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No Place Like Home: Home Bias and Environmental Concern in the European Union

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Abstract

This research paper analyzes the effect of growing environmental concern on home bias in the European Union. Using the latest release of the International Trade and Production Database for Estimation, for the years 2002-2016, the home bias is estimated with the gravity model of trade. The Eurobarometer "Public Opinion in the European Union" is used as a proxy for environmental concern over the same years. Concern for the environment in the European Union has seen an increase during the 21st century, indicating a shift toward more sustainable and local consumption. Simultaneously, the home bias has shown a general decrease in the European Union and its respective countries. An increase in local and domestic consumption could lead to a larger home bias. The results do not find any conclusive evidence of environmental concern affecting the home bias. However, when controlling for unobserved heterogeneity with a rich set of fixed effects, there are indications of a positive relationship between the two variables. This paper extends the current literature on environmental concern and home bias and contributes with a previously unexplored relationship: if environmental concern affects the home bias.

Key Words: *Home Bias, Environmental Concern, European Union, Gravity Model*

List of Abbreviations

CEPII = Centre d'Etudes Prospectives et d'Informations Internationales

CIF = Cost, Insurance and Freight

EAS = Ecological Attitude Scale

EU = European Union

ITPD-E = International Trade and Production Database for Estimation

MCFA = Multigroup Confirmatory Factor Analysis

OECD = Organization for Economic Co-operation and Development

OLS = Ordinary Least Squares

PPML = Poisson Pseudo-Maximum Likelihood

US = United States

USITC = United States International Trade Commission

WDI = World Development Indicators

WTO = World Trade Organization

Table of Contents

List of Figures

List of Tables

1. Introduction

In the wake of the Second World War, the European Union was founded to bring peace and prosperity over the continent. The following decades have seen unprecedented integration of the European nations, and the European Union is considered the most integrated bloc globally, both economically and politically. Today the Union consists of a diverse set of countries, acting on a single market which refers to the European Union as "one territory without any internal borders or other regulatory obstacles to the free movement of goods and services" (European Commission, n.d). Simultaneously, with this economic and political integration, the global nature of environmental issues has received more and more attention as the trans-boundary human-caused degradation of the environment has become increasingly apparent. However, one can argue that it is only during the early years of the 21st century this has become a widespread concern among the general public. More than ever, there is a need for a global response to these problems and the European Union is called upon for collective action for fighting climate change.

Empirical research has documented a “home bias”, where people consume a disproportionate amount of domestically produced goods compared to foreign goods. This was first noted by John McCallum (1995), who used Canadian provinces and state-level data from the United States and found that trade flows between two Canadian provinces were about 22 times as large as trade with US states. This spawned a large and growing literature on border effects – national borders effect on international trade – often referred to as "home bias" where people tend to consume domestically produced goods over foreign.

Since the causes of the home bias remain unclear, recent research on home bias has moved from estimating border effects to investigating their likely causes (Chen, 2004). Seeking to contribute to the increasingly growing literature on home bias, this paper investigates an alternative explanation to the variation in the home bias; that growing environmental concern in the European Union has affected the home bias through a change in consumer preferences. Individuals with high levels of environmental concern change their consumption to more sustainable, and movements such as the "Buy Local" encourages people to buy locally produced goods. A shift in preferences to more local and sustainable would institute a new form of trade barrier as people turn to domestically produced goods. Subsequently, this would, in theory, lead to an increase in the home bias.

It is, therefore, of interest to test whether trade is continued to be disrupted by national borders between members of the European Union and if forces of environmental concern can explain the variation in the home bias. The question this paper seeks to answer is:

Does growing environmental concern lead to a growing home bias?

The case of the European Union is particularly interesting as extensive integration within the European Union through the single market should lead to a small home bias. With the Single Market, Schengen Area and the Eurozone, one might think that national borders separating the European countries are irrelevant and do not affect the free movement of goods across the continent. However, previous studies[1] have illustrated trade volumes to be 3 to 31 times larger within European countries than trade between them.

This paper will follow the empirical literature on estimating the home bias, namely, by estimating a gravity model that covers both domestic and international trade, and where the home bias is captured by including a dummy variable for domestic trade. Importantly, using a rich data set that has recently been made public enables estimation of an individual home bias for every combination of importer and year. These estimated home biases will then, in a second stage, be used as the dependent variable in a new set of regressions, where I investigate if the variation in home bias can be explained by variation in environmental concern. After controlling for unobserved heterogeneity with a set of fixed effects, there are indications of a positive relationship between home bias and environmental concern. The result is, however, sensitive to which estimator is used to estimate the home bias.

This paper's main contribution is to provide an alternative explanation to the home bias, namely, that environmental concern has shifted consumers preferences toward buying more domestically produced goods, thus affecting the home bias. Extensive research on home bias and environmental concern has been conducted separately, providing valuable results and understanding of the two fields. Although, there have been discussions about consumer preferences linked to home bias, there is yet to be researched whether citizens environmental concern does affect the home bias. The detailed estimations of the home bias for every

[1] See (Nitsch, 2000; Head & Mayer, 2002; Chen, 2004; Balta & Delgado, 2009; Cheptea, 2013)

combination of importer and year is another contribution of this paper. Other studies have, to my knowledge, not estimated the home bias in such great detail as this paper does. The final contribution of this paper is the illustration of how the home bias has over time in the European Union.

The rest of the paper is organized in the following manner: Section 2 provides background information and potential origins of the home bias. Section 3 explains environmental concern, how it is measured and discusses how it can affect the home bias. Finally, it provides a descriptive analysis of how the environmental concern has evolved during 2002-2016. The fourth section outlines previous research on home bias and environmental concern, followed by the empirical strategy in section 5. In section 6, the results are presented and, finally, in the last section, the paper is summarized and concluded.

2. Home Bias in International Trade

With home bias, consumers differentiate between domestic goods and imported goods and tend to consume the domestically produced variety. In a basic theoretical sense, the home bias could originate from two factors. Firstly, importers could face a range of barriers in moving a product from the producer in one country to the consumer in another country. These barriers (whether official, informal or accidental) could exist of high transportation costs, tariffs or exclusion from foreign distributional networks, and they generate additional costs, thus generating home bias (Evans, 2001).

Secondly, consumers might prefer domestic goods, and there might exist an inherent benefit in the utility function to buying and consuming goods produced domestically (Evans, 2001). If the only difference between foreign and domestically produced goods is the origin and consumers prefer one over the other, it indicates that the origin is a characteristic the consumers care about and consider (Morey, 2016). This origin of the home bias could also be seen as the "preference-side" of the home bias where consumers might have an inherent benefit in the utility function and preferences that lead them towards buying domestic goods.

Empirically, the home bias is measured as the effect of national borders on international trade and is often referred to as border effects. The measured effect that national borders have on international trade seems too large to be explained by the small border-related trade barriers (Head & Mayer, 2002). Empirical studies in the international trade literature have reported large degrees of border effects. For example, Trefler (1995) showed that home bias helps explain why nations trade with each other less than what the Heckscher-Ohlin framework would predict, i.e., the "case of missing trade". He found that there was approximately 50% less international trade than expected by the Heckscher-Ohlin framework and rejected the model for a modification that allows for home bias in consumption. Many early studies documented a "border puzzle", a phenomenon in which intranational trade is higher than international trade.

The main puzzle is the size of the border effects, which seems to be at odds with the existing evidence on the size and elasticity of trade barriers. Even the most moderate border barriers can result in large home biases if there exists a high degree of substitution between domestic and foreign goods. A high degree of substitution between foreign and domestic goods implies high

responsiveness in trade flows which is why small border-related barriers could lead to large home biases. Although some products and sectors face large border effects, they are also likely to be highly substitutable Chen (2004). It has previously been shown that border effects are equal to the product of; the substitutability between goods produced in foreign countries and the tariff equivalent of the border barrier (Wei, 1996; Evans, 2001; Hillberry & Hummels, 2002; Anderson & van Wincoop, 2001).

However, the origin of the home bias remains unclear, and the academic literature struggles to find conclusive evidence of the forces behind the home bias (Mika, 2017). Given the importance of the home bias, the lack of information about the source of the bias is a concern. Understanding the causes of home bias is of interest since it would enable a more extensive evaluation of its welfare implications (Evans, 2001). If border effects reflect the existence of national trade barriers, this would indicate that their welfare implications are significant and that there is room for increased market integration by the removal of those national trade barriers. On the other hand, if consumers simply prefer domestically produced goods, or if the border effects appear as a consequence of optimal location choices from producers, the welfare and policy implications would be minimal (Chen, 2004; Evans, 2001).

3. Can Growing Environmental Concern be Linked to Changes in Home Bias?

As mentioned in the previous section, home bias could originate from consumers differentiating between domestic and foreign produced goods. The origin of the product is something that individuals could take into account when purchasing goods and, domestically produced goods is often perceived as more environmentally friendly than goods that have been transported from across the globe. Therefore, it is plausible that people with high levels of environmental concern, to a greater extent, differentiate between domestic and foreign products and that this would indicate an increase of the home bias.

The field of environmental concern is complex, everchanging and expanding, making it difficult to map out the field's key features and boundaries. Concern for the environment encompasses several beliefs, attitudes, intentions and behaviours (Marquart-Pyatt, 2011). Ever since the scientific and societal attention to human-caused environmental problems became a subject for discussion in the 1970s, researchers and social scientists have conducted studies on

how people perceive these problems. Besides trying to document to what extent the public saw environmental problems as serious and supported actions to solve them, these early studies also documented a variation in environmental concern in different sectors of the public. However, the researchers' varying backgrounds and methods mostly resulted in ad hoc and atheoretical studies, often disconnected from any kind of attitude theory (Dunlap & Jones, 2002). Another issue linked to environmental concern is the ambiguity of the environment itself. This was pointed out by Heberlein (1981), who noted that:

> "The environment as an object is constantly present and has multiple sub-objects, which do not, as individual objects, represent the totality. We have attitudes about specific objects in the environment such as pine trees, a particular river, the Rocky Mountains, etc. The environment is an experiential object, but no one experiences "the environment" as a whole, but rather separate distinct aspects of the environment" (Heberlein, 1981, p 243).

Despite the ambiguity of the environment, a widely accepted definition of environmental concern exists, and it refers to "the degree to which people are aware of problems regarding the environment and support efforts to solve them and/or indicate a willingness to contribute personally to their solution (Dunlap & Jones, 2002, p. 485). The assessment of environmental concern stresses the importance of mapping out the factors influencing an individual's behaviour. According to Fransson and Gärling (1999), environmental concern has been treated as the evaluation of attitudes towards facts, one's own behaviour, and others' behaviour with consequences for the environment.

Several determinants of environmental concern have been researched, and there is consensus about some of the factors affecting people's environmental concerns. One main factor behind environmental concern is a result of the individual's socio-economic context. Studies examining the sources of individual-level environmental concern emphasizes the position in the social structure. This includes education, income, knowledge and socio-demographic factors such as age, gender and place of residence (Fransson & Gärling, 1999; Dunlap & Jones, 2002; Marquart-Pyatt, 2011). People living in urban areas tend to express higher levels of concern for the environment as well as younger individuals (Dunlap & Jones, 2002; Dunlap & Jones, 1992). Environmental concern is also likely to be higher among people with higher education and

income, and pro-environmental attitudes are more often vocalized by women (Jones & Dunlap, 1992).

Cross-national research on environmental concern also emphasizes the role of context in two prominent ways. Firstly, countries vary on several structural and institutional dimensions such as economic, political and environmental features, which might affect the environmental concern (Marquart-Pyatt, 2011). Wealthy countries with higher GDP are more likely to have citizens that express concerns for the environment as, according to Inglehart (1995), a base of wealth and security has afforded those opportunities. Studies have also found that the rapid expansion of an international system including environmental organizations and actors has ideological roots that expanded during the 20th century to enable increased recognition of the interdependency between humans and the environment (Frank et al., 2000; Schofer & Hironaka, 2005; Marquart-Pyatt, 2011). This is supported by institutional structures such as democratic governments and membership in international environmental organizations (Marquart-Pyatt, 2011).

Secondly, objective environmental conditions like pollution or deforestation can affect environmental concern. This was initially noted by Brechin (1999) to explain why people express concern about the environment irrespective of national income and economic development. These factors point towards an experiential dimension of the concern. Regardless of socio-economic and demographic positions, citizens can express environmental concern because they can see and experience environmental degradation. If a person lives in an area with high air or water pollution levels, they express concerns about these issues regardless of the socio-economic status (Marquart-Pyatt, 2011).

3.1 Measuring Environmental Concern

Initially, environmental concern was measured as a general attitude towards the environment or by value orientation. Since then, several measuring instruments have been developed (Fransson & Gärling, 1999). Two of the most frequently used historically is the Ecological Attitude Scale developed by Maloney and Ward (1973) and the Environmental Paradigm Scale, developed by Dunlap and Van Leire (1978).

The Ecological Attitude Scale (EAS) incorporates different scales. The scales consist of what respondents say they are willing to do to protect the environment (Verbal Commitment), what they actually do (Actual Commitment), the emotionality related to environmental issues (A) and, finally, knowledge (K) which measures factual knowledge about environmental issues (Fransson & Gärling, 1999). The New Environmental Paradigm Scale consists of a scale of 12 items, and the respondents indicate to which degree they agree with the 12 items (Dunlap & Van Liere (1978). More recent measuring instruments of environmental concern include Multigroup Confirmatory Factor Analysis (MCFA). MCFA has been the primary method used for data analysis after study completion, and MCFA is used to validate measures of environmental concerns based on surveys' (Rodríguez-Casallas et al., 2020).

This study will use the European Commission's Standard Eurobarometer as a proxy for environmental concern. The Eurobarometer's "Public Opinion in the European Union" has consistently asked the same questions in their surveys over the sample's scope. Since 1973, the European institutions have regularly commissioned public opinion surveys, the Eurobarometer, in all European Union member states (European Parliament, n.d). The Eurobarometer has a section in each survey about the main concerns at the national level where respondents are asked which the two most important issues facing their country are at the moment. The percentage of respondents who choose "Protecting the environment" will be used to model European citizens' environmental concerns.

The Eurobarometer includes all European countries, including countries outside the European Union. The number of interviews in each country are weighted against the proportion of the population and, approximately 1000 interviews are conducted in each country with respondents over the age of 15. In all countries, gender, age, region was taken into account in the sampling

process. All interviews were conducted face-to-face in the respondent's homes and their national language.

The Eurobarometer is a good measurement of environmental concern since respondents are asked to rank the two most important issues their country faces at the moment after a number of options. Thus, the people who rank protecting the environment as one of two main problems have a higher level of concern for the environment than the typical respondent. As a result, these people might be more likely to take actions to protect the environment. Another benefit of this measurement is the consistency of the Eurobarometer. The consistency of the survey questions and frequency contributes to a unique set of data that eliminates the need to estimate the environmental concern between different surveys and methods.

Table 1: Alternative answers in the Eurobarometer survey

What do you think are the two most important issues facing (OUR COUNTRY) at the moment?	Rising prices/Inflation	The economic situation	Healthcare system	Pensions	Unemployment	Taxation	Energy related issues	Housing	Crime	Protecting the environment

3.2 How Environmental Concern Could Affect the Home Bias

To my knowledge, there are no studies on whether environmental concerns of individuals could affect the home bias. However, there is a possible link between the forces. The environmental concern could affect the home bias in two ways. Firstly, politicians in countries with great environmental concern might be pressured to establish climate change mitigation policies and measures that constitute trade barriers and border effects. "Buy local" is often not much different from "buy domestic" (Ferguson & Thompson, 2020), which is why it can be seen as a discriminatory measure and why it could clash with the free movement of goods in the European Union.

Secondly, citizens with high environmental concern could alter their preferences towards more sustainable consumption. The "Buy Local" movement is an example of firms and producers trying to affect consumers' preferences and increase domestic trade in the name of environmental protection. Although mixed empirical results on whether the "Buy Local" movement is better for the environment or not[2], locavourism – the practice of buying and consuming local products – is often seen as beneficial for the environment and our carbon footprint (Ferguson & Thompson 2020). The "Buy Local" movement is highly based on the perception that local consumption is sustainable (Morey, 2016).

Rizkalla and Erhan (2020) and Lazaric et al. (2020) found that environmental concern is a significant determinant of sustainable consumption. Although this is not equivalent to buying domestically produced goods, it is an important indicator of consumers shifting preferences. The Flash Eurobarometer "*Attitudes of Europeans towards building the single market for green products*" found that 65% of the 26.573 thousand respondents have chosen locally produced products or groceries as an action of environmental protection, an increase of 35% from 2011 (Eurobarometer, 2013). Respondents from Slovakia (79%), Greece (78%), Latvia (78%) and the Czech Republic (84%) were most likely to claim that they have chosen locally produced products or groceries for environmental reasons. From 2011 to 2013, consuming locally produced products and groceries for environmental reasons increased the most in Slovakia (+60%), Portugal (+57%) and Spain (+54%) (Flash Eurobarometer 367, 2013). This indicates a trend of buying more locally (i.e. domestically) produced goods to contribute to protecting the environment.

[2] See Schnell (2013) for a discussion about this.

The home bias results from the substitutability between foreign and domestic produced goods among consumers and an increase in the consumption of domestic goods would subsequently lead to a more considerable home bias. If local is a synonym to domestic for consumers, increased demand for environmentally friendly products (i.e. locally or domestically produced goods) would institute a higher differentiability between domestic and foreign goods, thus increasing the home bias. The link between environmental concern and home bias is the increased differentiation between domestic and foreign goods and demand for domestically produced goods, based on the perception that local products are more sustainable.

3.3 Increase in Environmental Concern

As climate change becomes more and more of a pressing issue, the environmental concern has increased in the European Union. As shown in Figure 1, the environmental concerns of European citizens have increased during 2002-2016. This information is collected from the Eurobarometer, and the displayed values are the accumulative environmental concern of the European citizens who answered, "*Protecting the environment*" to the question "*What do you think are the two most important issues facing (OUR COUNTRY) at the moment?*". A slow but steady increase can be seen, and within countries, the concern varies more.

The mean of environmental concern during the period have been higher for the Nordic countries Denmark (14.2%), Finland (10.3%) and Sweden (17.7%) while the Baltic states Estonia (3.7%), Latvia (1.7%) and Lithuania (1.9%) have expressed lower levels of concern of the environment. Member states who joined in 2004, 2007 and 2013 have, on average, reported lower concerns of the environment than countries who joined before the millennial shift. A list of accession dates can be found in the appendix.

Figure 1: Increase Environmental Concern of European Citizens 2002-2016

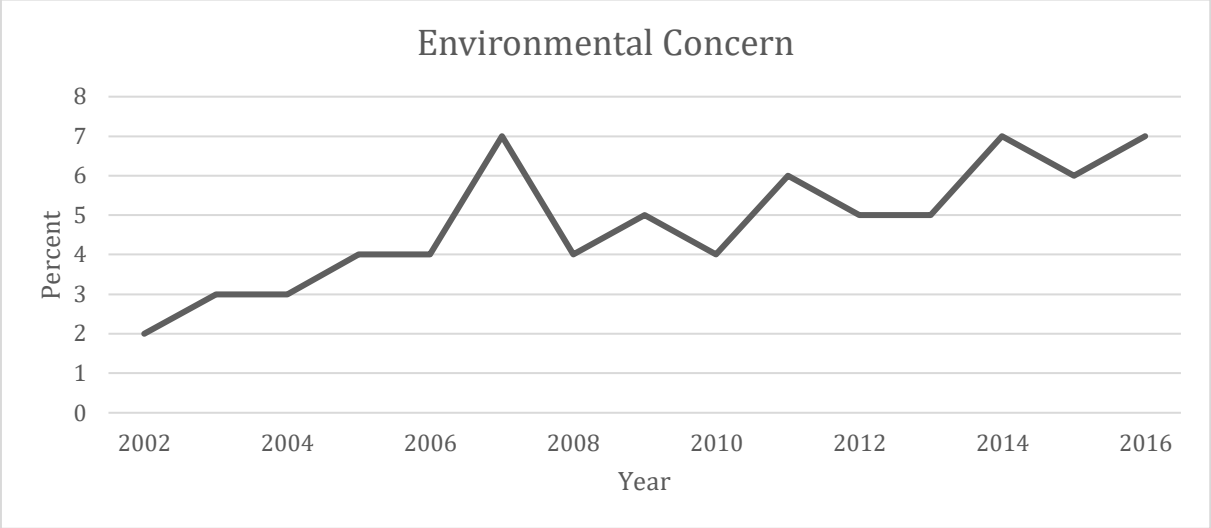
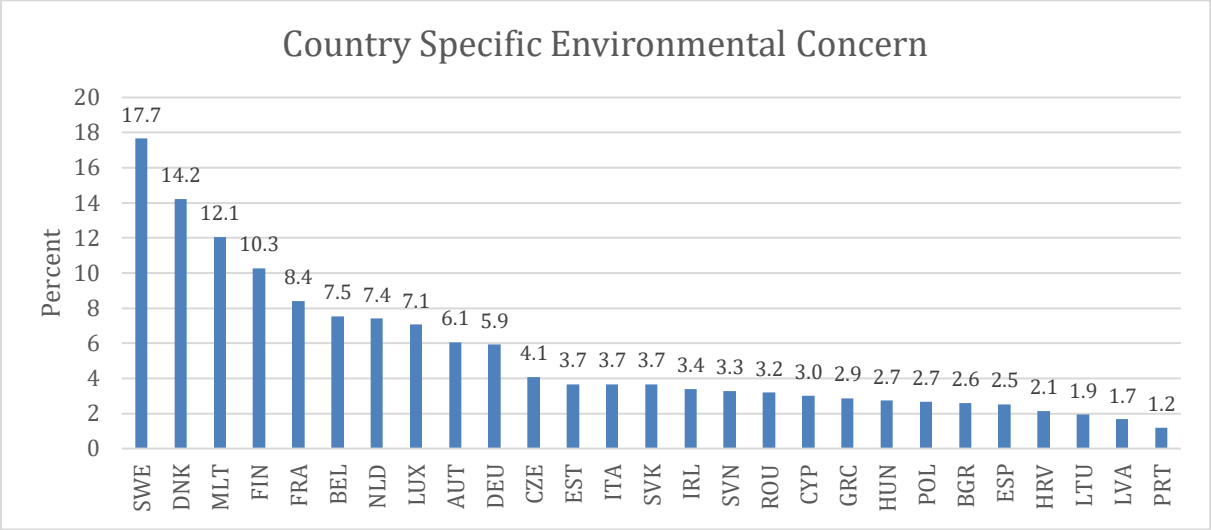


Figure 2 displays a tendency for older members of the European Union to be more concerned about protecting the environment than more recent members. Austria, Belgium, Malta and the Netherlands, together with the Nordic countries, have higher levels of concern for the environment than countries like Bulgaria, Lithuania and Romania. However, this may be a consequence of the fact that respondents in these countries are not as well-informed about the issues linked to the environment. In the 2009 Eurobarometer about European citizens attitudes about the environment, respondents in Bulgaria, Romania, and Lithuania admitted to not being well-informed about the causes, consequences and ways to fight climate change. (Special Eurobarometer, 2009).

Other explanations include cultural differences and socio-economic and demographic positions of citizens, as well as the economic state of the countries they live in. There is a strong correlation between environmental concern and the country's economic state. A series of studies have documented a positive relationship between national wealth and environmental concern (Franzen & Vogl, 2013; Marquart-Pyatt 2011). Some studies have studied the individual environmental concern and found it positively related to the GDP per capita.

Figure 2: Mean Country Specific Environmental Concern 2002-2016



4. Previous research

4.1 Home Bias

The home bias, first described by McCallum (1995), remains one of the six puzzles of international economics. McCallum (1995) used the gravity model and Canadian province-level data from 1988 to investigate trade between Canada and the United States. He found that trade between two Canadian provinces was more than 20 times greater than trade between a Canadian province and a US state of equal economic size and proximity. Considering that the border between Canada and the US was, at the time, considered to be frictionless and subsequently have a relatively small effect on trade, this result pointed toward a surprisingly large home bias (McCallum, 1995).

Wei (1996) examined the home country bias in the goods market among the OECD countries. After controlling for sizes of the importer and exporter, distance, geographic location relative to the rest of the world and language, he found that an average OECD country imports about two and a half times as much from itself than from an otherwise identical trading partner. In lack of data on sub-national trade flows, Wei (1996) construct a measure based on the assumption that a country's trade with itself is the difference between its total production and its total exports to foreign countries. He also found that the observed bias implies small non-tariff barriers as the substitutability among OECD countries is high. According to Wei, the home bias showed a fifty percent decrease in a typical member country in the European Union during 1982-1994.

To investigate whether the discrepancies between McCallum's and Wei's results were due to differences in specification, interpretation and data, Helliwell (1997) jointly used the OECD and Canada–US data for identical sample years with specification and estimation methods as close as possible to being identical. Helliwell discovered that data, specification, and interpretation had a significant effect on the outcome. He found that OECD countries trade about 13 times more domestically and trade between Canada and the US, the border effect reduced to about 6 (Helliwell, 1997).

The first extensive study of the border effect in the European Union was executed by Nitsch (2000). Using Western European countries as sample, he found that an average Western

European country trades $e^{2.43-1} = 10.36$ times as much domestically than with a comparable international trading partner. Nitsch also proposed a new measure to estimate the average of intranational distances. Instead of using ad hoc measured based on distances between specific states or cities (as proposed by Wei 1996 and Holger Wolf 1997), Nitsch suggested making the average distance within counties a function of their sizes.

Natalie Chen (2004) focused on industry differences as another source of variation in the home bias in the European Union. She found the average border effects of seven European countries to be about $e^{1.87} - 1 = 5.49$. The measured border effect ranged from about zero (for toys and games) to about 4000 (for ready-mixed concrete). Her paper emphasized that controlling for relative prices significantly decreases the border effect (from $e^{1.87} - 1 = 5.49$ to $e^{1.32} - 1 = 2.74$) and that the way intranational distances are measured affects the size of the effect.

While many have studied the home bias's supply side, Mitchell Morey (2016) researched the home bias's demand side. The home bias demand side is that individuals have a personal preference for domestically produced goods regardless of whether foreign products are identical. Letting consumers bid on imported or domestically produced rice while either knowing the origin or not, Morey (2016) worked with experimental auctions in Madagascar to identify a preference-based home bias. By randomly revealing the origin, he estimated a difference-in-difference model with OLS. The results revealed that consumers prefer domestically produced rice and are willing to pay at least 8% more for the domestically produced rice. Furthermore, this result suggests it would lead to a 5% decrease in the quantity of imported rice and explain 10% of the total 50% missing trade (Morey, 2016).

4.2 Environmental Concern

Several studies have focused on the relationship between socio-economic and demographic factors and attitudes toward the environment and environmental concern. One recognized review by Dunlap and Van Liere (1980) suggested five hypotheses on the determinants of environmental concern. They include the age, social class, gender, residence and the political-ideology hypotheses. The age hypothesis states that younger individuals are more concerned about the environment than older people. A possible explanation to this is that younger people are less integrated in the social order and, since solutions to environmental issues are often seen as threatening to this social order, it is logical that younger people support them more. This

hypothesis has received support from Van Liere (1981) and Howell and Laska (1992). Furthermore, women were more likely to express environmental concern than men, and urban residents expressed pro-environmental attitudes more than rural residents. Dunlap (1975) found that in the US, liberals were more environmentally concerned than democrats.

Marquart-Pyatt (2011) studied the relationship between individual and country-level variables in 27 nations using a multilevel modelling strategy. She found that several individual-level factors influence environmental concern cross-nationally. These factors include education, age and being female influences environmental concerns and living in an urban area, income, and knowledge have partial influences on environmental concern. On the country-level, national wealth and political structures like democracy affect environmental concern. Marquart-Pyatt (2011) also examined the impact of environmental conditions on concern for the environment. The well-being of ecosystems and national environmental footprints shape environmental concern to some extent.

Hao and Song (2020) conducted a multilevel analysis of the environmental concern in China. Like Marquart-Pyatt (2011), they found that residential location and educational status influence the public´s environmental concern. Other factors affecting the environmental concern among the Chinese public include Communist Party membership, income, post-materialist values and social capital. People who live in urban areas, are members of the Communist Party, have higher education, more income, higher post-materialist values, more trust and higher levels of socialization express greater concerns for the environment. In support of the affluence hypothesis that national wealth affects environmental concern, Hao and Song (2020) also found that people who live in provinces with higher GDP per capita are more likely to perceive the dangers of pollution and express pro-environmental attitudes.

Lazaric et al. (2020) used a sample of 3000 French households to identify the factors triggering sustainable behaviour and consumption. Like many other studies, they found age, gender, education, and income significant determinants of sustainable consumption. They also found environmental concern and peer effects to be major factors to sustainable consumption. Among the variables included, the peer effect was the highest-scoring influential variable on sustainable consumption. Environmental concern and peer pressure were, in this study, strong indicators of sustainable consumption.

5. Empirical strategy

This section aims to explain the gravity model of trade and evaluate its applicability for researching international trade and the home bias. The empirical strategy is split into two steps. In the first step, the gravity model is used to estimate the extent of the border effects within the European Union and illustrate how it has changed over time. In the second step, the estimated home bias will be included in regression with environmental concern to examine if environmental concern can be linked to changes in the home bias in the European Union.

5.1 Step 1: Estimating Home Bias over Time using the Gravity Model

The gravity model is a common empirical model to analyze international trade. The model was first demonstrated by Jan Tinbergen (1962), who used an analogy with Newton's law of gravitation to describe patterns of bilateral aggregate trade flows between two countries; the amount of trade between two countries is proportional to their economic size and the distance between them (Baier & Standaert, 2020). Since its introduction to economics, the gravity model has proven itself empirically successful when estimating international trade and served as a workhorse for modelling international trade (Baier & Standaert, 2019).

The early gravity models of trade posited a relationship between the bilateral trade flow between two countries based on their economic size and the trade frictions. These early gravity models lacked theoretical underpinnings and are often referred to as the naïve gravity model. In its initial formulation, the gravity model takes a multiplicative form (see equation 1) where X_{ij} is bilateral trade between exporting country *i* and importing country *j*, $Y_i \; and \; Y_j$ is the Gross Domestic Product (GDP) of country *i* and *j* and $dist_{ij}$ is the bilateral distance between the countries. ε_{ij} is assumed to be a log-normally distributed error term (Baier & Standaert, 2019). Given the multiplicative structure, the standard procedure for estimating a gravity equation is to take the natural logarithm of all variables to obtain a log-linear equation, enabling estimation with ordinary least squares (OLS) estimation (see equation 2).

$$X_{ij} = GY_i^{\beta_1} Y_j^{\beta_j} dist_{ij}^{\beta_3} \varepsilon_{ij} \qquad \textit{(equation 1)}$$

$$\ln(X_{ij}) = \ln(G) + \beta_1 \ln(Y_i) + \beta_2 \ln(Y_j) + \beta_3 \ln(dist_{ij}) + \ln(\varepsilon_{ij}) \qquad \textit{(equation 2)}$$

The main regression in this analysis takes the following form:

$$lnImports_{ijts} = \gamma Home_{ij} + \beta_1 ln(GDP_{it}) + \beta_2 ln(GDP_{jt}) + \beta_3 ln(Population_{it}) + \beta_4 ln(Population_{jt}) + \beta_5 ln(Distance_{ij}) + \beta_6 Language_{ij} + \beta_7 Border_{ij} + \beta_8 Euro_{ijt} + \beta_9 EU_{ijt} + \beta Schengen_{ijt} + \varepsilon_{ij} \quad \textit{(equation 3)}$$

Where the dependent variable $lnImports_{ijts}$ is imports to each member from each member of the European Union. It is a bilateral variable where *t* represents the year the imports took place, and *s* signifies in which industry the countries trade. The independent variable of interest in the analysis is the coefficient on the dummy variable *Home*. The variable takes the value one when *i=j*. When the *Home* variable takes the value one, it represents domestic trade, i.e. when the country trades with itself. The coefficient on the *Home* variable illustrates how much more country *i* trades with itself, compared to trade with an international trading partner, otherwise identical to *i* (Mika, 2017).

The variable *GDP* captures the economic size and similarity effects that affect trade between trading countries and can be seen as representative for importing countries demand and exporting countries supply (Machin & Pinna, 2003). The importers and exporters GDP are expected to positively affect imports in the European Union since a larger GDP of either importer or exporter implies a higher demand for imports and a larger supply of exports. Likewise, *Population* is a variable that aims to capture similarity effects between countries and is also predicted to positively impact imports between the countries in the sample. The *Distance* variable is expected to be negative since the distance between countries is often seen as a trade cost. ε_{ij} is a disturbance term. Fixed effects are not included in the equation, but they will be added one by one in the estimation. The added effects are industry, bilateral and time fixed effects.

To account for trade barriers other than distance, a standard procedure is to augment the gravity equation with additional variables. Therefore, equation (3) is augmented with a set of dummy variables. The variable *Language* takes the value one when the countries share an official language, and the variable is expected to impact *Imports* positively. The variable *Border* takes value one when countries share a common border. The coefficient is expected to have a positive effect on *Imports* since sharing a border is likely to decrease trade costs. The dummy *Euro* is

equal to one if both countries are members of the Eurozone and is expected to be positive. The *EU* dummy is meant to capture information on countries membership in the European Union. Membership in the European Union is likely to positively impact *Imports* because of the trade liberalization measures the European Union has implemented. The variable *Schengen* takes the value one when both countries are members of the Schengen area and is also expected to have a positive impact on trade.

5.1.1 Measuring Intranational Distance

One of the most problematic issues when estimating border effects is the measurement of intranational distance. The gravity model specification and the choice of distance have shown to be crucial for determining the size of the border effect. The estimated *Home* coefficient is known for being sensitive to how the intranational distances are measured (Chen, 2004). Geographical distances are the most straightforward of trade costs since it tends to be cheaper to trade with nearby countries. There have been three main approaches in the literature to estimating intranational distances:

1. ***A fraction of the distance to a neighboring country's centre*.** The initial papers within the literature of border effects employed a measurement based on fractions of distances to neighboring countries' centres. This method was heavily criticized by Nitsch (2000), who questioned its applicability since it suffers from geographical inconsistencies, and there seems to be no defence other than it was a first attempt to estimate intranational distances. Wei (1996) proposed using $d_{ij} = 0.25$, i.e. one quarter the distance to the neighboring country calculated with a great circle formula. Wolf (1997, 2000) used a similar measure but multiplied the distance by 0.5.

2. ***Area-based average measures***. Nitsch's (2000) critique of the former method resulted in another measuring internal distance technique; the average distance within a country is made a function of the country's size: $\sqrt{\frac{country\ area}{\pi}}$. Admitting that his procedure has shortcomings like not taking different geographical shapes, internal structures, or trading patterns into account, Nitsch (2000) claims that it delivers a more consistent measure across countries under the assumption that the population is evenly distributed within a circle.

3. ***Average weighted distance*.** As opposed to measures based on geometric approximations, average weighted distances use data on the spatial distribution of production within a country, making the data requirements more stringent as they demand disaggregated data on activity, area, latitude and longitude (Head & Mayer, 2002). Head and Mayer (2000) used inter-city distances weighted by population shares, whereas Cheptea (2013) used arithmetic averages of inter-regional distances.

In this paper, weighted average distance measures from the CEPII database is employed. These measurements can be used for both international and intranational distances and are more balanced than standard average measures. Not only are they easier to use, but they also make this study comparable to other studies (Mika, 2017; Cheptea, 2013; Pacchioli, 2011).

5.2 Step 2: Using Variation in Environmental Concern to Explain Variation in Home Bias

The second part of the analysis will focus on the environmental concern and whether it affects the home bias. The home bias for every importer and year combination is estimated with the gravity equation, creating a sequence of panel data with home bias and environmental concern by year and country. This data is included in a regression with the environmental concern as the independent variable to investigate a potential relationship between the home bias and environmental concern. Time and importer fixed effects will be added to the equation to capture unobserved heterogeneity. In this step of the analysis, there are only importers in the data and exporter fixed effects is excluded. Industries are not included in the sample, and industry fixed effects is not included. When concern for the environment increase, the home bias should follow if the hypothesis of this paper is correct.

The regression takes the following form:

$$\widehat{Home\ Bias}_{it} = \beta_1 + \beta_2 Environmental\ Concern_{it} + \varepsilon_{ij}$$

(equation 4)

Where:

$Home\ Bias_{it}$ is the estimated home bias for every combination of importer and year

$Environmental\ Concern_{it}$ is the environmental concern for every combination of importer and year

5.3 Estimation Issues

To this day, there exists no econometric estimator of the gravity equation that dominates over all others. There are several theory-consistent estimation methods available, and to rely solely on one would be to neglect the many dimensions of the estimation techniques. The estimation through different methods allows for a more in-depth analysis of the implications of the results, and it mitigates some common problems with the estimation of the gravity model. These problems are unobserved heterogeneity, zero trade flows and heteroskedasticity (Bacchetta et al., 2012).

In the presence of heteroscedasticity, the estimation is rendered inefficient, which makes the estimated standard errors larger than necessary. This problem can be solved by using robust standard errors. However, when the gravity model is estimated in a logarithmic form (i.e. with OLS), the property of the error term changes, leading to inefficient estimations (Gómez-Herrera, 2013). A non-linear estimator, such as the PPML, can solve the problem since it is robust to heteroskedasticity. Another benefit with PPML is that it does not omit zero trade flow observations. The log of 0 is undefined and have to be dropped when using OLS (Santos Silva & Tenreyro, 2006).

Another problem with the estimation of the gravity model is unobserved heterogeneity. It arises from unobserved differences between individuals (country-pairs or industries). Unobserved heterogeneity can make the estimation biased, and it can be controlled for by adding fixed effects to the model and using panel data (Gómez-Herrera, 2013).

The main method of estimation in this paper is the OLS estimator, and the PPML estimator will be used as a robustness test throughout the paper. The OLS is preferred over PPML to get the model to converge and due to its simplicity. Using OLS will make this paper comparable to other studies since the OLS is a commonly used method when estimating home bias. The PPML estimator encounter problems with converging due to the fixed effects and the large dataset. Furthermore, the dataset does not contain a considerable amount of zero trade flows, so there is no need to drop a substantial number of observations. Industry, bilateral and time fixed effect will eliminate a great amount of unobserved heterogeneity, and robust standard errors are used.

Limitations of this paper include qualitative limitations on the measurement of the environmental concern. To investigate consumer preferences effect on the home bias in more detail, qualitative data is needed. This study uses a proxy for environmental concern from the Eurobarometer, but more detailed data and information would give a better understanding of the effect for future research. Another limitation is the data on bilateral trade. The available data stretches up until 2016, and data from 2016 to 2020 would give this paper more relevancy. One challenge for estimating equation (3) is the absence of internationally comparable data on intranational trade flows. Several studies compute a country's intranational trade as the difference between the total production and total exports (Wei, 1996; Chen, 2004; Cheptea, 2013; Nitsch, 2000). The same method is utilized in the data source used for the gravity estimation in this paper, discussed in detail in section 5.4.

5.4 Data

The trade data is collected from the International Trade and Production Database for Estimation (ITPD-E, 2020) compiled by the United States International Trade Commission (USITC). The data are constructed at the industry level, covering the broad sectors of agriculture, mining and energy, manufacturing and services. The service sector is not included in this paper since it examines the home bias in goods, thus, excluding services. The database covers the period from 2000 up until 2016, which is the most recent year data across all sectors are available. The ITPD-E covers 243 countries and 170 industries, including 26 industries in agriculture, 7 in mining and energy and 120 in manufacturing (Borchert et al., 2020). The database is constructed with reported administrative data and does not include statistical estimated information, making the ITPD-E suitable for estimation with the gravity model of trade (Borchert et al., 2020).

International trade flows are reported by both the importer and exporter. Data on imports are chosen over export data since data on imports is considered more reliable because of import regulations and surveillance (Borchert et al., 2020). Consistent with gravity methodology, imports are reported on a cost, insurance and freight (CIF) basis. Domestic trade is computed as the difference between the gross values of total production and total exports. Total exports are the sum of bilateral trade reported in the ITPD-E for each exporting country. In the case of negative domestic trade observations, they are deleted from the database and replaced with zero observations (Borchert et al., 2020).

Data on GDP are collected from the World Bank World Development Indicators (WDI). The data are expressed in gross values and in current US dollars, converted from domestic currencies using yearly official exchange rates. Information on population is also collected from WDI, and the values are midyear averages. Data on European Union, Eurozone and Schengen membership and accession dates are from the European Union's website (EU, 2020).

Bilateral and intranational distances are from Centre d'Etudes Prospectives et d'Informations Internationales GeoDist database (CEPII, 2011). The distance is measured as the population-weighted distance between most populated cities (km) (Mayer & Zignago, 2011). Information on countries´ adjacency and shared languages are from the CEPII Gravity Database (CEPII, 2021).

Data on environmental concern are from the Standard Eurobarometer–Public Opinion in the European Union. The surveys include all European countries, and the number of interviews is weighted against the country's populations, but approximately 1000 interviews are conducted in each country with people over 15 years. In all countries, gender, age, region was taken into account in the sampling process. All interviews were conducted face-to-face in the respondent's homes and their national language (Eurobarometer, 2016). The Eurobarometer covers all years in the paper, and countries that had not joined the European Union before 2004, 2007 and 2013 have still been included in the survey. The consistency of the questions and frequency of the survey contributes to a unique set of data that eliminates the need to estimate the environmental concern between different surveys and methods.

Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovakia and Slovenia did not join the Union until 2004. In 2007, Bulgaria and Romania became members, and the most recent European Union member is Croatia, who joined in 2013. Even though these countries have not been members of the whole scope of the sample, they are included in both the surveys and the sample before their accession dates. This allows for an examination of the effect of membership in the European Union, Eurozone and the Schengen Area.

6. Empirical results

To estimate the border effects within the European Union, the OLS estimator is employed. Firstly, the average home bias across the European Union from 2002 to 2016 is presented below, along with four robustness tests. Furthermore, the home bias in the broad sectors of agriculture, manufacturing and mining and energy are estimated, and the home bias in each industry from 2002-2016. Secondly, the average home bias over time from 2002 to 2016 is estimated. Thirdly, the average home bias from 2002 to 2016 is estimated for each country using interaction terms between the importer and the *Home* dummy. Finally, in step two of the analysis, the impact of Europeans environmental concern on border effects is assessed.

6.1 Home Bias

The first set of regressions examines the average border effects in the European Union over the 15 years included in the sample. The baseline model is estimated using the OLS estimator, making this paper comparable to previous studies. Table 2 shows that there still exists an extensive home bias in the European Union despite decades of European integration. The coefficient on *Home* in the baseline regression (1) indicates that an average member of the European Union traded $e^{2.994} - 1 \approx 18.9$ times more domestically than with a comparable international trading partner during 2002-2016.

Other coefficients included in the regression (1) carry the expected signs. Nominal GDP of both importer and exporter increases bilateral trade. The GDP of the exporter increases trade more than the importers GDP, which is in line with the assumptions made in the previous section; that the importers GDP represents the importing countries demand and the exporters GDP represents the supply. Population in exporting and importing countries have a positive effect on bilateral trade. As expected, distance between trading partners decrease trade and similarly, sharing a border increases trade. Sharing an official language increases trade by 13%. Joint membership in the European Union and the Eurozone increases bilateral trade by approximately 67% and 5% respectively, and common membership in the Schengen area has a positive effect on trade of about 24%. Some insignificant coefficients unexpected carry negative signs and will not be subject to further analysis.

6.1.1 Robustness Tests

To test the robustness of the baseline model, four robustness tests are employed in Table 2. Initially, the OLS estimator with industry fixed effects is used to test the robustness of the results. The second regression incorporates both industry and bilateral fixed effects, and the third OLS estimation is with industry, bilateral and time fixed effects. Finally, the PPML estimator with all fixed effects is used to check the robustness. The home bias in the broad sectors of agriculture, mining and energy and manufacturing will also be estimated with the previously mentioned tests to further test the estimators' robustness.

When adding fixed effects, the home bias decreases. The fixed effects are added one by one to control for unobserved heterogeneity and to land in a model that fits the data better than the baseline model. The fixed effects are added to control for variation between the country pairs, the different sectors and, the variation over time and to capture unobserved heterogeneity. The robustness tests show that there are not any larger deviations on the coefficients on *Home*. Although small changes in the coefficient yield large differences in how much more countries trade with each other, this does not raise concern. It is impossible to obtain precise estimates of the home bias because it is a hypothetical coefficient, estimated with imperfect data such as intranational distance (Mika, 2017).

In regression (2), the sign on *Euro* changes. This can be explained by the unobserved heterogeneity that the industry fixed effects in this regression captures and that the membership in the Eurozone varies over time. All countries did not join the Eurozone instantly when becoming members of the European Union. In the other regressions, the sign on *Euro* changes back to being positive. The sign on *Importer Pop* and *Exporter Pop* changes in regression (3) and (4). The population in importing and exporting countries varies over time and is captured by the fixed effects, which could explain why the coefficients changes signs.

In regression (3), all fixed effects are included in the estimation, capturing the most unobserved heterogeneity of the other OLS estimates. The coefficient on *Home* indicates that members of the European Union have traded, on average, $e^{2.334} - 1 \approx 9.3$ times as much with themselves than with other members of the European Union. This is the preferred specification of the gravity model since it captures a lot of unobserved heterogeneity and is a good fit for the data.

In the fifth regression, the PPML estimator was used. When heteroscedasticity is present, the coefficients estimated with OLS can be biased according to Jensen's inequality (Santos Silva & Tenreyro, 2006). However, the PPML estimator is robust to heteroscedasticity and does not omit zero values. There are 97.256 zero trade observations in the data, which is why the estimated coefficients coming from OLS can be biased. As can be seen in Table 2, the average home bias in the European Union 2002-2016 have been 2.746, which indicates that countries, on average, have traded $e^{2.746} - 1 \approx 14.6$ times more domestically than with other members.

Table 2: Average Home Bias in the European Union 2002-2016

			OLS		**PPML**
Trade	1)	2)	3)	4)	5)
Home	**2.994***** (.000)	**2.404***** **(.**000)	**2.252***** **(.**000**)**	**2.334***** (.000)	**2.746***** (.000)
Importer Pop	0.659*** (.000)	0.776*** (.000)	-0.217* (.024)	-0.843*** (.000)	-0.672* (.036)
Importer GDP	0.380*** (.000)	0.395*** (.000)	0.829*** (.000)	0.734*** (.000)	0.632*** (.000)
Exporter Pop	0.433*** (.000)	0.558*** (.000)	-0.819** (.005)	0.409*** (.000)	**-0.637** (.051)
Exporter GDP	0.215*** (.000)	0.305*** (.000)	0.967*** (.000)	1.247*** (.000)	0.445*** (.000)
Distance	-1.973*** (.000)	-2.277*** (.000)	-2.395*** (.000)	-2.397*** (.000)	-0.563*** (.000)
Contig	0.612*** (.000)	0.555*** (.000)	0.599*** (.000)	0.601*** (.000)	0.483*** (.000)
Comlang_off	0.131*** (.000)	0.182*** (.000)	0.142*** (.000)	0.146*** (.000)	0.300*** (.000)
EU	0.676*** (.000)	0.706*** (.000)	0.316*** (.000)	0.214*** (.000)	0.233*** (.000)
Euro	0.048*** (.000)	-0.030*** (.000)	0.071** (.000)	0.076*** (.000)	0.118*** (.000)
Schengen	0.237*** (.000)	0.234*** (.000)	0.061** (.000)	0.043*** (.000)	0.255*** (.000)
N	1 373 367	1 373 367	1 373 367	1 373 367	1 470 623
R-squared	.3367	.5911	.6121	.6137	.5424
Industry FE	No	Yes	Yes	Yes	Yes
Bilateral FE	No	No	Yes	Yes	Yes
Time FE	No	No	No	Yes	Yes

p statistics in parentheses * p<0.05, ** p<0.01, *** p<0.0

Table 3 displays the average home bias in the broad sectors of agriculture, manufacturing and mining and energy. In regression (4), the largest border effect is found in the mining and energy sector where countries, on average, trade $e^{8.875} - 1 \approx 7050$ times more domestically than internationally. A possible explanation for this might be that intermediate and final good producers tend to cluster, generating border effects (Chen, 2004). Wolf (2000) points out the fact that trade in intermediate goods usually covers shorter distances than the trade in final goods which leads to clustering of the production of intermediate goods, which, in turn, could explain the large coefficients on the *Home*. This argument should apply to the manufacturing sector as well, however, the manufacturing sector exhibits the lowest home bias of 1.527. Another possible explanation to the differences between the sectors and the large home bias in mining and energy can also be explained by the number of observations. There are 196.861 observations in the agricultural sector, 1.235.368 in the manufacturing sector and 38.394 in the mining and energy sector. These large differences in observations might explain why the home bias in agriculture is smaller than in mining and energy

Finally, the agriculture sector has an average home bias of 4.844. This is not a shocking result, as one could imagine that the agricultural sector mainly produces goods for the domestic market and consumer, resulting in a large home bias. As can be seen in Table 3, values estimated by PPML are lower than values estimated with OLS. Zero observations are not omitted with PPML, which could be why the coefficients display smaller values.

Table 3: Average Home Bias within Broad Sectors 2002-2016

	OLS				PPML
	1)	2)	3)	4)	5)
Agriculture*Home	**1.905*** **	**4.815*** **	**4.822*** **	**4.844*** **	**2.804*** **
	(.000)	**(.000)**	**(.000)**	**(.000)**	**(.000)**
Manufacturing*Home	**3.142*** **	**1.624*** **	**1.435*** **	**1.527*** **	**2.553*** **
	(.000)	**(.000)**	**(.000)**	**(.000)**	**(.000)**
Mining&Energy*Home	**4.900*** **	**8.945*** **	**8.764*** **	**8.875*** **	**4.407*** **
	(.000)	**(.000)**	**(.000)**	**(.000)**	**(.000)**
Importer Pop	0.659***	0.776***	-0.231**	0.840***	-0.842**
	(.000)	(.000)	(.027)	(.000))	(.007)
Importer GDP	0.379***	0.396***	0.839***	1.113***	0.612***
	(.000)	(.000)	(.000)	(.000)	(.000)
Exporter Pop	0.433***	0.559***	-4.832	.542***	-0.795*
	(.000)	(.000)	(.067)	(.000)	(.012)
Exporter GDP	1.215***	1.306**	0.966***	1.252***	0.422***
	(.000)	(.001)	(.000)	(.000)	(.000)
Distance	-1.975***	-2.277***	-2.396***	-2.399***	-0.576***
	(.000)	(.000)	(.000)	(.000)	(.000)
Contig	0.610***	0.557***	0.598***	0.603***	0.488***
	(.000)	(.000)	(.000)	(.000)	(.000)
Comlang_off	0.131***	0.182***	0.141***	0.145***	0.299***
	(.000)	(.000)	(.000)	(.000)	(.000)
EU	0.677***	0.705***	0.313***	0.214***	0.232***
	(.000)	(.000)	(.000)	(.000)	(.000)
Euro	-0.049***	-0.029**	0.071***	0.076***	0.121***
	(.000)	(.003)	(.000)	(.000)	(.000)
Schengen	0.234***	0.233***	0.061***	0.043***	0.266***
	(.000)	(.000)	(.000)	(.000)	(.000)
N	1 373 367	1 373 367	1 373 367	1 373 367	1 470 623
R–squared	.3369	.4768	.6143	.6152	.6066
Industry FE	No	Yes	Yes	Yes	Yes
Bilateral FE	No	No	Yes	Yes	Yes
Time FE	No	No	No	Yes	Yes

p statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001

6.2 Home Bias Over Time

By adding an interaction term between *Year* and *Home*, the time dimension of the home bias can be analyzed. Table 4 describes the average home bias across time and Europe and illustrates a general decline in the average home bias from 2002-2016. Wei (1996) also found a decrease in the home bias, but during 1982-1994 and so did Nitsch (2000) between 1979 and 1990. Time fixed effects are not controlled for since the home bias is estimated over time. The home bias is estimated as an average across all countries in the sample over all the sample years.

Looking at the OLS estimates in Table 4, there has been a significant decline in the home bias between 2014 and 2016. One explanation to this could be that countries who joined the European Union in 2004, 2007 and 2013 have reached a point of integration that decreases the home bias within the European Union. As suggested by Table 2, European Union membership is associated with approximately 49% higher trade flows between countries, which should result in a decrease in the home bias. Alina Mika (2017) tested the hypothesis that membership in the European Union decreases the home bias and found that integration in the European Union is associated with declines in the home bias.

Another explanation might be that there is a substantial amount of zero trade observations in the data toward the end of the sample making the OLS estimator inefficient and biased. The PPML does not imitate this decline in the home bias and might be more trustworthy than the OLS values in this estimation.

Table 4: Home bias over time

		OLS		PPML
Trade	**1)**	**2)**	**3)**	**4)**
2002*Home	3.487***	2.919***	2.66***	2.835***
	(.000)	(.000)	(.000)	(.000)
2003*Home	3.319***	2.666***	2.44***	2.786***
	(.000)	(.000)	(.000)	(.000)
2004*Home	3.197***	2.577***	2.358***	2.791***
	(.000)	(.000)	(.000)	(.000)
2005*Home	3.118***	2.468***	2.243***	2.793***
	(.000)	(.000)	(.000)	(.000)
2006*Home	3.092***	2.485***	2.273***	2.804***
	(.000)	(.000)	(.000)	(.000)
2007*Home	3.006***	2.345***	2.132***	2.855***
	(.000)	(.000)	(.000)	(.000)
2008*Home	2.897***	2.205***	2.069***	2.787***
	(.000)	(.000)	(.000)	(.000)
2009*Home	2.836***	2.155***	2.071***	2.632***
	(.000)	(.000)	(.000)	(.000)
2010*Home	2.884***	2.190***	2.107***	2.710***
	(.000)	(.000)	(.000)	(.000)
2011*Home	2.853***	2.148***	2.074***	2.740***
	(.000)	(.000)	(.000)	(.000)
2012*Home	2.855***	2.176***	2.114***	2.730***
	(.000)	(.000)	(.000)	(.000)
2013*Home	2.854***	2.196***	2.132***	2.682***
	(.000)	(.000)	(.000)	(.000)
2014*Home	2.729***	1.921***	1.831***	2.585***
	(.000)	(.000)	(.000)	(.000)
2015*Home	2.452***	1.417***	1.774***	2.718***
	(.000)	(.000)	(.000)	(.000)
2016*Home	1.940***	1.436***	1.604***	2.673***
	(.000)	(.000)	(.000)	(.000)
N	1 373 367	1 373 367	1 373 367	1 470 623
R–squared	.3368	.5911	.6121	.4234
Industry FE	No	Yes	Yes	Yes
Bilateral FE	No	No	Yes	Yes

p statistics in parentheses * p<0.05, ** p<0.01, *** p<0.00

gravity variables included in the regressions

Figure 3: Home bias over time across Europe

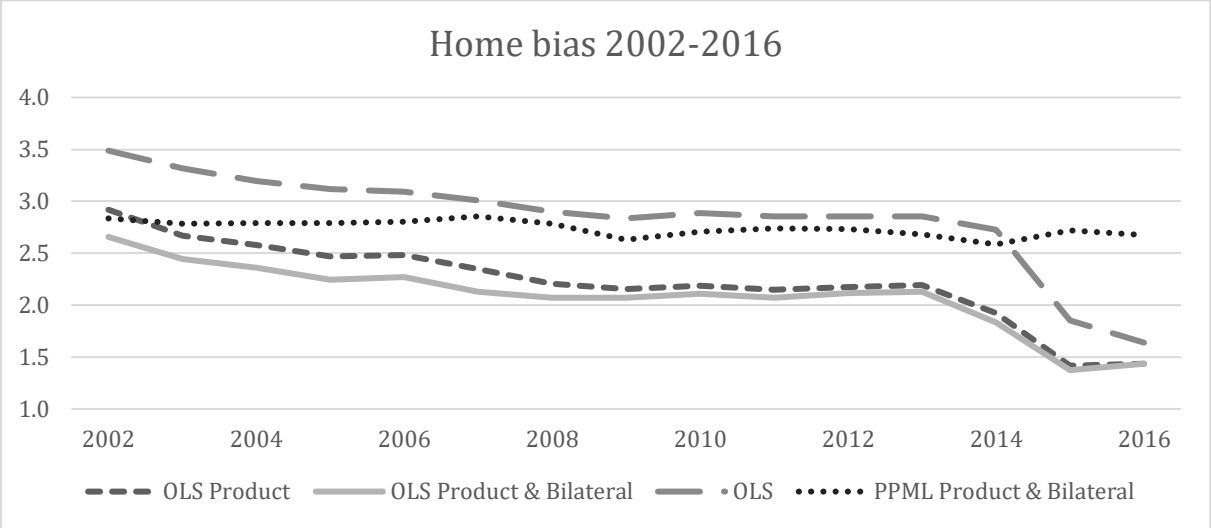


Figure 3 illustrates the average home bias over time and a comparison between the different methods of estimation. The OLS estimates show a decrease toward the end of the sample, while the PPML estimates are more consistent across time. The average home bias estimated with PPML increased between 2014 and 2015. As previously mentioned, zero observations towards the end of the sample, i.e., 2014-2016, might explain the variation between the PPML and OLS estimates.

Overall, Figure 3 and Table 4 point to four findings. One, that the average home bias in the European Union decreased during the period. Two, there is support for an integration effect. Three, the decline shows substantial variation depending on which estimator the regression is run with. Four, that the PPML estimator is more trustworthy in this context due to zero observations.

6.3 Country Specific Home bias

To explore the home bias in each country of the European Union, the home bias is estimated using an interaction variable between *Home* and *Importer*. The results are presented in Table 5 and Figure 4, and 5 graphically displays the average home bias per importer during 2002-2016. As can be seen in Table 5, there is a substantial variation in the home bias across the members of the European Union. Figure 4 illustrates the OLS estimated country-specific home bias with industry, bilateral and time fixed effects. Figure 5 shows the PPML estimated country-specific home bias with the same fixed effects.

Table 5: Country Specific Home Bias

Country			**OLS**		**PPML**
	1)	2)	3)	4)	5)
AUT*Home	2.699***	2.262***	2.040***	2.106***	3.840***
	(.000)	(.000)	(.000)	(.000)	(.000)
BEL*Home	1.567***	1.208***	0.751***	0.662***	3.158***
	(.000)	(.000)	(.000)	(.000)	(.000)
BGR*Home	4.756***	4.578***	4.033***	4.174***	4.510***
	(.000)	(.000)	(.000)	(.000)	(.000)
CYP*Home	4.479***	3.854***	2.910***	2.965***	5.609***
	(.000)	(.000)	(.000)	(.000)	(.000)
CZE*Home	3.376***	3.257***	2.550***	2.635***	3.503***
	(.000)	(.000)	(.000)	(.000)	(.000)
DEU*Home	0.468***	0.856***	0.955***	0.879***	2.506***
	(.000)	(.000)	(.000)	(.000)	(.000)
DNK*Home	2.546***	2.047***	0.472***	0.531***	3.869***
	(.000)	(.000)	(.000)	(.000)	(.000)
ESP*Home	2.005***	1.049***	0.293**	0.352***	3.032***
	(.000)	(.000)	(.002)	(.000)	(.000)
EST*Home	6.540***	6.460***	4.482***	4.568***	4.598***
	(.000)	(.000)	(.000)	(.000)	(.000)
FIN*Home	4.876***	4.282***	4.110***	4.170***	4.463***
	(.000)	(.000)	(.000)	(.000)	(.000)
FRA*Home	0.998***	-0.0592***	0.889***	0.953***	3.330***
	(.000)	(.544)	(.000)	(.000)	(.000)
GRC*Home	2.581***	1.925***	2.299***	2.357***	4.926***
	(.000)	(.000)	(.000)	(.000)	(.000)
HRV*Home	4.161***	4.186***	6.430***	6.593***	5.068***
	(.000)	(.000)	(.000)	(.000)	(.000)
HUN*Home	3.462***	3.465***	3.403***	3.480***	2.995***
	(.000)	(.000)	(.000)	(.000)	(.000)
IRL*Home	3.160***	2.166***	3.045***	3.139***	3.884***
	(.000)	(.000)	(.000)	(.000)	(.000)
ITA*Home	1.087***	1.139***	1.515***	1.258***	2.854***
	(.000)	(.136)	(.000)	(.000)	(.000)
LTU*Home	5.079***	5.407***	4.589***	4.730***	4.401***
	(.000)	(.000)	(.000)	(.000)	(.000)
LUX*Home	2.374***	2.997***	4.304***	4.339***	4.972***
	(.000)	(.000)	(.000)	(.000)	(.000)
LVA*Home	5.902***	5.850***	5.738***	5.878***	5.048***
	(.000)	(.000)	(.000)	(.000)	(.000)
MLT*Home	2.981***	2.418***	2.078***	2.201***	4.804***
	(.000)	(.000)	(.000)	(.000)	(.000)
NLD*Home	0.936***	0.246	1.556***	1.482***	2.729***
	(.000)	(.135)	(.000)	(.000)	(.000)
POL*Home	2.658***	1.762***	2.144***	2.243***	3.417***
	(.000)	(.000)	(.000)	(.000)	(.000)
PRT*Home	2.868***	2.188***	1.553***	1.606***	3.747***
	(.000)	(.000)	(.000)	(.000)	(.000)
ROU*Home	3.615***	3.241***	4.385***	4.535***	3.672***
	(.000)	(.000)	(.000)	(.000)	(.000)
SVK*Home	3.545***	3.680***	4.817***	4.897***	3.551***
	(.000)	(.000)	(.000)	(.000)	(.000)
SVN*Home	4.326***	3.781***	3.316***	3.381***	4.215***
	(.000)	(.000)	(.000)	(.000)	(.000)
SWE*Home	4.143***	3.542***	2.655***	2.723***	3.054***
	(.000)	(.000)	(.000)	(.000)	(.000)
N	1 373 367	1 373 367	1 373 367	1 373 367	1 470 623
R–squared	.3378	.5926	.6140	.6156	.8721
Industry FE	No	Yes	Yes	Yes	Yes
Bilateral FE	No	No	Yes	Yes	Yes
Time FE	No	No	Yes	Yes	Yes

p statistics in parentheses * p<0.05, ** p<0.01, *** p<0.00

gravity variables included in the regressions

The estimated home bias coming from the PPML estimator are more consistent over time. This was noted in section 6.3 as well, where the estimated home bias over time were more consistent estimated with the PPML. Although the size of the home bias differs, the estimators, more or less, show a similar pattern.

In Figure 4, the home bias is largest for Croatia (6.6), Latvia (5.9) and the smallest for Italy (0.5) and Spain (0.4). In Figure 4, the largest bias is found in Cyprus (5.6) and Croatia (5.1) and the smallest in the Netherlands (2.7) and Germany (2.5). This supports the possible explanation for the decrease in home bias discussed in the previous section. Croatia became a member of the European Union in 2013, and Latvia and Cyprus became members in 2004. Germany, Italy and the Netherlands are the founding members of the European Union and Spain joined in 1986. The most recent members display the largest home bias, and the oldest members have the smallest home bias. It can thus, be suggested that European integration is associated with decreasing home bias and that countries who have been members for a long time are better integrated with other members and more likely to trade within the European Union. In both figures, the home bias is larger in Central and Eastern European countries, consistent with the findings of Mika (2017).

Due to the uncertain origin of the home bias, there exist few explanations to the variation of the bias across different countries. The cross-country variation in the home bias in the European Union has received no academic attention (Mika, 2017). The literature on home bias has not found any convincing evidence on forces affecting the home bias, which is a problem due to the heterogeneity in the coefficient.

However, some attempts at explaining this variation have been made. Head and Mayer (2002) argue that accuracy in intranational distances is crucial for estimating home biases that are not illusionary. They argue that illusory border effects arise from the standard methods used to measure the distance between and within nations, leading to internal distances being overestimated with respect to international distances, resulting in inflated home bias coefficients. Another explanation, as suggested by Evans (2001), is that the elasticity of substitution between domestic and foreign goods is low. A third attempt at explaining the variation is made by Yi (2010), who found that vertical specialization could explain the home bias between the US and Canada.

This section points to four findings. First, there is considerable variation in the home bias over the European countries. Second, the PPML and OLS estimators differ and the PPML show more consistent results. Third, Central and Eastern European countries tend to have a larger home bias. Four, there are indications of an integration effect where older members generally have a smaller home bias than more recent European Union members.

Figure 4: Country specific home bias OLS

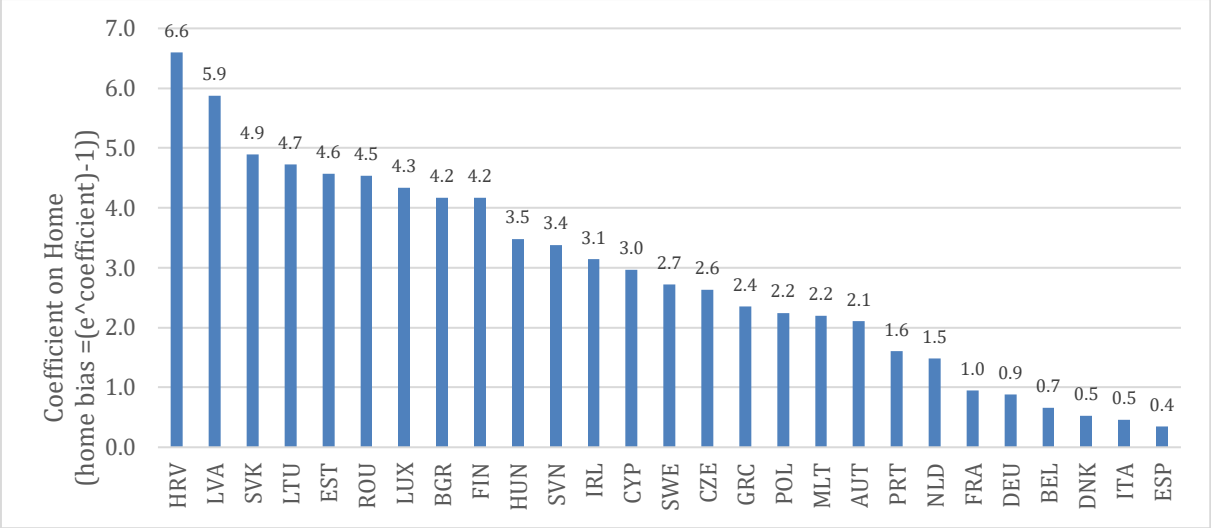
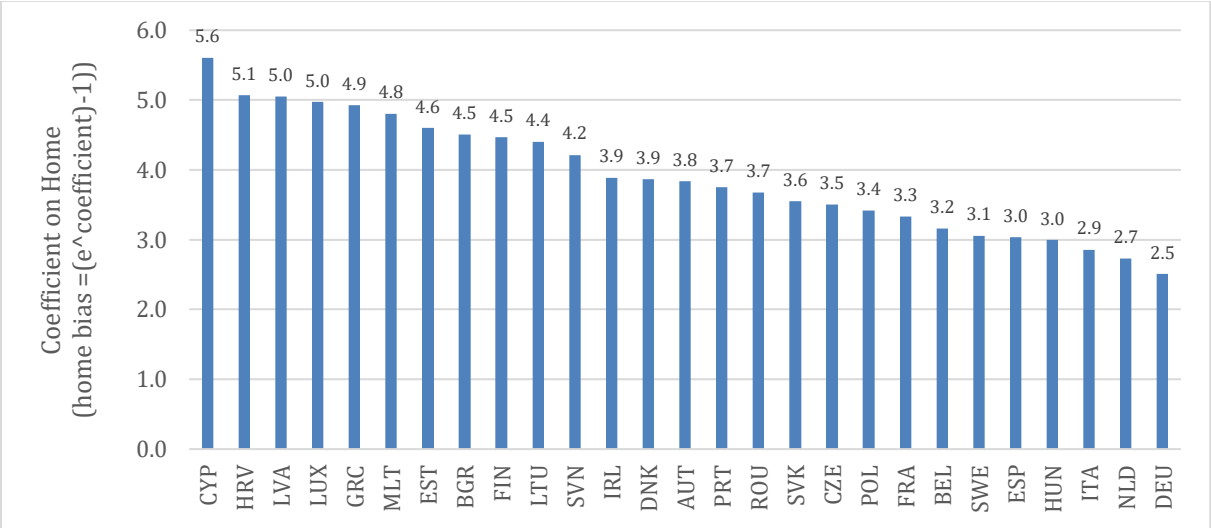


Figure 5: Country specific home bias PPML



6.4 Explaining the Variation in Home Bias with Environmental Concern

Previous sections have illustrated an extensive home bias in the European Union during 2002-2016. The home bias has shown a general decline over the years, and it varies depending on which estimator is used. Section 6.3 illustrated the average home bias during 2002-2016 in each member state, and the results point towards an integration effect. Now, the paper turns to step 2 of the analysis, namely, to examine if environmental concern affects the home bias. This paper's main purpose is to examine whether increasing environmental concern affects the estimated home bias within the European Union. The hypothesis is that consumers have altered their preferences due to their environmental concern and consume more domestically produced goods, thus increasing the home bias. The environmental concern of individuals might lead to an increased preference towards domestically produced goods, lowering the demand for imported goods, which would yield a larger home bias.

If the hypothesis is correct, the home bias should increase with environmental concern. However, as pointed out in section 6.2, the home bias could be affected by an integration effect, and other factors could affect the home bias other than environmental concern. This calls for caution when addressing the results. The estimated home bias in the European Union has shown a decline over the years included in the sample while the environmental concern has increased, creating a disparity between the two variables.

Table 6: Home bias and environmental concern with OLS estimates of home bias

Home Bias		**OLS**	
	1)	**2)**	**3)**
Importer Concern	-0.071*** (0.000)	-0.048** (0.002)	0.022** (0.004)
N	405	405	405
R–squared	.0538	.1094	.4233
Time FE	No	Yes	Yes
Importer FE	No	No	Yes

*p statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001*

Table 7: Home bias and environmental concern with PPML estimates of home bias

Home Bias	**OLS**		
	1)	**2)**	**3)**
Importer Concern	-0.048***	-0.044***	0.0004
	(0.000)	(0.000)	(0.958)
N	405	405	405
R–squared	.0573	.0712	.8716
Time FE	No	Yes	Yes
Importer FE	No	No	Yes

*p statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001*

In Table 6, the home bias and environmental concern are regressed with the OLS estimates of the home bias, and in Table 7, the PPML estimates are used. This is done to examine how the results vary when using different estimators and, furthermore, it can be seen as a robustness test. Both samples are estimated with OLS; the PPML estimator is not employed for this analysis since there are no zero observations. The regressions do not include industry or exporter fixed effects since only importers are in the data and no industries. The home bias is estimated separately for each combination of importer and year and is included in a regression with the environmental concern of each country and year.

Regression 3 in Table 6 displays a positive relationship between environmental concern and home bias after controlling for unobserved heterogeneity with time and importer fixed effects. Thus, when environmental concern increases, the home bias grows in size. However, when using the PPML estimates of the home bias, in Table 7, the coefficient on *Importer Concern* is insignificant. Although the sign is positive, it cannot be statistically assured that there is a positive relationship between environmental concern and home bias. Throughout the paper, the PPML estimates have received more credibility due to the zero observations in the data. Therefore, the results in Table 7 are more reliable. No conclusive evidence of the environmental concern affecting the home bias is found in this analysis.

7. Conclusion

The main purpose of this paper was to examine if environmental concern has affected the home bias in the European Union from 2002 to 2016. By using a gravity model of trade, the empirical results do not show any conclusive evidence that environmental concern has affected the home bias during 2002-2016. When controlling for unobserved heterogeneity with a rich set of fixed effects, there are some indications of a positive relationship. However, the results are sensitive to which estimator that was used to estimate the home bias. This paper cannot confirm a positive relationship between environmental concern and home bias, but it cannot rule out one either.

The variation in the home bias could have other explanations. Countries who have been members of the European Union for a longer time generally have a smaller home bias than more recent members, indicating an integration effect where older members are more integrated in the European Union and more prone to trading with the other members. The paper found that the home bias has shown a general decline over the period. The extent of the decline varies depending on the estimator. This result further supports the integration effect since the home bias declines over time as countries become increasingly integrated in the European Union.

Furthermore, this paper also focused on estimating the home bias within the European Union and its members. The empirical results found that there has existed an extensive home bias in the European Union of 2.334 or 2.746, depending on whether the OLS or the PPML estimator is used. This implies that members of the European Union, on average, have traded between 9.3 and 14.6 times more with themselves than with other members of the European Union during the 15 years included in the sample. The country-specific estimation of the home bias showed large variation between the countries, and older members had a generally smaller home bias than more recent members, further supporting the integration effect.

Limitations of this paper include qualitative limitations on the measurement of the environmental concern. In order to investigate consumer preferences effect on the home bias in more detail, qualitative data is needed. This study uses a proxy for environmental concern from the Eurobarometer but for future research, more detailed data and information would give a better understanding of the effect. Another limitation is the data on bilateral trade. The available data stretches up until 2016 and data from 2016 to 2020 would give this paper more relevancy.

Looking forward, the human-caused environmental issues does not seem to end, and the concern for the environment will likely increase as more countries are becoming developed and aware of these problems. Whether this will impact the trade between countries and affect the home bias remains to be seen, and there are several questions remained to be answered. The COVID-19 pandemic resulted in an unprecedented disruption to world trade, and production and consumption have decreased worldwide (WTO, 2021). This could increase the home bias since the fragility of the global value chains has become apparent, leading to more domestic production and consumption. Whether the future holds increased environmental concern and larger home bias in countries remain to be seen, and hopefully, this paper inspires future research on the relation.

8. References

Anderson, J.E & Van Wincoop, E. (2001). Gravity with Gravitas: A Solution to the Border Puzzle, *American Economic Review*, Vol. 93, pp. 170–192. Available at: https://www.nber.org/papers/w8079#:~:text=The%20gravity%20model%20has%20been,unions%20and%20exchange%20rate%20mechanisms.&text=Within%2DCanada%20trade%20rises%20by,%2DUS%20trade%20rises%2025%25. [Accessed: 13 December 2020]

Bacchetta. M, Beverelli. C, Fugazza. M, Grether. JM, Helble. M, Nicita. A, Piermartini. R, Cadot. O. (2012). A Practical guide to trade policy analysis. Publisher: World Trade Organization. Available at: https://www.wto.org/english/res_e/publications_e/practical_guide12_e.htm [Accessed: 14 November 2020]

Baier, S & Standaert, S. (2020). Gravity models and empirical trade, *Oxford Research Encyclopedia of Economics and Finance*, pp. 1–48. Oxford: Oxford University Press. Available at: https://oxfordre.com/economics/view/10.1093/acrefore/9780190625979.001.0001/acrefore-9780190625979-e-327 [Accessed: 22 January 2021]

Borchert, I., Larch, M., Shikher, S., Yotov, Y. (2020). The International Trade and Production Database for Estimation (ITPD-E), *International Economics.* Available at: https://usitc.gov/publications/332/working_papers/itpd-e_usitc_wp.pdf [Accessed: 12 February 2021]

Brechin, S. (1999). Objective problems, subjective values, and global environmentalism: evaluating the postmaterialist argument and challenging a new explanation, *Social Science Quarterly*, Vol. 80, No. 4, pp. 793–809. Available at: https://www.jstor.org/stable/42864406?seq=1#metadata_info_tab_contents [Accessed: 23 March 2021]

CEPII. (2011). GeoDist Database. Available at: http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=6 [Accessed: 20 November 2020]

CEPII. (2021). Gravity Database. Available at: http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=8 [Accessed: 20 November 2020]

Chen, N. (2004). Intra-national versus international trade in the European Union: why do national borders matter? *Journal of International Economics*, Vol. 63, pp. 93–118. Available

at: https://www.sciencedirect.com/science/article/pii/S0022199603000424 [Accessed: 27 November 2020]

Cheptea, A. (2013). Border effects and European integration, *CESifo Economic Studies*, Vol. 59, pp. 277–305. Available at: https://www.researchgate.net/publication/265914273_Border_Effects_and_European_Integration [Accessed: 22 November 2020]

Dunlap, R.E. (1975). The impact of political orientation on environmental attitudes and action, *Environment and Behaviour*, Vol. 7, No. 4, pp. 428–454. Available at: https://www.researchgate.net/publication/232557579_The_Impact_of_Political_Orientation_On_Environmental_Attitudes_and_Actions [Accessed: 10 December 2020]

Dunlap, R.E. & Jones, R.E. (1992). The Social Bases of Environmental Concern: Have They Changed Over Time?, *Rural Sociology*, Vol. 52, No. 1, pp. 28–47. Available at: https://www.researchgate.net/publication/229733769_The_Social_Bases_of_Environmental_Concern_Have_They_Changed_Over_Time1 [Accessed: 23 February 2021]

Dunlap, R.E. & Van Liere, K.D. (1978). The "new environ-mental paradigm", *Journal of Environmental Education*, Vol. 9, pp. 10–19. Available at: https://www.tandfonline.com/doi/abs/10.1080/00958964.1978.10801875 [Accessed 12 December 2020]

Dunlap, R.E. & Van Liere, K.D. (1980). The Social Bases of Environmental Concern: A Review of Hypotheses, Explanations and Empirical Evidence, *The Public Opinion Quarterly*, Vol. 44, No 2, pp. 181–197. Available at: https://www.jstor.org/stable/2748427?seq=1#metadata_info_tab_contents [Accessed: 10 December 2021]

Dunlap, Riley E & Jones R. (2002). Environmental Concern: Conceptual and Measurement Issues, Handbook of Environmental Sociology, pp. 482–524. Westport CN: Greenwood Press.

European Commission. (n.d). Internal Market, Industry, Entrepreneurship and SMEs. Available at: https://ec.europa.eu/growth/single-market_en [Accessed: 12 February 2021]

European Parliament. (n.d). What is Eurobarometer? Available at: https://www.europarl.europa.eu/at-your-service/en/be-heard/eurobarometer [Accessed: 12 February 2021]

Evans, Carolyn L. (2001). Home Bias in Trade: Location or Foreign-Ness? *FRB of New York Staff Report*, No. 128. Available at: https://ssrn.com/abstract=923143 [Accessed: 9 February 2021]

Ferguson, B. & Thompson, C. (2020). Why Buy Local? *Journal of Applied Philosophy*, Vol. 28, No. 1, pp. 104–120. Available at: https://onlinelibrary.wiley.com/doi/full/10.1111/japp.12459 [Accessed: 18 March 2021]

Flash Eurobarometer (2013). Attitudes of Europeans towards building the single market for green products, No. 367. Available at: https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/Survey/index#p=1&instruments=FLASH [Accessed: 16 March 2021]

Frank, D., Hironaka, A., Schofer, E. (2000). The nation state and the natural environment, *American Sociological Review*, Vol. 65, No. 1, pp. 96–116. Available at: https://www.jstor.org/stable/2657291?seq=1#metadata_info_tab_contents [Accessed: 20 March 2021]

Fransson, N & Gärling, T. (1999). Environmental Concern: Conceptual Definitions, Measurement Methods, and Research Findings, *Journal of Environmental Psychology*, Vol. 19, pp. 369–382. Available at: https://www.sciencedirect.com/science/article/pii/S027249449990141X [Accessed: 4 March 2021]

Franzen, A. & Vogl, D. (2013). Two Decades of Measuring Environmental Attitudes: A Comparative Analysis of 33 Countries, *Global Environmental Change, 2013.* Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2352200 [Accessed 17 December 2020]

Gómez-Herrera, E. (2013). Comparing alternative methods to estimate gravity models of bilateral trade, *Empirical Economics*, Vol. 44, pp. 1087–1111. Available at: https://www.etsg.org/ETSG2011/Papers/Gomez.pdf [Accessed: 22 December 2020]

Hao, F & Song, L. (2020). Environmental concern in China: A Multilevel Analysis, *Chinese Sociological Review*, Vol. 52, No. 1, pp. 1–26. Available at: https://www.tandfonline.com/doi/full/10.1080/21620555.2019.1654367 [Accessed: 5 January 2021]

Head, K. & Mayer, T. (2000). Non-Europe: the Magnitude and Causes of Market Fragmentation in the EU, *Review of World Economics*, Vol. 136, No. 2, pp. 284–314. Available at: https://www.parisschoolofeconomics.eu/docs/koenig-pamina/article_headmayer_noneurope.pdf [Accessed: 13 January 2021]

Head, K. & Mayer, T. (2002) Illusory Border Effects: distance mismeasurement inflates estimates of home bias in trade, *CEPII*, No. 2002–01. Available at: http://www.cepii.fr/PDF_PUB/wp/2002/wp2002-01.pdf [Accessed: 9 December 2020]

Heberlein, Thomas A. (1981). Environmental Attitudes, *Zeitschrift fur Umweltpolitik 2*, pp. 241–270. Available at: https://numerons.files.wordpress.com/2012/04/4environmental-attitudes-thomas-a-heberlein.pdf [Accessed: 22 February 2021]

Helliwell, John F. (1997). National Borders, Trade and Migration, *Pacific Economic Review*, Vol. 2, No. 3, pp. 165–185. Available at: https://www.nber.org/papers/w6027 [Accessed: 26 December 2020]

Hillberry, R. & Hummels, D. (2002). Intra-national Home Bias: Some Explanations, *NBER Working Paper*, No. 9022. Available at: https://www.nber.org/papers/w9022 [Accessed: 27 December 2020]

Howell, S. & Laska, S. (1992). The Changing Face of the Environmental Coalition, *Environment and Behaviour*, Vol. 24, No. 1, pp. 134–144. Available at: https://journals.sagepub.com/doi/10.1177/0013916592241006 [Accessed: 6 December 2020]

Inglehart, R. (1995). Public Support for Environmental Protection: The Impact of Objective Problems and Subjective Values in 43 Societies, *Political Science and Politics*, Vol. 28, No. 1, pp. 57–72. Available at: https://www.cambridge.org/core/journals/ps-political-science-and-politics/article/abs/public-support-for-environmental-protection-objective-problems-and-subjective-values-in-43-societies/A051E18F5DE47D79A3B8C79AC037223B [Accessed: 20 March 2021]

Lazaric, N., Le Guel, F., Belin, J., Oltra, V., Lavaud, S., Douai, A. (2020). Determinants of sustainable consumption in France: the importance of social influence and environmental values, *Journal of Evolutionary Economics*, Vol 30, No, 2, pp. 1337–1366. Available at: https://www.researchgate.net/publication/337705642_Determinants_of_sustainable_consumption_in_France_the_importance_of_social_influence_and_environmental_valuesDOI_101007s00191-019-00654-7 [Accessed: 25 February 2021]

Maloney, M.P. & Ward, M.P. (1973). Ecology: Let´s hear from the people. An objective scale for the measure-ment of ecological attitudes and knowledge, *American Psychologist*, Vol. 28, No. 7, pp. 583–586. Available through: LUSEM Library website https://www.lusem.lu.se/library [Accessed: 25 March 2021]

Manchin, M. & Pinna, Anna M. (2009). Border effects in the enlarged EU area: Evidence from imports to accession countries, *Applied Economics*, Vol. 41, pp. 1835–1854. Available at: https://www.tandfonline.com/doi/abs/10.1080/00036840601044974 [Accessed: 22 December 2020]

Marquart-Pyatt, Sandra. T. (2011). Contextual influences on environmental concerns cross-nationally: A multilevel investigation, *Social Science Research*, Vol. 21, pp. 1085–1099. Available at: https://www.sciencedirect.com/science/article/pii/S0049089X12000701 [Accessed: 12 February 2021]

Mayer, T. & Zignago, S. (2011). Notes on CEPII´s distances measures: the GeoDist Database, *CEPII Working Paper*, No. 2011–25. Available at: http://www.cepii.fr/PDF_PUB/wp/2011/wp2011-25.pdf [Accessed: 15 November 2020]

McCallum, J (1995). National borders matter: Canada-US regional trade patterns, *The American Economic Review*, Vol. 85, pp. 615–623. Available at: https://www.jstor.org/stable/pdf/2118191.pdf [Accessed: 16 November 2020]

Mika, A. (2017). Home sweet home: the home bias in trade in the European Union, *ECB Working Paper* No. 2046. Available at: https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2046.en.pdf [Accessed: 12 November 2020]

Morey, M. (2016). Preferences and the home bias in trade, *Journal of Development Economics*, Vol. 121, pp. 24–37. Available at: https://www.sciencedirect.com/science/article/pii/S0304387816000146 [Accessed: 16 January 2021]

Nitsch, V. (2000). National borders and international trade: evidence from the European Union, *Canadian Journal of Economics*, Vol. 33, pp. 1091–1105. Available at: https://www.jstor.org/stable/2667393?seq=1#metadata_info_tab_contents [Accessed: 8 November 2020]

Pacchioli, C. (2011). Is the EU internal market suffering from an integration deficit? Estimating the "home-bias effect", *CEPS Working Documents*, No. 348. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1898602 [Accessed: 5 January 2021]

Rizkalla, N. & Erhan, P.T. (2020). Sustainable Consumption Behaviour in The Context of Millennials in Indonesia – Can Environmental Concern, Self-efficacy, Guilt and Subjective Knowledge Make a Difference? *Journal of Sustainable Business and Management Solution in Emerging Countries*, Vol. 25, No. 3, pp. 43–53. Available at: http://management.fon.bg.ac.rs/index.php/mng/article/view/306 [Accessed 12 January 2021]

Rodríguez-Casallas, J.D., Luo, W., Geng, L. (2020). Measuring environmental concern through international surveys: A study of cross-cultural equivalence with item response theory and confirmatory factor analysis, *Journal of Environmental Psychology,* Vol. 71. Available at: https://www.researchgate.net/publication/343901472_Measuring_environmental_concern_through_international_surveys_A_study_of_crosscultural_equivalence_with_item_response_theory_and_confirmatory_factor_analysis [Accessed: 24 February 2021]

Santos Silva, J.M.C. S & Tenreyro, S (2006). The log of gravity, *The Review of Economics and Statistics*, Vol. 88, pp. 641–658. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=380442 [Accessed: 16 November 2020]

Schofer, E. & Hironaka, A. (2005). The effects of world society on environmental protection outcomes, Social Forces, Vol. 84, No. 1, pp. 25–47. Available at: https://cpb-us-e2.wpmucdn.com/faculty.sites.uci.edu/dist/c/219/files/2011/03/Schofer-Hironaka-Environmental-Outcomes-SF.pdf [Accessed: 24 February 2021]

Special Eurobarometer (2009). European´s attitudes towards climate change, No. 313. Available at: https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/Survey/index#p=1&instruments=SPECIAL [Accessed: 27 November]

Standard Eurobarometer 58 (2002), 60 (2003), 62 (2004), 64 (2005), 66 (2006), 68 (2007), 70 (2008), 72 (2009), 74 (2010), 76 (2011), 78 (2012), 80 (2013), 82 (2014), 84 (2015), 86 (2016). Public Opinion in the European Union. Field Work: Autumn. Available at: https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/Survey/index#p=1&instruments=STANDARD [Accessed: 10 December 2020]

Tinbergen, J (1962). Shaping the world economy: Suggestions for an international economic policy, New York: Twentieth Century Fund.

Trefler, D. (1995). The Case of the Missing Trade, *American Economic Review*, Vol. 85, No 5, pp. 1029–1046. Available at: https://www.jstor.org/stable/2950973?seq=1#metadata_info_tab_contents [Accessed: 16 January 2021]

Van Liere, K. D. (1981). Environmental Concern: Does it Make a Difference How it´s Measured?, *Environment and Behaviour*, Vol. 16, No. 6, pp. 651–676. Available at: https://www.researchgate.net/publication/232497667_Environmental_Concern_Does_it_Make_a_Difference_How_it's_Measured |Accessed: 6 December 2020]

Wei, Shang J. (1996). Intra-national versus international trade: how stubborn are nations in global integration*?*, *NBER Working Paper*, No. 5531. Available at: https://www.nber.org/papers/w5531 [Accessed: 19 November 2020]

Wolf, Holger C. (1997). Patterns of Intra- and Inter-State Trade, *NBER Working Paper*, No. 5939. Available at: https://www.nber.org/papers/w5939 [Accessed: 23 November 2020]
Wolf, Holger C. (2000). Intranational home bias in trade, *Review of Economics and Statistics*, Vol. 82, pp. 555–563. Available at: https://www.jstor.org/stable/2646651?seq=1#metadata_info_tab_contents [Accessed: 21 January 2021]

World Bank. (2021). World Development Indicators. Available at: https://databank.worldbank.org/source/world-development-indicators/preview/on [Accessed: 3 January 2021]

WTO. (2021). COVID-19 and world trade. Available at: https://www.wto.org/english/tratop_e/covid19_e/covid19_e.htm#measures [Accessed: 10 April 2021]

Yi, Kei-Mu (2010). Can multistage production explain the home bias in trade? *The American Economic Review*, Vol. 100, pp. 364–393. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1150912 [Accessed: 26 December 2020]

9. Appendix

Table A1: European Union, Eurozone and Schengen Area accession dates.

Country	European Union	Eurozone	Schengen Area
AUT	01/01/1995	01/01/1999	01/12/1997
BEL	23/07/1952	01/01/1999	26/03/1995
BGR	01/01/2007	–	–
CYP	01/05/2004	01/01/2008	–
CZE	01/05/2004	–	21/12/2007
DEU	23/07/1952	01/01/1999	26/03/1995
DNK	01/01/1973	–	25/03/2001
ESP	01/01/1986	01/01/1999	26/03/1995
EST	01/05/2004	01/01/2011	21/12/2007
FIN	01/01/1995	01/01/1995	25/03/2001
FRA	23/07/1952	01/01/1999	26/03/1995
GRC	01/01/1981	01/01/2001	01/01/2000
HRV	01/07/2013	–	–
HUN	01/05/2004	–	21/12/2007
IRL	01/01/1973	01/01/1999	–
ITA	23/07/1952	01/01/1999	26/10/1997
LTU	01/05/2004	01/01/2015	21/12/2007
LUX	23/07/1952	01/01/1999	26/03/1995
LVA	01/05/2004	01/05/2004	21/12/2007
MLT	01/05/2004	01/01/2008	21/12/2007
NLD	23/07/1952	01/01/1999	26/03/1995
POL	01/05/2004	–	21/12/2007
PRT	01/01/1986	01/01/1999	26/03/1995
ROU	01/01/2007	–	–
SVK	01/05/2004	01/01/2009	21/12/2007
SVN	01/05/2004	07/01/2007	21/12/2007
SWE	01/01/1995	–	25/03/2001

Table A2: Industry Specific Home Bias

Industry	**Industry ID**	**Home Bias**
Vegetable and animal oils and fats	37	7.213*** (0.000)
Other special purpose machinery	122	6.259*** (0.000)
Lifting and handling equipment	113	5.695*** (0.000)
Mining of iron ores	30	5.423*** (0.000)
Other oilseeds (excluding peanuts)	7	5.344*** (0.000)
Watches and clocks	137	5.287*** (0.000)
Casting of iron and steel	103	5.277*** (0.000)
Cereal products	5	5.272*** (0.000)
Engines \& turbines (not for transport equipment)	109	5.103*** (0.000)
Agricultural and forestry machinery	115	5.094*** (0.000)
Other chemical products n.e.c.	88	4.964*** (0.000)
Raw and refined sugar and sugar crops	9	4.819*** (0.000)
Builders' carpentry and joinery	65	4.775*** (0.000)
Publishing of newspapers journals etc.	72	4.717*** (0.000)
Wines	48	4.717*** (0.000)
Other non-metallic mineral products n.e.c.	100	4.612*** (0.000)
Other food products n.e.c.	46	4.569*** (0.000)
Steam generators	106	4.553*** (0.000)
Macaroni noodles \& similar products	45	4.494*** (0.000)
Prepared fruits and fruit juices	14	4.471*** (0.000)
Animal feed ingredients and pet foods	8	4.341*** (0.000)
Basic precious and non-ferrous metals	102	4.233*** (0.000)
Automobile bodies trailers \& semi-trailers	139	4.217*** (0.000)
Other agricultural products, nec	26	4.188*** (0.000)
Plastics in primary forms; synthetic rubber	83	4.158*** (0.000)
Pesticides and other agro-chemical products	84	4.124*** (0.000)
Insulated wire and cable	127	4.121*** (0.000)
Ovens furnaces and furnace burners	112	4.035*** (0.000)
Other electrical equipment n.e.c.	130	4.020*** (0.000)
Eggs	19	3.976*** (0.000)
Processing/preserving of fish	35	3.882*** (0.000)
Musical instruments	150	3.839*** (0.000)

Other general purpose machinery	114	3.837*** (0.000)
Malt liquors and malt	49	3.790*** (0.000)
Other sweeteners	10	3.742*** (0.000)
Motorcycles	145	3.694*** (0.000)
Publishing of books and other publications	71	3.650*** (0.000)
Soft drinks; mineral waters	50	3.649*** (0.000)
Structural metal products	104	3.649*** (0.000)
Service activities related to printing	76	3.648*** (0.000)
Starches and starch products	40	3.644*** (0.000)
Cotton	23	3.637*** (0.000)
Cocoa chocolate and sugar confectionery	44	3.630*** (0.000)
Parts/accessories for automobiles	140	3.609*** (0.000)
Mining of lignite	28	3.580*** (0.000)
Refined petroleum products	79	3.567*** (0.000)
Fertilizers and nitrogen compounds	82	3.515*** (0.000)
Paints varnishes printing ink and mastics	85	3.511*** (0.000)
Machinery for metallurgy	117	3.497*** (0.000)
Other mining and quarring	31	3.459*** (0.000)
Dairy products	38	3.449*** (0.000)
Cutting shaping \& finishing of stone	99	3.432*** (0.000)
Beverages, nec	22	3.429*** (0.000)
Bicycles and invalid carriages	146	3.409*** (0.000)
Games and toys	152	3.400*** (0.000)
Carpets and rugs	54	3.360*** (0.000
Other transport equipment n.e.c.	147	3.356*** (0.000
Building and repairing of ships	141	3.342*** (0.000
Sports goods	151	3.277*** (0.000
Processing/preserving of fruit \& vegetables	36	3.219*** (0.000
ManHuman-madebres	89	3.163*** (0.000
Motor vehicles	138	3.156*** (0.000
Processing of nuclear fuel	80	3.137*** (0.000
Glass and glass products	93	3.136*** (0.000
Other wood products; articles of cork/straw	67	3.131*** (0.000
Basic chemicals except fertilizers	81	3.124***

		(0.000
Lighting equipment and electric lamps	129	3.121*** (0.000
Rice (raw)	2	3.098*** (0.000
Grain mill products	39	3.082*** (0.000
Accumulators primary cells and batteries	128	3.003*** (0.000
Extraction crude petroleum and natural gas	29	3.002*** (0.000
Prepared animal feeds	41	2.984*** (0.000
Machinery for textile apparel and leather	120	2.966*** (0.000
Optical instruments \& photographic equipment	136	2.958*** (0.000
Processing/preserving of meat	34	2.951*** (0.000
Electricity production, collection, and distribution	32	2.903*** (0.000
Bearings gears gearing \& driving elements	111	2.897*** (0.000)
Tobacco products	51	2.884*** (0.000)
Footwear	62	2.814*** (0.000)
Railway/tramway locomotives \& rolling stock	143	2.787*** (0.000)
Pulp paper and paperboard	68	2.776*** (0.000)
Prepared vegetables	15	2.728*** (0.000)
Sugar	43	2.725*** (0.000)
Spices	25	2.710*** (0.000)
Live Swine	18	2.684*** (0.000)
Cement lime and plaster	97	2.634*** (0.000)
Corrugated paper and paperboard	69	2.632*** (0.000)
Rubber tyres and tubes	90	2.625*** (0.000)
Soybeans	6	2.560*** (0.000)
Electricity distribution \& control apparatus	126	2.536*** (0.000)
Other manufacturing n.e.c.	153	2.519*** (0.000)
Pharmaceuticals medicinal chemicals etc.	86	2.472*** (0.000)
Textile fibre preparation; textile weaving	52	2.447*** (0.000)
Cordage rope twine and netting	55	2.437*** (0.000)
Corn	3	2.402*** (0.000)
Measuring/testing/navigating appliances etc.	135	2.398*** (0.000)
Plastic products	92	2.395*** (0.000)
Tanning and dressing of leather	60	2.393*** (0.000)
Made-up textile articles except apparel	53	2.372*** (0.000)
Jewellery and related articles	149	2.345***

		(0.000)
Bakery products	42	2.274*** (0.000)
Refractory ceramic products	95	2.235*** (0.000)
Food/beverage/tobacco processing machinery	119	2.186*** (0.000)
Veneer sheets plywood particle board etc.	64	2.185*** (0.000)
Wearing apparel except fur apparel	58	2.181*** (0.000)
Dressing \& dyeing of fur; processing of fur	59	2.066*** (0.000)
Other rubber products	91	1.903*** (0.000)
Weapons and ammunition	121	1.872*** (0.000)
Tanks reservoirs and containers of metal	105	1.742*** (0.000)
Pulses and legumes, dried, preserved	11	1.629** (0.001)
Office accounting and computing machinery	124	1.579*** (0.000)
Medical surgical and orthopaedic equipment	134	1.465*** (0.000)
Domestic appliances n.e.c.	123	1.420*** (0.000)
Building/repairing of pleasure/sport. boats	142	1.378** (0.001)
Wheat	1	1.354** (0.003)
Luggage handbags etc.; saddlery \& harness	61	1.343** (0.001)
Reproduction of recorded media	77	1.328* (0.005)
Mining of hard coal	27	1.257*** (0.255)
Wooden containers	66	1.177* (0.012)
Basic iron and steel	101	1.121* (0.012)
Articles of concrete cement and plaster	98	1.104** (0.006)
Nuts	16	1.063** (0.005)
Pottery china and earthenware	94	1.013*** (0.000)
TV and radio receivers and associated goods	133	1.006* (0.014)
Machine tools	116	0.903*** (0.181)
Machinery for mining \& construction	118	0.892** (0.001)
Fresh vegetables	13	0.812 (0.071)
Other articles of paper and paperboard	70	0.652 (0.386)
Tobacco leaves and cigarettes	24	0.543 (0.130)
Electric motors generators and transformers	125	0.472 (0.283)
Publishing of recorded media	73	0.438 (0.556)
Sawmilling and planing of wood	63	0.394 (0.402)
Live Cattle	17	0.368 (0.353)
TV/radio transmitters; line comm. apparatus	132	0.357

		(0.532)
Aircraft and spacecraft	144	0.213 (0.764)
Distilling rectifying \& blending of spirits	47	0.018 (0.978)
Electronic valves tubes etc.	131	-0.050 (0.903)
Printing	75	-0.088 (0.775)
Furniture	148	-0.545 (0.695)
Other publishing	74	-0.598 (0.101)
Gas production and distribution	33	-0.711 (0.238)
Struct.non-refractory clay; ceramic products	96	-1.087* (0.039)
Soap cleaning \& cosmetic preparations	87	-1.544*** (0.000)
Coke oven products	78	-1.637*** (0.000)
Pumps compressors taps and valves	110	-2.081*** (0.334)

p statistics in parentheses * p<0.05, ** p<0.01, *** p<0.00

**Industries 1-26 belong to the broad sector Agriculture*

Industries 27-33 belong to the broad sector Mining

Industries 34-153 belong to the broad sector Manufacturing