer is willing to buy a given quantity of the product

objective factors: external circumstances influencing the rationality of price differentiation, e.g. differentiation of law, contracts, differences in labour costs and costs of capital

subjective factors: internal circumstances influencing the rationality of price differentiation, e.g., demand elasticity differentiation due to differences in purchasing power

perfect competition: market structure, where so many companies operate that they have no influence on the product price (e.g. agricultural products market, hosting services market)

price discrimination: differentiation in the price for a unit of the same goods; three kinds of discrimination are distinguished (of the first, second and third degree)

demand elasticity : sensitivity of demand to price changes – the higher the demand elasticity, the bigger consumers' reaction in terms of purchased quantity to price change

e-commerce: electronic commerce; in this report, Internet commerce

geo-blocking: practice of refusing sale or discrimination of buyers making purchases on the Internet due to geographical location identified with the IP address

online commerce: Internet commerce

monopolistic competition: market structure combining the features of monopoly (market power stemming from product differentiation) and perfect competition (large number of companies, low costs of entering the market)

marginal cost (MC): cost incurred by the producer when increasing production of given goods by a unit

supply curve: relation showing amounts of commodity that producers are willing to sell at different prices

demand curve: relation showing amounts of commodity that consumers are willing to buy at different prices

partial equilibrium model: model used in economic analysis. When analyzing a single market (e.g. the market of e-commerce goods in a given country), we assume that all variables not connected with the model (not located either on the X axis or on the Y axis in a graphical representation of the model, e.g. consumer income) are constant over time

monopoly: market structure where only one company operates (e.g. city transport)

mystery shopper (mysterious shopper method): procedure for testing a service – e.g., an Internet shop – by taking on the role of a customer and trying to conclude a transaction

consumer's surplus: difference between consumer's reservation price and the actual price paid by the consumer. Consumer's surplus is the measure of benefits obtained by the consumer from a given transaction

producer's surplus: difference between the cost of manufacturing a given amount of goods incurred by the producer and the actual price, at which the producer is selling this product. Producer's surplus is the measure of benefits obtained by the producer from a given transaction

imperfectly competitive market: market structure, where companies possess market power and are able to set a price above the marginal cost (e.g., monopoly, oligopoly)

oligopoly: imperfectly competitive market, where a small number of companies operate which are able to influence price changes (e.g., duopoly in case of two companies), and entry barriers are very high

asymmetric oligopoly: form of oligopoly where companies perceive markets in different ways, i.e., e.g., the market of country H is a weak market for company X, while the market of country P is a strong market for company Y. In an asymmetric oligopoly, products or consumer's tastes are more differentiated than in a symmetric oligopoly

symmetric oligopoly: form of oligopoly where companies perceive markets in the same way, i.e., e.g., the market of country H is a weak market for all companies, while the market of country P is a strong market for all companies

purchasing power parity: foreign currency exchange rate calculated based on comparing the prices of a fixed basket of goods and services. It allows, among others, for expressing GDP in a form which takes into account differences in purchasing power of the population

regression: statistical method which allows for examining the relationship between the data and forecasting on that basis unknown values of certain quantities based on the known values of other quantities

regressor: one of many variables explaining the dependent variable in the regression model

re-routing: redirecting the user of a website to other website – e.g., a user with an IP from Poland will be automatically redirected from the website of the Zalando.com Internet shop to Zalando.pl

strong market: market with lower demand elasticity. A price differentiating producer will establish a higher price in such a market

weak market: market with higher demand elasticity. A price differentiating will establish a lower price in such a market

SEPA (Single European Payment Area): uniform area of euro payments

marginal revenue (MR): the revenue obtained by a producer due to sale increase by a unit

VPN (Virtual Private Network): method which enables hiding actual user location by establishing a connection to an intermediary server (proxy) located in another state

web scraping: technique of automated collection of information from websites by an appropriately written script

Pearson's correlation coefficient: coefficient determining the level of linear dependency between random variables. The correlation coefficient is a number from the $[-1,1]$ interval. Large negative values indicate negative dependency, while large positive values indicate positive dependency, and values close to zero indicate lack of dependency between the variables

binary variable: variable taking only two values (e.g., either 0 or 1)

Context and aims of the study

Our report focuses on the geo-blocking phenomenon in cross-border trade in goods and selected services, excluding web services offering access to digital multimedia contents, in accordance with the actions of the European Commission. We define geo-blocking as the practice of refusing sale or other form of discrimination of buyers making purchases over the Internet due to their location. Analysing the significance of geo-blocking, we seek an answer to the question what barriers hamper and limit the growth of the online transactions market.

The experiences of the European Union in eliminating barriers to the traditional trade in goods and services prove that this facilitates cooperation, stimulates better use and allocation of resources, and in consequence translates to economic growth of all participants of the exchange. E-commerce is an important step towards further strengthening of commercial relations within the Digital Single European Market. However, at present the EU does not make use of the potential of Internet transactions. Especially Polish companies rarely use this sales channel, which is why their share in cross-border *e-commerce* is low. Yet, problems with *online* purchases from abroad are declared by less than 5% consumers, while as many as 70% have had no problem at all.¹

Research methodology

The study was aimed at identification of geo-blocking practices based on:

- analysis of statistical data,
- analysis of business models of e-commerce,
- quantitative analysis of product prices obtained from price comparison websites using the *web scraping* technique, two simulation studies carried out in real time using the “*mystery shopper*” method, separately for goods and touristic services,
- econometric analysis of price determinants in e-commerce in the EU,
- analysis of legal regulations.

Study of prices on the web with the *web scraping* technique has allowed us not only to check if the price comparison websites use geo-blocking practices, but also enabled documenting the actual scale and scope of product prices differentiation among the EU Member States via the electronic channel.

Results of the study

¹ [http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Internet_use,_frequency_of_use_and_online_purchases,_2015_\(%25_of_individuals\).png](http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Internet_use,_frequency_of_use_and_online_purchases,_2015_(%25_of_individuals).png)

- **In all European Union countries, the possibilities of economic cooperation development within e-commerce are used to a small extent only.**
 - This problem concerns especially Poland. Only 3 per cent of producers make cross-border sales via e-commerce, whereas in the European Union there are on average 8% of such enterprises. **Compared to web users from countries with higher purchasing power, Polish e-customers relatively rarely buy products and services in a cross-border way².** In Poland consumers decide for *online* shopping mainly due to the chance of obtaining a lower price, and buy first of all food, clothing and household appliances, while services are purchased relatively more rarely.
 - **A prerequisite for significant increase in the volume and value of the cross-border e-commerce of Poland, but also of other European Union countries, is decreasing the costs of international parcels.**
- Review of business models of e-commerce indicates that **introduction of the price differentiation according to buyer's location is not always possible and desirable** (mainly due to the so-called reputation risk).
 - Reputation risk is the higher the more competitive and integrated the market, the larger number of entities the seller cooperates with, and the easier access to price information customers have. In consequence, companies carrying out sales in the electronic channel are exposed to high reputation risk, and will rarely be willing to introduce different prices for buyers without a clear cost-based reason. This applies especially to the European Union area, due to the high mobility and free flow of people.
- **There is a natural price differentiation among the individual EU members.**
 - Online price differentiation occurs in EU Member States, since prices of the same goods differ also in offline transactions.
 - Differentiation of international transaction prices on the Internet by a single seller can result from demand-based reasons (e.g., differences in purchasing power among consumers) or from supply-based reasons (e.g., differences in the costs of implementing transactions to different EU MSs).
 - On the supply side, there are many factors which potentially determine the price differentiation. These are, among others, differences across Member States in substantive law and process law specifying the subject matter of transaction and vendors' liability, incomplete harmonization of many areas of Member States' laws, or differences in internal technical and administrative regulations.

² According to GUS (Central Statistical Office) data, the share of persons buying products and services from other EU countries does not exceed 5%, and from the rest of the world – 2%. According to eMarketer data, the share of persons making use of cross-border *e-commerce* is 24%, and in countries with higher purchasing power amounts to about 50% (in Germany 53%, in the United Kingdom even 58%).

- Quantitative analysis of the prices of 182 products representing the most popular categories in electronic commerce, which have been obtained from price comparison websites in 25 EU countries with the *web scraping* technique, indicates existence of an on average 10%+ price differentiation among EU countries.
- The direction of price differentiation is consistent with differences in the welfare levels between the individual EU countries. Along with the growing level of *per capita* GDP, product prices also grow. This regularity is also observed in offline commerce. In states like Denmark, Sweden, United Kingdom, Italy or France, prices are on average higher, independently of the product category. In turn, in countries like Poland, the Czech Republic or Hungary, prices in most categories are lower than the average level. For 65 products (ca 1/3 of the sample), the spread of their prices exceeded the average price of delivery inside the European Union (EUR 25-30), which means that in theory one could buy them cheaper in one EU country and sell at a profit in another EU state (so-called price arbitrage). In practice, the possibility of conducting such transactions by consumers is often limited by additional factors, such as lack of multilingual service of Internet shop websites, and lack of possibility of delivering goods abroad directly from the shop level.
- The existing price differentiation is connected not only with welfare levels of the individual countries, but also with cost-related factors. Along with the increase in cost of capital in a given country by 1 percentage point, the deviation of the product price in that country from the average price level in the European Union increases by 0.4 percentage point. In turn, GDP *per capita* increase by EUR 1,000 is connected with increase in the prices deviation in the given country from the average price in the EU by 0.22 percentage point. The scale of differentiation is specific for the individual product groups.
- **The results of studies with the *mystery shopper* and *web scraping* techniques do not give grounds for stating that the geo-blocking phenomenon occurs on a significant scale in e-commerce in goods and services in the European Union.** We should stress that our studies, though based on a broad selection of products, suppliers and countries, are incomplete by the very nature of things. This means we cannot exclude that in single cases consumers may encounter geo-blocking practices. However, we have not found even a single example of geo-blocking among the offers of Internet shops, airlines and hotels that we have examined. Hence such situations, if they occur at all, have with high probability incidental character. Another argument supporting this conclusion is also the easy accessibility of VPN technologies, which ensure an increased scope of anonymity on the Internet. For example, a consumer can enter the website of any shop through an IP of an arbitrary European country using free proxy servers, avoiding in this way the effects of geo-blocking.

We have not discovered geo-blocking on the level of price comparison websites in any of the 25 EU countries either. This is an essential factor, because the use of price comparison websites is a common way of acquiring information about the product price on the Internet.

- Nevertheless, the differentiation of regulations and the incomplete by assumption character of European law constitute objective reasons for the practices of applying different prices in cross-border trade (which, however, are by no means a symptom of geo-blocking).
 - Online prices are a function of offline prices, and hence do not constitute a potential barrier to e-commerce development in the European Union. Additional barriers to cross-border trade are institutional and language differences.
 - Differentiation of the price levels among EU states is due to the continuing differentiation of cost conditions. Part of these differences, of legal character, can be eliminated. For example, one could consider introduction of harmonizing regulations on consumer protection and transport market in the European Union. Differentiation of other elements is of permanent character and follows from the degree of economic development (e.g., labour costs) or differences in the fiscal policy in the individual countries (VAT and CIT rates, cost of capital).

Recommendations

- **There are no justified reasons for introducing additional regulations that prohibit geo-blocking.**
 - Introduction of this type of regulations would hardly decrease price discrimination that occurs for objective reasons. On the other hand, the regulations would represent an excessive intervention in the freedom of economic activity: e.g., they could disrupt the directions of trade in a substantial way, strengthening the position of non EU countries as preferred trade partners. Consumers from relatively less wealthy EU countries (including Poland) would more gladly make use of offers from, e.g., the Chinese market, as they prefer to buy cheaper products.

- **A special area requiring harmonization is the parcel delivery market.**
 - The high prices of parcel delivery between the EU Member States compared to domestic delivery services do not seem to be justified by differences in the costs between foreign and domestic deliveries.

- **Geo-blocking does not exhaust the list of factors that can constitute barriers to development of cross-border online trade in the EU territory.**
 - We should look at the legal conditions and the transaction costs connected with *e-commerce*.
 - The extent and profile of *e-commerce* use differ across EU countries (both in case of internal trade and cross-border trade). We can suppose that there are a number of factors influencing the local tendency of both entrepreneurs and consumers to sell/buy goods and services online. The growth dynamics of the e-commerce market is not necessarily determined by the geo-blocking practices, but can be connected with deeper determinants stemming from the sphere of the development levels of national economies, national regulations, specific consumer preferences, or the issue of trust in the security of such transactions.

Introduction

Cross-border e-commerce has a considerable growth potential in the European Union. However, the actual dynamics and scale of e-commerce indicate existence of barriers limiting its development. The European Commission has initiated work on identifying factors blocking the growth of e-commerce, especially in the cross-border dimension. One of these factors is deemed to be geo-blocking, which leads to differentiation of prices for buyers from different EU countries, and in consequence poses a barrier to the development of Digital Single Market.

The aims of this study are: (1) to answer the question about the scale, occurrence forms and consequences of price differentiation in the EU area; (2) to identify other potential barriers to e-commerce.

In our analysis, we discuss barriers that constitute the preconditions of price differentiation. On this basis, we can establish potential determinants of price discrimination in the European Union. In addition, we present various business models used in e-commerce in the context of the possibility for the companies to carry out strategic price discrimination.

It is a common opinion that development of e-commerce in the European Union encounters a number of barriers, which, despite a substantial growth potential of this kind of trade, limits its scale³. This is why the European Commission has undertaken actions aimed at pointing out factors that should be eliminated to boost cross-border e-commerce.

A cross-border transaction between entities from different states of the European Union, implemented under e-commerce, is a complex, multidimensional legal phenomenon, comprising many aspects. Its normative form depends on the parties' statuses (*business to consumer* - B2C, *business to business* - B2B), as well as on the subject matter of the service. The legal regime governing such a transaction is composed of numerous regulations: of the law on contracts, copyright, tax law, personal data protection law, postal law, procedural law, and numerous technical regulations.

The subject matter of contract in an e-commerce transaction can be either commodities or intangible goods (services, digital contents). Failure to perform under the contract – and in case of contracts concerning tangible goods also improper quality of the goods on its own – give rise to claims settled only based on the appropriate regulations (e.g., concerning warranty or technical standards). Preparation, conclusion and performance of such a contract require processing personal data, copyright protection to the extent of the granted licence, and its subject matter is, as a rule, subject to VAT taxation.

The aim of this study is to extend knowledge of the geo-blocking phenomenon taking the form of price differentiation, as well as to conduct studies whose results will be used to elaborate Polish proposals regarding the legal initiative towards combatting unjustified geographical blocking, announced in the Digital Single Market strategy.

Geo-blocking does not have any official definition, and its interpretation in the official and scientific texts, as well as in journalism, is sometimes not uniform, and in principle depends on the

³ Commission Staff Working Document – A Digital Single Market Strategy for Europe – Analysis and Evidence, COM (2015) 192 final, p. 21.; and the study of the European Parliament (EU Directorate General for Internal Policies, entitled *Discrimination of Consumers in the Digital Single Market*, IP/A/IMCO/ST.2013-03, p. 8.

context of its application. **In the study we assume that geo-blocking consists in differentiating the situation of buyers depending on the place they make the transaction from.**

The geo-blocking practice in e-commerce can occur in three forms: denial of the right to conclude a contract by electronic means via a website, redirecting (*re-routing*) to other website of the same commercial organization, or automatic adjustment of the offered transaction terms (including prices) depending on the customer's location⁴. Usually, geo-blocking is implemented using the customer's IP address, which contains a rough indication of the location from which the customer connects to the Internet.

Among the Member States, geo-blocking in its most severe form of access denial occurs in case of subscription-based web services distributed digitally, which offer access to resources covered by copyright.

Geo-blocking which consists in differentiating the terms – especially prices – of cross-border transactions between European Union states depending on the buyer's location is more difficult to identify. Firstly, because **differentiation of prices** among EU states **occurs in real economy**. EU states, despite the strong convergence of interest rates, inflation or budget deficit, still have different price levels. Secondly, there are many objective reasons supporting price differentiation, due to both different conditions of pursuing economic activity in various EU states (production factor costs), and to differentiation of consumers with respect to purchasing power (demand-related factors).

As a result, to identify geo-blocking based on price differentiation in e-commerce, **we should find the practices of applying price differences that function in cross-border transactions, and introduce additional price differentiation solely for online trade in this kind of transactions.** This is simple in case of services which are provided „on site” (e.g. hotel services) or do not require delivery (e.g., purchase of flight tickets). In this case, geo-blocking would consist in offering different prices to buyers depending on the country where they are concluding the transaction over the Internet (e.g., depending on their physical location when booking a hotel room). It would occur also if we received different prices for buying an e-book. Identification of the geo-blocking practice is more difficult in case of purchasing goods. This is because when purchasing services we do not encounter the costs which accompany trade in goods (cost of transport, postal charges, costs of service, costs of maintaining trade agencies, sales reps, etc.), or follow from a lower level of purchasing power in the buyer's country. Prices of the same goods are already strongly differentiated even in domestic transactions. Differentiation of the markets EU states, as well as the lack of full harmonization of law, leads to the situation where divergence in the price levels among countries is even stronger.

The aims of this study are: (i) to establish the actual scale of price differentiation in e-commerce between the EU countries, (ii) to examine the determinants of this phenomenon, and (iii) to examine, based on selected examples, if producers /distributors in the European Union apply price differentiation for customers logging in from different locations - which practice can be regarded as geo-blocking. Results of the analysis will be used to carry out a quantitative assessment of price differentiation determinants in e-commerce. The conclusions will be used to formulate

⁴ Ibid, p. 21.; and ibid, pp. 19-21.

Polish postulates with regard to the legal initiative aimed at combatting unjustified geographical blocking, announced in the Digital Single Market Strategy for Europe.

In our analysis, we refer to scientific literature and recognized econometric methods which underlie the assessment of reliability of our research. For greater clarity of presentation, we have placed the scientific part in the Annex.

We verify the cases of the geo-blocking practice through:

- Two simulation studies carried out in real time using the “*mystery shopper*” method, separately for touristic goods and services:
 - The first of the studies consisted in simulating purchases in a given Internet shop using local IP addresses from various countries (e.g., purchase of Crocs shoes in a British shop by a customer identified on the Internet as coming from Germany, Poland, Netherlands, etc.),
 - The second option used was examination of websites of airlines offering flights on selected European routes, and web services of hotel chains which offer the service of booking hotel rooms, as well as web services aggregating different offers.

- Quantitative analysis of the data acquired from price comparison websites thanks to the use of the *web scraping* technique, developed specially for needs of the study⁵ (25,402 observations). In this way, we estimate the scale of price differentiation based on the price data on 182 products collected from 25 EU countries.

⁵ A program based on the *Java* language was prepared for the needs of the study . The program searched for an appropriate *proxy* server in order to simulate the country of connection to the selected browser (in case of a local call), and simulated a visit to the website. Then, analyzing the site code, the program selected from it price information, product name and Internet address of an Internet shop offering the product based on a set of selectors, appropriately chosen for each browser.

1. Analysis of the e-commerce structure in Poland and its importance compared to the European Union

Based on Eurostat data, we can determine both the structure of e-commerce in the European Union and its importance. The presented study applies to all EU states. For the needs of analysis, we present the results separately for the „old” European Union (i.e., countries which joined the EU before 2004 – EU15) and the „new” Union (new Member States without Poland – NMS12), and finally for Poland alone.

Even though the e-commerce market is developing very dynamically in Poland, Polish consumers and enterprises still use this transaction channel relatively rarely. If Polish consumers decide for purchase online, this is first of all due to the chance of getting a lower price. The structure of their purchases is governed by that goal. The Poles buy first of all clothing, sports equipment and household appliances. However, they buy services (books, films, music) relatively more rarely.

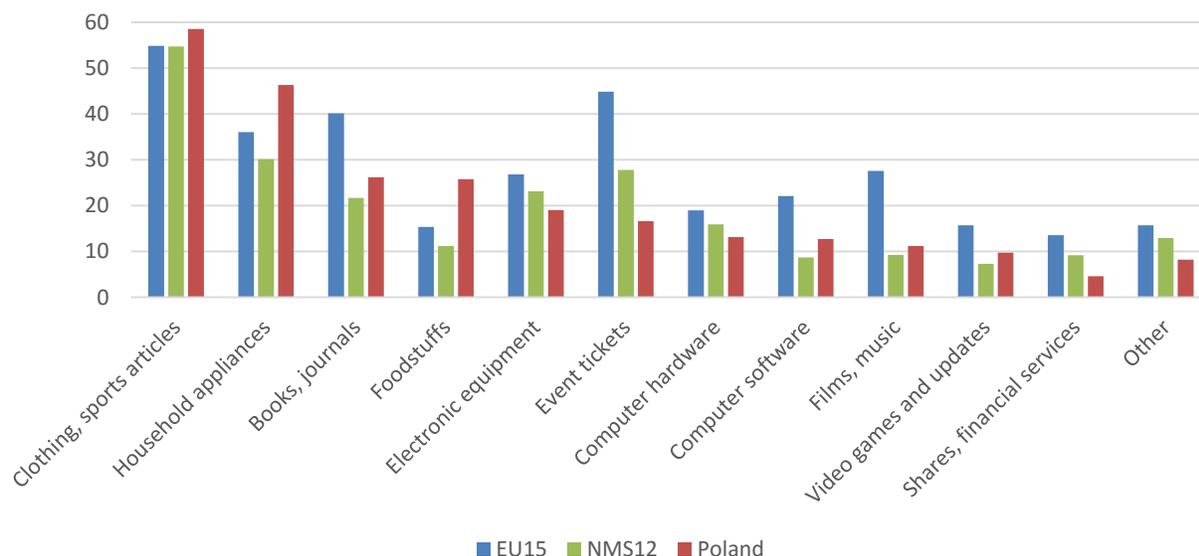
Sales over the Internet are carried out first of all by large companies, whereby the share of cross-border transactions in the entire e-commerce is very low. Relatively the greatest number of enterprises offer their services to foreign consumers over a website in the accommodation sector and in the information and communication sector.

The e-commerce market is developing dynamically in Poland, though the share of sales over the Internet in the total sales is still lower than in the „old” European Union. According to eMarketer data, in 2015 retail sales over the Internet grew in Poland by 21%. The growth rate of e-commerce is comparable to the growth rate in Germany (23%), and considerably faster than in EU15 countries (below 20%).

The exact percentage of consumers making use of e-commerce in Poland is difficult to estimate. Eurostat informs that in 2015 37% persons in Poland, and on average 53% in the EU, made a purchase online, while eMarketer has estimated that this percentage can amount to even 50%. Interestingly, in the United Kingdom it reaches even 70% according to eMarketer. Note that average annual expenditures in Poland (EUR 340) are relatively much lower than in the United Kingdom (about EUR 1,200). The reason why Polish consumers use online shopping is the chance to obtain a lower price. The Poles are less frequently interested in a purchase because of loyalty to the shop. Interestingly, over one third of Polish e-consumers choose products offline, but buy them in an Internet shop, often making use of a more attractive price offer.

Polish consumers differ from EU15 and NMS12 consumers in the type of products bought online (Figure 1). The Poles more often than consumers from other EU countries buy over Internet goods like clothing and sports equipment, household appliances and food. They less frequently decide to buy services – only 17% of those concluding an online transaction buy tickets to the cinema or concerts. This type of transactions are concluded by 45% e-consumers in EU15 and 28% w NMS12. The share of Polish Internet users making use of e-commerce in order to rent a room or a house is lower and equals only 9%.

Figure 1. Categories of goods and services ordered over the Internet – percentage of persons aged 25-64 years buying goods and services, 2014.



Source: Eurostat database on the information society <http://ec.europa.eu/Eurostat/web/information-society/data/comprehensive-database>.

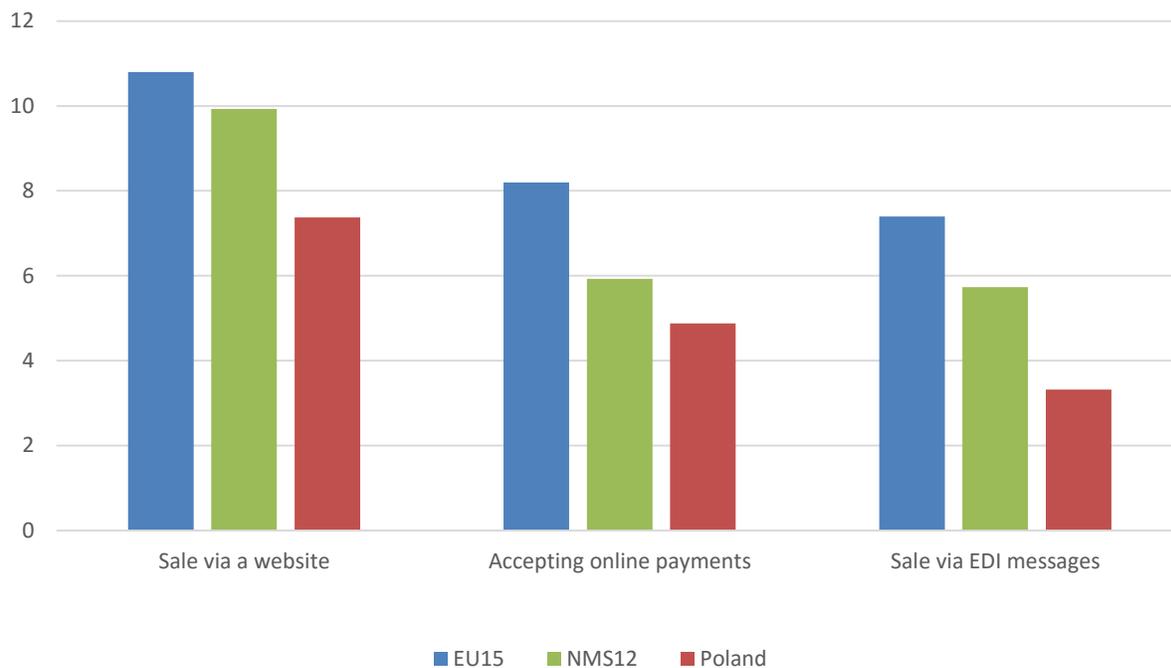
At the same time, in the „old” EU already 30% Internet users book accommodation online. About 12% Polish e-consumers buy films and music, which is considerably below the values for EU15 (28%). Polish consumers are more attached to traditional forms of access to culture.

The share of cross-border e-commerce is surprisingly low. A decisive majority of Polish consumers buy only from domestic sellers. According to the GUS (Central Statistical Office) data, in 2014 the share of persons buying from other EU countries and from the rest of the world was, respectively, as low as 5% and 2%⁶.

The share of Polish enterprises making e-commerce sales is still small – just 12% conducted sales over Internet in 2014. At the same time, the average level for NMS12 is 16%, and for EU15 – 19%. These are mainly large companies – among them, as much as 18% make use of e-commerce. The share of medium- and small-sized companies is much smaller and amounts, respectively, to 7% and 4%.

⁶ According to Eurostat surveys, in the European Union the share of international shopping via the Internet channel has been on average much larger than in Poland over the last years, and is considerably growing. In 2015 residents of the EU declared purchases from other EU countries much more often (30%) than in 2012 (25%). The share in transactions with third countries has also considerably improved, growing from 13% (2012) to 18% (2015).

Figure 2. Share of enterprises engaging in e-commerce, 2014

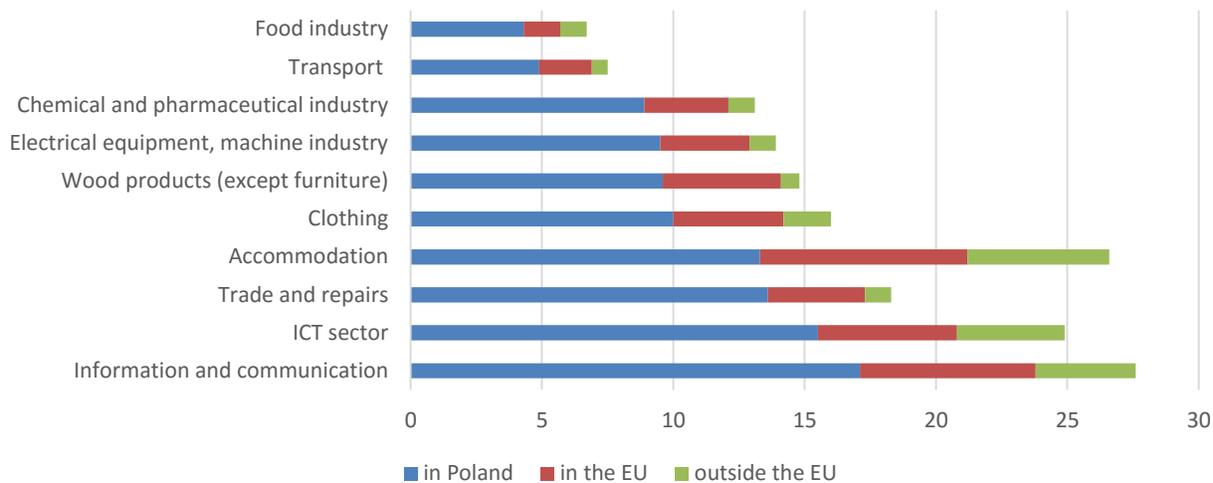


Source: Own elaboration based on <http://ec.europa.eu/Eurostat/web/information-society/data/comprehensive-database/>.

This small involvement of companies in e-commerce translates to the percentage share of sales over Internet in the total turnover. In Poland it is relatively lower, amounting to 12%, while in the EU it is on average 15%, reaching 20% in the United Kingdom.

The percentage of enterprises making cross-border sales is also small – half less than the EU average. Polish enterprises make sales to other EU countries, but their share is only 3%. Relatively, the greatest number of companies export products from the information and communication sector – 7% companies sell to EU markets, and 4% to markets outside the EU. Their relatively high share is also visible in the accommodation sector – 8% companies sell to EU markets and 5% to states all over the world (Figure 3).

Figure 3. Percentage of Polish enterprises selling via website by sale markets, divided by sectors, 2012.



Source: Own elaboration based on GUS (2013).

2. Analysis of price differentiation application mechanisms

In practice, the application of price differentiation by companies is not so obvious. Not all business models of e-commerce offer the possibility of influencing the price and, due to the high comparability of prices with competitors, high reputation risk and the correspondence between the online prices and the offline ones, the use of price differentiation by location is a relatively rare phenomenon.

Geo-blocking, which consists in differentiating the terms, especially prices terms, of cross-border transactions between European Union states depending on the buyer's location, is more difficult to identify than the differentiation of prices between EU states taking place in the real economy. Hence to identify geo-blocking which consists in price differentiation in e-commerce we should find the practices of applying price differences which occur in cross-border transactions and **represent additional differentiation of prices with respect to that already occurring in the real economy.**

However, possibilities of applying geo-blocking understood in this way depend on the industry, the business model and the relation between potential benefits of the company and risks involved in this type of practice.

Digital technologies on the one hand hamper, and on the other hand facilitate price differentiation. They hamper it by offering consumers the possibility of comparing prices with competitors (i.e., access to data on comparable goods, as well as homogeneity of goods). And facilitate it due to the „digital traces” left by Internet users and the ease with which the seller can make use of potential customer's data to determine the price. The possibility of applying price differentiation is a function of those two factors: high comparability of prices, which decreases the probability of applying differentiation, and also high possibility of influencing the price, which in turn increases this probability.

Possibilities of applying geo-blocking: industries

Geo-blocking is relatively simple in case of services, especially those which are provided „on site” – an example might be hotel services. In this case, geo-blocking would consist in offering different prices to buyers depending on the country where they are concluding the transaction over the Internet (e.g., where they are staying when booking the hotel room).

Geo-blocking could take a similar character in case of buying flight tickets, which would be offered to buyers at different prices depending on the location, from where the transaction would be concluded. We can assume that in this case emergence of different prices of the same services can be attributed solely to unjustified geo-blocking practices.

Identification of this type of practices is more difficult in case of goods purchase. This is because on the one hand – due to the factors discussed earlier – the prices might be differentiated in the domestic trade. On the other hand, purchase of goods is burdened by additional costs which do not appear in case of services: namely, costs of transport, postal charges, service, maintenance of trade agencies, etc.). The differentiation of EU states' markets, combined with the incomplete harmonization of law, leads ultimately to increasing the divergences in price levels between countries.

Hence in case of services one can relatively easily identify the occurrences of price differentiation following solely from applying the geo-blocking practice in cross-border online trade,

and select conclusive cases for an empirical study. In case of goods purchase, identification of price differentiation following solely from geo-blocking practices is more difficult, and the results obtained must be related to other supply and demand factors responsible for those differences.

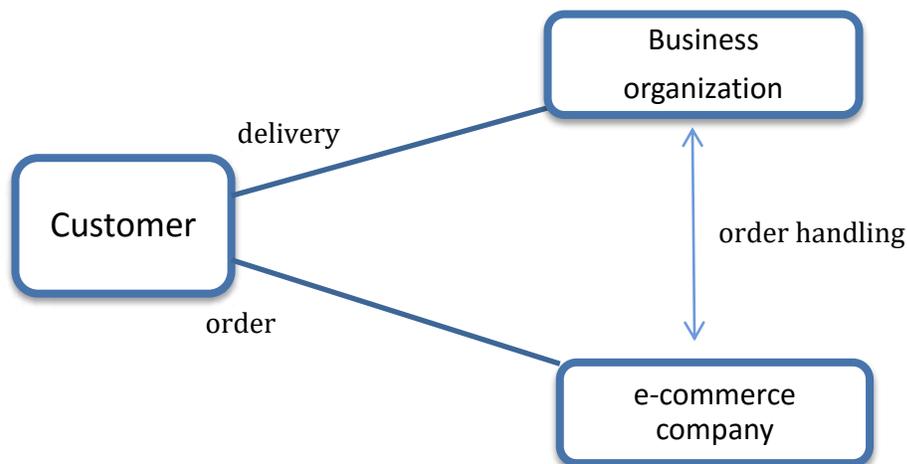
Possibilities of applying geo-blocking: business models

The possibility of applying geographical blocking depends on the e-commerce model chosen by the company. The basic classification of the models occurring in practice focuses on the supplier-recipient relation, distinguishing four basic types of that relation⁷:

- *Business-to-Business* (B2B),
- *Business-to-Consumer* (B2C),
- *Consumer-to-Consumer* (C2C),
- *Consumer-to-Business* (C2B).

For the needs of this study – focusing on the effects of geo-blocking for consumer’s prosperity – we concentrate on the **Business-to-Consumer (B2C)** models and mixed models containing the B2C component (Figure 4).

Figure 4. The B2C business model



Source: Own elaboration based on http://www.tutorialspoint.com/e_commerce/e_commerce_business_models.htm.

Classification by the subject matter of transaction

The second important classification of business models in the e-commerce market applies to the subject matter of the provided service. Here we can distinguish two basis cases:

1. Services provided wholly virtually, concerning intangible goods (among others, music or film *streaming* services),
2. Services involving physical subjects of trade, or provided at least partially in the real world (product trade, bookings /ordering of services provided in the real world).

⁷ In addition, within the above models one can consider, as a special case, the Business-to-Government (B2G), Government-to-Business (G2B) and Government-to-Citizen (G2C) models, where governmental/social activity is examined as a special type of economic activity, and mixed models.

This distinction is essential for many reasons. In case of the group of services connected with intangible goods (the first group), transaction costs are extremely low (no transport costs; low headcount costs of customer service, in most case provided in an automated way; no costs of storage, rental of premises, etc.). This category is dominated by three business models: the subscription model, the brokerage model and the e-shop model.

To give an example of companies operating in this area of the market, we can list global potentates in *online streaming* (e.g. Spotify, Deezer – subscription models), film *streaming* (e.g., Netflix – subscription model, YouTube – brokerage model; is starting to introduce the subscription model, too), trade in computer games in „downloadable” versions (e.g. Origin, Steam – brokerage models, Ubisoft – e-shop model), trade in mobile applications (e.g., iTunes, Google Play Store – brokerage model).

In case of the second category, there is much greater differentiation of business models, and so also differentiation of the costs involved, price strategies, IT technologies used. In the survey below we focus on the e-shop model, the brokerage model and the model of third party marketplace. Examples of companies operating in each model, together with a short definition, are given below (Table 1).

Table 1. Price differentiation vs business models

Business model	Comparability of prices with competitors	Possibility of influencing the price	Possibility of applying price differentiation
Subscription model	High	High	Medium
e-shop model - direct	Low	Very high	Very high
e-shop model - indirect	Medium	High	High
Brokerage model	High	Low	Low
Third party marketplace model	High	Low	Low

Source: Own elaboration.

The greatest probability of applying price differentiation occurs in the e-shop model (both in the direct and the indirect one). It is just in this model that the enterprise concentrates within its structures both the sales service process (analysis of customer data) and the price determination process. In addition, the possibility of comparing prices is limited due to the non-homogeneity of products and their large number. This is the most frequently occurring model, used, among others, by the greatest European players in the e-commerce market. The largest ten of them are presented in Table 2.

Table 2. The largest e-commerce companies and their business models

Name	Online sales (EUR m, 2014)	Increase (%)	Monthly number of unique users	Business model
Amazon.com Inc.	21,091.17	20.00%	154,990,953	Third party marketplace / e-shop
Atto Group	6,500.00	8.33%	54,340,556	e-shop
Tesco Stores	4,000.00	11.11%	11,111,111	e-shop
Staples	3,370.00	-2.18%	3,437,373	e-shop
Apple Inc.	2,790.00	7.93%	38,387,011	e-shop
Home Retail Group	2,600.28	5.29%	21,669,000	e-shop
Cnova NV/ Groupe Casino	2,333.18	22.80%	20,553,030	e-shop
Zalando SE	2,214.00	25.65%	16,473,214	e-shop
Asda	1,990.00	22.71%	11,476,355	e-shop
Shop Direct	1,982.34	8.97%	20,649,375	e-shop

Source: Own elaboration based on the Top500Guide Europe report.

In case of the subscription model, we can expect a small possibility of differentiating the price due to the limited number of service characteristics and high comparability with substitute web services, while in the brokerage model and in that of “third party marketplace” the e-commerce enterprise has a small possibility of creating the price due to being just a subcontractor of producers/distributors.

Risks involved in applying geo-blocking

Up to now, our analysis has been focused on the business model from the viewpoint of economic surroundings – on the economic character of its relations with suppliers and customers (model type) and positioning with respect to competitors (pricing policy). However, in the management practice, besides the economic content of the relations itself, extremely important issues are those connected with trust and counterparty’s reliability. From the theoretical viewpoint, they lower transaction costs connected with sale/concluding the contract for both parties. From the practical viewpoint, they are connected with management of the so-called reputation risk. According to a report by Deloitte⁸, 87% managers are of the opinion that reputation risk is one of the most important strategic risks; in addition, even 25% of the company’s value is connected with its reputation.

Price discrimination can be recognized as a negative phenomenon from the customer’s viewpoint. A company thought to apply this type of practices is exposed, from a purely business viewpoint, to a significant reputation risk. And the possibility of discovering such practices by the customer is relatively high: the latter has at present broad access to price information, among others, due to the ubiquity of smartphones, which give continuous access to that information. Because of this, many companies operating in the e-shop model, where e-commerce represents one of the sales channels, apply the same prices in online distribution and in the land chain (see Cavallo et al. 2012). This fact became the basis for „The Billion Prices Project”, which provides a tool for monitoring inflation indexes based on prices available on the Internet for about 5 million products sold by about 300 e-commerce companies in over 70 countries. The results obtained up to now

⁸ Following „2014 global survey on reputation risk Reputation@Risk”.

confirm a significant correlation between online inflation indexes and those published by statistical offices⁹, which suggests lack of differences between online and offline prices.

Hence we can assume that companies do not apply price differentiation by customer's country of origin, and prices in e-commerce to a large extent reflect those in the real economy.

⁹ Among others, Cavallo A. (2013).

3. Estimated scale of price differentiation in cross-border e-commerce in the EU

We identified geo-blocking practices in two separate studies on the final supplier level, using the *mystery shopper* method for goods and touristic services. The first study consisted in concluding a transaction in a given Internet shop using IP addresses from various countries. The second study concerned transactions made through websites of airlines offering flights on selected European routes and portals of hotel chains offering the accommodation booking service, as well as web services aggregating various offers. The conducted studies of shop and web service offers did not show symptoms of geo-blocking in the form of price differentiation in cross-border trade in goods and services. Neither did we establish geo-blocking on the level of price comparison websites.

Quantitative analysis of the prices of 182 products representing the most popular categories in e-commerce allowed for determining the scale of 'natural' price differentiation among the European Union states. The information on prices was obtained from price comparison websites in 25 EU countries with the web *scraping* technique. Results of the study indicate occurrence of price differentiation equal on average ten-plus percent between the EU countries. The differentiation equals from 9% to 13% depending on the product category, and is not connected with geo-blocking in cross-border transactions¹⁰. The direction of the established 'natural' price differentiation is compliant with differences in the prosperity levels of the individual EU countries and with production factor costs. A prerequisite for essential increase in the volume of trade within EU is reduction in the costs of cross-border parcel deliveries.

Differentiation of prices among the EU states is influenced first of all by: cost of capital and the level of GDP *per capita*. Deviation from the median of prices in the EU grows together with the increase in those factors, whereby it is higher for capital.

Geo-blocking in e-commerce in goods in the EU area

The aim of the study was to verify symptoms of geo-blocking in cross-border trade in goods via Internet shops.

Methodology of the study

The study covered 10 products in five countries of the European Union (Hungary, United Kingdom, Germany, Sweden, Poland), representing each of the five main product categories (Table 3). The number of shops offering a given product in a single country was limited to maximally three. All in all, 144 direct links to Internet shops were examined.

¹⁰ The results returned by price comparison websites for different IP addresses were always identical.

Table 3. List of products used in the study.

Category	Subcategory	Product
Clothing	Footwear	Nike Md Runner 2 Ladies
Clothing	Footwear	The North Face W's Snowstrike II
Cosmetics and beauty	Perfumes	Calvin Klein CK ONE for Him edt 100 ml
Cosmetics and beauty	Perfumes	Christian Dior Fahrenheit edt 100 ml
Household appliances	Body care appliances	Braun Oral-B PRO Cross Action 3000
Household appliances	Small household appliances for the home (above EUR 100)	iRobot Roomba 620 Vacuum Cleaning Robot
Electronics	Computer accessories	Logitech K120 USB
Electronics	Game consoles	Microsoft 500 GB Xbox One
Games and software	Software	Microsoft Office 2013 Home & Student
Games and software	Computer games	Assassin's Creed Syndicate (PC)

Each link was opened in the browser using a local IP address and IP addresses from Poland and United Kingdom. Each time, the information on product prices, possibility of delivering the purchase abroad and customer service in multiple languages was recorded.

Thanks to this, making two types of comparisons became possible. Firstly, we compared the contents of each shop's offers visible from the local and a foreign IP address in each of the 5 countries. Secondly, for shops from Hungary, Germany and Sweden we compared the content of offers visible from an IP address from a country with high income level (United Kingdom) and a country with low income level (Poland). Establishment of possible differences in the price and other parameters of the offer depending on the IP address (local vs. foreign, or foreign for Poland and foreign for United Kingdom) would constitute a premise for ascertaining geo-blocking.

Results

In the studied group, we can distinguish four types of Internet shops:

- Shops oriented at local trade. These entities do not offer delivery of goods abroad, and do not maintain multilingual service of their website either.
- Local shops offering the possibility of delivery abroad either in the area of the whole European Union or only to the neighbouring countries. These entities usually provide handling of selected foreign languages (chosen by selecting the country flag). In the United Kingdom and Germany a large percentage of shops offering dispatch maintain website service in the domestic language only.
- Chain stores operating in several countries. These entities maintain multilingual service of their websites. Selection of the language re-routes the customer to the website of the appropriate division in a given country. Local divisions do not offer delivery abroad (e.g., Zalando).
- Chain stores operating in several countries and offering the possibility of dispatch abroad without re-routing (e.g., Amazon).

Table 4 presents information about the studied shops. It concerns offering delivery abroad, handling multiple languages, and the practice of re-routing in case of chain stores.

Table 4. Characteristics of studied shops

	Hungary	United Kingdom	Germany	Sweden	Poland
number of studied shops	29	30	30	27	30
number of shops offering dispatch abroad	1	17	20	3	6
number of shops having multilingual websites	1	11	10	6	7
re-routing to a shop in another state after language change	0	3	2	4	2

In Poland, Hungary and Sweden most shops do not conduct cross-border sales. Those shops do not offer the possibility of delivery abroad, and most often provide website service in the domestic language only. In this group, the weakest level of internationalization characterizes shops from Hungary. In turn, in Germany and United Kingdom over half of the studied shops carry out cross-border transactions of varied range. Poland comes after both these countries, but before Hungary and Sweden.

The costs of dispatch abroad considerably exceed the cost of delivery inside the country, and as a rule are differentiated depending on the destination country. In case of chain stores having multilingual service with re-routing, the prices are expressed in the currency of the selected country. This can cause small differences in prices following from currency conversion.

In face of differentiated openness to cross-border trade between states, we compared price conditions offered by shops in the individual states depending on the IP address of the buyer's computer. It turned out that in the examined group of shops the product price offered and the dispatch conditions displayed on the website are, without any exception, the same regardless of the buyer's IP address. From this result we conclude that:

1. Contents of the commercial offer available to a local buyer do not differ from the contents displayed for buyers identified by a foreign IP address (Polish or British one).
2. Contents of the offer of German, Swedish and Hungarian shops available to buyers identified by IP address from Poland and United Kingdom do not differ either. This means that, regardless of the *per capita* income level, foreign buyers see either identical or very similar offer parameters. In a few cases, differences in the price followed from conversion of the domestic currency - HUF, SEK or EURO – to Polish zlotys or pounds sterling.

Thus in the study we did not find symptoms of applying geo-blocking in cross-border e-commerce in goods.

Study of price differentiation in the flight and hotel services sector

The study of price trends in *e-commerce* in sales of flight tickets and hotel services was conducted for flight connections between selected European tickets and hotel accommodation in the flight arrival cities.

The prices of flights on the selected routes were obtained from the Skyscanner.com web service. Queries to the service were sent from local servers in 5 countries: Poland and four countries with high levels of GDP *per capita* (Netherlands, United Kingdom, France, Germany). The method employed allowed us to verify if there is price differentiation in air carriage services and hotel services among the studied countries.

Results of flight services examination

In order to examine the price differentiation for flight services, we checked the level of flight ticket prices on selected 10 routes within the European Union.

Table 5. Selected routes

Departure airport	Arrival airport
Stockholm ARN	Paris CDG
London LHR	Brussels BRU
Budapest BUD	Warsaw WAW
Madrid MAD	Prague PRG
Amsterdam AMS	Madrid MAD
Berlin SXF	Athens ATH
Brussels BRUS	Rome FCO
Stockholm ARN	London LHR
Frankfurt am Mein FRA	Copenhagen CPH
Budapest BUD	Frankfurt am Mein FRA

For collecting the data, the following procedure was adopted:

1. Route selection (e.g., London-Brussels).
2. Consumer's country selection and connection to the VPN server from the given country (United Kingdom, Germany, France, Netherlands and Poland).
3. Visit at the Skyscanner.com website (the website automatically re-routes the buyer to the appropriate version for the country, e.g., Skyscanner.nl or Skyscanner.pl).
4. Search for direct connections between the above-mentioned airports in the period 11.01.2016 – 16.01.2016 (departure and return dates).
5. Recording of the first 3 offers according to the automatic sorting of the page – total price of a return flight for one person.
6. Change of the connection to the VPN server of a different country. Repeating the actions from Item 3 to 5.

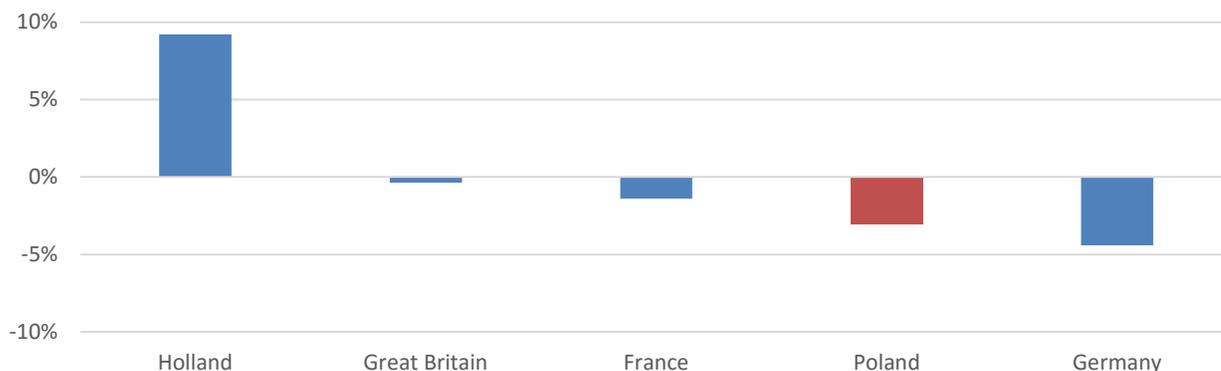
The prices were retrieved in local currencies. For Poland and United Kingdom, the prices were converted to EUR at the exchange rate of the retrieval date. Based on the obtained data, in order to estimate price differentiation, the following values were calculated:

1. Median of the price and the minimum price for single results (e.g., for the London-Brussels route for the VPN connection from the Netherlands).
2. The average of medians and minimums for the individual routes (e.g., for the London-Brussels route for VPN connections from UK, FR, NL, PL, DE).
3. Percentage deviation of the median of the price on a given route for each country from the average of medians (e.g., deviation of the median of prices on the London-Brussels route for VPN from the Netherlands from the average of medians for all VPNs – countries).
4. The averages of percentage deviations from the individual VPNs (countries) on all routes (e.g., average difference in the offers received for VPN from the Netherlands in relation to offers from other countries).

The estimates based on average prices (but also on minimum prices) allowed for studying different groups of consumers – those who do not necessarily search for the lowest price, but also those who are looking for the cheapest offers. The results obtained show that differentiation of offer prices due to the search country is small, whereby the largest differences exist first of all between Netherlands and Germany.

Examination of the differences based on the median shows that consumers from the Netherlands obtain on average 10% more expensive offers than consumers from other states (Figure 5). Customers from Germany can benefit from offers cheaper on average by 4%. Consumers from Poland also obtain on average 3% cheaper offers.

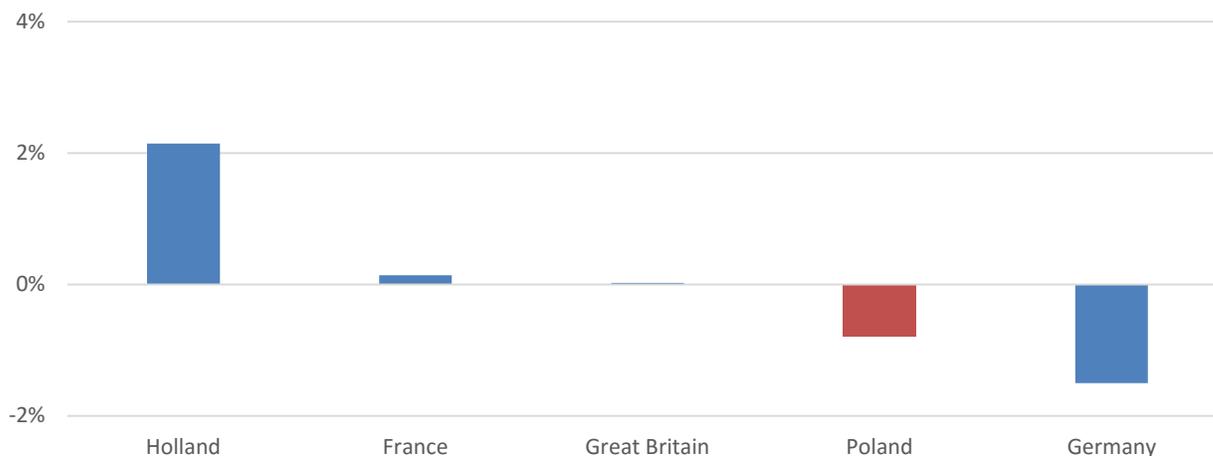
Figure 5. Differences in the obtained offers based on the median, in %



Source: Own elaboration based on Skyscanner.com.

Differences in the minimum prices are lower than in case of the median and do not exceed ± 2 percent (Figure 6). This follows from the fact that well-informed consumers from all the studied countries pay approximately the same prices for the cheapest flights. The structure of differentiation is the same. If we observe differences at all, then consumers from the Netherlands pay more for the cheapest ticket, and consumers from Poland and Germany – less.

Figure 6. Differences in offers based on minimum prices, in %

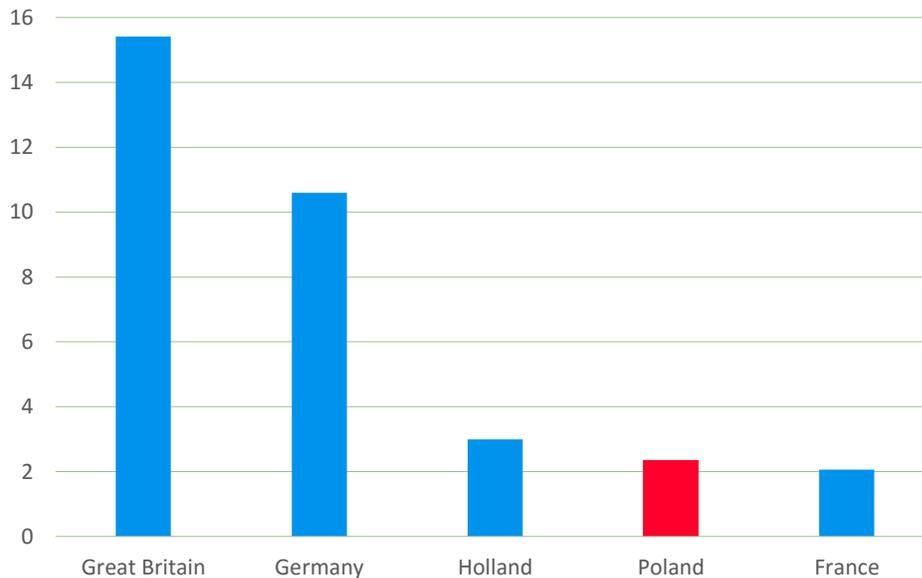


Source: Own elaboration based on Skyscanner.com.

In conclusion, results of the study show a small degree of relative price differentiation in the offer for consumers from the studied countries. What is more, the differentiation is independent of GDP *per capita* – flight tickets in Germany are obtained at a lower price than in Poland. Also the market size (measured by the number of tourists travelling abroad, Figure 6) has no connection with the observed differentiation. United Kingdom and France are countries where the prices do not

deviate from the average, while France is a market not much less than Netherlands from the viewpoint of tourists travelling abroad, and United Kingdom is a market larger than Germany.

Figure 7. Number of tourists travelling abroad in 2014, in millions of people



Source: Eurostat data.

The established differences in prices follow first of all from the fact that search for prices on a given route leads to offers from different carriers. For example, on the Warsaw-Budapest route, a customer from the Netherlands will get an offer for a LOT flight, while a consumer from Poland for a Wizzair flight. Though consumers z Netherlands as a result of search receive on the first three positions offers with higher prices, yet they have the possibility of using a cheaper carrier for the same routes.

Prices for identical flights (with the same carriers) do not differ in a significant way, which means there are no grounds for establishing price differentiation of the third degree.

Results of hotel offer examination

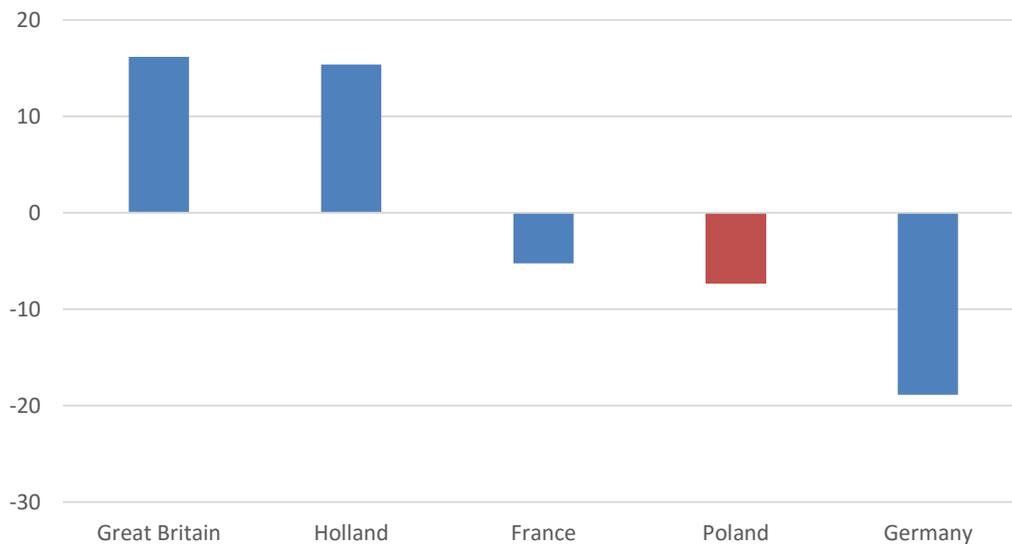
In the study of hotel services we adopted a similar methodology, as in the study of air ticket prices. In case of hotel accommodation prices, we additionally took into consideration the fact that the specifics of Skyscanner is offering „special prices”, so-called „deals”, containing additional reductions. The study covered selected hotels in the following cities:

- Paris,
- London,
- Brussels,
- Budapest,

- Warsaw,
- Madrid,
- Prague,
- Berlin,
- Athens,
- Rome,
- Copenhagen.

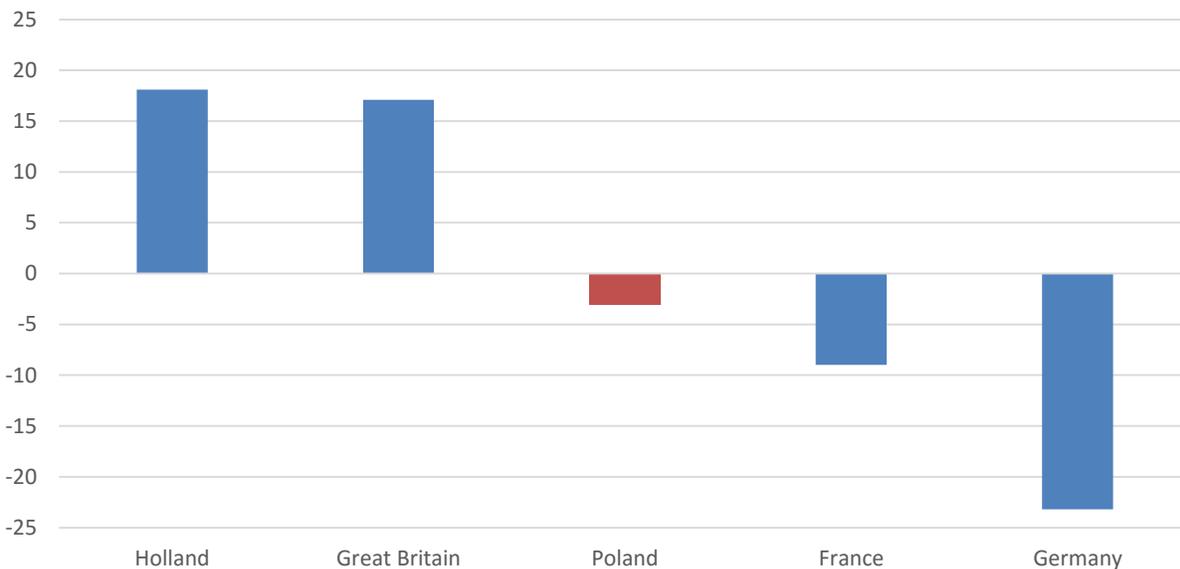
Similarly as in case of air ticket prices, also hotel services are characterized by price differentiation, which does not exceed 20% (Figure 8). Consumers from United Kingdom and – again– from the Netherlands obtain in the search results first of all offers with the highest accommodation prices, while customers from Germany are offered the lowest prices. Like in case of air ticket prices, the reason for this differentiation follows from different prioritization of offers in the Skyscanner web service. As a result, consumers from United Kingdom and from the Netherlands get the same „first” offers, but different than consumers from Poland or Germany.

Figure 8. Differences in the received hotel offers based on the median, in %



Source: Own elaboration based on Skyscanner.com.

Figure 9. Differences in the received hotel offers based on the minimum prices, in %



Source: Own elaboration based on Skyscanner.com.

Analysis of prices in service providers' web services

The results of price analysis in the Skyscanner web service suggest that the differences observed there are not caused by differentiation of prices by the suppliers, but follow only from different prioritization of offers by the price comparison software. Due to the key importance of this issue, we decided to additionally verify our initial result by comparing the prices offered directly by the suppliers of flight and hotel services on their websites using the „mystery customer” procedure.

We have selected the cheapest connections on the routes analyzed earlier, identified by the flight number. Next, using VPN servers from 5 countries, we visited the carrier's website, trying to purchase a ticket. It turned out that single airlines, like Lufthansa, British Airways or Ryanair, provide identical prices for a given flight regardless of the VPN connection. Hence we can state that airlines do not apply the practice of territorial price differentiation.

The differences of prices on Skyscanner.com follow from the operating specifics of that website. Skyscanner finds tickets on several other similar web services besides the air carriers' websites. Web services such as eSky.pl, Opodo.com or Tripair.com collect the prices from the carriers' websites, offering frequently their own reductions. Skyscanner aggregates that information, and allows for choosing the most advantageous offer.

Results on Skyscanner may differ also because some web services are not accessible to all countries. For example, the Lastminute.com service operates in the German, British, Spanish, French, Irish and Italian markets – but not in the Polish and Dutch markets. In addition, the web services operating in the German market are more efficient. An example is the WAW-BUD route, which is served both by the more expensive LOT and the cheaper Wizzair. German web services propose the more economic option of flying in one direction with LOT, and in the other with Wizzair, while Dutch web services offer solely flights with LOT or with Wizzair in both directions, which considerably increases the price.

We have also discovered different prices of hotel services on Skyscanner. The operating mechanism of Skyscanner employed in searching for hotels is identical as in case of flight search: Skyscanner filters other sites which act as an intermediary between the customers and hotels, and shows the best offers. **Differences in prices are also caused by the accessibility of those sites**, e.g., the Skoosh.com web service operates in the English, German, Spanish, French, Italian and Russian markets – but is not accessible in Poland and Netherlands.

We verified our conclusion regarding lack of differentiation in the prices of accommodation in the same hotels by comparing the accommodation prices directly on the websites of hotel chains offering services for more thrifty consumers (IBIS) and premium customers (Radisson BLU). We checked the prices choosing one hotel from each chain in Paris, Amsterdam and Warsaw. The results we obtained show lack of discrimination by hotel chains based on the country (VPN server) from which the enquiry is sent. The prices turned out to be identical for all consumers, regardless of the country of making the reservation.

Analysis of conditions for price differentiation on the Internet in the European Union

Description of the study

The study covered selected products belonging to the main product groups with the largest share in Internet purchases in the EU countries and in Poland:

- clothing,
- games and software,
- cosmetics and beauty,
- household appliances,
- electronics.

At the beginning, the study covered 659 products representing the main product categories listed above, and seventeen more narrow subcategories. The information about the product structure is given in Table B1¹¹. Examination of prices was based on price comparison websites operating in the individual EU countries (see Table B2). This choice allowed us to gather the full scope of offers for the same product available in the individual countries, which was very important for assessing reliability of the study results. At the data collection phase, all price comparison websites were sent an enquiry concerning each of the products. The answers to the product enquiries delivered by the price comparison websites contained, besides the information about the price of each offer, also the Internet shop data.

All in all, over 143 thousand of product price observations were gathered in 25 countries¹². Due to differentiated compliance of the results returned by the websites with the sent enquiry (e.g., in case of lack of the product in the offer, the closest product was returned), strict filters cleaning the data specific for the product were applied. This resulted in obtaining a final set, containing over 32 thousand price observations. In addition, the analysis was limited only to the products, for which price observations were available for at least 10 countries. Eventually, 25,402 price observations for 182 products were qualified for analysis.

¹¹ Tables B1, B2 and B3 are included in an Annex at the end of the document.

¹² In the study we omitted Malta, Cyprus and Luxemburg, since in those countries there are no domestic price comparison websites with the full product scope.

Scale of price differentiation in the European Union

To characterize the level of prices in a given country based on the distribution of prices offered by the individual Internet shops, we employed the median. In contrast to the average value, this measure shows greater robustness to atypical observations¹³.

Geographical coverage for each of product subcategories was on average ten plus countries (see Table B3). Table 6 presents the average level of price differentiation between the countries in the main product groups. The degree of differentiation is expressed by percentage deviation of the median of product price in a given country from the average of all medians in the group of countries where the product was offered by a price comparison website.

¹³ In addition, we removed the observations where the median in a given country deviated by over 35% from the average median in the market. During the verification, those observations turned out to be anomalies following from results returned by the price comparison website in an imprecise way, and did not represent transactions available in the market. The final sample of median prices covered 182 products, and the influence of the discussed data cleaning methods is illustrated in Table B1.

Table 6. Average differentiation of prices among EU countries

Category	Subcategory	Average relative price differentiation	Average number of observations per product in the country
Clothing	Clothing	13.87%	9.91
Clothing	Footwear	12.30%	12.36
Clothing	Accessories	9.88%	7.92
Cosmetics and beauty	Cosmetics	12.90%	12.72
Cosmetics and beauty	Perfumes	12.52%	12.53
Household appliances	Body care appliances	13.10%	5.51
Household appliances	Small household appliances for the kitchen	11.38%	7.06
Household appliances	Small household appliances for the home	9.59%	6.65
Household appliances	Small household appliances for home (above EUR 100)	10.37%	7.02
Electronics	Computer accessories	10.68%	10.05
Electronics	Laptops and computers	11.35%	8.67
Electronics	Monitors	7.79%	9.18
Electronics	Tablets and e-book readers	9.60%	7.36
Electronics	Game consoles	9.60%	10.09
Games and software	Software	11.75%	9.11
Games and software	Computer games	12.34%	7.46
Games and software	Console games	10.74%	7.44

Source: Own elaboration.

All in all, in the whole set of products, differentiation of prices between the countries equals ten plus percent. The greatest percentage price differentiation occurs in the group of household appliances and cosmetics, while the smallest one – in electronics.

Analyzing the percentage price differentiation within the individual countries more closely, we can observe systematic differences (Table 7). In countries like Denmark, France, Sweden, United Kingdom and Italy, the prices (besides clothing) are on average higher for all products categories. In turn, in countries like Poland, Czech Republic or Hungary, for most categories, the prices are significantly lower than the average level. The results below represent an important premise justifying the hypothesis of the dependence of prices on the welfare level of the society. We should stress that in some developed countries, such, as Germany or Austria, prices for the majority of products are slightly lower than the average level in the European Union, which shows competitiveness of those countries' economies.

In addition, analyzing the individual categories, we can observe higher prices for selected product groups in less wealthy countries. This can follow from the specific positioning of some products as luxurious goods, or the wish to place the surplus of an older product version in markets with lower purchasing power.

Table 7. Percentage differentiation of prices among countries within individual categories

Country	Clothing	Cosmetics and beauty	Household appliances	Electronics	Games and software
Austria	3.08%	-5.45%	-1.71%	-0.20%	6.03%
Belgium	-1.91%	0.48%		9.42%	-7.28%
Bulgaria	-0.74%	-12.36%	11.20%	-3.96%	7.16%
Croatia	-8.23%		5.76%	5.43%	6.88%
Czech Republic	1.50%	-8.18%	-1.83%	-2.75%	-3.16%
Denmark	4.95%	13.85%	2.61%	4.87%	2.43%
Estonia		-5.22%	2.02%	-1.40%	-7.51%
Finland			14.44%	6.43%	-3.01%
France	4.50%	9.89%	2.31%	3.67%	0.81%
Greece	8.02%	-0.34%	-0.26%	1.26%	-0.02%
Spain	5.51%	11.75%	-1.26%	6.21%	-0.07%
Netherlands	3.16%	3.65%		4.69%	-12.34%
Ireland	-1.83%	4.95%	6.45%	3.40%	-1.63%
Lithuania	22.41%	9.71%	-1.64%	-1.67%	5.49%
Latvia	5.24%	-6.00%	-4.66%	-7.88%	2.73%
Germany	-0.28%	-2.60%	-12.63%		4.44%
Poland	-15.61%	-15.04%	-15.51%	-10.79%	-12.07%
Portugal	-4.85%	0.63%	33.91%	-11.57%	-5.94%
Romania	-4.01%	2.30%	-2.78%	-0.55%	-0.09%
Slovakia	-4.14%	-6.68%	-4.34%	-3.46%	-7.61%
Slovenia	-9.47%	1.45%	-1.45%	-0.50%	6.64%
Sweden	10.21%	8.88%	8.46%	6.69%	1.97%
Hungary	2.03%	-7.42%	-2.75%	-2.03%	-5.05%
United Kingdom	-3.14%	14.47%	6.62%	6.25%	-4.57%
Italy	-5.97%	5.10%	3.82%	3.12%	5.32%

Source: Own elaboration. Comments: colours represent passing from the smallest values (dark red) to the largest ones (dark blue).

A potentially large role in cross-border trade with Scandinavian countries and United Kingdom, Lithuania, Netherlands and Belgium can be played by Poland, which is the most attractive country in terms of prices in Central Europe. A precondition for substantial increase in the volume of trade with those countries is decreasing the costs of cross-border parcel deliveries to the contractual level of EUR 10. In turn, decreasing the prices of those deliveries to the domestic level (EUR 3-4) would enable Polish Internet shops to enter the German market¹⁴.

¹⁴ Assuming absence of clauses concerning territorial limitations of trade.

Table 8. Size of absolute price differentiation among countries (in EUR)

Country	Clothing	Cosmetics and beauty	Household appliances	Electronics	Games and software
Austria	2.31	-3.35	-5.25	-2.05	2.36
Belgium	0.00	-1.01		41.20	4.12
Bulgaria	2.01	-7.48	16.79	-6.39	3.89
Croatia	-7.68		1.68	12.36	6.03
Czech Republic	1.64	-5.35	0.36	0.53	1.74
Denmark	5.04	7.67	-1.60	3.10	0.78
Estonia		3.06	9.63	-11.29	-27.78
Finland			29.86	9.63	-0.92
France	1.43	2.56	8.35	8.43	-1.91
Greece	6.13	2.85	8.32	15.46	1.77
Spain	4.61	5.11	11.27	21.34	0.58
Netherlands	3.02	0.28		-1.86	-37.27
Ireland	1.25	1.66	-5.89	0.85	1.25
Lithuania	7.55	8.74	2.72	-13.67	2.30
Latvia	3.69	-4.87	-6.73	-21.19	-2.26
Germany	-1.06	-2.07	-2.49		8.47
Poland	-8.86	-6.99	-16.78	-18.77	-12.63
Portugal	-4.68	-3.78	36.95	-30.65	-12.27
Romania	-5.06	2.30	-2.36	0.44	5.02
Slovakia	-3.72	-2.98	-5.61	0.14	-3.51
Slovenia	-9.52	1.20	1.46	4.01	4.45
Sweden	7.97	4.28	6.42	11.30	3.95
Hungary	-0.12	-4.10	-1.45	-8.77	-3.26
United Kingdom	-3.36	9.35	11.96	15.43	-2.32
Italy	-6.49	0.57	3.36	13.20	2.42

Source: Own elaboration. Comments: colours represent passing from the smallest values (dark red) to the largest ones (dark blue)

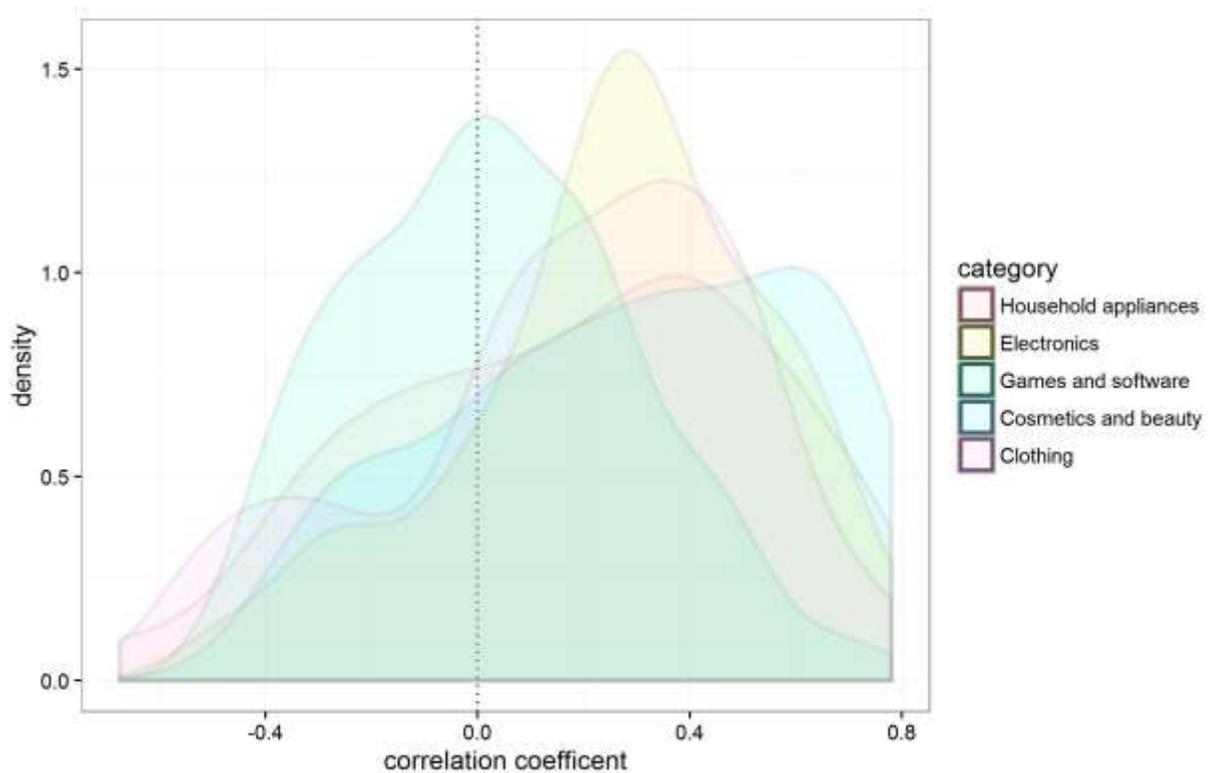
Analysis of Pearson's correlation of median product prices in the individual countries with real GDP *per capita* in a **decisive majority of cases shows positive dependence of the price level on the income**. However, distribution of the correlation coefficient depends on the selected group of products. Our set contains also products for which the correlation of prices and income is negative, which shows that the price level is also conditional on other elements than the purchasing power of consumers. The products with negative (and statistically significant) correlation occur in all five product groups. Table 9 presents five products with the lowest and the highest correlation coefficients in the whole data set.

Table 9. Correlation coefficients of prices and *per capita* income for selected products

Product query	Category	Subcategory	Correlation coefficient	Average value
KitchenAid 5KSM150PSEER	Household appliances	Small household appliances for the kitchen	-0.6748	0.0041
Casio G-Shock GA-100-1A1ER	Clothing	Accesories	-0.5289	0.0771
Casio G-Shock GA-100-1A4ER	Clothing	Accesories	-0.5100	0.0625
Eizo Cs240-Bk	Electronics	Monitors	-0.4832	0.0494
Batman Arkham Knight (PS4)	Games and software	Console games	-0.4171	0.0851
Remington AS7051 Volume & Curl	Household appliances	Body care appliances	0.7114	0.0095
ck one 100 ml	Cosmetics and beauty	Perfumes	0.7262	0.0006
Electrolux EDB6130	Household appliances	Small household appliances for the home	0.7430	0.0015
The North Face Snowstrike II	Clothing	Footwear	0.7730	0.0032
LG 19M37A-B	Electronics	Monitors	0.7805	0.0006

Source: Own elaboration.

Figure 10. Distribution of the correlation coefficient for the median of product prices and real income *per capita*



Source: Own elaboration.

Determinants of price differentiation on the Internet

Differentiation of prices in the EU countries follows from factors like the cost of manufacturing goods and the purchasing power of the population, or those following from differentiated conditions of pursuing economic activity in the individual countries. Differentiation of prices may also follow from macroeconomic factors. Though at present in the EU we can observe strong convergence of interest rates, inflation or fluctuation of real exchange rates, in other areas there is still high differentiation (Annex C).

In the study we verify to what extent supply and demand factors influence price differentiation in EU states. We will start with analysis of objective preconditions for price differentiation, taking into account in the analysis (i) production factor costs available in the Eurostat statistical bases, such as unit labour cost, unit cost of energy and transport fuels, as well as cost of capital; and (ii) demand and supply factors, such as average annual net salary in the sectors of services and enterprises, GDP *per capita* and the level of standard VAT rate.

The scale of differences in these factors among the Member States of the European Union, translating in a natural way to prices of goods and services, is quite large (Table 10).

Table 10. Descriptive statistics for cost, demand and supply determinants in the EU countries

Variable	average	median	min	max	standard deviation
Unit cost of labour [EUR/h]	18.96	15.60	3.80	40.30	11.87
Average annual net salary [EUR/full time] (*)	13455	11960	2668	28583	7973
Electric energy price [EUR/kwh]	0.18	0.17	0.09	0.30	0.06
Euro95 petrol price [EUR/litre]	1.31	1.34	1.10	1.57	0.14
Diesel fuel price [EUR/litre]	1.24	1.23	1.05	1.54	0.11
Cost of capital - interest rate [%] (a)	1.80	1.26	0.31	7.81	1.57
Standard VAT rate [%] (b)	21.61	21.00	17.00	27.00	2.35

Source: Eurostat, average annual data (2014) except for (a) ECB (status as at 31/10/2015), (b) DG TAXUD (status as at 1/09/2015).

To assess the real, statistically measurable influence of those factors on the differentiation of prices in the EU countries, we have conducted linear regression analysis. The variable explained in the model was percentage deviation of the median of product prices in a given country from the average of medians for all countries where the product was offered for online sale; in this way, we can assess to what extent differentiation of prices in *e-commerce* follows from objective factors, and which of those factors have the strongest influence on that differentiation.

As implied by the conducted analysis (results of the regression are given in Annex D), differentiation of prices among the EU countries is conditional first of all on two factors: cost of capital (the 'interest_rate' variable) and the level of GDP *per capita* (the 'GDP' variable). Estimations of parameters for both variables follow the expected direction: along with the increase in cost of capital in a given country by 1 percentage point, the deviation of (an arbitrary) product price in that country from the median of prices in the EU increases by 0.4 percentage point. In turn, increase in GDP *per capita* by EUR thousand is connected with increase in deviation of the price in the given country from the median of prices in the EU by 0.22 percentage point.

The influence of the GDP variable can be illustrated on the example of Poland and United Kingdom, whose GDP levels are, respectively, EUR 11 thousand and 41 thousand. Based on the

model, we can determine that in the group of studied products the prices in Poland will be, due to the differences in income, on average 6.6 percentage point lower than in the United Kingdom.

Other variables distinguished in the model show systematic differences in the price level between the individual product categories. For example, the positive coefficient at the 'Perfumes' variable means that, with all other factors unchanged, the deviation of perfume price in a given country will be by 3 percentage points higher than for other studied products.

Interesting conclusions are also provided by the results describing which variables proved to be statistically inessential in the model explaining deviation of prices. First and foremost, these are the VAT rate level, and fuel and energy costs. VAT rates are established on the national level, and depend on the fiscal policy of the individual EU countries. Hence the observed differentiation does not depend on their welfare levels. Fuel and energy costs are not essential variables in the model, since their share in the costs of a pursuing commercial activity is relatively low¹⁵.

¹⁵ In addition, unit energy costs are sometimes higher in less developed countries due to a greater share of more expensive fossil fuels (e.g., coal or gas) in the energy balances and less efficient production capacities.

4. Factors determining dynamics of e-commerce development

Factors that can constitute an objective premise for differentiating prices, and in consequence a barrier to e-commerce development, may result from the differences occurring in legal regulations of the individual Member States concerning contracts. As a result, obligations of parties to sales or service provision contracts are regulated in different way. These are factors like differentiation of postal regulations, and in consequence charges, differentiation in the law of contracts, copyright conditions, etc.

There are many objective reasons that influence the rationality of price differentiation from the seller's or service provider's perspective. Those reasons follow basically from the differences in provisions of law concerning the individual aspects of an *e-commerce* transaction. Among the most important factors, we can list the following:

- Differentiation of postal regulations and charges,
- Regime of seller's liability for defects in goods,
- Differentiation in the law of contracts,
- Problems of pursuing claims,
- Copyright terms,
- Privacy protection requirements,
- Creation and operation of service infrastructure,
- Differentiation of technical standards,
- Aspect of payment for goods or for service.

Differentiation of postal regulations and charges

Dispatch of goods is as a rule part of an *e-commerce* transaction. European law does not unify postal systems or the provisions which regulate the parcel market¹⁶, but liberalizes that market using the so-called Postal Directives and sets the minimum quality standards¹⁷. As a result, the way of providing postal and courier services is regulated, as a rule, by national laws and international agreements, while European law only contains certain limited regulations which harmonize national laws.

Differentiation in legal regulations of Member States applicable to parcels with goods leads to domination of the market by local operators. Enterprises with global reach (among others, UPS, DHL, TNT Express) focus on B2B turnover, and their services are characterized by relatively high costs, which follow, among others, from the need to apply differentiated provisions of law. Within e-commerce, a parcel sent from a supplier in one state to a recipient in another country must correspond to the requirements of at least two different postal legislations.

In addition, the ranges of services available in different EU states are different. In practice, there are essential differences among EU states with regard to requirements and prices concerning

¹⁶ See Z. Szańcyk, *Świadczenie pocztowej usługi powszechnej w warunkach liberalizacji rynku*, Warszawa 2015, p. 2.

¹⁷ See Directive 97/67/EC of the European Parliament and of the Council of 15 December 1997 on common rules for the development of the internal market of Community postal services and the improvement of quality of service (Off. J. EC L 15 of 21.1.1998 r., pp. 14–21); changed by Directive 2002/39/EC and Directive 2008/6/EC). It focuses on improving the quality of services, and its aim is „greater harmonization” of the market of postal services, which can be recognized at most as a step towards a unified parcel market of the whole European Union.

parcel types, sending-receiving labels, charge systems, available range of services, parcel identification and tracking systems and delivery times. In addition, the individual postal systems are characterized by different efficiencies, which can be attributed on the one hand to different degrees of postal market de-monopolization, and on the other hand – to historical adjustment to the market of letters rather than parcels.

Differentiation in the costs of delivering goods and other terms of this service is also affected by the location of consumer's seat, e.g., in a remote or sparsely populated territory. The operation of postal operators assumes low costs of services wherever the economies of scale can be achieved (the more mail pieces, the lower the unit price). However, in regions with small population or either peripheral or atypical location (e.g., islands), the costs of delivering goods to the consumer are higher. This type of differentiation may remain even in the hypothetical case of unifying the parcel market on the whole EU scale.

We have examined the differentiation in parcel prices on the example of 11 EU countries. We have analyzed prices of standard parcels of up to 3 kg in weight, with insurance up to EUR 100. The data on prices has been obtained from the ecoparcels.eu service, which delivers parcels inside the EU, acting as a broker based on cooperation with the greatest courier companies (GLS, DPD). The list of prices is presented in Table 11.

Table 11. Prices for sending a parcel up to 3 kg between exemplary EU countries (in EUR, exclusive of VAT)

Dispatch country	Parcel reception country										
	England	Belgium	Czech Republic	France	Spain	Netherlands	Germany	Poland	Romania	Hungary	Italy
England		16.85	17.87	20.76	BD	17.77	16.74	17.72	20.21	17.87	18.41
Belgium	19.20		27.60	26.40	21.60	27.60	20.40	16.80	16.80	15.60	23.40
Czech Republic	20.40	27.60		20.40	21.60	19.20	19.20	16.80	16.80	15.60	21.00
France	15.60	21.60	19.20		24.00	19.20	13.20	19.20	16.80	16.80	19.80
Spain	18.71	22.80	23.40	24.00		22.80	22.80	22.80	18.00	18.00	24.60
Netherlands	19.20	27.60	19.20	15.60	22.80		19.20	16.80	19.20	19.20	23.40
Germany	22.80	15.60	19.20	19.20	22.80	19.20		16.80	19.20	21.60	24.60
Poland	27.60	16.80	16.80	27.60	22.80	16.80	16.80		16.80	15.60	29.40
Romania	22.80	16.80	16.80	16.80	18.00	19.20	19.20	16.80		ND	23.40
Hungary	16.80	12.00	12.00	16.80	18.00	15.60	18.00	12.00	ND		12.00
Italy	24.00	18.00	16.20	22.80	24.60	18.00	19.20	24.00	13.20	13.20	

Source: Own elaboration based on Ecoparcel.eu. Comments: colours represent passing from the smallest values (dark red) to the largest ones (dark blue). ND = no data.

The costs of transport are characterized by significant differentiation: from EUR 12 (parcels from Hungary) up to EUR 29.40 (parcel from Poland to Italy). Specific determinants for the observed differentiation of parcel prices - for example, by distance or income in the country - are difficult to identify. On the one hand, we can observe relatively cheap long distance parcel deliveries (Hungary-Netherlands), and on the other hand - relatively expensive ones to neighbouring countries (Belgium-Netherlands, EUR 27.60 euro).

Table 12. Average prices for sending a parcel (over 3 kg) „from” and „to” selected EU countries (in the increasing order)

Average price of sending a parcel from a given country		Average price of sending a parcel to a given country	
Hungary	14.80	Hungary	17,05
England	18.24	Romania	17,45
France	18.54	Germany	17,67
Romania	18.87	Poland	17,73
Germany	19.15	Belgium	18,78
Italy	19.32	Netherlands	19,54
Poland	20.21	Czech Republic	19,69
Netherlands	20.22	England	20,71
Belgium	20.58	France	21,04
Czech Republic	20.63	Spain	21,60
Spain	21.61	Italy	22,00

Source: Own elaboration based on ecoparcel.eu.

Among the cheapest countries for parcel dispatch, we should point out Hungary, but just behind it there is United Kingdom – one of the largest and most developed EU economies. On the other hand, Spain is among the most expensive countries, but just behind it we have Czech Republic.

Quantitative analysis shows lack of correlation between the costs of dispatch from a given country and its real income *per capita* (correlation coefficient on the level of 0.08, with the p-value equal 0.25). However, for costs of dispatch to a given country, we can note a small **positive dependency between the dispatch costs and the income** (correlation coefficient equal 0.16, with p-value of 0.01).

The above analysis indicates the lack of possibility for the countries to make use of lower prices in cross-border e-commerce due to the transport service price (as shown in Chapter 3, most of the price differentiation is on a scale under EUR 20). This is only possible for consumers in wealthier countries, i.e. those that could be possibly interested in buying goods at lower prices in less wealthy countries.

Regime of seller's liability for defects in goods

At present, Member States' regulations which determine seller's liability for defects in goods in B2C trade are harmonized only with respect to the minimum standard¹⁸. The individual states grant consumers different rights in that scope. No member state permits depriving consumers of post-sale rights or their reducing to a level below the minimum requirements¹⁹. We should point out here that numerous EU states have considerably extended the scope of consumer protection with respect to the European law standard. Moreover, in the individual states the situation may in addition change with time.

Differentiation of post-sale obligations in trade with consumers (B2C) justifies the sellers' practice of applying price differentiation depending on the country where they sell their goods.

In turn, in professional trade (B2B), the liability for defects in sold goods may be limited, extended or waived in the contract²⁰.

The differentiation of legal regimes concerning liability for defects in goods is the subject matter of European Commission's attention. Undertaking of legislative actions aimed at unifying the seller's liability regime in case of distance sales, in particular online²¹ sales, is proposed. The EC proposes unification of the regime of liability for quality of goods within online sales, which would allow for overcoming the particularism of internal laws in this area, but only with respect to "distance" trade. Should that Directive be adopted and implemented in all EU Member States, the premise for price differentiation due to the non-uniform principles of seller's liability for sold goods across EU states could expire.

An essential improvement with respect to the sellers' liability for digital contents, leading to development of this market segment, should be brought by the planned directive on certain aspects

¹⁸ The common property of those regulations is, however, their unconditionally binding character.

¹⁹ The minimum standards are set forth by Directive 1999/44/EC on certain aspects of the sale of consumer goods and associated guarantees, changed by Directive 2011/83/EU.

²⁰ This claim is not refuted by the fact that Viennese Convention on International Sale of Goods of 11.04.1980 is valid in B2B trade for over 70 states in the world. The Convention is an optional tool - see its Art. 6 - and regulates, among others, seller's reliability for non-compliance of the goods with the contract. However, also this single aspect of the transaction can be modified according to the parties' will - see Art. 36 of the Convention.

²¹ The draft *Directive on certain aspects concerning contracts for the online and other distance sales of goods* (COM(2015)635, presented by the European Commission in December 2015.

of contracts for delivery of digital contents²². The directive would allegedly introduce a legal regime of seller's liability for digital contents analogous like in case of goods.

Differentiation in the law of contracts in European Union states

Up to now, the European Union has not unified the law of contracts. The Internal laws of Member States regulate mutual obligations of parties to sale contracts or service provision contracts in different ways. Such a state of things affects the seller's or service provider's risk involved in addressing goods or services to the individual Member States. This issue is of particular importance for B2C trade, since it is governed by the principle that consumer's country law applies in cross-border trade.

The Member States' law of contracts is harmonized in the EU only in the areas which are important from the viewpoint of EU goals, including especially that of building the internal market. Those issues do not include assessment of legal effectiveness of concluding a contract with respect to its legal form (the requirement of a special legal form implies higher transaction cost) or the time of transferring ownership of the purchased item. For example, German law states that ownership of the purchased item passes to the buyer only upon its issuing. In turn, Polish law transfers ownership basically already at the contract conclusion time. This type of circumstances may influence the type and scope of liability of parties to the contract- e.g., if the item is lost on its way from the seller to the buyer.

There are also differences with respect to services provision contracts. Depending on the member state, mutual obligations of the parties are regulated differently in such contracts, which influences the scope of service provider's service and justifies applying different price terms in the individual states.

The above problem is of limited importance for B2B trade, since under it the parties have in principle the right to choose the legal regime governing the contract they are concluding. Then customer's freedom is limited to the choice whether to conclude the contract or not. The use of templates is a common phenomenon both in B2B trade and in B2C trade, whereby only in the latter case European law imposes limitations protecting consumers from the consequences of using templates containing so-called abusive clauses (prohibited contractual provisions).

However, in the B2C trade the right to choose the legal regime is very limited. The governing law for the contract between the consumer and the entrepreneur is, as a rule, law of the state where the consumer has his/her place of residence²³. An additional requirement is that this must also be the state where the entrepreneur pursues its activity, or a state that the entrepreneur's activity is addressed to.

In the practice of *e-commerce*, there are essential doubts as to the meaning of the latter condition. This suggests the question whether the accessibility of the entrepreneur's website from a given EU state and the possibility of making a purchase via this site by a consumer from other member state is tantamount to fulfilling that condition. The criterion of „addressing the activity to other European Union state” is interpreted rather broadly in the judgments of the Court of Justice²⁴. In the practice of *e-commerce* under B2C trade, this results in the necessity of using various legal

²² COM(2015)634

²³ Regulation no 593/2008 (Rome I)

²⁴ The judgments issued by the Court of Justice of the European Union point out a number of conditions which allow for qualifying a website as addressed also to consumers from other EU states, including, among others, using other currency in descriptions of prices, indication of an international character of entrepreneur's activity posted on the website, and even such elements as displaying phone numbers with international prefix, or the possibility of using the website in a language other than the language of the state of entrepreneur's seat.

systems. **The differentiated level of consumer protection following from those laws can doubtlessly justify applying the price differentiation mechanism.**

Problems of pursuing claims

European law as a rule does not regulate court proceedings on pursuing contractual claims²⁵. European law only offers limited tools for simplifying pursuit of claims in trans-border trade under *e-commerce*, usually oriented at protecting consumers' interests. As result, an entity which addresses its goods or services to individual states of the European Union must take into account the necessity of conducting litigation according to regulations of the individual states. The judiciary in Member States are organized in a differentiated way (e.g., with regard to the conditions of access to court or applied charges). This influences the cost of pursuing claims, which is different depending on the member state.

The problem of differentiated rules of practice is only to a limited extent counteracted by the institutions of European law. The European order for payment²⁶ allows an entity pursuing a claim to obtain an order for payment which will be effective in other member state too. However, this regulation is important mainly in the B2B trade, where obtaining an injunction at the court of the contract performance place is possible. In trade with participation of consumers (B2C), legal action should be initiated at the court of the consumer's place of residence. In addition, the European order for payment can only be issued with respect to money claims, so only in part of the cases. Filing of a protest against such an order results in initiating ordinary civil proceedings at the court which has issued the order, according to the procedure of the state where that court operates. Thus the function of the European order for payment is limited to facilitating pursuit of virtually undisputable claims, due to which its importance as an element removing the discussed barrier is negligible.

The regulation on jurisdiction, recognizing court judgments and their enforcement in civil and commercial cases²⁷ regulates the problems of international jurisdiction in civil and commercial cases. The regulation allows for different ways of concluding an agreement on jurisdiction, also with respect to trade under *e-commerce*²⁸.

The possibility of resolving disputes in the supplier's country at one court and according to the rules of practice of that country would eliminate the issue of pursuing claims as an argument for applying the price differentiation mechanism. However, an agreement on jurisdiction by its very nature requires the consent of the other party, which seems difficult to obtain, and within B2C trade is in addition actually and legally impossible, for the mentioned regulation unequivocally resolves that the competent court is the court of consumer's place of residence²⁹. On the other hand, the consumer can sue the supplier both at the supplier's seat court and at the court of the consumer's own place of residence.

Within B2B trade, there is a general binding principle that legal action should be initiated at the court of the defendant's seat, or at the court competent for the place where the contract is to be performed.

²⁵ However, there are binding point regulations in the form of EU regulations on the European order for payment and on small claims.

²⁶ Regulation (EC) no. 1896/2006 of the European Parliament and of the Council of 12 December 2006, instituting proceedings on the European order for payment; Off. J. EU L 399 of 30.12.2006 pp. 1-32.

²⁷ Regulation (EU) no 1215/2012, the so-called Regulation (Brussels I). The Regulation superseded the earlier Regulation no 44/2001 as of 10 January 2015.

²⁸ See P. Polański, „Europejskie prawo handlu elektronicznego”, Warsaw 2014, p. 170.

²⁹ See *ibidem*, p 175.

The legal instrument trying to counteract the above difficulties is the regulation on European Small Claims Procedure³⁰. However, that procedure is not suitable for resolving matters of greater degree of complexity, which is important especially in trade in intangible goods, limits the value of the subject matter of dispute to EUR 2000, which in practice meets part of the consumers' needs, but is a too low a threshold from the viewpoint of B2B trade. Moreover, it does not apply to the Kingdom of Denmark.

The problem of differentiation in the rules of practice across the EU states discussed above influences the cost of pursuing claims, and constitutes an objective premise for price differentiation in cross-border trade within the EU.

The Online Dispute Resolution (ODR) platform for resolving disputes out-of-court, to be launched on 15 February 2016, can hardly give any hopes for expiration of the discussed premise for price differentiation in cross-border trade. This is because that regulation, similarly as the already implemented legislative solutions within ADR (Alternative Dispute Resolutions), is of a basically pro-consumer character, and does not serve entrepreneurs' interests in an adequate degree. From consumer's perspective, choosing the court avenue might still prove more advantageous, especially that, potentially, the consumer may count on a rather passive attitude in the dispute on the part of a cross-border supplier, for which – especially in single cases – it will not pay to engage actively in court proceedings abroad. When calculating prices in the individual markets, it is still advisable to take into account the differentiation of internal laws and the costs following from this fact.

The copyright determinant

Within *e-commerce*, trade in digital contents takes place especially frequently. Hence that trade is marked by the influence of the specifics of intellectual property law, which applies the so-called territoriality principle. The subject matter of a copyright transaction is not as a rule the disposal of copyright, but only granting of a specific right to making use of the work (licence). Licences are granted by an entity holding property copyright and often take the form of territorial licences. **The existence of such licences, their different costs for the individual areas, as well as differentiation of other terms of making use of the works applied in those licences, can result in applying geo-blocking of access to digital contents and the price differentiation mechanism (which is the subject matter of the study presented in the report).**

Lack of a tangible form of the goods results in a specific transaction contract, which resembles a service contract more than a sales contract. The entity making the „sale” of digital contents does not get rid of those contents, but makes them available – grants a licence for them – on the principles described in the contract.

At present, the licence system is not in principle regulated by the European law, but the Court of Justice has adjudicated³¹ that parties having rights under the copyright and services providers may, as a rule, conclude licence contracts based on the territoriality criterion, but may not include in the licence contracts any clauses on exclusivity of the licence for a given territory which would violate the competition law and the treaty-based freedom of service provision³².

³⁰ Regulation (EC) no 861/2007 of the European Parliament and of the Council of 11 July 2007 establishing a European Small Claims Procedure; Off.J. L 199 of 31.7.2007 pp. 1-22.

³¹ Judgments C-403/08 and C-429/08.

³² See Commission Staff Working Document – A Digital Single Market Strategy for Europe – Analysis and Evidence, COM (2015) 192 final, p. 28.

Nevertheless, the EU legislator has taken actions with regard to introducing multi-territorial licences for music made available online. However, the relevant directive³³ has a relatively narrow regulation scope, since it disregards digital contents other than music made available online.

Lack of the licence for a given territory implies the necessity to apply territorial geo-blocking. In turn, specific licence terms can result in different access rules, as well as a different range and cost of services for buyers from different Member States.

An important tool for improving the operation of the internal market, and at the same time an important stage in forming JRC, can prove the draft Regulation „on providing the possibility of cross-border transfer in the internal market of online content services“³⁴, being at present processed at the Council. According to the Commission’s intentions, the regulation is to enable free use of digital contents purchased in one member state in other EU states. The conception embodied in the draft Regulation provides for both elimination of already existing cases of geo-blocking, which consist, e.g., in preventing the use of purchased music or films during a holiday in another member state, and counteracting potential attempts to apply geo-blocking in future. Indeed, fast development of digital economy will lead to establishment of new services with yet unknown properties. It is of essential importance that those services could develop in a possibly free way – without the geo-blocking mechanism, and that limitations following from the macro-economically ineffective system of private licences be minimized, if not eliminated outright, with the method of legislative influence on the market.

Privacy protection requirements

Partial harmonization of the personal data protection law in the European Union results in non-uniformity of the internal market. This applies in particular to pre-sale marketing actions. This factor causes different operating costs in the individual markets, and so can justify differentiation of prices, which is important especially for delivering digital contents.

The problems of personal data remain under protection of Member States’ laws, which are harmonized in this scope by the European law. The basic directive devoted to this matter – 95/46/EC – dates back to 1995³⁵, and is supplemented by a regulation of 2002, devoted specifically to the electronic market³⁶. However, the mentioned regulations originate from the period when development of *e-commerce* was in an initial phase. Moreover, these Directives do not regulate personal data protection in a comprehensive way, but only in the main aspects of this process.

The individual Member States try either to develop provisions of the Directive, or to create their own personal data protection conceptions in more detailed areas. Such a state of things results in fragmentarization of the internal market. However, problems connected with the latter are to be solved by a general data protection regulation³⁷, which is already at an advanced stage of the

³³ Directive of the European Parliament and of the Council 2014/26/EU of 26 February 2014 on collective management of copyright and related rights and multi-territorial licensing of rights to musical works for online use in the internal market, Off. J. L 84 of 20.3.2014, pp. 72-98. The Directive is to be implemented by member states by 10.04.2016.

³⁴ COM(2015) 627 final

³⁵ Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data, Off. J. L 281 of 23.11.95, p. 31.

³⁶ Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector, Off. J. EU L 201 of 31.7.2002, pp. 37-47.

³⁷ Motion – Regulation of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data and on the free movement of such data (general regulation on data protection), COM (2012) 11 final; inter-institutional reference number (COD) – 2012/0011; see. also: See Commission Staff Working Document – A Digital Single Market Strategy for Europe – Analysis and Evidence, COM (2015) 192 final, p. 46. It will replace outdated regulations of Directive 95/46/EC, as well as modernize Directive 2002/58/EC, devoted to electronic market.

legislation process. The said regulation is to introduce unified data processing and protection rules, directly applicable in all Member States. Though the regulation will preserve the system of national data processing supervision bodies, it will nevertheless take into account, with respect to issues of cross-border range, the necessity to form a uniform official practice on the part of authorities supervising personal data processing in the Member States. The expected publication time of the regulation text will be in spring 2016³⁸, and its provisions will come into force with respect to Member States in mid-2018. However, until the commencement date of the regulation, major fragmentarization of personal data protection law in the internal EU market is an undisputable fact, and can justify applying price differentiation.

Creation and operation of service infrastructure

National laws, as well as contracts themselves, impose on the sellers the obligation of repairing damages resulting from the defects present in the goods at the time of sale. Within *e-commerce*, deliveries of goods take place because of a transaction concluded remotely via the Internet. In the situation when the seller addresses the sale to another member state, enforcement of claims following from warranty is connected with the need to establish the appropriate service infrastructure. The significantly lower salaries and lower prices of transport services in Poland and in other new EU Member States compared to the „countries of the old fifteen” result in lower operating costs of the service network, and can justify lower prices of goods serviced by this network.

Guarantee obligations of sellers follow either from the provisions of law or from the concluded contracts. In B2B trade, warranty terms may be specified by the contract, while B2C trade is governed by statutory national regulations, which – as discussed above – regulate the scope of consumer protection *in plus* with respect to the model following from the provisions of EU law³⁹.

The characteristic feature of labour-consuming repair services provided in Poland and other „new” Member States is their cost, lower than in Western Europe and conditional on lower labour costs in this sector. Potential repair costs must be included in the price of delivered goods, so application of price differentiation by sellers in cross-border sales is objectively justified

Differentiation of technical standards

With respect to technical standards, European law focuses on the issue of security norms. A means to this end is the obligation of notifying technical regulations, which, however, are not uniform. Part of the technical infrastructure of the Member States was built before the European integration. As a result, there are differences in technical standards, which can have an objective impact on price differentiation.

In the scope covered by normative directives of the so-called „new approach”⁴⁰, in order for certain goods to be marketed for the first time in the European Union, they must be subjected to the compliance assessment procedure required by the EU Directives appropriate for that product. In

³⁸ After the presentation on 17 December 2015 of the position of the parliamentary Commission for Civic Freedoms, Justice and Internal Affairs, the text of the draft regulation was approved by Committee of Permanent Representatives (COREPER). The next stage will be the Council taking a position, and sending of the draft to the European Parliament for adoption in plenary voting.

³⁹ Directive 99/44/EC.

⁴⁰ Up to now, almost thirty „New Approach” directives have been adopted, which define requirements with respect to large product groups, including machines, toys, medical, electrical and electronical products, building materials, etc. Each of those directives contains certain basic elements – specifies the scope of products it applies to, and often contains exception lists as well. The basic safety requirements which should be met by a product subject to the directive are, as a rule, contained in appendixes.

many cases, the compliance assessment procedure requires participation of a third party, i.e. the notified entity, which issues the compliance document. The producer prepares the product compliance declaration and places on the product the compliance symbol CE, honoured by all countries of the European Union.

Besides legal issues subject to harmonization under the mentioned “new approach”⁴¹ directives, there are numerous regulation areas which are not being unified. E.g., electrical infrastructure in the EU states uses voltages from 220V to 240V and several types of electrical sockets and plugs, partly or wholly incompatible with each other. The coding standards of colour TV also differ (PAL/SECAM). Different technical regulations apply to goods not covered by those directives, as well as based on the so-called “exception lists” provided for there. The state of things in this area stems from the differentiated traditions and regulations of the individual Member States; those regulations often originate still from the times before the European integration. The requirement of adjusting goods to local conditions and technical requirements can be an objective factor for price differentiation.

Aspect of payment for goods or service

Payment for goods or a service in the international trade under *e-commerce* is most often made using electronic payments with payment cards, which involve costs in the form of card operator remuneration. However, in domestic markets, we commonly encounter payments via settlement systems of the *e-pay* type, or traditional systems (bank transfer based on a bill or invoice after delivery, or else a prepayment document before delivery). As a result, the price of goods or services offered to foreign customers must include a higher transaction cost, which is an objective factor of price differentiation.

There are solutions aimed at facilitating and reducing the cost of bank services performed between entities from different EU states. E.g., SEPA (*Single European Payment Area*) bank transfers, which – each time when they are performed in euro – should have uniform cost, regardless of whether they concern entities from the same member state or different ones. By assumption, they should allow for offering in international trade in the EU payment forms analogous to those encountered in the domestic markets. However, there are significant differences in costs and bank services among the Member States. In the banking practice, SEPA transfers are offered at a higher price than traditional ones.

Summary

The aim of the report is to enhance the knowledge of the geo-blocking and price differentiation practices, and assess the occurrence of this phenomenon in cross-border e-commerce in the European Union.

The geo-blocking phenomenon should be analysed in a broader context.

- Firstly, in the context of differentiation in prices of goods and services in the ground trade in the EU area: because we can speak of unjustified geographical blocking only in the case when online differentiation of prices deviates from their differentiation in the offline trade.
- Secondly, determinants of geo-blocking practices and their forms should be taken into consideration: not all business models of e-commerce allow this type of practices; the situation with sale of goods is also different from that with sale of services; for a certain type of companies, applying geographical blocking also involves reputation risk. An in-depth analysis of the forms of this phenomenon is a precondition for selecting for empirical study such cases and such methodology which will enable giving a credible answer to the question about the occurrence scale of geo-blocking.
- Thirdly, regardless of the results of this study, to obtain a full picture of the barriers that limit development of the e-commerce market in the EU area, we need analysis of other factors that may potentially influence the tendency of companies and consumers to enter into online transactions. The most important among those factors seem to be internal legal regulations in the individual EU countries, and in case of trade in goods – parcel delivery costs. Additionally, a factor of essential importance can be differentiation in the motivations and profiles of online transactions in the individual EU countries; analysis of that differentiation may reveal deeper determinants for entering the e-commerce market.

The report consist of four main parts, in which we consecutively point out the importance and structure of e-commerce in the EU, present the business models and reasons for price differentiation in cross-border e-commerce in the EU, and then estimate the scope and scale of the price differentiation phenomenon, ending with pointing out regulatory issues that can pose a barrier to the development of e-commerce. Below we present the main conclusions from the individual areas.

What do we know about e-commerce?

- The share of consumers making use of e-commerce in Poland is lower (ca. 34% people) than in the countries of the „old” European Union (e.g. in the United Kingdom it even reaches 70%).
- The main reason why consumers decide for online purchases is the chance of getting a lower price. This determines the structure of Polish *e-commerce*.
- The Poles less frequently than citizens of the „old” EU make use of services ordered via the Internet (flight tickets, accommodation).
- A substantial majority of Polish consumers buy from domestic sellers, and from other EU countries – only 5% of them. This also follows from the fact that the Poles look for

cheaper products, more often available locally and from intermediaries offering products from cheap import.

- The share of enterprises engaging in e-commerce is much lower (about 12%) than in EU15 countries (ca. 18%) or in the NMS12 group of new member countries (15%). Moreover, these are first of all large companies.

- Relatively the greatest number of Polish enterprises offer their services for foreign consumers via the website in the accommodation sector and in the information and communication sector.

Do companies actually apply geo-blocking?

- The greatest possibilities of applying geographical price differentiation occur in case of e-shop models.

- Price differentiation applied by companies involves reputation risk connected with negative perception of price differentiation practices by consumers, which can be a significant obstacle to unjustified price discrimination.

- The reputation risk is the bigger the more competitive the market is, the greater number of entities the seller cooperates with, and the easier access to price information customers have. This is why companies engaged in e-commerce are exposed to very high reputation risk.

- Geo-blocking is observed in case of subscription-based web services which offer access to goods covered by copyright and distributed digitally. This is where the most severe type of geo-blocking in the form of access denial occurs.

What is the actual range of price differentiation in e-commerce in the European Union?

- Studies of the sales prices of flight tickets and accommodation on the level of an aggregating web service indicate price differentiation following from different operation of intermediary web services in the individual countries. However, this differentiation does not follow from active geo-blocking by the aggregating web service.

- The *mystery shopper* experiment that concerned concluding transactions directly via the websites of air carriers and hotels revealed lack of symptoms of geo-blocking in the form of differentiation in transaction prices.

- Quantitative analysis of the prices of 182 products representing the most popular categories in electronic commerce, which have been obtained from price comparison websites in 25 EU countries with the *web scraping* technique, indicates existence of an on average ten-plus percent price differentiation among EU countries.

- In states like Denmark, Sweden, United Kingdom, Italy or France, prices are on average higher, independently of the product category. In turn, in countries like Poland, the Czech Republic or Hungary, prices in most categories are lower than the average level.

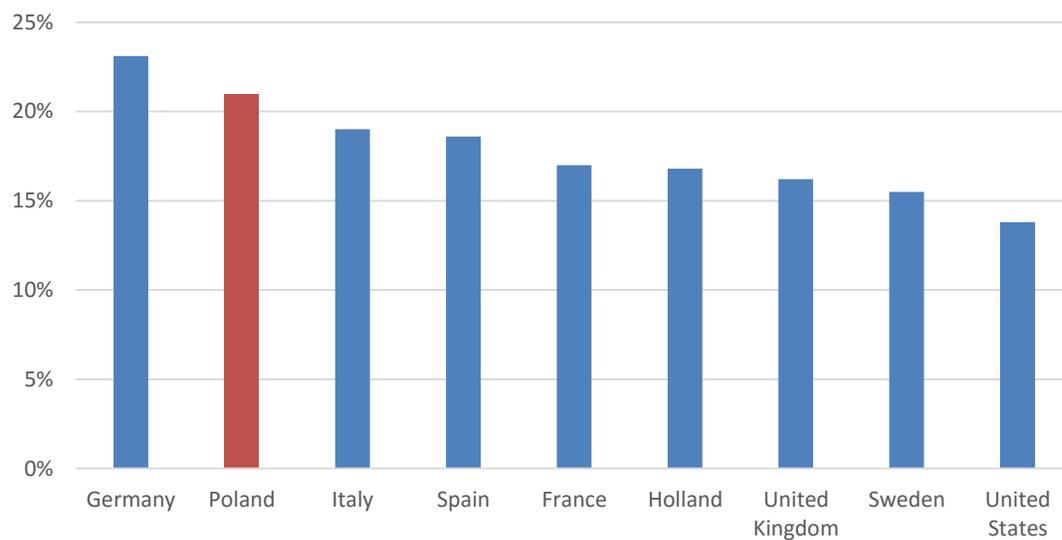
- In case of selected product categories (e.g., electronics, household appliances), utilization of the price difference between the most expensive and the cheapest states is theoretically possible even with the present, high costs of international parcels.
- A potentially large role in the development of cross-border trade with Scandinavian countries and with United Kingdom, Lithuania, Netherlands and Belgium can be played by Poland, which is the most attractive country in terms of prices in Central Europe. A precondition for substantial increase in the volume of trade with those countries is to decrease the costs of cross-border parcel deliveries to the contractual level of EUR 10. In turn, decreasing the parcel prices to the domestic level (EUR 3-4) would enable Polish Internet shops to enter the German market.
- Analysis of the correlation of product prices in the individual countries with real GDP *per capita* shows positive dependence of the price level on income, though it is differentiated depending on the product category.
- Econometric analysis also shows that differentiation of prices is connected with the welfare levels of the individual countries and with production factor costs. Together with the increase in cost of capital in a given country by 1 percentage point, deviation of the product price in that country from the average level of prices in the European Union increases by 0.4 percentage points. In turn, increase in GDP *per capita* by EUR thousand is connected with increase in the deviation of the product price in a given country from the average price in the EU by 0.22 percentage points. The study has also showed that the scale of differentiation is specific for individual product groups.

What are the reasons for price differentiation in cross-border e-commerce in the European Union?

- Differentiation of macro-economic factors (different consumption levels, different salaries or purchasing power), different costs of transport and parcels, and differentiation of regulations represent an objective premise for maintaining the practice of applying different prices in cross-border trade.
- Given the non-uniform regulations on post-sale liability for defects in goods, an essential factor are the newest plans of the European Commission regarding the Directive on certain aspects of contracts on sales of goods concluded over the Internet or in another distance way and the Directive on certain aspects of contracts on delivering digital contents, which – in case of adopting the relevant Directive – is to lead to unification of the regime of responsibility for the quality of goods under online sale.

Annex A. Analysis of the e-commerce structure in Poland and its importance compared to the European Union

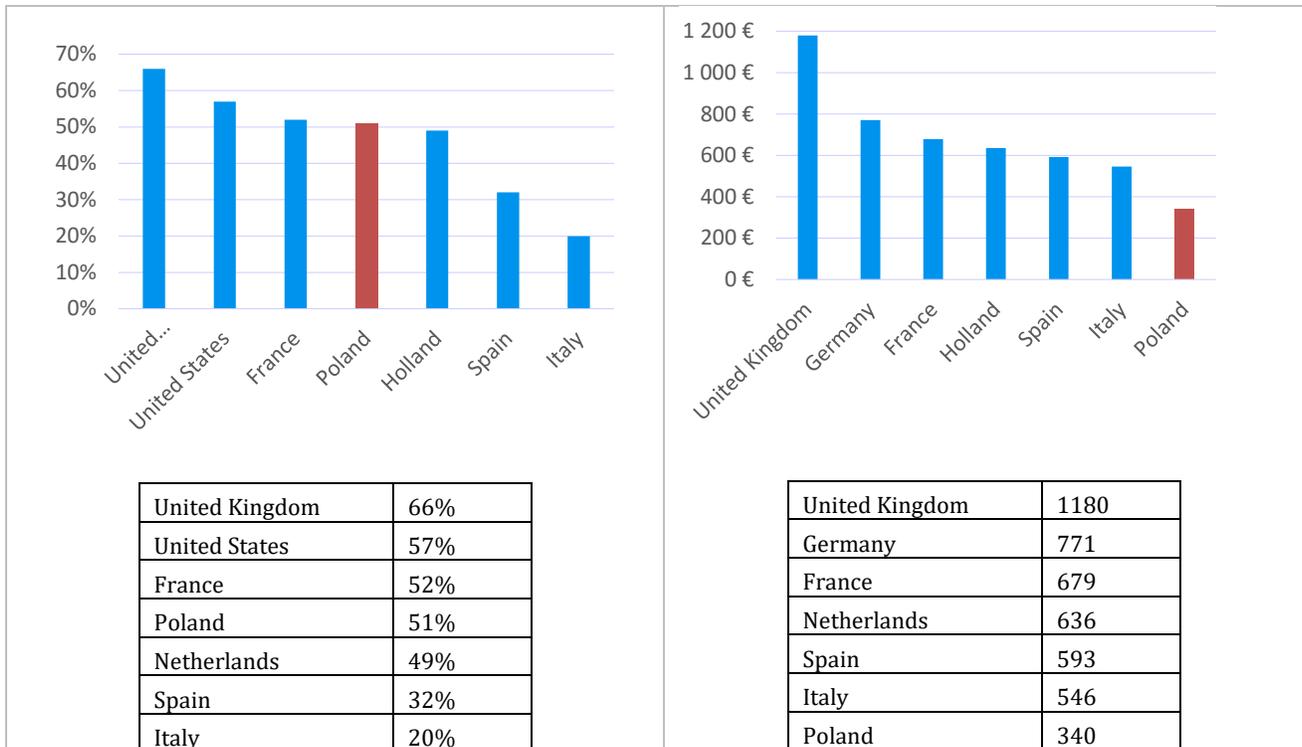
Figure A1. Change in online retail sales compared to the preceding year, 2015



Germany	23%
Poland	21%
Italy	19%
Spain	19%
France	17%
Netherlands	17%
United Kingdom	16%
Sweden	16%
United States	14%

Source: Own elaboration based on eMarketer data

Figure A2. Percentage of e-commerce consumers in the whole population of consumers in Poland and in selected countries (2014), and average annual expenditures on e-shopping in Poland and in selected countries (2015).



Source: Own elaboration based on eMarketer data.

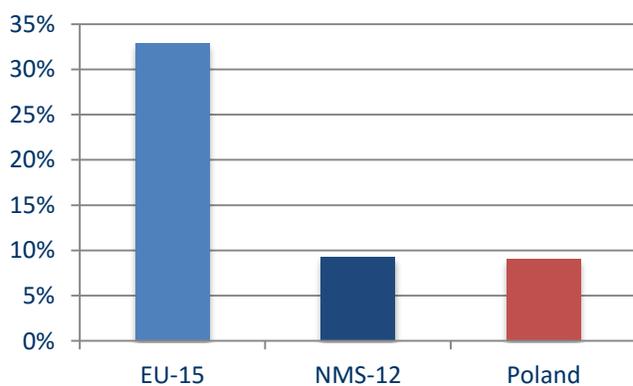
Figure A3. Reasons and patterns of online shopping use in Poland, 2013.



Reason for online purchase: lower prices	76%
I always compare prices and look for the lowest ones	69%
Reason for online purchase: convenience	59%
Loyalty to the online shop	47%
Check in a High Street shop, purchase online	39%
Regular search for the best offers	30%

Source: Own elaboration based on eMarketer data.

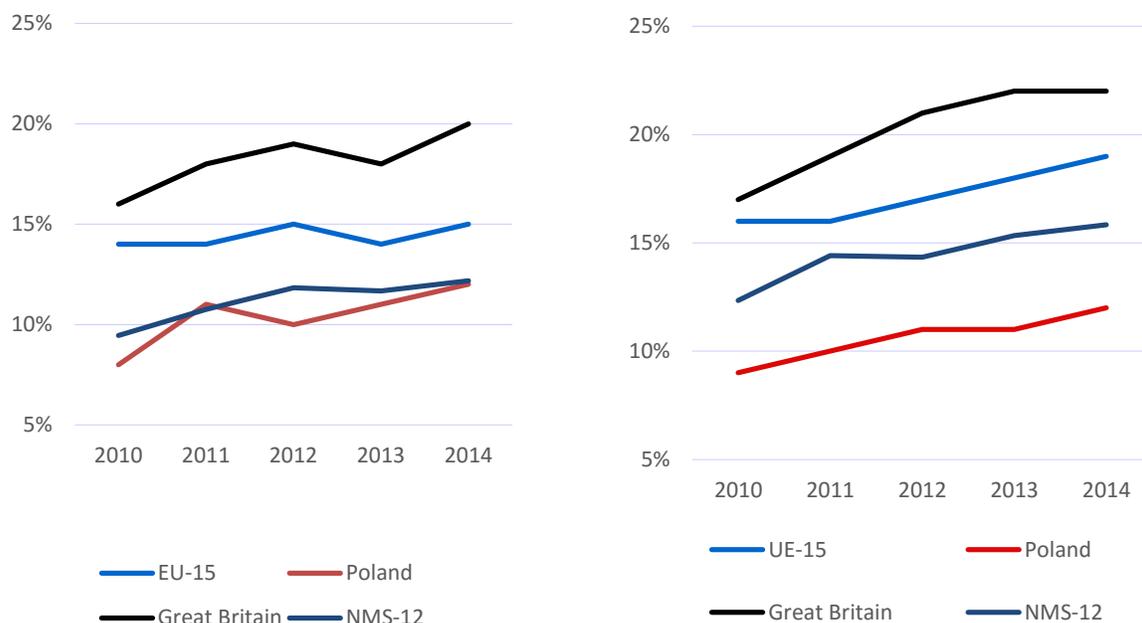
Figure A4. Share of Internet users booking accommodation online in 2010-2014



EU15	33%
NMS12	9%
Poland	9%

Source: Eurostat database "ICT Usage in Households and by Individuals 2014"

Figure A5. Percentage share of the value of sales over Internet and/or other computer networks in the total turnover – of Poland, United Kingdom, and in the average EU turnover (excluding the financial sector), 2014, and percentage of enterprises selling over Internet and other computer networks in Poland, United Kingdom and EU, 2014 (excluding the financial sector)



Source: Own elaboration based on Eurostat data.

Table A5(a). Percentage share of the value of sales over Internet and/or other computer networks in the total turnover of Poland, United Kingdom, and in the average EU turnover (excluding the financial sector), 2014, and percentage of enterprises selling over Internet and other computer networks in Poland, United Kingdom and EU, 2014 (excluding financial sector) (the left panel of Figure A5)

	2010	2011	2012	2013	2014
EU-15	14%	14%	15%	14%	15%
Poland	8%	11%	10%	11%	12%
United Kingdom	16%	18%	19%	18%	20%
NMS-12	9%	11%	12%	12%	12%

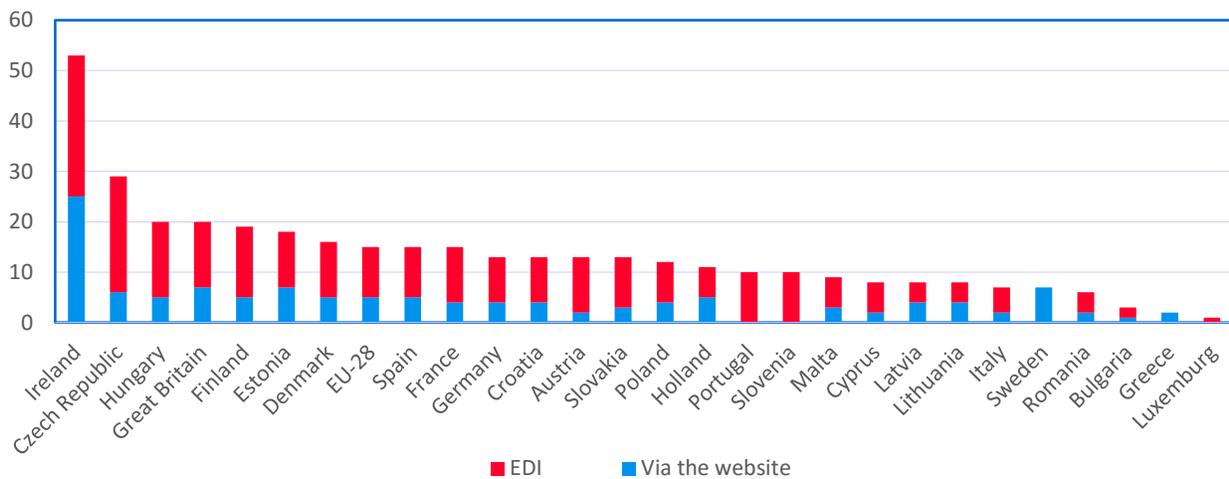
Source: Own elaboration based on Eurostat data.

Table A5(b). Percentage of enterprises selling over the Internet and other computer networks in Poland, United Kingdom and EU (excluding financial sector), 2014 (the right panel of Figure A5)

	2010	2011	2012	2013	2014
EU-15	16%	16%	17%	18%	19%
Poland	9%	10%	11%	11%	12%
United Kingdom	17%	19%	21%	22%	22%
NMS-12	12%	14%	14%	15%	16%

Source: Own elaboration based on Eurostat data.

Figure A6. Percentage share of the value of sales via the website and EDI in the total turnover in EU countries, 2014.

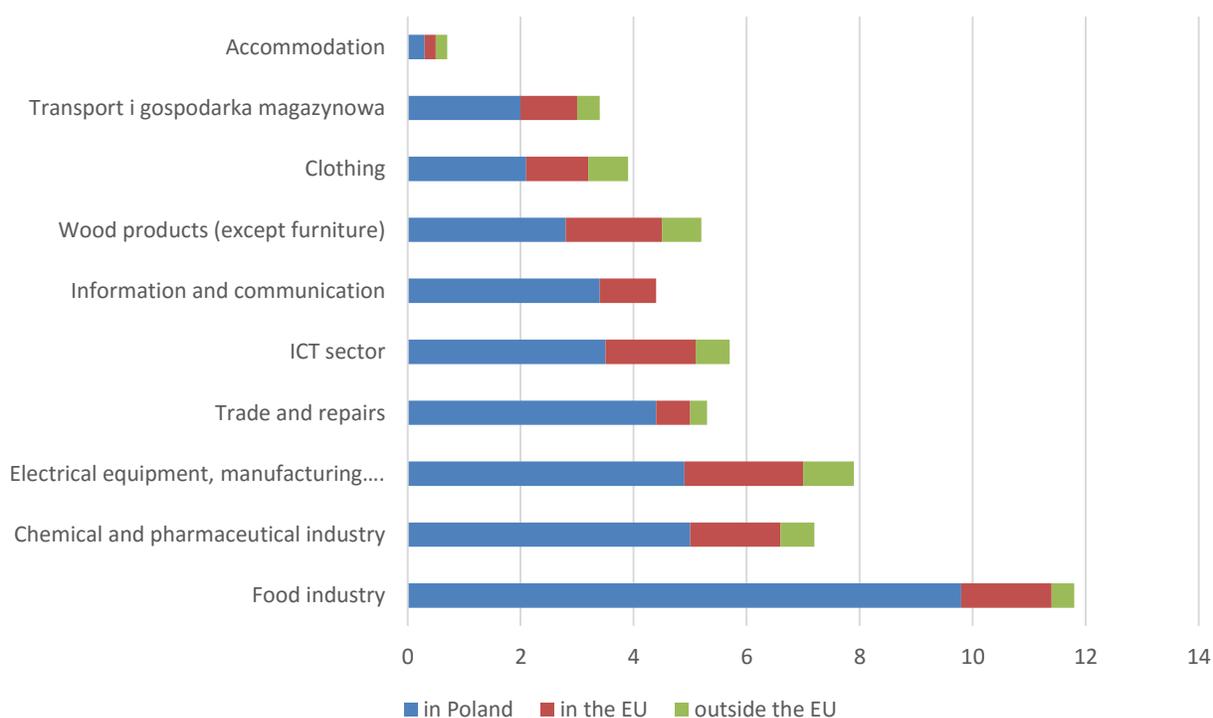


	Via the website	EDI
Ireland	25	28
Czech Republic	6	23
Hungary	5	15
Great Britain	7	13
Finland	5	14
Estonia	7	11
Denmark	5	11
EU-28	5	10
Spain	5	10
France	4	11
Germany	4	9
Croatia	4	9
Austria	2	11
Slovakia	3	10
Poland	4	8
Holland	5	6
Portugal	BD	10

Slovenia	BD	10
Malta	3	6
Cyprus	2	6
Latvia	4	4
Lithuania	4	4
Italy	2	5
Sweden	7	BD
Romania	2	4
Bulgaria	1	2
Greece	2	BD
Luxemburg	BD	1

Source: Own elaboration based on Eurostat

Figure A7. Percentage of Polish enterprises selling over EDI by sale markets, divided by sectors, 2012.



	in Poland	in the EU	outside the EU
Clothing	2.1	1.1	0.7
Food industry	9.8	1.6	0.4
Electrical equipment, machine industry	4.9	2.1	0.9
Wood products (except furniture)	2.8	1.7	0.7
Chemical and pharmaceutical industries	5	1.6	0.6
Information and	3.4	1	0

communication			
ICT sector	3.5	1.6	0.6
Transport	2	1	0.4
Accommodation	0.3	0.2	0.2
Trade and repairs	4.4	0.6	0.3

Source: Own elaboration based on GUS (2013).

Annex B. Basic business models

Subscription model Assumes delivery of services in return for subscription paid on a regular basis (e.g., monthly or annually). Such a model is used, among others, by Netflix, Spotify, Deezer.

e-shop model

The e-shop is one of the most basic business models in e-commerce. It is used for selling company's goods or services via the Internet. This distribution channel can be the only channel for reaching the customer, or a supplement to a traditional sales network. We distinguish its two subtypes – the direct (producer's) model, used by numerous clothing brands, among others by H&M, Zara, and the indirect (distributor's) model, popular among the largest players in the European market - among others Tesco.

Brokerage model

The brokerage model consists in bringing together sellers and buyers in order to conclude a transaction. The company earns money by taking a fee (commission) for the executed operations, for making the transaction possible, or in advertising charges. The model can be consumer-oriented: searching for the best offers (price bargains) or seller-oriented: supporting payments for concluded transactions and order processing. Frequently, in this model the e-commerce company is only a provider of information, e.g. price, not interfering with its value. It is just the model used, among other, by the price comparison websites we employ. Its more developed form is the third party marketplace (Tchibo, Zalando, Media Markt - Saturn Group).

Third party marketplace

Third party marketplace is a model specifying an external (third) company which is entrusted with providing network services (*outsourcing*), often together with additional functions, such as: payments, logistics, delivery, ensuring transaction security. Frequently, such a third party is an additional online channel supplementing the distribution channels already existing in the enterprise. An example of such a company in the European market is part of Amazon's activity (the company also operates partly in the e-shop model).

Other classifications

There are many approaches to classifying business models of e-commerce. Those we have presented above represent only a certain part of them, the most important one from the viewpoint of the conducted analysis. We should also note another emerging model of an *e-commerce* platform which combines the brokerage model and the third party marketplace model.

Table B1. Product structure for the study of prices on the Internet

Category	Subcategory	Number of initial products	Number of products after cleaning	Number of products for which the median of prices was calculated
Clothing	Clothing	134	55	5
Clothing	Footwear	141	54	16
Clothing	Accessories	87	45	12
Cosmetics and Beauty	Cosmetics	47	16	9
Cosmetics and Beauty	Perfumes	40	17	15
Household appliances	Body care appliances	25	25	15
Household appliances	Small household appliances for the kitchen	18	17	9
Household appliances	Small household appliances for the home	6	3	3
Household appliances	Small household appliances for the home (above EUR 100)	9	11	8
Electronics	Computer accessories	23	22	12
Electronics	Laptops and computers	17	16	5
Electronics	Monitors	13	8	8
Electronics	Tablets and e-book readers	16	14	8
Electronics	Game consoles	15	15	10
Games and software	Software	17	16	8
Games and software	Computer games	18	18	12
Games and software	Console games	31	30	27
Total		657	382	182

Source: Own elaboration.

Table B2. List of price comparison websites covered by the study of prices on the Internet

1	Austria	www.preisvergleich.at
2	Belgium	www.kieskeuroig.be
3	Bulgaria	www.pazaruvaj.com
4	Croatia	www.jeftinije.hr
5	Czech Republic	www.hledejprices.cz
6	Denmark	www.kelkoo.dk
7	Estonia	www.hinnavaatlus.ee
8	Finland	hinta.fi
9	France	www.idealo.fr
10	Greece	www.bestprice.gr
11	Spain	www.idealo.es
12	Netherlands	www.beslist.nl
13	Ireland	pricespy.ie
14	Lithuania	www.kainos.lt
15	Latvia	www.csv.lv
16	Germany	preisvergleich.de
17	Poland	www.ceneo.pl
18	Portugal	www.buscape.com
19	Romania	www.compari.ro
20	Slovakia	www.heuroeka.sk
21	Slovenia	www.ceneje.si
22	Sweden	www.prisjakt.nu; www.pricerunner.se
23	United Kingdom	kelkoo.co.uk; pricerunner.co.uk
24	Hungary	www.arukereso.hu
25	Italy	www.kelkoo.it

Source: Own elaboration.

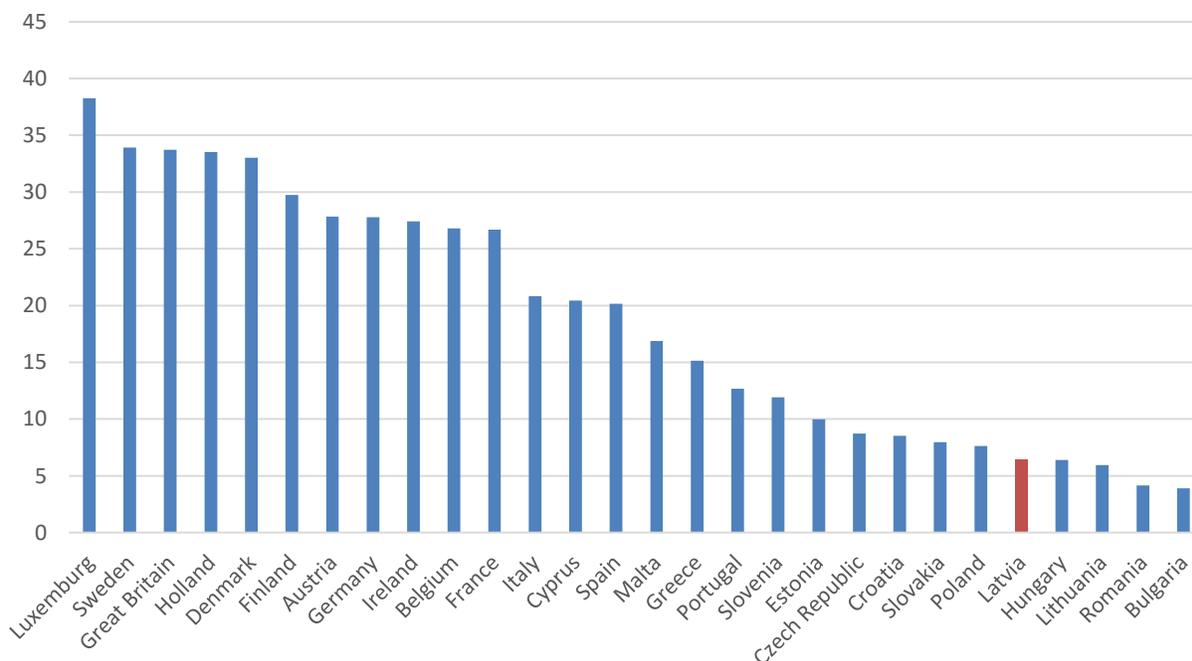
Table B3. Number of available domestic observations in subcategories

Category	Subcategory	Min	Average	Max
Clothing	Clothing	8	11.00	17
Clothing	Footwear	8	12.13	15
Clothing	Bags and suitcases	8	10.33	14
Cosmetics and beauty	Cosmetics	6	12.22	18
Cosmetics and beauty	Perfumes	8	15.87	19
Household appliances	Body care appliances	9	12.13	16
Household appliances	Small household appliances for the kitchen	8	13,33	19
Household appliances	Small household appliances for the home	2	8,25	15
Household appliances	Small household appliances for the home (above EUR 100)	4	10,67	19
Electronics	Computer accessories	10	14,83	20
Electronics	Laptops and computers	8	13,40	18
Electronics	Monitors	13	17.25	21
Electronics	Tablets and e-book readers	10	13.25	17
Electronics	Game consoles	12	16.30	20
Games and software	Software	9	13.38	20
Games and software	Computer games	5	15.25	19
Games and software	Console games	6	16.93	21

Source: Own elaboration.

Annex C. Determinants of price differentiation

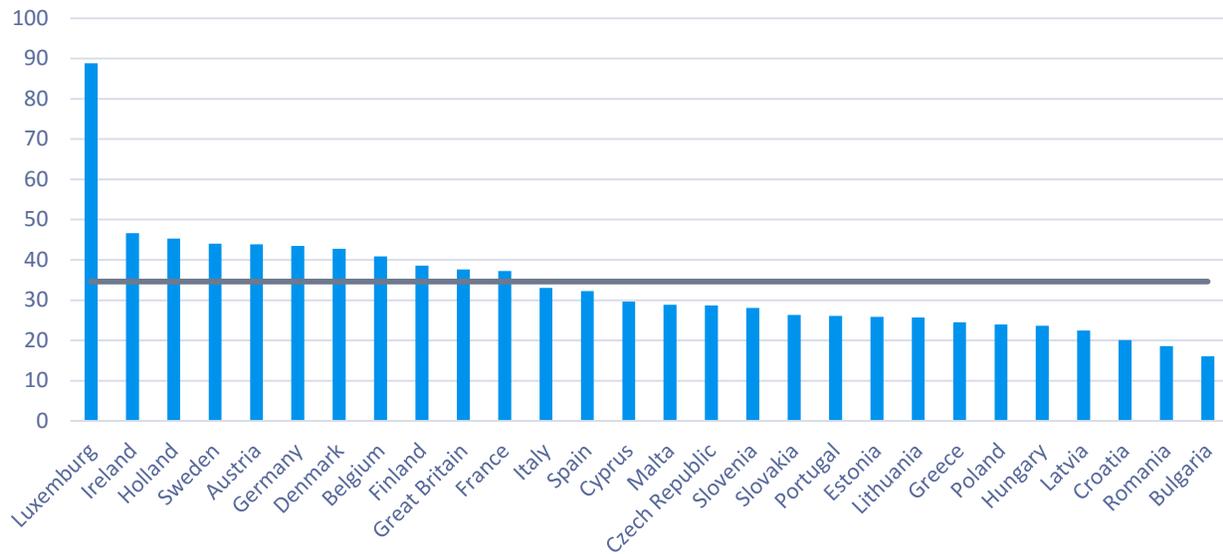
Figure C1. Average level of annual salaries in the European Union in EUR thou., 2014.



Luxemburg	38
Sweden	34
United Kingdom	34
Netherlands	34
Denmark	33
Finland	30
Austria	28
Germany	28
Ireland	27
Belgium	27
France	27
Italy	21
Cyprus	20
Spain	20
Malta	17
Greece	15
Portugal	13
Slovenia	12
Estonia	10
Czech Republic	9
Croatia	9
Slovakia	8
Poland	8
Latvia	6
Hungary	6
Lithuania	6
Romania	4
Bulgaria	4

Source: Eurostat data.

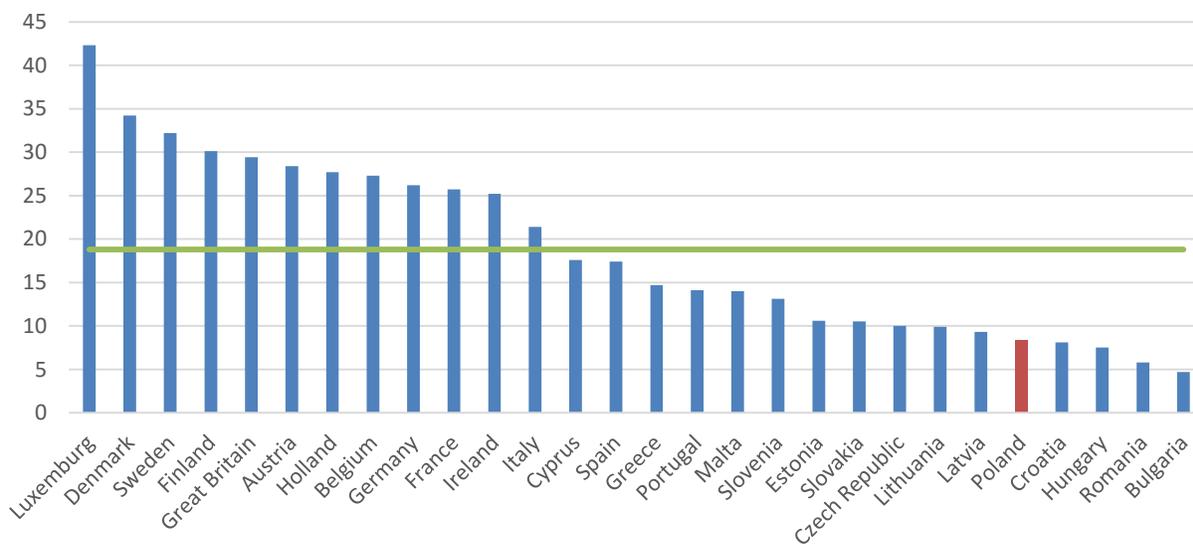
Figure C2. GDP *per capita* by purchasing power parity, in fixed prices in 2014, USD thou.



Luxemburg	88.85
Ireland	46.63
Netherlands	45.28
Sweden	44.03
Austria	43.91
Germany	43.44
Denmark	42.78
Belgium	40.88
Finland	38.57
United Kingdom	37.61
France	37.21
Italy	33.08
Spain	32.27
Cyprus	29.67
Malta	28.82
Czech Republic	28.69
Slovenia	28.06
Slovakia	26.35
Portugal	26.05
Estonia	25.87
Lithuania	25.71
Greece	24.50
Poland	23.95
Hungary	23.61
Latvia	22.46
Croatia	20.06
Romania	18.57
Bulgaria	16.05

Source: World Bank. Data for Luxemburg and Malta of 2013.

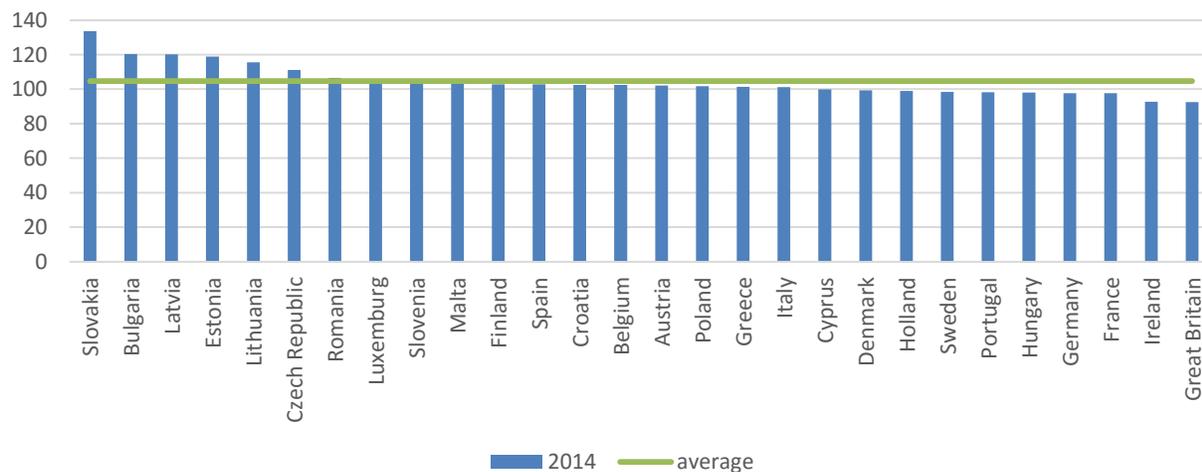
Figure C3. Expenditures on consumption *per capita* – current prices, EUR thou., 2014.



Luxemburg	42.3
Denmark	34.2
Sweden	32.2
Finland	30.1
United Kingdom	29.4
Austria	28.4
Netherlands	27.7
Belgium	27.3
Germany	26.2
France	25.7
Ireland	25.2
Italy	21.4
Cyprus	17.6
Spain	17.4
Greece	14.7
Portugal	14.1
Malta	14
Slovenia	13.1
Estonia	10.6
Slovakia	10.5
Czech Republic	10
Lithuania	9.9
Latvia	9.3
Poland	8.4
Croatia	8.1
Hungary	7.5
Romania	5.8
Bulgaria	4.7

Source: World Bank. Data for Luxemburg and Malta of 2013.

Figure C4. Real effective exchange rate – deflator: CPI, base year 2005, with respect to EUR – 18 trade partners from the Eurozone, 2014.



Slovakia	133.61
Bulgaria	120.41
Latvia	120.24
Estonia	118.82
Lithuania	115.6
Czech Republic	111.23
Romania	106.59
Luxemburg	104.97
Slovenia	104.82
Malta	103.2
Finland	102.86
Spain	102.84
Croatia	102.48
Belgium	102.42
Austria	102.1
Poland	101.68
Greece	101.43
Italy	101.23
Cyprus	99.96
Denmark	99.39
Netherlands	98.94
Sweden	98.41
Portugal	98.25
Hungary	98.12
Germany	97.68
France	97.63
Ireland	92.78
United Kingdom	92.45

Source: Eurostat data.

Annex D. Estimation of the application scale of price differentiation in cross-border e-commerce in the European Union

For a systematic study of the determinants for price differentiation, a linear regression model was used, in which the variable being explained is percentage deviation of the median of product prices in a given country from the average of medians for all countries where it was offered for sale. The set of all variables used in the model is presented in Table D1.

Table D1. List of variables used in the model

Name of variable in the model	Variable description
[percent_deviation]	Percentage deviation of the median of product prices in a given country from the average of medians for all countries based on the <i>web scraping</i> study of results from price comparison websites
[GDP]	Real GDP <i>per capita</i> in EUR thousands, at the end of 2014.
[net_earnings]	Average annual net salary in 2014
[NMS]	Variable indicating a new member state of the European Union
[pop_density]	Population density
[vat_stdrate]	Current level of standard VAT rate
[ele_cost]	Unit cost of electric energy, average annual value in 2014.
[E95_price]	Euro95 petrol price, average annual value in 2014.
[diesel_price]	Diesel oil price, average annual value in 2014.
[unit_lab_cost]	Unit cost of labour, average annual value in 2014.
[interest_rate]	Current interest rate on 10-year Treasury bonds in the secondary market-capital price index
[Games for PC], [Games for consoles], [Consoles], [Cosmetics], [Laptops and computers], [Small household appliances for the home < EUR 100], [Small household appliances for the home > EUR 100], [Small household appliances for the kitchen], [Monitors], [Footwear], [Perfumes], [Software], [Tablets and e-book readers], [Clothing], [Body care appliances] – Binary variables for individual subcategories of products.	

Estimations of linear regression parameters are presented in Table D2. Due to the co-linearity of 'GDP', 'unit_lab_cost' and 'net_earnings' variables, they could not be used simultaneously in the model. The best match to data was ensured by using the first of the listed regressors⁴².

⁴² The final version of the model fulfills the diagnostic tests provided for the classic linear regression method, thanks to which estimations of the parameters can be viewed as effective and not burdened.

Table D2. Results of linear regression for the 'percent_devation' variable

MODEL	Parameter	Std. Error	t value	Pr(> t)
(Intercept)	-0.1258	0.0493	-2.55	0.0108
vat_std_rate	0.0005	0.0014	0.33	0.7433
ele_cost	-0.1300	0.0897	-1.45	0.1474
E95_price	0.0577	0.0405	1.42	0.1546
diesel_price	-0.0165	0.0422	-0.39	0.6956
GDP	0.0022	0.0004	5.95	0.0000
interest_rate	0.0042	0.0022	1.89	0.0592
Computer accessories	-0.0004	0.0160	-0.02	0.9824
PC games	0.0190	0.0158	1.20	0.2292
Console games	0.0287	0.0138	2.08	0.0372
Consoles	0.0248	0.0163	1.53	0.1272
Cosmetics	-0.0202	0.0178	-1.13	0.2575
Laptops and computers	0.0067	0.0207	0.32	0.7457
Small household appliances for the home < EUR 100	-0.0524	0.0268	-1.96	0.0502
Small household appliances for the home > EUR 100	0.0326	0.0186	1.75	0.0801
Small household appliances for the kitchen	0.0133	0.0175	0.76	0.4481
Monitors	0.0196	0.0169	1.16	0.2451
Footwear	0.0148	0.0156	0.95	0.3429
Perfumes	0.0301	0.0151	2.00	0.0457
Software	0.0073	0.0179	0.41	0.6817
Tablets and e-book readers	0.0222	0.0181	1.23	0.2189
Clothing	0.0101	0.0220	0.46	0.6453
Body care appliances	0.0102	0.0159	0.64	0.5214

Residual standard error: 0.136 on 2526 degrees of freedom

Multiple R-squared: 0.05411, Adjusted R-squared: 0.04587

F-statistic: 6.568 on 22 and 2526 DF, p-value: < 2.2e-16

In Table D2, the colour green marks variables of the model (including product subcategories) which explain the observed differentiation of prices in the data set⁴³ in a statistically significant way.

⁴³ Statistically significant variables are deemed to be those with critical probability value in the last column of Table D2 smaller than 10%.

Annex E. Theoretical analysis of price differentiation in e-commerce

The theory of economy distinguishes three degrees of price discrimination. First degree discrimination, known also as total differentiation, is the situation where each consumer pays according to his/her reservation price. This means that the price for each consumer will be different. Second degree discrimination is differentiation based on the purchased quantity of product. Then, the greater the amount of product bought, the lower the price per unit. However, if the company is carrying out price discrimination among different groups of consumers based on observable heterogeneity (for example, determined by the level of purchasing power), we speak of third degree discrimination. Establishment of different prices in different countries or among different consumer segments is a frequent form of third degree discrimination, and this is the discrimination degree analysed in the study.

To estimate the effects of differentiation in e-commerce, we will use prosperity analysis based on the model of perfectly competitive partial equilibrium, and then based on imperfect competition models. In this way, we will show how introduction of uniform prices influences consumer's surplus and company's situation, and how as a result it will influence the general social prosperity in the country.

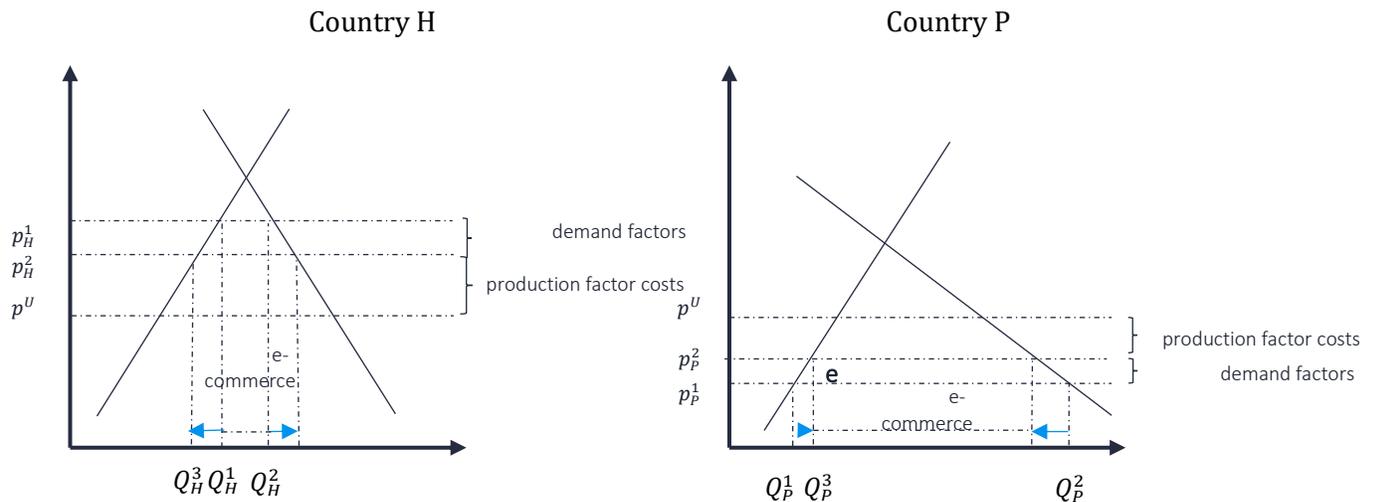
To present the results of differentiation under partial equilibrium, we base on the analysis of changes in countries H and P, which belong to the Community but differ from each other in demand elasticity (sensitivity of demand to price, like e.g. Netherlands, a country from the so-called old fifteen, and Poland – a so-called new member of the EU). We assume that consumers in countries H and P buy the goods (e.g., Crocs shoes) over Internet from a third country belonging to the EU (e.g., from France).

We assume that country P is a relatively less wealthy one, by which we understand that the income of consumers from country P is relatively lower than the income of consumers from country H. In effect, the price-related elasticity of demand is higher in country P (if the price grew by the same amount in both countries, the consumers in country P would lower their purchases more – they would have smaller tendency for buying – than consumers in country H).

The initial prices in countries H and P are different (Fig. E1). The equilibrium price in country H (p^H) is above the uniform price (p^U), while in country P it is on level p^P , lower than p^U . The difference between the prices depends on the demand and production factor costs (a precise analysis of both demand and production factor costs is presented in Chapter 4).

Introduction of a wholly unified price (p^U) in the EU is not possible due to the continuing cost differences. However, one can try to reduce the scale of price differentiation by eliminating discrimination based on demand reasons. In this situation, prices will stay on the p^2 level.

Figure E1. Comparison of prosperity effects of reducing shoe price differentiation in countries differentiated with respect to income (H – wealthier, P – less wealthy)



Source: Own elaboration.

As a result of eliminating price differentiation for demand reasons, in a wealthier country prices will fall, and cross-border *e-commerce* will grow. In turn, a converse situation will occur in a relatively less wealthy country, where prices will grow, and the volume of *e-commerce* will fall. This will have a direct impact on changes in affluence in both the countries (Table E1).

Table E1. Prosperity effects of ban on geo-blocking in countries with differentiated incomes

Prosperity efekt	Country H (wealthier)	Country P (less wealthy)
Consumer's surplus	+a+b+c+d	-e-f-g-h
Producer's surplus	-a	+e
Net	+b+c+d	-f-g-h

Source: Own elaboration.

In economic approach, social prosperity consists of so-called consumer's surplus and producer's surplus⁴⁴.

Consumer's surplus is the difference between consumer's reservation price for a certain quantity of product (the maximum price that the consumer is willing to pay for the given quantity) and the actual price. The surplus of all consumers of given goods (e.g., Crocs shoes) is the area under the demand curve above the level of equilibrium price (in the chart, it is represented by the area of the triangle delimited from below by the level of equilibrium price, from the left by the Y axis, and from the right by the demand line).

Producer's surplus is the difference between producer's reservation price determined by the producer for delivering a given quantity of product and the equilibrium price. Producer's surplus is the area above the demand curve and below the price level (in Figure E1, it is presented in both countries by the area of the triangle delimited from above by the market price, from the left by the Y axis, and from the right by the demand line). Social prosperity is defined by the sum of consumers' surplus (prosperity) and producer's surplus (prosperity) in a given country.

⁴⁴ We omit here the third prosperity effect: budget surplus of the state, the analysis of which is important e.g. in trade policy concerning taxes and customs duties.

If equilibrium prices change (in country H, the price falls, and in country P grows to the uniform price p^U (Figure E2), there will also be shifts in social prosperity. Table E1 sums up the changes in consumers' surplus and producer's surplus resulting from partial unification of prices after distinguishing demand factors (full unification of cost and demand effects would lead to the p^U price). In country H, due to falling prices, consumers' surplus grows (the „abcd” area), but producers' prosperity decreases (area of the „-a” trapezoid). The net prosperity effect is positive, for the increase in consumers' surplus (the „a+b+c+d” area) exceeds the decrease in producer's surplus („-a”). The situation in the less wealthy country (P) is converse: there, the consumers' surplus will fall (by the area of the „efgh” trapezoid), while the producers' surplus will grow (by the „e” area).

From the viewpoint of both countries in the group, the prosperity effect will depend on the scale of price changes and the reaction of demand and supply to those changes, as well as the relative sizes of both markets. **Assuming that price changes are the same in both countries, while the demand function in country P is more convex than in country H, the net prosperity for the whole group will decrease as a result of unifying prices** (Cowan 2008; Cowan 2013).

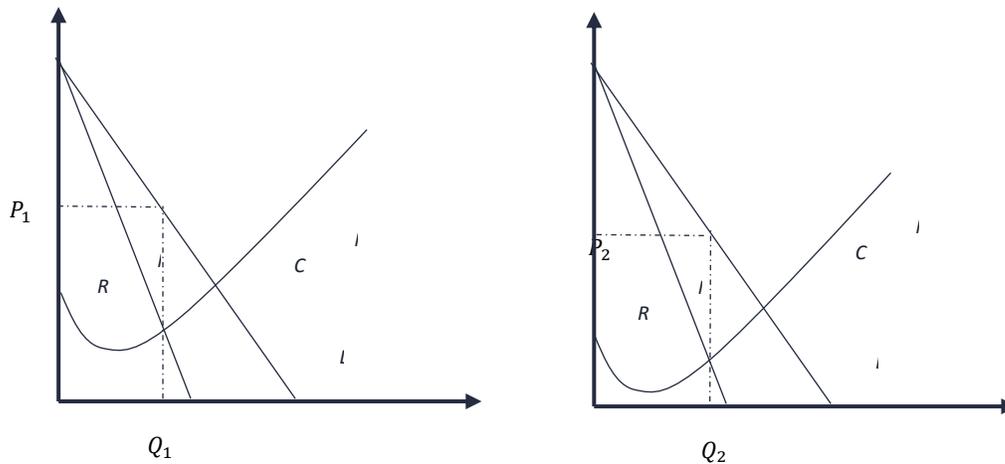
Here one should also take into account the scenario where consumers from the relatively less wealthy country will resign completely from buying the goods from import inside the group, and turn to a cheaper supply source outside the EU (e.g., from Asian markets with competitive prices). In this way, an external disturbance may appear, and part of the market might be taken over by cheap producers of similar goods manufactured in third countries.

We should remember that price discrimination may have justified reasons stemming from economic effectiveness, and might be a necessary solution for companies.

Let us consider prosperity changes in the situation of an imperfectly competitive market. The example of a monopoly structure provides the best illustration for the reasons why price differentiation should be continued.

If a company has to do with different costs in different countries, this is a situation that requires its use of different prices (Figure E2). Introduction of a uniform price would lead to emergence of allocation ineffectiveness, worsening of the company's results, and in extreme cases even to withdrawal from the market, where a new, common price will not allow for covering the operating costs.

Figure E2. Price discrimination in presence of different costs in two countries



Source: Own elaboration.

An enhanced and dynamic analysis of the effects of unifying prices was presented by Malueg et al. (1994). In the analysis of social prosperity (W), they took into account both changes in consumers' surplus (S) and changes in companies' profits (π). Hence their analysis is a supplement to the models presented earlier (from Figure E1 and Figure E2).

We assume that a monopolist sells to foreign markets, differentiated with respect to consumers' income, but not differing from each other in consumers' preferences. As a result, the demand in wealthier countries is less flexible, so – as mentioned above – response of the demand to price changes is weaker than in less wealthy countries. In the considered model, due to the assumption about zero production costs, the only element of price differentiation is the demand factor. Thus elimination of differentiation leads to fully uniform prices in both countries.

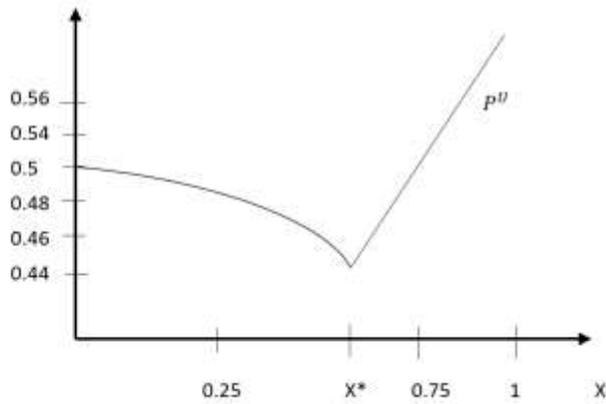
The specifics of the model are that in presence of price differentiation the monopolist maximizes the profit by selling in both markets. However, in case of uniform prices, given a sufficiently large difference in consumers' income between the countries, the monopolist will propose the product price high enough to make it inaccessible to consumers from the less wealthy country.

Hence the decisive variable is the measure describing the difference in incomes: X^{45} . For the limit value X^* (Figure E3), the difference between the markets is so large that the product will no longer be sold in the markets of less wealthy states.

In consequence, below the limit value X^* , the price falls with increasing difference in incomes. In other words, the greater the difference in incomes, the lower price the monopolist will set, making use of growing sales in the markets with more flexible demand.

⁴⁵ Higher consumers' income in a given country translates to lower limit usefulness of money, and further to lower demand elasticity for each price.

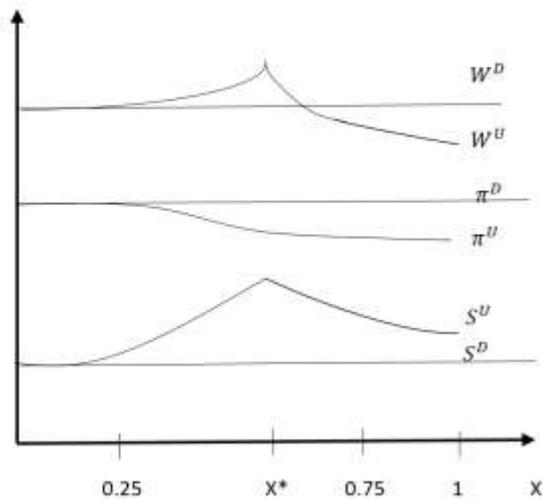
Figure E3. Relation between uniform prices and the level of difference X in incomes



Source: Malueg et al. (1994).

Above the differentiation X^* of markets the monopolist is unable to set a uniform price (p^U) in both markets, and will withdraw from the less wealthy market (demand for the product will then equal zero in less wealthy markets). At the same time, the monopolist will raise prices in the markets of wealthier countries to make use of the low price-related elasticity of consumers in those markets. However, sales at uniform prices will not exceed the quantity sold in the conditions of price-based discrimination. As a result, monopolist's profit (π^U) will be lower (Figure E4). An interesting observation from the model is that increase in income differentiation will ultimately lead to decrease in prosperity in case of uniform prices below the prosperity level for price-based discrimination. This is caused by two effects. On the one hand, an increasing number of markets is eliminated along with growing X in case of a uniform price, reducing the monopolist's profit, and on the other hand, with a lower number of wealthier markets, the uniform price grows, reducing consumers' surplus (though it is still higher than in case of price differentiation).

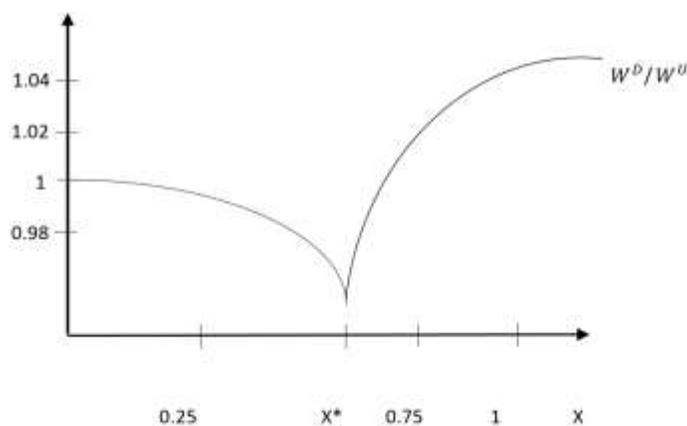
Figure E4. Prosperity effects for price-based discrimination and for uniform prices – depending on the difference in incomes in two countries (X)



Source: Malueg et al. (1994).

Consumers' surplus (S^U) in case of applying uniform prices will always be higher, regardless of the degree of increase in income differentiation X. This effect is connected with increase in the consumers' surplus in wealthier countries (where the uniform price is relatively lower than the price in case of discrimination), with simultaneous decrease in surplus in less wealthy countries, part of which stops being served at some moment. The dominant effect is positive impact in wealthier countries. Surplus increase is higher in wealthier countries, and exceeds losses of consumers in less wealthy countries.

Figure E5. Changes in relative social prosperity



Source: Malueg et al. (1994).

The change in relative social prosperity (comparing the situations where discrimination occurs and when the price is unified) depends on the degree of income differentiation (demand elasticity). If the differences are small and stay below the critical level X^* , price discrimination leads to fall in social prosperity compared to the uniform price. **To this extent, uniform prices will increase social prosperity of the whole region, but at the cost of less wealthy countries, which may even experience the exit of the monopolist from their markets. However, above the limit value of income differentiation, price discrimination increases the total social prosperity in the region.**

The presented analysis constitutes a starting point in the subsequent theoretical considerations on the subject of price differentiation effects. Studies conducted based on different assumptions (strong and weak markets⁴⁶, symmetric and asymmetric oligopoly, monopolistic competition) fail to give an unequivocal answer concerning prosperity-related consequences of introducing price differentiation. Most often, price discrimination is advantageous for consumers if it leads to sales growth (and this is the case for numerous assumptions). **Discrimination allows companies to stay in the market, but also to finance R&D activities, and so to develop innovations.**

Table E2. Review of theoretical research on prosperity effects of price differentiation in different market conditions

Author	Assumptions	Prosperity effects of discrimination from the viewpoint of consumers and companies	Net effect for social prosperity
Malueg et al. (1994)	Monopoly, weak market and strong market E.g. Apple Macbook laptop in British and Polish markets	Consumers from less wealthy countries (Poland): increase in surplus. Consumers from wealthier countries: decrease in surplus. Total effect negative Example: price discrimination allows consumers access to the product, since in case of uniform prices Macbook would have been withdrawn from the Polish market due to excessive price Company: increase in surplus (with discrimination, profit is higher). The company improves allocation between markets	Positive or negative (if income differences between the markets are substantial, the sum of changes is positive)
Danzon (1997)	Monopolistic competition, analysis of pharmaceutical industry in the European Union	Consumers: increase in surplus (in the opposite case, with uniform prices, relatively less wealthy consumers will stop buying some drugs) Companies: increase in surplus (price discrimination has positive results, for it allows companies to finance fixed R&D costs)	Positive
Corts (1998)	Duopoly, asymmetric model, one company manufactures high quality	Consumers: increase in surplus (lower prices, when companies	Negative or positive

⁴⁶ Theoretical models usually analyse effects of discrimination on the example of two markets: in a „weak” market (a smaller one, with lower purchasing power and greater demand elasticity) and in a „strong” market (a greater one, with higher purchasing power and lower demand elasticity). A weak market is characterized by smaller demand for given goods, so the optimum prices are lower. The demand is greater in a strong market, and companies will fix higher prices than in a weak market there.

	products, the other low quality ones; two consumer types: with high and low income Example: in retail sales shops with brand products organize sales, competing in this way in terms of the price with shops offering cheaper products	engage in an intensive price war) Companies: decrease in surplus (decreasing profit, which depends on the companies' strategy: to what extent they will reduce the margin)	
Stole (2003)	Duopoly, symmetric model: price-base competition between two companies in two markets – a weak and a strong one. The markets are perceived identically by the companies (the first market is a weak one for both companies) E.g., telecommunication companies offering their services in Poland and in Germany	Consumers: increase in surplus (lower prices) Companies: increase in surplus (the more differentiated the markets, the greater the sales), higher profit (depending on the companies' strategy)	Positive
Armstrong (2006)	Monopoly, weak market and strong market E.g. Microsoft Office in the British and Polish markets	Consumers: 1) negative prosperity effect, if the weak market is relatively bigger (than higher prices in the strong market in case of discrimination) 2) increase in prosperity, if the strong market is relatively bigger (lower prices in the weak market) Companies: increase in prosperity	Positive or negative (depending on the markets' size, and on whether possible consumers' losses are compensated by increase in companies' profits)
Cowan, (2008), Aguirre et al. (2010)	Monopoly, weak market and strong market	Consumers: total prosperity effect depends on the relation between the numbers of consumers in the weak market and in the strong one (positive impact, if there are relatively more consumers with high reservation prices in the strong market than in the low market) Positive impact in the weak market, negative in the strong market Company: positive effect (profit increases)	Positive or negative (depending on the difference in demand characteristics between the markets)
Adachi et al. (2011)	Oligopolistic competition, companies offer different products for consumers with different preferences (distinct brands, e.g. according to consumers' age) Strong and weak markets Example: Pepsi Cola and Coca Cola in the British and Polish markets	Consumers: decrease in prosperity Companies: increase in prosperity, if products are substitutes in the strong market, and are complementary in the weak market E.g. if consumers in England are less attached to the Pepsi Cola brand (with growing price of Pepsi, demand for Coca Cola increases), and in Poland consumers are more loyal to the Pepsi brand, than decrease in the consumers' prosperity in case of price discrimination is smaller, and at the same time prosperity of companies grows	Negative or positive (depending on the sum of consumers' losses and companies' profits)
Galera et al. (2014)	Monopoly, increasing marginal costs; the company selects the price before it gets to know the exact demand (demand uncertainty)	Consumers: increase in prosperity Company: increase in prosperity (even if sales are lower in case of discriminative prices, companies can	Positive

	E.g. car rental company operating in several markets. In the off-holiday period, the company has difficulties with determining the size of demand for cars	increase their profits by reducing costs)	
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Source: Own elaboration.

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