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Outward FDI Effects on the Portuguese Trade Balance, 1996-2007

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Classificação JEL codes: F21; C23; F14

Keywords: Foreign Direct Investment, Trade, Gravity Model, Portugal

Abstract

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We use panel data analysis within a framework of gravity equations for exports and imports, with a sample composed by EU-15, U.S.A., Brazil, Angola, Japan and China, for the period 1996-2007. Our main conclusion is that the empirical evidence for Portugal is consistent with a substitution hypothesis between direct investment abroad and trade, and consequently we detect a negative trade balance effect with the majority of countries in our sample, excepting Angola and, in a lesser extension, Spain.

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We use panel data analysis within a framework of gravity equations for exports and imports, with a sample composed by EU-15, U.S.A., Brazil, Angola, Japan and China, for the period 1996-2007.

Our main conclusion is that the empirical evidence for Portugal is consistent with a substitution hypothesis between direct investment abroad and trade, and consequently we detect a negative trade balance effect with the majority of countries in our sample, excepting Angola and, in a lesser extension, Spain.

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1. Introduction

The main objective of this paper is to analyse the effect emanating from Portuguese outward Foreign Direct Investment (FDI) on exports and imports with its main economic partners, in the period between 1996 and 2007.

This study seemed particularly relevant to us for two reasons. Firstly, we want to participate on the debate that has emerged in the last decade about what happens in home country when national firms become increasingly multinational. Before, the discussion on the effects of multinational firms tended to be focused on host countries, i.e. the countries where they operate.

Secondly, we want to evaluate if the complementary relationship between foreign production and trade, shown in most studies for traditionally outward investor economies (the most developed nations) also holds for a country like Portugal, where outward FDI is a more recent phenomenon.

The paper is structured as follows: section 2 presents the theoretical background of our research; section 3 briefly reviews the previous empirical studies regarding the question in analysis and section 4 contains the description of data and econometric methodology, jointly with the presentation of main empirical results. Finally, section 5 presents the conclusions and further research questions.

2. Outward FDI effects on trade – Theoretical background

Traditionally, there has been a divergence in terms of the theories on FDI and international trade: the latter try to explain why countries trade with each other and the former try to account for why firms produce and invest outside its borders.

In the neoclassical approach of trade theory, Mundell (1957) was the first to focus on the relationship between capital movements and trade of goods, demonstrating that FDI and exports become substitutes for each other. Upon the assumptions of the Heckscher-Ohlin-Samuelson (HOS) general equilibrium model, the flows of FDI depend on the differences in factor price and factor endowment between countries. So, he showed that the international movement of capital driven by FDI displaces the movement of those goods produced in a capital-intensive manner, leading to an equilibrium in which factor prices and product prices have the same characteristics as in the free trade equilibrium.

We can say that the substitution effect plays a prominent role in theory, like in the product cycle model developed by Vernon (1966), in which he considered that FDI affiliates' production and sales in foreign market replace trade in the same market. Additionally, the theory of internalization (Williamson 1975; Markusen 1984) suggested that FDI substitutes for exports when there are sufficient costs to external transactions such as exporting or licensing. Moreover, the eclectic theory or OLI paradigm introduced by Dunning (1981), whose basic assumption is that a firm will engage in international production (i.e. become multinational) instead of exporting when it possesses at the same time ownership, location and internalization advantages, also considered trade and FDI as alternative strategies.

Over the last two decades, some models were developed in order to incorporate the concept of the multinational enterprise (MNE) into the standard theory of international trade. They show that the results on the relationship between capital movements and trade depend on whether the foreign operations are in goods industries or in services, are in developed or developing countries, and specially if the foreign operations' relation to home operations is "horizontal" or "vertical". In the first case, the MNE produces the same goods in their

home country and in multiple plants located in the host countries, and so the same (horizontal) stage of the production process is duplicated. This type of FDI is a mean to avoid some costs like trade barriers, transportation costs and other transaction costs that discourage exports, and is also known as market-seeking FDI, because is driven by market considerations.

In the second case, the firms fragment the production process geographically and locate specific stages of the value chain in countries that have factor-price differences. This type of FDI is motivated by cost considerations and it is also known as efficiency-seeking FDI.

The models based on horizontal FDI, such as Markusen (1984) and Markusen and Venables (1995) consider that the choice of MNEs is determined by factors such as the firm specific advantages (activities of research and development, marketing, managerial know-how, etc.), the firm- and plant-level economies of scale and transport costs. The firm faces the dilemma of either producing abroad or exporting and naturally the substitutability between such foreign investments and trade tends to prevail.

On the other hand, the theoretical contributions of Helpman (1984) and Helpman and Krugman (1985) show that outward FDI and trade might be complements. That occurs in the case of vertical FDI, as it generates complementary trade flows of final goods from foreign affiliates to parent firms or to the home country and intra-firm transfers of intangible headquarter services from parent firms to foreign affiliates. Lipsey and Weiss (1984) argue that one way by which complementarity occurs is when a firm's production presence in a foreign market with one product may increase total demand for the whole line of products.

Recent studies like Carr *et al.* (1998) attempted to combine both horizontal and vertical motives for FDI. They basically imply that horizontal FDI is more prevalent with countries that are similar in market size, relative factor endowments and technical efficiency and vertical FDI arises when countries differ substantially in terms of factor endowments. Accordingly to them, trade and FDI between developed countries could be regarded as substitutes while between developed and developing countries tend to be complements.

Thus, as both substitution and complementary effects can occur, the main conclusion of the theoretical literature is that the impact of outward FDI on home country's exports is not predictable a priori by any economic theory, but it is mainly an empirical question

3. Empirical studies

The question regarding the impact of outward foreign investment on domestic exports has been addressed all over the years in several countries by two different ways, which means that there is quite some variation in methodology and generality of results: the business-oriented authors analyses have attempted to examine what would have happened in specific cases if investment abroad had not been possible, and the econometric studies have tried to detect the overall relationship between FDI and home country exports in larger samples of firms or industries.

In what refers the business-oriented analyses, we can highlight the earliest contributions of Stobaught et al. (1972), who studied nine U.S. firms, and Jordan and Vahlne (1981) whose study aims to compare the domestic effects of foreign direct investment with alternative ways (like exports, licensing, and minority joint ventures) to exploit the competitive advantages of a sample of Swedish firms. The overall conclusion they reached is that

foreign direct investment has positive effects on home country exports and employment, particularly for low-technology products with high transportation costs, because the establishment of foreign affiliates resulted in large increases in the foreign market shares and in exports of intermediate products to affiliates. However, these results were based on very specific assumptions about export survival rates, i.e. the fractions of the affiliates' market share that could have been served by home exports, which were very low, concluding that most of the foreign markets have been lost in the absence of FDI.

So, these assumptions were criticized by Frank and Freeman (1978: 9), who noted that the estimates of survival rates are often based on surveys and interviews with company officials. They proposed a more "neutral" approach and used an alternative model for the U.S. economy, estimating survival rates from data on costs, revenues and demand conditions. Their calculations suggested survival rates ranging between 20 and 40 per cent, depending on industry, implying that foreign direct investment substituted for U.S. exports and that the net employment effect of FDI was negative.

The discussion about what is the appropriate counterfactual remains one of the core questions in this kind of studies, and it is likely that this debate will continue, probably with mixed results depending on assumed survival rates. In one of the most recent contributions Barba Navaretti and Castellani (2004:4) observed that "the effects of outward investment on home activities are not relevant *per se*, but with respect to what would have happened if firms had not invested abroad". In this study, they use propensity score matching to compare the performance of a group of Italian firms that do not invest abroad and another of Italian outward investors, and their results suggest that outward FDI has no significant

effect on employment growth, at the same time that significantly enhances the rate of productivity growth and output.

This problem of assessing survival rates and counterfactuals does not usually come up in the other type of studies about the relationship that we are analyzing. Indeed, the econometric studies usually employ regression analysis to determine the relation between exports and various firm, industry, and country characteristics. Controlling for as many other determinants as possible, the focus is on the partial effect of FDI — a negative coefficient implies that foreign production substitutes for exports, whereas a positive sign suggests that the opposite effect of complementarity, i.e. the stimulus to home exports of intermediate and other related products, prevails in aggregate.

The most relevant econometric studies developed over the last three decades were about countries with large experience and high levels of outward investment, like U.S.A., Sweden, Japan and France. The majority of them predict a positive relationship between outward FDI and domestic exports, and can be divided according to the level of aggregation used.

Starting by the analysis on country-level, they show dominantly a complementary effect. In this context, Swedenborg (1979, 1982 and 2001), Blomstrom, Lipsey, and Kulchycky (1988), and Svensson (1996) all based their studies on data from Swedish multinationals, although there are significant differences in the methodology used and the considered time period. The major innovation in both of Swedenborg's analyses was the introduction of 2SLS (two-stage least squares) estimations, in order to deal with the endogeneity of exports and the mutual determination with investment, i.e. the fact that both foreign production and exports may be affected by the same omitted variables. Her findings suggest that there was

no significant overall effect, or a small positive effect, of foreign production on the exports of Swedish enterprises.

The findings in Blomstrom, Lipsey, and Kulchycky (1988) do not differ significantly from those presented by Swedenborg. They concluded about no signs that large foreign production in a country reduces the country's subsequent imports from Sweden and so there are mainly positive relationships between outward FDI and exports growth, with exception of one major industry – metal manufacturing – in which an opposite effect was found.

Svensson (1996) focus his analysis on the developments during the late 1980s and early 1990s and challenged the results of these studies, arguing that is necessary to account for the foreign affiliates' exports to third countries, because they are likely to substitute directly for parent exports. Doing this, he found a substitution effect (relatively small) between Swedish investment abroad and exports from Sweden. The increasing preference among Swedish MNEs for acquisitions rather than greenfield ventures as mode of foreign market entry is likely to strengthen this conclusion. Since acquired affiliates have already established linkages with local suppliers and subcontractors, they are less dependent on imports of intermediates from the home country, at least in the short run.

Braunerhjelm and Oxelheim (2000) also analyse this relationship on Swedish economy and argue it may vary depending on industry characteristics. They found that outward FDI and exports tend to be complements in industries that rely on immobile natural resources (Heckscher-Ohlin industries), but that they may be substitutes in industries relying on technology, brand names, and other intangible assets (Schumpeter industries).

In this context, we can also refer Eaton and Tamura (1994), who analyse the American and Japanese bilateral flows of trade and FDI with a hundred of partners for the period 1985-1990. They used a modified gravity model, by which each variable of internationalisation (export, import, inward FDI and outward FDI) is explained by the population of the partner country, its income *per capita*, its density and its endowment in human capital, finding for the Japan and U.S.A. a strong correlation between outward FDI and exports, as well as for imports. In contrast, Andersen and Hainault (1998) used time-series analysis and find evidence of complementarity between exports and outward FDI flows for U.S.A., Japan and Germany, but no significant relationship for the United Kingdom.

Using two panel data sets on the operations of 29 U.S. multinational firms abroad and the operations of foreign affiliates operating in the United States, Clausing (2000) find a strong positive effect of outward FDI on exports, particularly when the intra-firm trade is considered. Finally, the time-series analysis of Alguacil and Orts (2002), for the period 1970-1992, found evidence of a positive Granger-causality from Spanish FDI to exports.

Considering the studies on industry-level, they have mixed results. Lipsey and Weiss (1981) consider 44 foreign markets in which U.S. firms compete against 13 other exporting countries in 1970 and found a positive effect. According to them, and depending on the industry, one dollar of local sales leads to a 2 cents to 78 cents of additional exports to the corresponding market, at the same time that the production of U.S. affiliates abroad substituted for exports to the host country of third countries. In a later study, the same authors (Lipsey and Weiss 1984) analyzed foreign production and U.S. exports in 14 industries in the manufacturing sector, obtaining a positive and significant relationship in 11 of them.

Focusing on bilateral trade and direct investment relationships for France, Fontagné and Fajot (2002) found complementary relationship between outward FDI flows and net exports both for countries as a whole and for individual industries. Furthermore, the impact of outward FDI on trade is much larger impact when spillovers between sectors are considered. A similar conclusion was obtained by Chédor, Mucchielli and Soubaya (2002), whose analysis on panel data for individual French firms reported complementarity between direct investment abroad and home country exports.

Also the analysis who used data from Japan (Lipsey, Ramstetter and Blomstrom 2000) and Australia (Productivity Commission 2002) concluded about a positive effect of outward investment on home exports in the minority of industries where it can be discerned.

At this level of aggregation, there have been some studies who concluded about the opposite effect, but in a lesser dimension. That was the case of Graham (1996), whose analysis for years 1983, 1988 and 1991 demonstrate a predominant complementarity relation between U.S. outward FDI and exports, but also a confirmation of the substitution

hypothesis. It deserves specially relevance Brainard (1997) whose cross-section analysis for 1989 of total sales, exports and imports of the U.S. MNEs affiliates, in 27 markets, found evidence of a strong substitution effect on industry level, that he called “proximity-concentration trade off”. According to him, when the income *per capita* of the destination market catches up the U.S. level, the U.S. multinationals tend to substitute FDI for exports.

Referring to studies with firm-level data, Lipsey and Weiss (1984) used information on intermediate versus finished products within the firms in their sample. They found, in 1970, a strong complementary relationship between the U.S. affiliates production of intermediate goods in the host country and the exports in the same region. At the same time, this relation becomes weaker and even negative when finished goods are taken into account. Head and Ries (2001) used a panel data set to examine the relation between outward production and exports for 932 Japanese manufacturing firms, over the period 1966-1990. They concluded about a net positive effect, but also important differences across firms. In particular, those firms that are not vertically integrated and are unlikely to ship intermediate inputs to overseas production affiliates show evidence of substitution.

In a recent empirical study for companies from 10 European countries, Oberhofer and Pfaffermayr (2007) confirmed the complementarity hypothesis between FDI and exports and, at the same time, stated that a considerable number of firms use a combination of both FDI and exports to serve foreign markets.

Finally, using product-level data, Blonigen (2001) found that both effects may arise, depending on the nature of the relationship between parents and foreign affiliates: he detected for the period 1978-1994 a substitution effect between the production of Japanese automobile parts in the U.S. and Japanese exports of the same products to the U.S., at the

same time that a complementarity between Japanese automobiles (final goods) production in the U.S.A. and Japanese exports of automobile parts. In a recent study, Türkan (2006) used a panel data analysis and identified for the period 1989-2003 a strong complementary relation for intermediate goods and a slight negative effect for finished goods.

Thus, the main conclusion emerging from the empirical studies on the effects of outward FDI on home-country exports is that positive associations are more common, although there are some examples of negative correlations. The most relevant explanations for diverging results is the level of aggregation used and, at the same time, we should also consider “the frequency of results indicating no association in either direction” (Lipsey 2002, p.12).

4. Our study

4.1 Data and methodology

The main sources of this research were the Banco de Portugal Statistical Database, for data on trade (exports and imports) and outward FDI, and Eurostat for data on GDP, both measured in Mio Euro. We have also collected data on population from United Nations and Eurostat, and on straight line distance between Lisbon and the other countries’ capital city from www.globefeed.com.

Our data cover a 12-year period (1996-2007) and, being Portugal the home country, the sample is composed of 18 host countries – UE15 (considering Belgium and Luxembourg together), U.S.A., Angola, Brazil, China and Japan.

The following table contain the descriptive statistics for the totality of sample, while in the appendix we present the same information by country, taking in account that for some of

the countries there are only nine temporal statistic moments because data on GDP are only available after 1998.

Table 1: Summary statistics (totality of sample)

. summarize

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	216	1345810	1815718	17796	1.07e+07
imp	216	1902801	2908322	5896	1.69e+07
inv	216	1284299	1782580	4	6314408
gdp	207	1385983	2254599	5782.511	1.13e+07
pop	216	1.24e+08	2.85e+08	3620065	1.31e+09
dist	216	3698.571	2925.815	516.05	11145.27

In this paper, we use random-effects panel data analysis within a framework of gravity equations for exports and imports.

On the one hand, gravity models have been strongly used in the empirical literature on the determinants of FDI and trade. They were formulated in analogy with Newton's law of universal gravitation (two objects attract each other in direct proportion of their masses and in inverse proportion of the distance separating them) to explain the volume of trade and capital flows among countries. Their basic assumption is that exports and imports are positively related to GDP per capita and population, interpreted in terms of effective demand and market size, and negatively to distance, as a proxy for transportation costs. Additionally to these standard variables, in the present study we include outward FDI as an explanatory variable, whose coefficient reflects the substitution or complementarity effect on trade.

On the other hand, panel data or longitudinal data is an increasingly popular technique of analysis, with several advantages over conventional cross-section or time-series models. The major one is that panel data endows regression with both a spatial and temporal dimension, and thus it follows the same cross-sectional units (countries, states, firms,

households) over a particular time span. Furthermore, it gives the researcher a large number of observations, increasing the degrees of freedom and hence improving the efficiency of econometric estimates. In our study, we use random-effects panel data model because it allows for time-invariant variables (like distance) to be included among the regressors.

4.2 Results

Before interpreting the estimation results, presented in Tables 2 and 3, we should refer that we use the logarithmic form of the variables¹, and thus each one represent:

- **lexp** the log of Portuguese exports for host country,
- **limp** the log of Portuguese imports from host country,
- **lgdpcap** the log of host country's GDP per capita,
- **lpop** the log of host country's population,
- **ldist** the log of distance between Lisbon and the host country's capital city,
- **inv*** the log of Portuguese direct investment in host country, with ang=Angola, bra=Brazil, usa=U.S.A., jap=Japan, chi=China, spa=Spain and eu=EU15 without Spain.

Table 2: Estimation model for exports

```
. xtreg lexp lgdpcap lpop ldist linvang linvbra linvusa linvjap linvchi linvspa
linveu, re

Random-effects GLS regression              Number of obs      =       207
Group variable: id                        Number of groups   =        18

R-sq:  within  = 0.4896                   Obs per group: min =         9
        between = 0.8240                                     avg  =       11.5
        overall  = 0.8118                                     max  =        12
```

¹ As a consequence, the coefficients are expressed in terms of elasticities, measuring the responsiveness of trade flows with regard to percentage changes in the independent variable

Random effects u_i ~ Gaussian Wald chi2(10) = 283.00
corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000

lexp	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lgdpcap	.5744213	.0739333	7.77	0.000	.4295148	.7193278
lpop	.8010306	.0995913	8.04	0.000	.6058353	.9962259
ldist	-.7429428	.2874844	-2.58	0.010	-1.306402	-.1794838
linvang	.1573063	.0332695	4.73	0.000	.0920992	.2225134
linvbra	-.0773881	.0390169	-1.98	0.047	-.1538598	-.0009165
linvusa	-.0512798	.0432297	-1.19	0.236	-.1360085	.0334489
linvjap	-.2102121	.0604741	-3.48	0.001	-.3287393	-.091685
linvchi	-.3582747	.0722592	-4.96	0.000	-.4999001	-.2166494
linvspa	.0795772	.0399897	1.99	0.047	.0011988	.1579556
linveu	-.0083314	.0115327	-0.72	0.470	-.0309351	.0142724
_cons	7.970356	2.507655	3.18	0.001	3.055443	12.88527
sigma_u	.42016864					
sigma_e	.18742516					
rho	.83404256	(fraction of variance due to u_i)				

Concerning the relationship between Portuguese outward FDI and exports, the results reported in Table 2 depend on the partner country. For Angola, we observe a positive and highly significant correlation (the respective coefficient shows that a 1% increase in Portuguese FDI in this country implies a 0.16% increase in exports) and there is also evidence of a complementarity effect for Spain, at 5% significance level. By other way, we find a very significant substitution effect for Japan and China (a 1% increase in Portuguese FDI in these economies is associated with 0.21% and 0.36% decreases in exports, respectively) whereas in case of Brazil such negative relationship is significant at 5% level.

Table 3: Estimation model for imports

```
. xtreg limp lgdpcap lpop ldist linvang linvbra linvusa linvjap linvchi linvspa  
linveu, re
```

Random-effects GLS regression	Number of obs	=	207
Group variable: id	Number of groups	=	18
R-sq: within = 0.3742	Obs per group: min =		9
between = 0.8789	avg =		11.5
overall = 0.8424	max =		12

Random effects u_i ~ Gaussian	Wald chi2(10)	=	217.43
corr(u_i, X) = 0 (assumed)	Prob > chi2	=	0.0000

limp	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lgdpcap	.7875787	.103995	7.57	0.000	.5837522	.9914052
lpop	.9251523	.1226934	7.54	0.000	.6846777	1.165627
ldist	-1.087938	.375721	-2.90	0.004	-1.824338	-.3515383
linvang	.1080935	.0445392	2.43	0.015	.0207983	.1953886
linvbra	.0356726	.0504695	0.71	0.480	-.0632459	.1345911
linvusa	-.0905869	.0552145	-1.64	0.101	-.1988053	.0176314
linvjap	.0079596	.0804228	0.10	0.921	-.1496662	.1655854
linvchi	-.0170666	.1010815	-0.17	0.866	-.2151827	.1810495
linvspa	.0345169	.050541	0.68	0.495	-.0645418	.1335755
linveu	.0325443	.0169438	1.92	0.055	-.000665	.0657535
_cons	9.092187	3.370479	2.70	0.007	2.486171	15.6982
sigma_u	.52937068					
sigma_e	.29872086					
rho	.75847901	(fraction of variance due to u_i)				

Similarly to exports, the impact of outward FDI on imports, expressed in Table 3, depends on the partner country. Thus, we detect a significant complementarity effect for Angola (a 1% increase in Portuguese FDI implies a 0.1% growth of imports), but weaker than for exports, and also a positive correlation for European Union countries without Spain. In what refers to Brazil and Spain, the positive relationships observed are not statistically significant.

For the two models, the coefficients associated to GDP per capita, population and distance have the expected sign and are highly significant. So, both exports and imports are increasing in the partner country's population as well as its per capita income, and decreasing in distance between Portugal and the partner country.

5. Conclusions

The results we achieved on this paper confirm that the impact on home country's trade of the increased internationalisation of the Portuguese economy on the last decade,

transforming the country to a net exporter of capital, is not predicable with certainty and must rely on empirical evidence.

In this context, our main conclusion is that, contrarily to most of the previous empirical works, the Portuguese outward FDI is negatively related to exports suggesting a substitution effect, and thus a negative trade balance effect, for the majority of countries in our sample. The exceptions to this tendency were Angola and, in a lesser extension, Spain, for which the effect on exports outweighs that on imports, and consequently direct investments abroad have a positive contribution to the trade balance of Portugal with these countries. This finding is particularly relevant, and may act as a stimulus to a stronger Government support to outward FDI, taking in account that Spain is Portugal's top trading partner (with a share of about one third of the country's international trade) while Angola is a former colony which was in 2007 the sixth most important client of Portuguese products and a growing destination for Portuguese investment overseas.

The present study requires further analysis with more disaggregated data that would allow us to evaluate how outward FDI affected trade within the manufacturing sector, as well as to apply a more sophisticated model than the gravity model we used. Unfortunately those data are not available in Portugal, so that this constraint could be overcome by case studies on major outward firms.

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Appendix

Table 4: Summary statistics (by country)

```
. bysort country: summarize exp imp inv gdp pop dist
```

```
-> country = Angola
```

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	652941.8	415363.4	279042	1680390
imp	12	66189	99383.58	5896	361262
inv	12	141627.3	324354.1	3669	1151341
gdp	9	18694.53	12545.09	5782.511	39542.85
pop	12	1.47e+07	1453640	1.26e+07	1.70e+07
dist	12	5772.05	0	5772.05	5772.05

```
-> country = Austria
```

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	200047.5	27552.09	170991	241554
imp	12	292578.6	93374.53	170172	486346
inv	12	102119.7	115597	8547	336000
gdp	12	218519.1	28606.03	182634.4	270836.8
pop	12	8081130	121756.9	7953067	8298923
dist	12	2298.18	0	2298.18	2298.18

```
-> country = BelgLux
```

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	1184398	220062.4	791078	1606826
imp	12	1313470	238375.2	878874	1729119
inv	12	1262886	1316071	2274	3285637
gdp	12	129078.9	22677.04	92690.5	163082.9
pop	12	1.03e+07	201299.8	1.00e+07	1.06e+07
dist	12	1788.095	0	1788.095	1788.095

```
-> country = Brazil
```

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	192737.7	42004.18	130169	259381
imp	12	689537.4	328229.3	358774	1367059
inv	12	950527.1	1091710	26662	3813823
gdp	9	660757.9	160285.7	488316.8	958919.4
pop	12	1.78e+08	9112551	1.64e+08	1.92e+08
dist	12	7280.06	0	7280.06	7280.06

-> country = China

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	93998	68196.32	17796	213905
imp	12	420313.7	240171.7	174049	1012905
inv	12	1158.583	868.8497	176	2953
gdp	9	1653888	453643.6	1030993	2481103
pop	12	1.26e+09	3.30e+07	1.20e+09	1.31e+09
dist	12	9664.06	0	9664.06	9664.06

-> country = Denmark

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	298559.6	46739.68	239483	383200
imp	12	264835	48710.05	200246	355161
inv	12	344660.1	414789.2	12413	1485299
gdp	12	182727.9	26906.84	145323.9	227671.2
pop	12	5354106	62444.2	5251027	5447084
dist	12	2477.58	0	2477.58	2477.58

-> country = Finland

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	171808.3	49903.21	121705	265344
imp	12	230176.7	37042.68	143062	286259
inv	12	675982.3	678848.9	2782	1850395
gdp	12	138976.9	23720.59	101260.2	179734
pop	12	5191553	49570.47	5116826	5276955
dist	12	3360.36	0	3360.36	3360.36

-> country = France

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	3655074	600951.8	2750590	4756886
imp	12	4039118	505327.5	2949637	4747636
inv	12	2809740	1377712	641828	4509637
gdp	12	1529017	214902.2	1239836	1892244
pop	12	6.13e+07	1339687	5.95e+07	6.34e+07
dist	12	1452.94	0	1452.94	1452.94

-> country = Germany

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	4470739	436062.6	3768057	5181200
imp	12	6080791	958129	4313057	7532267
inv	12	3163857	2118395	339199	6012482
gdp	12	2122846	161233.3	1907246	2422900
pop	12	8.23e+07	239865.8	8.18e+07	8.25e+07
dist	12	2311.66	0	2311.66	2311.66

-> country = Greece

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	114346.3	20090.61	86769	148630
imp	12	72280.75	22030.37	35140	104176
inv	12	162878.8	271745.3	4	720501
gdp	12	160071.4	39013.16	109733.9	228180.3
pop	12	1.09e+07	153026.3	1.07e+07	1.12e+07
dist	12	2851.63	0	2851.63	2851.63

-> country = Ireland

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	143290.5	33554.26	90901	183891
imp	12	305542.7	104074.8	152792	464887
inv	12	570885.2	345669.9	73343	1183129
gdp	12	122466.3	42914.29	58278.3	190602.5
pop	12	3902970	225638.6	3620065	4314634
dist	12	1640.03	0	1640.03	1640.03

-> country = Italy

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	1161581	262679.4	713233	1563268
imp	12	2718197	240882.6	2223505	3030737
inv	12	317961.3	272780.1	62043	1064041
gdp	12	1263727	176813.4	992152.1	1535540
pop	12	5.75e+07	838781.1	5.68e+07	5.91e+07
dist	12	1841.48	0	1841.48	1841.48

-> country = Japan

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	124952.8	57256.55	86391	299106
imp	12	706744.7	182663.9	525359	1025677
inv	12	19294.33	10704.33	6126	41096
gdp	12	3879756	519867.1	3196746	5056700
pop	12	1.27e+08	742244.7	1.26e+08	1.28e+08
dist	12	11145.27	0	11145.27	11145.27

-> country = Netherlands

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	1122753	111509.4	937269	1298992
imp	12	1895637	375176	1177748	2576481
inv	12	4353214	2265287	306472	6314408
gdp	12	444661.8	78490.21	329315.5	567066
pop	12	1.60e+07	314215.9	1.55e+07	1.64e+07
dist	12	1863.73	0	1863.73	1863.73

-> country = Spain

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	6118136	2533454	2873480	1.07e+07
imp	12	1.15e+07	3331489	6077948	1.69e+07
inv	12	3705201	1997352	745018	5695363
gdp	12	726548.4	189106.1	490476.2	1050595
pop	12	4.13e+07	1767046	3.94e+07	4.45e+07
dist	12	516.05	0	516.05	516.05

-> country = Sweden

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	409850.5	35182.19	338499	459317
imp	12	479873.2	83966.43	306639	598134
inv	12	326007.6	164176.6	155760	635931
gdp	12	266032.8	36504.97	217516.4	331952.2
pop	12	8927179	91416.52	8837496	9113257
dist	12	2988.42	0	2988.42	2988.42

```
-----
-> country = United Kingdom
```

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	2654480	261854.8	2065605	2915284
imp	12	2162213	200374.3	1791204	2499549
inv	12	3478810	1396053	982684	5996181
gdp	12	1588248	317355.4	960590.2	2047289
pop	12	5.92e+07	883247.4	5.81e+07	6.09e+07
dist	12	1585.46	0	1585.46	1585.46

```
-----
-> country = U.S.A.
```

Variable	Obs	Mean	Std. Dev.	Min	Max
exp	12	1454886	365057.6	841446	2114312
imp	12	1046774	214070.6	828669	1618358
inv	12	730569.2	325150.6	250986	1236655
gdp	12	9385522	1592960	6156265	1.13e+07
pop	12	2.89e+08	1.07e+07	2.73e+08	3.06e+08
dist	12	5737.22	0	5737.22	5737.22