
# Geo-blocking and e-commerce in the European Union

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22 juin 2020

# INTRODUCTION

In this report, we will tackle the problem of geo-blocking from a statistical point of view. Geo-blocking is the act of discriminating against some European customers to segment the market along national borders and to increase profit to the detriment of foreign users. In other words, geo-blocking is the technology that restricts access to internet content based on the users' location. The segmentation of the market prevents the existence of a European single digital market, where firms can compete across borders. This why geo-blocking has known recent evolutions in the legal field. In 2015, the European Union announced a "Digital Single Market" strategy, which aims to end unjustified geo-blocking. This strategy is part of the Digital Agenda for Europe 2020, to rule on the access to online products and services; on the conditions for digital networks and services to grow and thrive, and on the growth of the EU's digital economy. Unjustified geo-blocking, eg. geo-blocking that increases profits to the detriment of foreign customers, has negative consequences on consumer welfare as well, by preventing consumers from accessing and purchasing products or services from another member state's website. This is why it appeared interesting to focus on geo-blocking on the consumers' side. Hence, the report will be divided into three parts: first, a description of the already existing literature and regulations on geo-blocking and its effects on consumers' behavior; then, a statistical study will be conducted, before focusing on the possible interpretation of the results.

For our analysis, we decided to use the Flash Eurobarometer 477 dataset, from 2019, titled: Accessing content online and cross- border portability of online content services, Cross-border access to content online, and Intra-EU calls.[1] This dataset comprises 25 questions focusing on consumers' habits and 26583 responses of a Q&A related to the purchase of digital goods and questions that could impact this decision.

Hence, this study focuses on the consumer side of geo-blocking. As the business side has been abundantly tackled in the literature, it seemed more interesting to focus on the consumers' side.

Moreover, when faced with the choice between physical goods or digital products, we decided to consider digital products for this study and see what could affect the decision of purchasing digital goods, such as music, movies, games, sports, from another country.

# LITERATURE

E-commerce and its relation to geo-blocking have been abundantly studied by official entities. For instance, the European Commission analysed the determinants of e-commerce [2]. Hence, new regulations have been introduced in the European Commission's plan for 2020 [3, 7, 8], leading to the construction of a European Digital Market. In order to assess this plan on how firms will invest and compete online, many studies surveyed the intended behaviors of B2B or B2C companies, with respect to new regulations [4, 5, 6]. Moreover, the European Parliament conducted a more in depth analysis of scope of ego-blocking, in an economic point of view [9]. Thus, there are abundant data and studies about geo-blocking on the companies' side, but fewer datasets tackle the problem geo-blocking poses to individuals. This is why we decided to focus on this matter.

# BARRIERS TO EUROPEAN E-COMMERCE

## 1. Barrier to European Cross-border e-commerce

### DETERMINANTS OF SELLING ONLINE

According to the article "Barriers to European Cross-border" published by the European Commission, there are several factors that were identified in the determinants of selling online.

- Larger firms are more likely to sell online. However, large firms have a smaller share of online sales compared to smaller companies. International groups are more likely to sell online because of their ease of access to new markets.
- Firms focused on B2C are more likely to engage in online sales.
- Other relevant factors for online sales noted the importance of geographical location as well as the growth rates of companies.
- Company age was identified as insignificant to the determinants of selling online.
- Also, financial barriers do not appear to be a significant obstacle to online sales.

### DETERMINANTS OF CROSS-BORDER E-COMMERCE

The article also reported the following determinants to cross-border e-commerce.

- Even if companies focused on B2C are more likely to engage in online sales, they are however less likely to make cross-border online sales due to higher delivery costs and complicated logistics contrary to the determinants of selling online. Distributors may be restricted through exclusive territory contracts and selective distribution agreements set by suppliers. Suppliers can also request firms to charge different prices in different markets which can also affect their decision to act in cross-border e-commerce.
- Different sectors is also a determinant in cross-border e-commerce. Notably, ICT is the sector that is most likely to proceed in cross-border e-commerce. Again, geography is an important factor in cross-border e-commerce due to the late incorporation of some countries to the European integration process and due to late broadband adoption in some cases.

### BARRIERS OF SELLING ONLINE

Some barriers were also outlined by the article that include the following.

- Cross country regulations (regulatory barriers refer to rules regarding guarantees and returns, copyright, product labelling, data protection, interoperability and complaints and disputes.) are negatively correlated with online sales.
- Adapting a firm's products to local tastes can make a company less likely to expand to new territory. Moreover, the fragmentation of Europe implies that many laws and procedures have been developed and enforced at national level.
- This regulatory fragmentation has an adverse effect on the adoption of e-commerce.

## 2. Digital Single Market

In 2015, the European Parliament, the Council, the European economic and social committee and the committee of the regions released a communication on the future of e-commerce in Europe.
Information and Communication Technology plays an increasingly big part in the countries' economies. However, along with being a great opportunity, new technologies put personal data at risk, and need a common effort from the EU countries and policy makers.
This context in which this agenda has been established is a context where there exist many boundaries in the digital world that do not exist in real life, preventing European consumers and firms to making the most of their opportunities.
There is a great diversity in regulation and taxation when purchasing online add to the difficulty to thrive online.
The delivery costs are too high and this deters firms from entering the market.
Even if there isn't geo-blocking, sometimes websites automatically reroute consumers to a local website with different prices and products thanks to geo-localisation. This results to high consumer dissatisfaction and complaints. In many case, geo-blocking is not justified - the possible justifications for geo-blocking are price discrimination to meet the local legal requirements. Hence, presently, firms have to declare VAT in every State they operate. But this is not the case for third, *eg* non-EU States, which can operation without paying additional VAT, giving them a competitive advantage which distorts the market.

Faced with these limitations, the European decisional entities established a strategy, aiming to:
Make the EU a leader in the digital market, by creating digital start-ups, among other solutions.
Grant the same access to culture by waiving potential copyright restrictions.
The consequences of these actions can be an increase of the GDP, as well as a lot of money saved by firms
First, the European Commission wants to guarantee a better online access for consumers and businesses across Europe.
By implementing cross-border e-commerce rules that consumers and businesses can trust
By establishing affordable high-quality cross-border parcel delivery
By preventing unjustified geo-blocking.
By renewing the European copyright framework, to give better access to digital content.
By reducing the VAT-related burdens and obstacles when selling across borders.

Furthermore, the European Commission wants to create the right conditions and a level playing field for advanced digital networks and innovative services.
For this, the European Commission intends to make the telecoms rules more adapted to current issues, to implement an « ambitious overhaul of the telecoms regulatory framework focusing on (i) a consistent single market approach to spectrum policy and management (ii) delivering the conditions for a true single market by tackling regulatory fragmentation to allow economies of scale for efficient network operators and service providers and effective protection of consumers, (iii) ensuring a level playing field for market players and consistent application of the rules, (iv) incentivising investment in high speed broadband networks (including a review of the Universal Service Directive) and (v) a more effective regulatory institutional framework. »

The Commission will review the Audiovisual Media Services Directive with a focus on its scope and on the nature of the rules applicable to all market players, in particular measures for the promotion of European works, and the rules on protection of minors and advertising rules.
Similar regulations will be established for intermediaries such as online platforms.
The European Commission will also ensure to reinforce trust and security in digital services and in the handling of personal data, by capitalising on cybersecurity and GDPR.

These decisions aim to maximise the growth potential of the Digital Economy.
Hence, the Commission will build a data economy, and « propose in 2016 a European 'Free flow of data' initiative that tackles restrictions on the free movement of data for reasons other than the protection of personal data within the EU and unjustified restrictions on the location of data for storage or processing purposes. It will address the emerging issues of ownership, interoperability, usability and access to data in situations such as business-to-business, business to consumer, machine generated and machine-to-machine data. It will encourage access to public data to help drive innovation. The Commission will launch a European Cloud initiative including cloud services certification, contracts, switching of cloud services providers and a research open science cloud ».
The commission will also boost competitiveness through interoperability and standardisation, and will « launch an integrated standardisation plan to identify and define key priorities for standardisation with a focus on the technologies and domains that are deemed to be critical to the Digital Single Market, including essential sectoral interoperability and standards in areas such as health (telemedicine, m-health), transport (travel planning, e-freight), environment, and energy. The Commission will revise and extend the European Interoperability Framework ».
To build an inclusive e-society, the Commission will address digital skills and expertise as a key component of its future initiatives on skills and training; and present a new e-Government Action Plan 2016-2020 which will include (i) making the interconnection of business registers a reality by 2017, (ii) launching in 2016 an initiative with the Member States to pilot the 'Once-Only' principle; (iii) extending and integrating European and national portals to work towards a 'Single Digital Gateway' to create a user friendly information system for citizens and business and (iv) accelerating Member States' transition towards full e-procurement and interoperable e-signatures.

## 3. Geo-blocking Regulation in the context of e-commerce

### CONTEXT:

- Geoblocking is the practice used by online sellers to restrict cross border sales based on nationality, residence or place of establishment.
- This article was published in september 2018 as an updated view and the replacement of the Q&A document published on 23 March 2018 when the "Geo-blocking Regulation" was first introduced. It comprises 9 articles that explains the limits of the regulation.

- It was published to provide practical guidance on Geo-blocking Regulation and general developments of certain aspects of the EU e-commerce, for helping traders adapt their commercial practices in accordance with the Geo-blocking Regulation, and finally to inform consumers about the provisions of the regulation.
- The Geo-blocking Regulation is to be enforced starting 3 december 2018

## ARTICLE 1: SCOPE OF THE REGULATION

- Regulation applies for both physical and digital goods
- Regulation applies to all traders offering their goods or services to customers in the EU.
- Regulation is applied only when a sale has cross border element
- Prohibits discrimination in relation to the range of payment means accepted by traders.
- Regulation benefits all customers residing in europe
- Regulation applies for B2C and B2B
- Regulation does not apply when goods or services are purchased for reasons other than for end of use.

## ARTICLE 2: WHAT IS NOT PART OF THE REGULATION

- Services in the field of transport
- Financial services
- Audiovisual goods such as e-books, software, updates, streaming of music or video and online videogames are excluded from the article 4 (non-discrimination in access to goods and services) of the Regulation.
- Electronically supplied services fall under the Regulation
- EX: cloud services, data warehousing services, web hosting and the provision of firewalls, use of search engines, and internet directories, website support
- Gambling services
- Flight tickets

## ARTICLE 3: ACCESS TO ONLINE INTERFACES

Article 3 of the Regulation bans the blocking of access to websites and re-routing without the customer's prior consent. This increases price transparency by allowing customers to access different national websites. This provision also applies to non-audio-visual services supplied electronically, such as e-books, music, games and software.

## ARTICLE 4: NON-DISCRIMINATION IN ACCESS TO GOODS OR SERVICES

- The Regulation does not introduce an obligation to deliver across the EU. It defines specific situations where customers cannot be denied access to the goods or services of the trader for reasons relating to the their nationality, residence or establishm
- No obligation to set up pick-up points
- Traders are allowed to charge customers for delivery however they are not allowed to discriminate against the customers from using these services.

## ARTICLE 5: NON-DISCRIMINATION RELATED FOR REASONS TO PAYEMENTS

- Traders are free to decide on the means of payment however differential treatment is prohibited if these three conditions are met:
- Payments are made through electronic transactions by credit transfer, direct debit or card-based payment instrument within the same brand and category;
- Authentication requirements are fulfilled;
- Payments are in a currency that the trader accepts.

## ARTICLE 6: AGREEMENTS ON PASSIVE SALES

- A supplier cannot contractually prohibit a trader from responding to unsolicited customer requests. However they can in some cases prohibit active sales by prohibiting traders from advertising goods in certain regions under exclusive distribution agreements.
- Suppliers prohibiting a trader from selling in a certain region does not fall under the restrictions of the regulation. Restrictions have to be determined under competition rules.

## ARTICLE 7: ENFORCEMENT OF THE GEO-BLOCKING REGULATION BY MEMBER STATES

- Member States must designate one or more bodies for adequate and effective enforcement of the Regulation.
- Customers will be entitled to refer alleged infringements of the Regulation to the enforcement bodies designated by the Member States where the rules applicable to the functioning of those bodies so provide.

## ARTICLE 8: PROVIDING ASSISTANCE TO CONSUMERS IN THE CASE OF A DISPUTE WITH A TRADER.

- Each Member State must designate a body or bodies responsible for providing assistance to consumers in the case of a dispute with a trader arising from the application of the Regulation. Such assistance could consist for instance of explaining the consumer's rights, helping consumers to settle a dispute with a trader based in another Member State or explaining consumers whom to contact or what to do if the consumer assistance body itself cannot help.

## ARTICLE 9:

- States that the Commission should regularly report to the European Parliament, Council and the European Economic and Social Committee on its evaluation of the Regulation.

# STATISTICAL ANALYSIS

## Dataset

Flash Eurobarometer 477 dataset,
Titled: Accessing content online and cross- border portability of online content services, Cross-border access to content online, and Intra-EU calls

## Data Description

Looking at the available data from the Q&A, we found that it would be the most interesting to run regressions to see what could impact purchasing online content as well as using services from other countries.

We estimate two regressions with two dependent variables: "Purchase online content", and "Access from another country" which are both binary variables.

Both of the regressions will include the following variables of interest: "is Female", "Owns a phone", and "Uses internet" which are all 3 binary variables as well.To account for country fixed effects we added a country dummy variable for each country and excluded France. Some of the omitted variables that are accounted for via country fixed effects would likely be GDP, Human Development Index and Internet coverage as they are very tied to the ability of purchasing and accessing online content.

Finally, to account fixed effects related to age: we added dummy variables for the following age groups: "under20", "over20under40", "over40under65" and "over65".

## Descriptive Analysis

### PER COUNTRY:

| Country | Nb Entries | % Female | Average Age | % Phone Users | % Internet Users | % Buy Online |
|---|---|---|---|---|---|---|
| **BELGIQUE** | 1010.0 | 54.6 | 57.7 | 98.3 | 81.6 | 22.3 |
| **DANMARK** | 1002.0 | 51.7 | 57.2 | 99.6 | 91.2 | 46.3 |
| **ELLADA** | 1004.0 | 51.9 | 50.5 | 99.7 | 84.0 | 13.1 |
| **ESPANA** | 1000.0 | 51.8 | 50.2 | 99.7 | 87.2 | 26.1 |
| **SUOMI** | 1002.0 | 42.7 | 58.5 | 99.2 | 85.1 | 30.4 |
| **FRANCE** | 1006.0 | 54.6 | 58.8 | 98.8 | 82.7 | 19.1 |
| **IRELAND** | 1002.0 | 48.8 | 56.3 | 98.9 | 85.7 | 41.8 |
| **ITALIA** | 1000.0 | 53.8 | 55.7 | 99.8 | 78.7 | 19.1 |
| **LUXEMBOURG** | 504.0 | 57.7 | 48.4 | 99.4 | 97.0 | 52.2 |
| **NEDERLAND** | 1008.0 | 50.8 | 59.3 | 99.6 | 90.1 | 34.0 |
| **ÖSTERREICH** | 1000.0 | 50.6 | 56.7 | 99.5 | 85.5 | 27.4 |
| **PORTUGAL** | 1000.0 | 57.1 | 51.2 | 99.8 | 79.6 | 13.2 |
| **SVERIGE** | 1000.0 | 47.5 | 62.1 | 98.9 | 88.7 | 39.6 |
| **DEUTSCHLAND** | 1000.0 | 49.8 | 58.3 | 99.4 | 87.9 | 28.5 |
| **UK** | 1001.0 | 49.7 | 57.0 | 99.2 | 84.2 | 42.1 |
| **BALGARIJA** | 1005.0 | 63.2 | 55.4 | 99.5 | 76.6 | 8.1 |
| **KYPROS** | 506.0 | 54.5 | 51.1 | 100.0 | 72.9 | 11.3 |
| **CESKA REPUBLIKA** | 1001.0 | 48.4 | 52.9 | 98.8 | 85.3 | 21.2 |
| **EESTI** | 1000.0 | 60.5 | 56.9 | 99.7 | 77.0 | 11.1 |
| **MAGYARORSZAG** | 1006.0 | 59.1 | 54.8 | 99.8 | 82.4 | 8.1 |
| **LATVIA** | 1000.0 | 59.5 | 51.5 | 99.5 | 82.8 | 14.6 |
| **LIETUVA** | 1000.0 | 57.0 | 50.9 | 99.3 | 81.9 | 13.9 |

| Country | Nb Entries | % Female | Average Age | % Phone Users | % Internet Users | % Buy Online |
|---|---|---|---|---|---|---|
| **MALTA** | 506.0 | 59.9 | 51.5 | 100.0 | 80.8 | 20.9 |
| **POLSKA** | 1000.0 | 49.3 | 55.2 | 98.4 | 79.7 | 19.7 |
| **ROMANIA** | 1004.0 | 52.2 | 49.5 | 99.9 | 75.6 | 8.0 |
| **SLOVENSKA REPUBLIC** | 1005.0 | 53.3 | 50.5 | 99.8 | 84.3 | 14.7 |
| **SLOVENIJA** | 1003.0 | 60.0 | 59.0 | 99.7 | 72.5 | 9.9 |
| **HRVATSKA** | 1008.0 | 63.3 | 55.4 | 99.6 | 76.9 | 10.0 |
| **AVG** | 949.4 | 54.0 | 54.7 | 99.4 | 82.8 | 22.4 |
| **STD** | 153.9 | 5.0 | 3.6 | 0.4 | 5.5 | 12.5 |

We can draw the following takeaways from the following statistics:

- The countries with the highest % of Phone Owners are KYPROS 100% and MALTA 100% but it is not very significant since STD is 0.4
- The country with the highest % of internet Users is LUXEMBOURG at 97.0%
- The country with the highest % of online buyers is also LUXEMBOURG at 52.2%
- The country with the lowest % of internet Users is KYPROS at 72.9%
- The country with the lowest % of online buyers is ROMANIA at 8.0% followed by MAGYARORSZAG (Hungary) and BALGARIJA (Bulgaria) tied at 8.1%. This is likely due to reasons tied to the development of these countries since these are the countries with some of lowest HDI (appendix 3) in Europe that are included in this Q&A and Romania and Bulgaria are part of the countries with the lowest internet penetration in Europe (appendix 1).

## PER AGE GROUP:

| Age Group | Nb Entries | % Female | % Phone Users | % Internet Users | % Buy Online |
|---|---|---|---|---|---|
| **Under20** | 606.0 | 44.2 | 99.5 | 99.7 | 54.8 |
| **Over20Under40** | 4909.0 | 48.3 | 99.7 | 99.1 | 39.9 |
| **Over40Under65** | 12077.0 | 53.7 | 99.5 | 91.4 | 23.7 |
| **Over65** | 8991.0 | 57.8 | 99.1 | 61.0 | 7.8 |
| **AVG** | 6645.8 | 51.0 | 99.4 | 87.8 | 31.5 |
| **STD** | 4315.5 | 5.2 | 0.2 | 15.8 | 17.6 |

We can draw the following takeaways from the following statistics:

- The age group with the highest % of internet users is the "under20" age group at 99.7%, closely followed by the over20under40 group at 99.1%
- Following the same logic the age group with the lowest % of internet users is the over65 age group at 61%.
- The age group that buy most online is the under20 age group at 54%
- And the age group that buy least online is the Over65 age group at 7.8%
- We can therefore say that accounting for fixed effects related to age via a dummy variable was an appropriate measure to reduce bias, as we can see that internet users as well as buying online varies a lot between age groups. This can also be seen through the respective STD of 15.8% and 17.6% of "% Internet Users" and "% Buy Online"

## INTERACTION BETWEEN VARIABLES

For the interaction among variables, we study the correlation between the variables of interest and the dependant variables to make sure that they are not very correlated in order to avoid negatively affecting the results of our regression.

## CORRELATION MATRIX

| | BUY ONLINE | ACCESS FROM ANOTHER COUNTRY | AGE | FEMALE | USE MOBILEPHONE | USE INTERNET |
|---|---|---|---|---|---|---|
| **BUY ONLINE** | 1 | NA | -0.32 | -0.12 | 0.013 | 0.24 |
| **ACCESS FROM ANOTHER COUNTRY** | NA | 1 | -0.25 | -0.1 | -0.037 | 0.16 |
| **AGE** | -0.32 | -0.25 | 1 | 0.076 | -0.032 | -0.43 |
| **FEMALE** | -0.12 | -0.1 | 0.076 | 1 | 0.00063 | -0.094 |
| **USE MOBILEPHONE** | 0.013 | -0.037 | -0.032 | 0.00063 | 1 | 0.028 |
| **USE INTERNET** | 0.24 | 0.16 | -0.43 | -0.094 | 0.028 | 1 |

## ONLINE CUSTOMER:

Looking at 'online customers' in the correlation matrix above. Among all variables, 'age' shows the highest correlation (-0.32) with "Buy Online". Being a female is also negatively correlated with buying online (-0.12). Finally, "Use Internet" is also correlated at 0.24 to "Buy Online".

## ACCESS FROM ANOTHER COUNTRY:

Looking at the correlations of "Access from another Country" we can clearly see the the following. That "Age" shows the highest correlation (-0.25) with "Buy Online". Being a female is also negatively correlated with buying online (-0.10). Finally, "Use Internet" is also correlated at 0.24 to "Buy Online".

## Results of the regression

After describing, cleansing and preprocessing the data, we can see which variables are interesting to predict. The aim of this project is to study geo-blocking in the EU, so the most relevant information is to know wether consumers buy online or not. Hence, we consider question n° 5: « For each of the following types of content, please tell me wether you have accessed or downloaded it free of charge or by paying for it? ». Furthermore, to understand the effects of geo-blocking, another relevant information is to know wether consumers can or cannot access online contents from another country. Question n°11 : « Over the past 12 months, have you tried to access or download any of the following types of content through an online service intended for users in another EU country? »

| Q5 | For each of the following types of content, please tell me whether you have accessed or downloaded it free of charge or by paying for it? If you have used multiple access methods, please mention the one you have used most often. |
|---|---|

(READ OUT - ONE ANSWER ONLY)

| | | Free of charge without registration | Free of charge upon registration (including free subscription) | Paid per item | Paid a subscription | DK/NA (DO NOT READ OUT) |
|---|---|---|---|---|---|---|
| 1 | Music | 1 | 2 | 3 | 4 | 5 |
| 2 | Sports | 1 | 2 | 3 | 4 | 5 |
| 3 | Audio-visual content such as films, series, and all TV content, excluding sports | 1 | 2 | 3 | 4 | 5 |
| 4 | E-books or digital books | 1 | 2 | 3 | 4 | 5 |
| 5 | Games or gaming apps | 1 | 2 | 3 | 4 | 5 |

| Q11 | Over the past 12 months have you tried to access or download any of the following types of content through an online service intended for users in another EU country? |
|---|---|

(READ OUT - MULTIPLE ANSWERS POSSIBLE)

| | |
|---|---|
| Yes, music | 1, |
| Yes, sports | 2, |
| Yes, audio-visual content such as films, series and all TV content, excluding sports | 3, |
| Yes, e-books or digital books | 4, |
| Yes, games or gaming apps | 5, |
| No | 6, |
| DK/NA (DO NOT READ OUT) | 7, |

NEW

ASK Q12 AND Q13 IF CODE 1 TO 5 IN Q11

We built a variable Y named **q5_6** summarising the answers to :

- 1: I have accessed or downloaded one of these types of content by paying for it.
- 0: I have accessed or downloaded one of these types of content free of charge.

We built a variable Ycommerce named **q11** summarising the answers to :

- 1: I have tried to access or download one of these types of content intended for users in another country.
- 0: I haven't tried to access or download one of these types of content intended for users in another country.

These two variables will be predicted with other dummy variables.

There are five dummy variables used for the regression:

- The sex of the users: male (0) or female (1).
- The age of the respondent partitioned into categories:

- Under 20
- Between 20 years old and 40 years old
- Between 40 years old and 65 years old
- Over 65 years old.

- The country of the respondent, amongst the 28 EU countries.
- The use of a mobile phone: yes (1) or no (0)
- The use of internet: yes (1) or no (0).

We ran Logistic regressions with these five dummy variables and got the following results.

## REGRESSION BY COUNTRIES

We utilised the seaborn and statsmodels Python libraries to run our regressions. We took countries one by one instead of grouping them by cultural or geographical proximity, in order not to loose information on the individual behaviour of respondents in each country. We then dropped France when running the regression.

**Buying online content**

When running the regression, we get the following coefficients. First, we notice that all p-values except for Luxembourg are inferior to 0.05, meaning that the results are statistically significant, except Luxembourg.

Furthermore, except for Luxembourg, all coefficients are negative, which means that people from these countries are less likely to buy online with respect to France.

According to the descriptive data, Luxembourg has the highest percentage of online purchasers (52.2%), so this country should have an influence on the chances to buy online. So it's surprising that Luxembourg is statistically insignificant. We can maybe say that Luxembourg is statistically insignificant because it is correlated with France ? To check this, we drop another country. No matter which country we drop, Luxembourg still remains statistically insignificant with the same coefficient and P-value. Thus, we can say that this is due to the fact that the number of respondents from Luxembourg is half the number of respondents of other countries. So Luxembourg has no dramatic influence on the online behavior of consumers when doing a regression by countries.

**Accessing online content from another country**

This is not the case for online access from another country. All countries are statistically significant with respect to France and the coefficients are all negative. So, people from all European countries are less likely to access online content from another EU country, with respect to France.

This means that consumers prefer to access online content that comes from their own country.

| | Buy online | | | Access from another country | | |
|---|---|---|---|---|---|---|
| | coef | std err | P>\|z\| | coef | Std err | P>\|z\| |
| **BALGARIJA** | -2.4343 | 0.116 | 0.000 | -2.3070 | 0.110 | 0.000 |
| **BELGIQUE** | -1.2496 | 0.076 | 0.000 | -1.5696 | 0.083 | 0.000 |
| **CESKA REPUBLIKA** | -1.3142 | 0.077 | 0.000 | -1.8672 | 0.093 | 0.000 |
| **DANMARK** | -0.1480 | 0.063 | 0.020 | -2.1240 | 0.102 | 0.000 |
| **DEUTSCHLAND** | -0.9198 | 0.070 | 0.000 | -2.6827 | 0.129 | 0.000 |
| **EESTI** | -2.0806 | 0.101 | 0.000 | -2.6662 | 0.128 | 0.000 |
| **ELLADA** | -1.8880 | 0.093 | 0.000 | -1.7630 | 0.089 | 0.000 |
| **ESPANA** | -1.0408 | 0.072 | 0.000 | -2.1752 | 0.104 | 0.000 |
| **HRVATSKA** | -2.1950 | 0.105 | 0.000 | -2.0399 | 0.099 | 0.000 |
| **IRELAND** | -0.3303 | 0.064 | 0.000 | -1.4013 | 0.079 | 0.000 |
| **ITALIA** | -1.4435 | 0.080 | 0.000 | -3.0550 | 0.153 | 0.000 |
| **KYPROS** | -2.0640 | 0.141 | 0.000 | -2.3514 | 0.158 | 0.000 |
| **LATVIA** | -1.7663 | 0.090 | 0.000 | -1.7663 | 0.090 | 0.000 |
| **LIETUVA** | -1.8236 | 0.091 | 0.000 | -2.5123 | 0.120 | 0.000 |
| **LUXEMBOURG** | 0.0874 | 0.089 | 0.327 | -1.0055 | 0.101 | 0.000 |
| **MAGYARORSZAG** | -2.4353 | 0.116 | 0.000 | -2.5931 | 0.124 | 0.000 |
| **MALTA** | -1.3280 | 0.109 | 0.000 | -1.0008 | 0.100 | 0.000 |
| **NEDERLAND** | -0.6621 | 0.066 | 0.000 | -2.3850 | 0.113 | 0.000 |
| **POLSKA** | -1.4052 | 0.080 | 0.000 | -1.8489 | 0.092 | 0.000 |
| **PORTUGAL** | -1.8834 | 0.093 | 0.000 | -2.0705 | 0.100 | 0.000 |

| | Buy online | | | Access from another country | | |
|---|---|---|---|---|---|---|
| | coef | std err | P>\|z\| | coef | Std err | P>\|z\| |
| **ROMANIA** | -2.4467 | 0.117 | 0.000 | -2.0354 | 0.099 | 0.000 |
| **SLOVENIJA** | -2.2117 | 0.106 | 0.000 | -2.4055 | 0.115 | 0.000 |
| **SLOVENSKA REPUBLIC** | -1.7562 | 0.089 | 0.000 | -2.1169 | 0.102 | 0.000 |
| **SUOMI** | -0.8265 | 0.069 | 0.000 | -2.3405 | 0.112 | 0.000 |
| **SVERIGE** | -0.4222 | 0.065 | 0.000 | -2.4698 | 0.118 | 0.000 |
| **UK** | -0.3204 | 0.064 | 0.000 | -1.9841 | 0.097 | 0.000 |
| **ÖSTERREICH** | -0.9744 | 0.071 | 0.000 | -1.7346 | 0.089 | 0.000 |

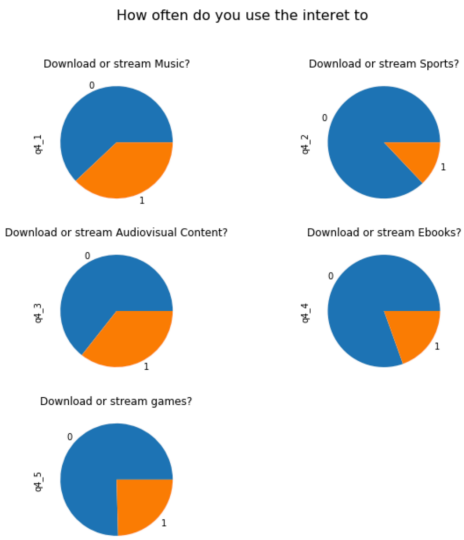
## REGRESSION BY SEX

We dropped the variable « being a male ». Here, we see that the variables are statistically significant.

| | Buy online | | | Access from another country | | |
|---|---|---|---|---|---|---|
| | coef | std err | P>\|z\| | coef | std err | P>\|z\| |
| **d2** | -1.5553 | 0.022 | 0.000 | -2.3871 | 0.030 | 0.000 |

For both regressions, the variable d2, *eg* to be a female, is statistically significant and negatively influences the access to online content: so being female reduces the chance of buying online or accessing service from another country. This can be explained by the contents surveyed here: music, sports, audio-visual contents (films, series), e-books, gaming contents. On the below graphs, we can women's preference of contents: 0 means no and 1 means yes.

Music and audio-visual contents have a higher share of yes then e-books, sports and gaming contents. Since women appear to be less likely to purchase online contents in three category amongst five, this could induce an asymmetry in answers which can explain the result.




## REGRESSION BY AGE

We dropped the variable « age under 65 years old »

| | Buy online | | | Access from another country | | |
|---|---|---|---|---|---|---|
| | **coef** | **Std err** | **P>\|z\|** | **coef** | **Std err** | **P>\|z\|** |
| **under20** | 0.1920 | 0.082 | 0.019 | -0.8068 | 0.088 | 0.000 |
| **over20under40** | -0.4085 | 0.029 | 0.000 | -1.1439 | 0.033 | 0.000 |
| **over40under65** | -1.1684 | 0.021 | 0.000 | -2.0619 | 0.029 | 0.000 |

We see that for both regressions, all age categories are statistically significant.

For the first regression, if a consumer is aged under 20 years old he or she is more likely to purchase online content. Over 20 years of age, the consumers are less likely to buy online.

Moreover, with respect to the category « Over 65 », consumers that are under 65 are less likely to try to access content from another EU country.

## REGRESSION BY USE OF MOBILE PHONE

| | Buy online | | | Access from another country | | |
|---|---|---|---|---|---|---|
| | **coef** | **Std err** | **P>\|z\|** | **coef** | **Std err** | **P>\|z\|** |
| **d19** | -1.2604 | 0.015 | 0.000 | -2.0391 | 0.019 | 0.000 |

The fact to have one or more active phone numbers is statistically significant and negatively influences the chances to buy online or try to access online content from another country, which is quite surprising: we would imagine that owning a phone number would increase the chances to purchase online contents or access online contents in other countries.

## REGRESSION BY USE OF INTERNET

| | Buy online | | | Access from another country | | |
|---|---|---|---|---|---|---|
| | **coef** | **Std err** | **P>\|z\|** | **coef** | **Std err** | **P>\|z\|** |
| **d8a** | -1.0125 | 0.015 | 0.000 | -1.8233 | 0.019 | 0.000 |

Using the internet is statistically significant and negatively influences the chances to buy online or try to access online content from another country. This result is surprising, because intuitively, using the internet should render consumers more likely to purchase online or try to access contents from other countries.

## REGRESSION WITH ALL VARIABLES

| | Buy online | | | Access from another country | | |
|---|---|---|---|---|---|---|
| | coef | Std err | P>\|z\| | coef | Std err | P>\|z\| |
| **Being a female** | -0.5133 | 0.034 | 0.000 | -0.6478 | 0.041 | 0.000 |
| **Having active phone number(s)** | -3.6421 | 0.130 | 0.000 | -3.2364 | 0.126 | 0.000 |
| **Using Internet** | 2.1694 | 0.115 | 0.000 | 1.6623 | 0.116 | 0.000 |
| **BALGARIJA** | -1.7781 | 0.143 | 0.000 | -1.0792 | 0.139 | 0.000 |
| **BELGIQUE** | -0.4818 | 0.112 | 0.000 | -0.3493 | 0.118 | 0.003 |
| **CESKA REPUBLIKA** | -0.8038 | 0.112 | 0.000 | -0.8970 | 0.125 | 0.000 |
| **DANMARK** | 0.7970 | 0.103 | 0.000 | -1.0204 | 0.132 | 0.000 |
| **DEUTSCHLAND** | -0.0978 | 0.107 | 0.359 | -1.5568 | 0.154 | 0.000 |
| **EESTI** | -1.3707 | 0.130 | 0.000 | -1.4558 | 0.154 | 0.000 |
| **ELLADA** | -1.4196 | 0.124 | 0.000 | -0.7139 | 0.122 | 0.000 |
| **ESPANA** | -0.5431 | 0.108 | 0.000 | -1.2271 | 0.134 | 0.000 |
| **HRVATSKA** | -1.5047 | 0.134 | 0.000 | -0.7735 | 0.130 | 0.000 |
| **IRELAND** | 0.5812 | 0.103 | 0.000 | -0.2091 | 0.115 | 0.068 |
| **ITALIA** | -0.7042 | 0.115 | 0.000 | -1.9243 | 0.174 | 0.000 |
| **KYPROS** | -1.5826 | 0.166 | 0.000 | -1.3084 | 0.182 | 0.000 |
| **LATVIA** | -1.3301 | 0.121 | 0.000 | -0.7489 | 0.123 | 0.000 |
| **LIETUVA** | -1.4126 | 0.123 | 0.000 | -1.5817 | 0.147 | 0.000 |
| **LUXEMBOURG** | 0.6172 | 0.122 | 0.000 | -0.0412 | 0.132 | 0.754 |
| **MAGYARORSZAG** | -1.8207 | 0.142 | 0.000 | -1.4391 | 0.150 | 0.000 |
| **MALTA** | -0.7505 | 0.140 | 0.000 | 0.1933 | 0.134 | 0.150 |
| **NEDERLAND** | 0.2938 | 0.104 | 0.005 | -1.1759 | 0.141 | 0.000 |

| | Buy online | | | Access from another country | | |
|---|---|---|---|---|---|---|
| | **coef** | **Std err** | **P>\|z\|** | **coef** | **Std err** | **P>\|z\|** |
| **Being a female** | -0.5133 | 0.034 | 0.000 | -0.6478 | 0.041 | 0.000 |
| **POLSKA** | -0.7821 | 0.114 | 0.000 | -0.7728 | 0.125 | 0.000 |
| **PORTUGAL** | -1.3822 | 0.124 | 0.000 | -1.0084 | 0.131 | 0.000 |
| **ROMANIA** | -2.0660 | 0.143 | 0.000 | -1.0396 | 0.130 | 0.000 |
| **SLOVENIJA** | -1.3799 | 0.135 | 0.000 | -1.0676 | 0.143 | 0.000 |
| **SLOVENSKA REPUBLIC** | -1.3324 | 0.121 | 0.000 | -1.1574 | 0.132 | 0.000 |
| **SUOMI** | 0.0237 | 0.107 | 0.824 | -1.2416 | 0.140 | 0.000 |
| **SVERIGE** | 0.6519 | 0.104 | 0.000 | -1.2709 | 0.144 | 0.000 |
| **UK** | 0.6272 | 0.103 | 0.000 | -0.8127 | 0.127 | 0.000 |
| **ÖSTERREICH** | -0.2078 | 0.107 | 0.053 | -0.5647 | 0.121 | 0.000 |
| **under20** | 2.5801 | 0.100 | 0.000 | 1.9178 | 0.108 | 0.000 |
| **over20under40** | 2.1181 | 0.056 | 0.000 | 1.6402 | 0.067 | 0.000 |
| **over40under65** | 1.1420 | 0.048 | 0.000 | 0.7382 | 0.063 | 0.000 |

We can see that some p-values are superior to 0.05, and the corresponding variables are thus not statistically significant. This is the case, for the first regression for countries like **Germany**, **Finland** and **Austria**. These countries were statistically significant when the group of countries was taken individually. The reason they became insignificant is that they are correlated, with respect to the base country France. It seems logical to say that Germany and Austria are correlated, as two German-speaking countries. We ran a regression with these two countries grouped, and saw that the group « Germany-Austria » is still statistically insignificant. Furthermore, the values indicated in green in the table are those with positive coefficients. So, people from the **UK**, **Sweden**, the **Netherlands**, **Luxembourg**, **Ireland** and **Denmark** are more likely to purchase online goods or services, with respect to France. This result can be explained by the fact that these countries rank amongst the first countries in European for internet penetration in percentage of their population [10] (appendix 1).

Consumers under 65 years of age are also more likely to purchase online, and this likeliness decreases with age. This a coherent result because the younger the consumer, the more time he or she spends on the internet, according to the takeaways of the statistical description.

Also, if people use internet, they are more likely to pay for online contents, which is a logical result.

For the second regression, **Ireland**, **Luxembourg** and **Malta** became statistically insignificant. As two english-speaking countries, it can be intuited that Ireland and Malta are correlated, a regression in which both countries are grouped proves it: the group "Ireland-Malta" becomes statistically significant. As we discussed in the regression by country section, Luxembourg has a small share of respondents, which is maybe why the variable became statistically insignificant. But the regression with all variables, Luxembourg behaves conversely to the regression with only countries.

## CONCLUSIONS

The statistical study enabled us to draw some interesting conclusions: being a female and owning a phone make the consumer less likely to either purchase or try to access foreign online contents, due to an asymmetry in the contents surveyed. Consumers in the UK, Sweden, the Netherlands, Luxembourg, Ireland and Denmark are more likely to purchase online goods or services, with respect to France, whereas consumers in other countries are less likely to engage in similar activities. Furthermore, the younger the consumer, the more likely he or she is to buy online contents. The same behavior is observed for accessing foreign online contents. The internet usage also positively affects the online purchases, as well as the access to online contents from another country.

However, a surprising result still holds, which the one concerning the ownership of an active phone number. Hence, to lift any ambiguity, a question related to the mean to access and purchase online contents could have been added: « Do you access online content on 1) a phone 2) a tablet or 3) a computer? ».

We may say that consumers from countries that negatively impact the possibility to purchase or access online contents are the ones subject to geo-blocking. An interesting study to conduct is to know from which countries consumers tried to purchase or access contents, to say which countries perform geo-blocking. Similarly, UK, Sweden, the Netherlands, Luxembourg, Ireland and Denmark are not subject to geo-blocking, a possible explanation could be that they themselves perform geo-blocking? When we look at this study [11], we see that in 2016, countries which performed unjustified geo-blocking by not making it possible to arrive to the « order » button were France, Spain, the UK, Luxembourg, Germany, Belgium and Austria. Three years later, the UK and Luxembourg might still perform unjustified geo-blocking, according to our results.

Hence, even if the contents of the questions introduced an asymmetry and lacked precision with respect to some variables, the survey enabled us to draw coherent conclusions on how geo-blocking affects consumers.

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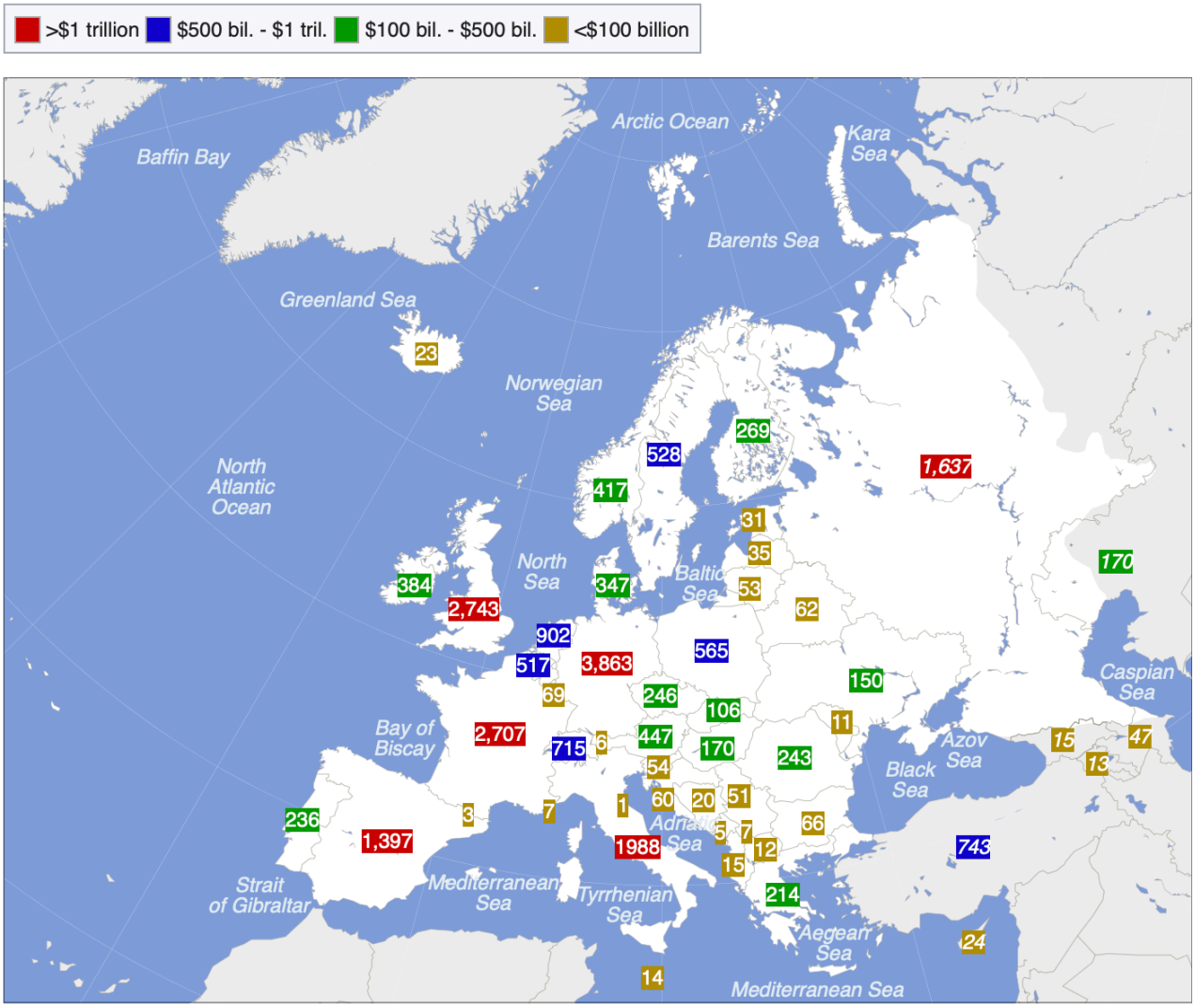
# APPENDIX

Internet penetration (Appendix 1) https://www.internetworldstats.com/

| EUROPE | Penetration (% Population) | Users % in Europe | Facebook 31-Dec-2018 |
|---|---|---|---|
| Norway | 98.4 % | 0.7 % | 3,400,000 |
| Estonia | 97.9 % | 0.2 % | 620,000 |
| Denmark | 97.8 % | 0.8 % | 3,700,000 |
| Luxembourg | 97.8 % | 0.1 % | 320,000 |
| Sweden | 96.4 % | 1.3 % | 6,300,000 |
| Germany | 96.0 % | 10.9 % | 31,000,000 |
| Netherlands | 95.6 % | 2.3 % | 9,800,000 |
| United Kingdom | 94.9 % | 8.7 % | 44,000,000 |
| Finland | 94.0 % | 0.7 % | 2,700,000 |
| Belgium | 93.9 % | 1.5 % | 6,500,000 |
| Italy | 92.5 % | 7.5 % | 30,000,000 |
| Spain | 92.5 % | 5.9 % | 23,000,000 |
| France | 92.3 % | 8.3 % | 33,000,000 |
| Ireland | 91.9 % | 0.6 % | 2,700,000 |
| Croatia | 91.5 % | 0.5 % | 1,800,000 |
| Lithuania | 90.9 % | 0.4 % | 1,400,000 |
| Hungary | 89.0 % | 1.2 % | 5,300,000 |
| Austria | 87.9 % | 1.1 % | 3,700,000 |
| Czech Republic | 87.7 % | 1.3 % | 4,600,000 |
| Latvia | 87.1 % | 0.2 % | 740,000 |
| Slovakia | 84.9 % | 0.6 % | 3,200,000 |
| Cyprus | 84.4% | 0.1 % | 870,000 |
| Malta | 83.1 % | 0.0 % | 320,000 |
| Bosnia-Herzegovina | 80.8 % | 0.4 % | 1,500,000 |
| Slovenia | 79.9 % | 0.2 % | 910,000 |
| Poland | 78.2 % | 4.1 % | 14,000,000 |
| Portugal | 78.2 % | 1.1 % | 5,800,000 |
| Romania | 73.8 % | 2.0 % | 8,900,000 |
| Greece | 72.9 % | 1.1 % | 5,000,000 |
| Bulgaria | 66.7 % | 0.6 % | 3,300,000 |

Appendix 2 - GDP




https://en.wikipedia.org/wiki/List_of_sovereign_states_in_Europe_by_GDP_%28nominal%29

## Appendix 3 - HDI

| List of Countries in Europe by Human Development Index | | | |
|---|---|---|---|
| Rank | HDI rank | Country | Human Development Index (HDI) |
| in region | | | HDI 2018 |
| 1 | 1 | Norway | 0.954 |
| 2 | 2 | Switzerland | 0.946 |
| 3 | 3 | Ireland | 0.942 |
| 4 | 4 | Germany | 0.939 |
| 6 | 8 | Sweden | 0.937 |
| 7 | 10 | Netherlands | 0.933 |
| 8 | 11 | Denmark | 0.930 |
| 9 | 12 | Finland | 0.925 |
| 10 | 15 | United Kingdom | 0.920 |
| 11 | 17 | Belgium | 0.919 |
| 13 | 20 | Austria | 0.914 |
| 14 | 21 | Luxembourg | 0.909 |
| 16 | 24 | Slovenia | 0.902 |
| 17 | 25 | Spain | 0.893 |
| 18 | 26 | Czech Republic | 0.891 |
| 18 | 26 | France | 0.891 |
| 19 | 28 | Malta | 0.885 |
| 20 | 29 | Italy | 0.883 |
| 21 | 30 | Estonia | 0.882 |
| 22 | 31 | Cyprus | 0.873 |
| 23 | 32 | Poland | 0.872 |
| 23 | 32 | Greece | 0.872 |
| 24 | 34 | Lithuania | 0.869 |
| 25 | 36 | Slovakia | 0.857 |
| 26 | 39 | Latvia | 0.854 |
| 27 | 40 | Portugal | 0.850 |
| 28 | 43 | Hungary | 0.845 |
| 29 | 46 | Croatia | 0.837 |
| 32 | 52 | Bulgaria | 0.816 |
| 32 | 52 | Romania | 0.816 |
| 34 | 63 | Serbia | 0.799 |
| 37 | 75 | Bosnia and Herzegovina | 0.769 |

https://en.wikipedia.org/wiki/List_of_sovereign_states_in_Europe_by_Human_Development_Index

Appendix 4 - Study [11] page 18

**Table 6: Country Matrix - Arrive to Order Button**

| | Country Shop | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Country of Buyer** | AT | BE | BG | HR | CZ | CY | DK | EE | FI | FR | DE | GR | HU | LV | LT | LU | IE | IT | MT | NE | PL | PT | RO | SK | SI | ES | SE | UK | Total |
| Austria | | | | | | | | | | 0.35 | 0.52 | | | | | | | 0.24 | | 0.29 | | | | | | | | 0.54 | **0.49** |
| Belgium | | | | | | | | | | 0.49 | 0.38 | | | | | 0.38 | | | | 0.28 | | | | | | | | 0.56 | **0.41** |
| Bulgaria | | | | | | | | | | 0.28 | 0.24 | 0.19 | | | | | | 0.21 | | | | | 0.15 | | | | | 0.36 | **0.28** |
| Croatia | 0.21 | | | | | | | | | 0.38 | 0.21 | | | | | | | 0.21 | | 0.19 | | | | | 0.17 | | | 0.37 | **0.26** |
| Czech Republic | 0.18 | | | | | | | | | 0.31 | 0.27 | | | | | | | | | | 0.09 | | | 0.09 | | | | 0.57 | **0.27** |
| Cyprus | | | | | | | | | | | 0.16 | 0.35 | | | | | | | | | | | | | | | | 0.43 | **0.37** |
| Denmark | | | | | | | | | | 0.4 | 0.25 | | | | | | | | | | | | | | | | 0.22 | 0.52 | **0.36** |
| Estonia | | | | | | | | | 0.2 | | 0.28 | | | 0.3 | | | | 0.37 | | | 0.12 | 0.1 | | | | | 0.23 | 0.39 | **0.3** |
| Finland | | | | | | | | 0.21 | | | 0.27 | | | | | | | | 0.34 | | | | | | | 0.48 | 0.31 | 0.44 | **0.34** |
| France | | 0.36 | | | | | | | | | 0.26 | | | | | | | 0.26 | | | | | | | | 0.37 | | 0.5 | **0.36** |
| Germany | 0.34 | | | | | | | | | 0.43 | | | | | | | | 0.31 | | 0.28 | | | | | | | | 0.21 | **0.3** |
| Greece | | | 0.1 | | | 0.08 | | | | 0.39 | 0.3 | | | | | | | 0.45 | | | | | | | | 0.28 | | 0.51 | **0.39** |
| Hungary | 0.34 | | | | | | | | | 0.07 | 0.17 | | | | | | | | | | | | | 0.25 | | | | 0.49 | **0.3** |
| Latvia | | | | | | | | 0.13 | | 0.36 | 0.28 | | | | 0.08 | | | | | | 0.24 | | | | | | | 0.35 | **0.28** |
| Lithuania | | | | | | | | | | 0.25 | 0.28 | | | | | | | | | | 0.22 | | | | | | | 0.36 | **0.31** |
| Luxembourg | 0.35 | 0.27 | | | | | | | | 0.51 | 0.34 | | | | | | | 0.31 | | 0.3 | | 0.31 | | | | | | 0.53 | **0.39** |
| Ireland | | | | | | | | | | 0.32 | 0.37 | | | | | | | 0.06 | | | | | | | | 0.33 | | 0.5 | **0.43** |
| Italy | 0.32 | | | | | | | | | 0.32 | 0.36 | | | | | | 0.34 | | | | | | | | | 0.41 | | 0.45 | **0.38** |
| Malta | | | | | | | | | | 0.29 | 0.22 | | | | | | 0.27 | 0.16 | | | | | | | | 0.25 | | 0.12 | **0.17** |
| the Netherlands | | 0.4 | | | | | | | | | 0.28 | | | | | | | | | | | | | | | | | 0.22 | **0.29** |
| Poland | | | | | 0.18 | | | | | | 0.3 | | | | | | | | | | | | | | | | | 0.38 | **0.31** |
| Portugal | | | | | | | | | | 0.3 | 0.4 | | | | | | | | | | | | | | | 0.45 | | 0.39 | **0.39** |
| Romania | 0.21 | | | | | | | | | 0.2 | 0.35 | | 0.01 | | | | | 0.18 | | | | | | | | 0.4 | | 0.37 | **0.27** |
| Slovakia | 0.24 | | | | 0.25 | | | | | | 0.41 | | 0.01 | | | | | | | | 0.16 | | | | | | | 0.31 | **0.26** |
| Slovenia | 0.22 | | | 0.28 | | | | | | | 0.3 | | | | | | | 0.32 | | | | | | | | | | 0.33 | **0.28** |
| Spain | | | | | | | | | | 0.23 | 0.39 | | | | | | | 0.42 | | | | 0.19 | | | | | | 0.49 | **0.37** |
| Sweden | | | | | | | 0.27 | | | | 0.49 | | | | | | | | | | | | | | | | | 0.38 | **0.4** |
| the UK | | | | | | | | | | 0.54 | 0.38 | | | | | | 0.47 | | | | | | | | | 0.39 | | | **0.44** |
| Total | **0.32** | **0.37** | **0.1** | **0.28** | **0.21** | **0.08** | **0.27** | **0.2** | **0.2** | **0.41** | **0.36** | **0.3** | **0.01** | **0.3** | **0.08** | **0.38** | **0.44** | **0.31** | **0.34** | **0.28** | **0.15** | **0.19** | **0.15** | **0.14** | **0.17** | **0.39** | **0.27** | **0.41** | **0.37** |