MASTER OF SCIENCE IN

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MASTERS FINAL WORK

DISSERTATION

TAX EFFECTS ON FDI IN PORTUGAL

By ANDRÉ FILIPE SIMÕES PEREIRA

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LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

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Abstract: The objective of this study is to understand and evaluate the extent to which taxes impact foreign direct investment (FDI) flows in Portugal, from 1996 to 2013. Other variables that previous literature considered important, were also tested for economic and legal effects. This work has a cross section data and a panel data, the first uses the total amounts of FDI flows, disregarding the country of origin. The second, contains data that discriminates those flows by country of origin. Two regressions were tested to both data sets, one testing for fiscal effects and other for economic and legal effects. The regression for fiscal effects, show that nominal tax rates and social security as a percentage of gross domestic product (GDP) are negatively correlated with FDI. The regression looking for economic and legal effects, shows that Public investment as a percentage of GDP has a positive correlation with FDI. The results hold for both data sets.

Supervisor:

JOAQUIM MIRANDA SARMENTO

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1. Introduction

This work aims to assess the importance of taxes in foreign direct investment in Portugal, from 1996 until 2013. Foreign direct investment is a particular type of investment, occurring when a company based in one country, the ”home country”, aims to establish a long lasting interest in another country, the “host country” (Galeza & Chan, 2015). This investment can be expressed through merging and acquisition (M&A) operations or either by engaging in a creation of a new facilities in the host country. Although the concept of long lasting interest may sound vague it is fundamental to differentiate between FDI and other types of investment, like portfolio direct investment. That is why international organizations such, OECD and IMF, clearly define that the concept of long lasting interest, corresponds to the acquisition of, at least, ten per cent of equity. It is proved that FDI contributes positively to economic development by promoting employment, productivity increase and know how transference.

The OECD in a report from April 2014, demonstrates that the FDI accumulated stock for 2013 in Portugal, accounts for 58.4% of the Portuguese gross domestic product (GDP). Although the value is preliminary, it clearly illustrates the relevance of FDI. The determinants of FDI are very broad, they vary according to the specifications of the studies, nevertheless, some determinants seem to be more relevant than others, as they are considered in the majority of studies about FDI flows and location. Determinants such as levels of taxation, GDP, levels of public investment, unemployment rate, corruption or other variables of institutional development, exchange rates and others. This work, will give particular emphasis on tax variables and their effect on FDI in

Portugal, without disregarding other variables that could give a more clear understanding about the economic and legal effects on FDI. Although the wide range of variables and methodologies that could be applied, previous literature is unanimous about the detrimental effect of taxes on FDI. The negative correlation between FDI and taxes, arises from the fact that taxes are costly and therefore have a detrimental effect on the rate of return.

Regarding methodology this study uses a cross-section data and a panel data, and two different OLS regressions. The cross section data, contains data about the total amount of FDI flows in Portugal, from 1996 to 2013. The panel data regards the same period of time, and the amount of FDI flows is now discriminated by country of origin. The first regression aims to capture the effect of fiscal variables, the second capture the effects of economic and legal variables. This work found that nominal tax rates and social security are negatively correlated with FDI flows, meaning that, when those variables increase the FDI tends to decrease. This is true to both data sets. When the economic legal variables are tested, this study finds that the unit labor costs, the unemployment rate, public investment and the cost of capital are positively correlated with FDI, meaning that when those variables increase positive impacts on FDI flows are expected. The results also show that exchange rates are negatively correlated with FDI. The results hold to both data sets.

In this introduction, the main objective was to give a clear summary of the following work. After, in chapter 2, the work proceeds with the literature review, where the concept of FDI, the most critical factors, the importance of taxation on FDI and what

previous literature has concluded, will be explained in a more thorough way. In chapter 3 and 4, I will explain the methodology and the data applied, and the main results, respectively. Finally, in chapter 5 I will present the main conclusions of this work.

2. Literature Review

2.1 *FDI: Concept and relevance*

Foreign direct investment, also known as by its acronym FDI, is a key component in global economic integration. Under an adequate policy framework, FDI could be an important factor of economic and technologic development, financial stability and promote the transfer of know-how between the recipient ("host") and the investing ("home") economy. FDI is a form of cross border investment with the objective of establish a lasting interest that a resident enterprise based in one country might have in an enterprise based in another country. Lasting interest implies a significant degree of influence on the management of a company. According to the Organization for Economic Cooperation and Development (OECD) and the International Monetary Fund (IMF) the ownership of at least 10 % of the voting power by the foreign investor is an evidence of such long lasting interest (Walker, 1983). The FDI equity ownership is in fact a critical determinant to distinguish FDI of other types of investment such as portfolio direct investment (PDI). Foreign portfolio investment (FPI) generally refers to investment in foreign securities, often channeled through financial intermediaries such as mutual funds or pension funds (De Mooij & Ederveen, 2003). This type of investment is mainly focused in the ownership and transaction of shares and other securities

without having control or any influence in the management of the underlying assets(Walker, 1983). FDI comprises different forms and capital flows. If a company establishes presence in a foreign market by means of constructing a new factory or facility, it's commonly referred as a greenfield direct investment. Instead, the company may engage in a direct investment by investing or taking over an existing local company, called brownfield direct investment (Galeza & Chan, 2015).

FDI flows are cross border transactions within a given period of time between companies that are in a direct investment relationship, and they could be either: (i) by direct transfers by the parent company, either in the form of equity or debt (ii) retained earnings by the affiliate. With respect to the types of capital, or strategies by which FDI could be materialized the most important are (i) real investment implants or equipment or (ii) trough merging or acquiring existing companies. The last one being the most significant, as it accounts for more 60 % of all the FDI in developing countries (De Mooij & Ederveen, 2003)(Kothe et al., 2014). The inward direct investment effects in economies are positive, being a mechanism of employment increase, productivity improvement, technology and knowledge transference and is also a promoter of economic competitiveness and more effective corporate governance (Murrel & Djankov, 2002), Some studies even suggest that company performance tends to be higher in foreign owned firms (Barrell & Pain, 1999). The 1990s were extremely significant in the growth and recognition of the benefits of FDI, growing strongly at rates above those of global economic growth or global trade (Carol S.Carson, 2003). Some events occurring during that particular time, namely, the increasing deregulation and widespread privatizations which lead to fewer trade barriers, set up the perfect ground

to foreign direct investment and exports to become considerably attractive. (Miyake & Sass, 2000) The relevance of this investment mechanism is undeniable, considering that the World Economic Forum refers that the world gross domestic product is 20% larger today than in 1990 because of world expansion of FDI (Forum, 2013). In fact, some studies refer that the preference of FDI relative to exports it's due to the absence of both, trade and transport costs (Billington, 1999). Being FDI one of the most predominant features of today's global economy, many countries regard it as an important factor for economic development, since it is usually linked to increasing capital, but also technology, marketing, and management development. (Cheng et al., 2000).

2.2 *FDI variables*

So FDI become a relevant field of study, especially in order to access what variables are important to investment. According to specifications of the model used, the depth of the study, nature of the business or the particularities of the countries, there's a wide range of variables that could be under analysis. Nevertheless, there are some variables that seem to appear in almost every study about what FDI location. Taxes are a very common variable across many studies on FDI location, and has stated by (Altshuler et al., 2000) multinationals' FDI has been an active area of research in international taxation and innumerous studies indicate that taxes apply a strong influence in FDI location decisions. It's common for a country to impose different taxes simultaneously, such as personal and corporate income taxes, sales taxes, value-added taxes, excise taxes and many others. Governments are typically influenced by their expectations of

the effects of taxation on investment and economic activity, in which FDI is included (Hines Jr & Desai, 2001). The GDP and respective rate of growth are commonly used as proxys to size and rate of growth of the market. Corruption and other specific country risks are, as suggested by (Henisz, 2000), important factors of institutional development and political risk. Exchange rates are considered an important factor shaping FDI decisions, as stated by (Xing & Wan, 2004), a devaluation of the host country currency against the home country currency could improve competitiveness and attractiveness of the home country and boost FDI inflows. Labor costs are usually negatively related to FDI, as higher costs are related with lower profitability. Still, companies try to minimize this factor and not compromising labor productivity (Bevan & Estrin, 2004). Public expenses in the host country as (Bénassy-Quéré et al., 2003) argue, aims to assess the size of the public sector. It is expected that higher amounts of public investment to be an attractive factor for FDI, as it is likely to be a proxy for the building of public goods/ infrastructures. R&D expenditures and the level of education are expected to reflect the level of general technological development of a certain economy. Both have an positive impact in FDI flows(Sun et al., 2002). Cost of capital in (Bevan & Estrin, 2004) indicates that relative high costs of capital seem to have no significant impact in FDI flows. One explanation suggested is the fact that companies could rely on their financial resources or in home financial markets.

2.3 *Importance of taxes in FDI*

Intuitively, it's commonly accepted the fact that higher levels of taxation could discourage investment, and legitimately so. In fact, one of the main goals of investment

is to have profit or maximize the rate of return. If taxes have a negative contribute to profits it is reasonable to think that companies address the impact of taxes carefully. This general idea is supported by innumerous studies and has been a subject of long discussion in investment location as (De Mooij & Ederveen, 2003) explain, the impact of taxes could be either by (i) the effect of taxes in the amount of dividends repatriated to parent companies (ii) differences in statutory tax rates may lead to profit shifting by debt contracts or manipulation of transfer prices (iii) the allocation of investment is strongly determined by taxes on the overall. In (Hines Jr & Desai, 2001), three ways in which higher taxes discourage FDI are presented, such as (i) higher tax rates tend to increase total costs (ii) profit taxes tend to encourage firms to substitute capital inputs to tax deductible inputs such as labor (iii) multinational firms also dispose of means to allocate taxable income to lower tax countries, so the attractiveness of a country with low levels of taxation could be justified just by the fact that reallocates taxable income from higher taxation countries. Adding to this, should be taken in to account the fact that FDI is an activity that may be subject to double taxation. A subsidiary is subjected to corporate tax in the destination country and the parent company may also be taxed in the home country. This problem may result in strong discouragement for companies to invest abroad, therefore is common to countries to have a system of tax credit or tax exemption. In the credit tax credit system, the taxes paid in the subsidiary country are subtracted to the taxable amount due in the parent country. In this case, the profits are taxed only when the profits are repatriated/received to the home county. In the exemption system, the income is only subjected to the foreign country corporate tax, being exempted in the home country.(De Mooij & Ederveen, 2003) The extent to which

the home tax system is an decisive factor in FDI is not clear, as (Hines, 1996) argues, investors from exemption countries seem to reduce their investment shares comparing to tax credit investors by 7-9%, for 1% variation in the tax rate, just as (Bénassy-Quéré et al., 2003) who finds that the impact of tax schemes on FDI flows are relevant. Others such as (Slemrod, 1990) finds no evidence that differences in tax schemes could influence FDI flows.

2.4 *Studies about taxation effects on FDI*

As mentioned previously, the studies about the impact of FDI are not homogeneous, in the way that are numerous models and wide range of variables that can be used in order to assess the most important variables in investment location decisions. Even though, when the tax variable is tested it is almost always negatively correlated with FDI, regardless of what tax rate used in the model. For instance, in (Bénassy-Quéré et al., 2003) the measure for tax variable is computed as the difference between corporate tax rates in the host country and in the investing country, and four tax variables are used, namely, statutory tax rates, average effective tax rates, marginal tax rates and apparent effective tax rates. The reason behind is that average and statutory rates are relevant for discrete location decisions and the marginal effective rates influences the decision of increasing existing capital. The main conclusions of their study is that small large tax differentials tends to promote important FDI outflows, and that the impact of positive tax differentials is depend of the tax scheme undergoing in the home country. (Billington, 1999) uses the statutory tax rate concludes that it has a negative effect in FDI, in contrast to GDP, growth, unemployment rate and interest rates. A significant

negative impact of the corporate tax rate on FDI inflows is also founded by (Cassou, 1997) (Altshuler et al., 2000), and (Boskin & Gale, 1987). Studies about the impact of corporate income and indirect taxes, such as (Hines Jr & Desai, 2001) , refers that both taxes imply costs and are associated with low levels of FDI and output of American firms. The findings by (Slemrod, 1990), support the negative effect of effective tax rates on FDI by transfer of new funds, but not in retained earnings.

3. *Methodology and Data*

This study aims to access the impact of taxes on FDI in Portugal, and the relative importance of taxes when compared with other variables. In the model used, the inputs are a set of variables considered important and in line with previous studies on FDI. The period of time under analysis comprises the years from 1996 until 2013. Two types of regressions were done, for two different databases. The first regression tests for the tax effects and the second tests for political institutional effects.

The first data set accounts for the total amount of FDI in Portugal regardless of its origin from 1996 to 2013, and the second discriminates the amounts of FDI flows according to country of origin, also from 1996 to 2013. For this second data set, the values of FDI are discriminated by country of origin, for that same time period. The depend variable for the first data set is the annual amount, in millions of euros, of foreign direct investment in Portugal, between 1996 and 2013. For the second database the dependent variable

is the annual amount of foreign direct investment flows in Portugal between 1996 and 2013, but discriminated by country of origin. The data was obtained from the AICEP[1].

The independent variables were divided in two categories: tax effect variables and economic/legal effect variables.

With respect to the tax effect variables, the decision was to incorporate nominal corporate tax rate (*ctax nominal*) and the effective corporate tax rate (*ctax efective*, social security as a percentage of GDP (*ssecurity perc GDP*).

The *ctax nominal* stands for the nominal corporate tax rate, it is extracted from the Taxation Trends report from The European Commission. Most of data is extracted from the 2013 Taxation Trends report, except for the years of 1996 and 1997, which are from the 1997 report. This nominal tax rate is the sum of the general tax rate plus excise taxes, applied to the income received by companies in Portugal. The sign is expected to be negative.

The *ctax effective* stands for the effective corporate tax rate, it is also obtained from the Taxations Trends report of the European Commission. The sign is expected to be negative.

The *ssecurity perc GDP* assesses the burden that companies working in Portugal, engage with the Social Security expenses. The data concerning this variable, also was extracted

[1] Aicep Portugal Global – Trade and Investment Agency is a government business entity, created in 2007, focused in encouraging the best foreign companies to invest in Portugal and contribute to success of Portuguese companies abroad in their internationalization processes or export activities.

of the Taxation Trends reports from the European Commission. The signal is expected to be negative.

The *unemployment rate* data is obtained from the INE database. The literature is not unanimous about the sign and interpretation of this variable. As some, such as (Cassou, 1997), argue that a negative signal is expected, because countries with high unemployment rates tend to have structural problems in their economies, and generally this countries are less attractive to foreign investors. Others such as (Billington, 1999) and (Devereux & Freeman, 1995) state that the unemployment rate could work as proxy for labor availability, therefore, a positive sign could be expected and, consequently, unemployment rates and FDI flows could be positively correlated.

The *CTU* stands for the unitary labor costs. It measures the average cost of labor per unit of output and are calculated as the ratio of total labor costs to real output. The data used is from the Banco de Portugal database. The unit of measure is a rate of change. Labor costs are usually negatively correlated with FDI, but higher labor cost may be offset by higher productivity. In order to avoid this problem, the unitary labor costs are assumed to me a more appropriate measure because it already incorporates productivity (Billington 1999). The sign is expected to be negative.

The values for the annual *exchange rate for EUR/USD* was obtained from the time series of the Bank of England Official Statistics, with daily frequency, and then an annual average was computed. The data is presented in euros. According to the literature exchange rates do exert strong influence in the allocation of FDI (Froot & Stein, 1991; Xing & Wan, 2004; Blonigen, 2005). This variable is expected to be negative.

The variable *SPREAD German bunds 10y* aims to access the cost of capital. It is the result of the German bund yield minus the Portuguese OT'S yield. The data from 1999 to 2013 is obtained from the Bloomberg databases. For the years 1998 and 1999 the procedure was the following: the spread was calculated on a daily basis and then was computed the average for the year. Regarding the years of 1996 and 1997, the data from the Portuguese OT'S was available on a daily frequency, but for the German bunds the data available was only available in monthly frequency, so I decided to compute the monthly averages for the Portuguese OT's then calculate the monthly spread, then average that to obtain the yearly spread. The data from the years 1996, 1998, 1997, 1999 the data on the Portuguese OT's is from the Banco de Portugal database and for the German bunds was taken from Eurostat and from the Global Yields database. Although (Bevan & Estrin, 2004) considers that this variable does not affect FDI, this study will test it. A negative signal is expected for this variable.

Corruption when trying to capture the effects of corruption the data on that variable was extracted from the World Bank database. In order to capture important factors of institutional development and political risk, corruption or other specific country risk measure, is commonly used (Henisz, 2000). The unit value is in percentiles and this variable is expected to have negative signal.

The *public investment perc GDP* variable was assumed to be the gross capital formation obtained from the United Nations Financial Statistics. The public expenses in the host country as (Bénassy-Quéré et al., 2003) argue, aims to assess the size of the public sector. It is expected that higher amount of public investment to be an attractive factor

to FDI, as it is likely to be a proxy for public goods/infrastructures. It is expected to have positive signal.

Regarding the methodology, and in accordance to the literature an OLS model was used. It was also tested a GLM model and a Tobin model, both of them without relevant results. Two different regressions were applied to the two data sets, the first tries to capture the fiscal effect (1), and the second the economic/legal effect (2).

(1)

$$y_t = \beta_0 + \beta_1\, ctax\ nominal + \beta_2\, ctax\ effective + \beta_3\, ssecurity\ perc\ GDP + \mu_i$$

In this regression (1), we account for the fiscal effects. Being *ctax nominal* the nominal corporate tax rate, *ctax effective* the effective corporate tax rate, *ssecurity perc GDP* the social security as a percentage of GDP.

(2)

$$\begin{aligned} y_t = \beta_0 + \beta_1\, CTU + \beta_2 exchange\ rate\ EUR|USD + \beta_3\, Unemployment\ rate \\ + \beta_4\, Public\ inv\ \%\ GDP + \beta_5\, Corruption \\ + \beta_6\, SPREAD\ German\ Bunds\ 10y + \beta_7 \end{aligned}$$

In this regression (2), the objective is to capture the economic/legal effects. Being *CTU* the unit labor costs, *exchange rate EUR/USD* the exchange rate between Euro and US dollar, *unemployment rate*, *public inv % GDP* the public investment as a percentage of GDP, *Corruption* being the variable that captures country legal institutional specific risks, and the *spread German Bunds 10y* which is the difference between the German bunds and the Portuguese OT'S, both with ten years maturity.

First, the regressions were applied to the first data, the one that accounts for the total annual amount of foreign direct investment. For the fiscal effects regression the descriptive statistics results were the following:

TABLE I - Table of descriptive statistics on dataset 1.

Variable	Obs	Mean	Std. Dev.	Min	Max
FDI	18	27427,66	11789,76	4629,529	47655,79
ctaxnominal	18	31,85556	4,639628	26,5	39,6
ctaxefective	18	26,26611	4,589524	17,1	33,4
ssecurity perc GDP	18	8,597962	1,553216	2,963313	10,1
Unemployment rate	18	8,022222	3,657475	3,9	16,2
CTU	18	1,927778	2,284682	-3,2	4,3
exchange rate EUR/USD	18	1,213275	0,170214	0,8960736	1,471182
SPREAD german bunds 10y	18	166,4799	270,5923	-4,308077	903,3621
Corruption	18	83,75556	3,73209	78,5	91,2
Public investment perc GDP	18	4,189992	0,9511732	2,152964	5,568281

The procedure was replicated to the second set of data, testing with year and country effects.

TABLE II - Table of descriptive statistics on the dataset 2.

Variable	Obs	Mean	Std. Dev.	Min	Max
N	432	216,5	124,8519	1	432
FDI	432	27427,66	11470,87	4629,529	47655,79
Country	432	12,49769	6,929207	1	24
Year	432	2004,5	5,194143	1996	2013
ctaxnominal	432	31,85556	4,514135	26,5	39,6
ctaxefective	432	26,26611	4,465387	17,1	33,4
ssecurity perc GDP	432	8,597962	1,511205	2,963313	10,1
Unemployment rate	432	8,022222	3,558548	3,9	16,2
CTU	432	1,927778	2,222886	-3,2	4,3
exchange rate perc GDP	432	1,213275	0,16561	0,8960736	1,471182
SPREAD German bunds 10y	432	166,4799	263,2733	-4,308077	903,3621
Corruption	432	83,75556	3,631145	78,5	91,2
public investment perc GDP	432	4,189992	0,9254459	2,152964	5,568281

The potential problems that could arise, could be due to the specificity of the data itself. The first data, the total annual amount of FDI in Portugal is a cross section data, on the contrary the second data is an example of panel data. The problem that could arise with this first type of data is multicollinearity.

TABLE III - Correlation matrix for the tax effect variables on dataset 1.

	ctaxno~l	*ctaxef~e*	*corpta~P*	*ssecur~P*
ctaxnominal	1			
ctaxefective	0,1644	1		
corptax perc GDP	0,1363	0,3161	1	
ssecurity perc GDP	0,2423	-0,1132	0,2865	1

TABLE IV - Correlation matrix on the economic/legal effect variables on dataset 1.

	Corrup~n	GDPgro~h	Unempl~e	CTU	exchan~D	SPRE~10y	Public~P	RDExpe~s	oilpri~s
Corruption	1								
GDPgrowth	0,1211	1							
Unemployment rate	-0,3509	-0,6563	1						
CTU	0,0427	-0,7476	0,2801	1					
exchange rate EUR/USD	0,3803	-0,0151	-0,3309	0,5161	1				
SPREAD German bunds 10y	-0,1342	-0,6941	0,8636	0,2465	-0,2318	1			
Public inv perc GDP	-0,2132	-0,5836	0,6525	0,3455	0,0662	0,8322	1		
RD expenditures	0,3785	-0,4024	0,2805	0,5224	0,6025	0,2882	0,4877	1	
oilprices	-0,2427	-0,4997	0,758	0,3909	0,0929	0,826	0,8249	0,3065	1

In the second set of data, when looking for heteroscedasticity using the Breusch-Pagan and the Wald test, no evidence of heteroscedasticity was found. It is important to notice that, some variables were presenting multicollinearity problems. To address that problem, they were used in different tests. A Ramsey regression equation specification error test was applied, no evidence of omitted variables was found.

Bellow in Figure I, we can see that the probability density of the random variables in data set 1. The line of the Kernel density estimate is not far from a normal density distribution.

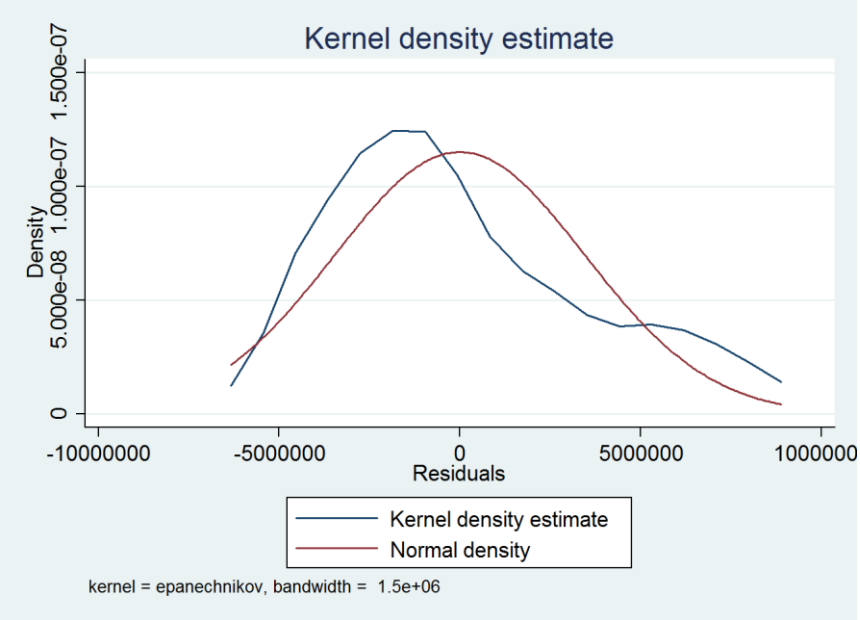

FIGURE I - Kernel density graphic for the data set 1.

In Figure II, we present the Kernel density estimate for the data set 2. Although, the Kernel density estimate line is far from the Normal density line in the left portion of the graphic, after it almost mimics the overall tendency of the Normal density.

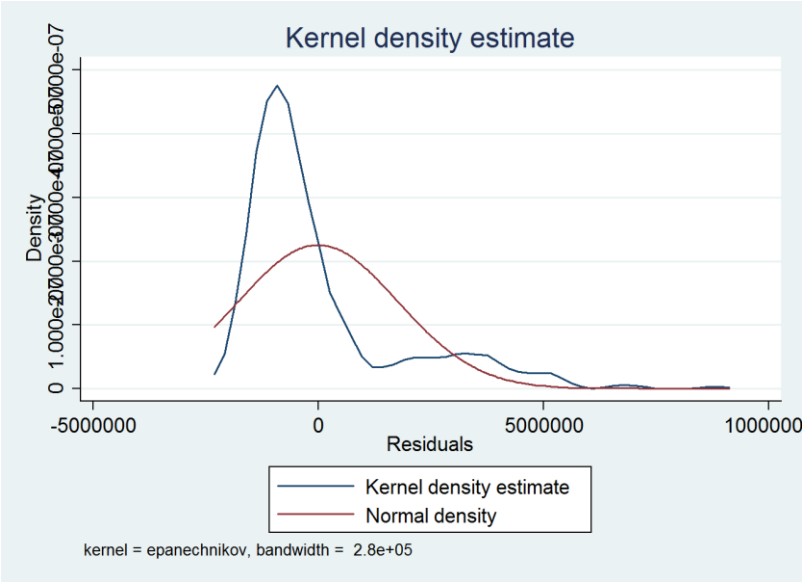

FIGURE II - Kernel density graphic for the data set 2.

4. Results

4.1 *Data 1*

For the data set 1, the histogram presents a relatively bell shaped format, indicating the FDI follows a normal distribution. Still, the Kernel estimation is more accurate to reflect the distribution of the underlying variable, yielding a smoother density function. The histogram is presented below, on Figure III.

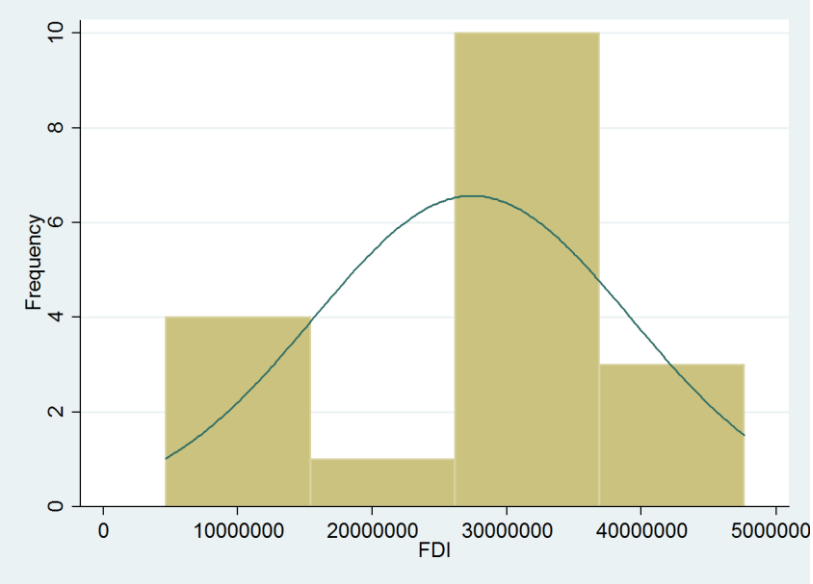

FIGURE III - Histogram on data 1.

In Figure IV, a scatter plot relating FDI and the public investment variable is presented. The pattern of dots from lower left side to upper right side, it's an indicator of a positive correlation between the two variables.

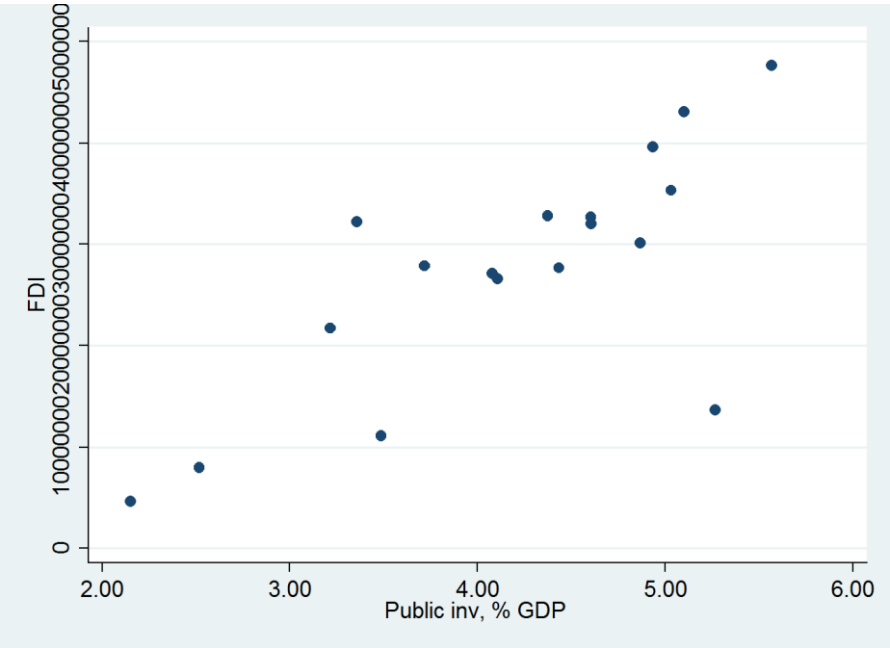

FIGURE IV - Scatter plot of the Public Investment and FDI for data set 1.

The results on the regression for the fiscal effects on the first dataset are the ones below, on Table V.

TABLE V - Results on the fiscal effects regression on the dataset 1.

VARIABLES	(1) FDI
ctax nominal	-1.9800e+06***
	(280,257.8993)
ctax efective	507,342.1454*
	(285,894.5360)
ssecurity perc GDP	-269488.8996
	(647,662.8352)
Constant	7.9492e+07***
	(1.5159e+07)
Observations	18
R-squared	0.6118

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results on this regression show that the variable *ctax nominal and ssecurity perc GDP* have a negative signal, showing that they are negatively correlated with the FDI.

These results are in accordance with the previous literature. Unexpectedly, the variable *ctax effective* was expected to also have a negative signal, which is not the case.

TABLE VI - Results on the economic/legal effects on the regression on the dataset 1.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	FDI	FDI	FDI	FDI	FDI	FDI
CTU	2154548.5967**	1369774.5778*	2884330.4231***	1010982.5155	2356424.5677**	1420395.0805*
	(888,850.1729)	(678,148.1922)	(537,145.9458)	(626,993.3517)	(1073678.7837)	(703,102.0661)
exchange rate EUR/USD	-1.0114e+07	-9.8884e+06	3810567.6609	-8.3778e+06	-3.1387e+06	-6.1292e+06
	(9085630.8952)	(8155162.4181)	(6545289.2942)	(5743645.8767)	(8253926.6204)	(6231395.4127)
Unemployment rate	701,147.2302	398,466.2170				
	(774,256.8041)	(835,993.7651)				
Public inv, % GDP	6168766.3759	2428418.4167			6789076.7515*	2486252.5189
	(3663326.5051)	(3438521.9293)			(3607821.0657)	(3480682.4896)
Corruption		-1.6764e+06		-2.2584e+06***		-1.7996e+06*
		(940,646.8371)		(619,723.8101)		(949,934.1256)
SPREAD german buns 10y			11,558.5374*	10,069.0127*		
			(5,460.2461)	(5,138.2632)		
Constant	4073323.8433	1.6382e+08	1.5320e+07**	2.2312e+08***	-1.7530e+06	1.7244e+08*
	(9930092.6146)	(9.4986e+07)	(6103089.9774)	(5.8120e+07)	(8457040.7215)	(9.5471e+07)
Observations	18	18	18	18	18	18
R-squared	0.7293	0.8016	0.5501	0.8218	0.7064	0.7946

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

On the second regression, where the economic/legal effects are accounted for, the variables *CTU*, *unemployment rate*, *public investment % GDP* and *SPREAD german bunds 10y* have a positive signal. Regarding *CTU*, the positive signal goes against what was anticipated. The *SPREAD german bunds 10y* is another variable that shows a sign that was not expected. Indeed, a higher spread may imply may imply a higher cost of capital in the "host country". The other variables positively correlated with *FDI* are in accordance with the literature. The variables with negative signal, *Exchange rate EUR/USD* and *Corruption,* were expected to have that negative correlation with *FDI.*

4.2 *Data 2*

The following histogram, represented on Figure V, is skewed right indicating that the probability density function does not follow a normal distribution.

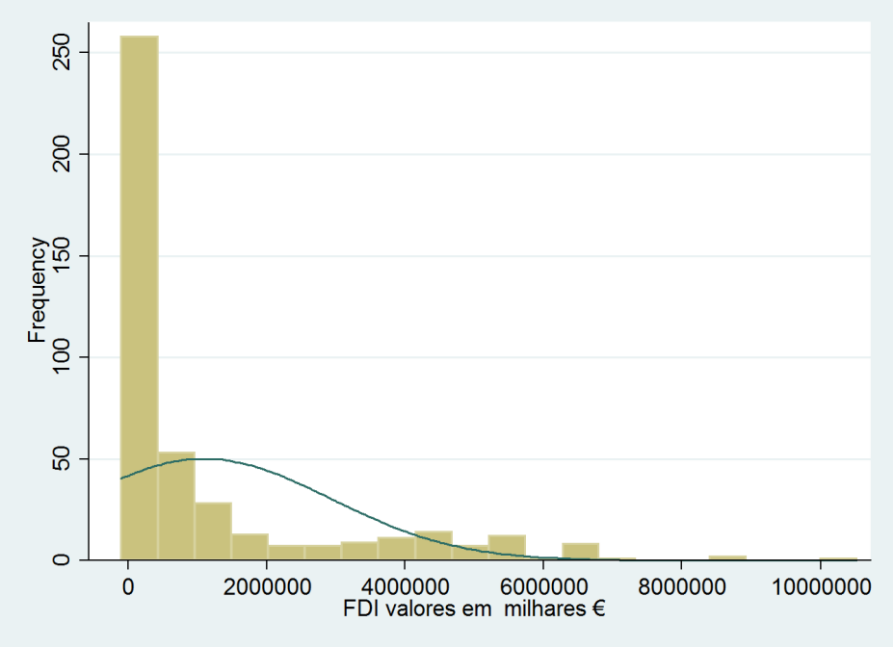

FIGURE V - Histogram for FDI on data set 2.

The scatter plot below, shows the correlation between the public investment variable and FDI. As in the Figure IV, the same positive correlation is found, as the pattern of the dots moves from the lower left to the upper right.

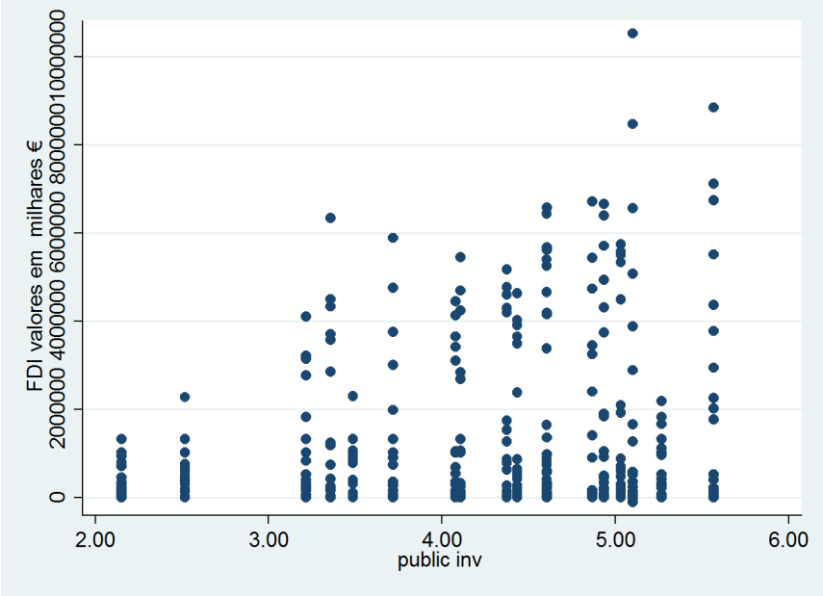

FIGURE VI - Graphic of the scatter plot of the Public investment and FDI for data set 2.

The Table VII shows the regression for the fiscal effects for the second dataset.

Table VII - Results of the regression of the fiscal effects on dataset 2.

VARIABLES	(1) FDIvaloresemmilhares	(2) FDIvaloresemmilhares	(3) FDIvaloresemmilhares
ctax nominal	-77,237.5509***	-77,226.3793***	-38,375.8457
	(16,580.9479)	(11,601.9717)	(60,848.7859)
ctax efective	12,448.8662	12,466.9447	145,404.9160**
	(10,092.6494)	(11,453.6596)	(66,001.7415)
ssecurity perc GDP	-10,465.3240	-10,480.9973	119,807.4471**
	(64,248.9170)	(34,404.6292)	(47,031.2290)
Constant	3323949.9858***	6269687.4414***	1092522.1540
	(731,175.2027)	(547,715.5974)	(3712683.8191)
Observations	432	432	432
R-squared	0.0364	0.6987	0.7272

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As in the first regression for the dataset 1, the variables *ctax nominal* e *ssecurity perc GDP* shown a negative sign, as expected. The *ctax effective,* as in the first regression, shows an unexpected signal.

Table VIII - results of the regression of the economic/legal effects on the dataset 2.

VARIABLES	(1) FDIvaloresemmilhares	(2) FDIvaloresemmilhares	(3) FDIvaloresemmilhares	(4) FDIvaloresemmilhares	(5) FDIvaloresemmilhares
CTU	82,049.3182**	82,130.3436***	108,261.1918***	108,343.9845***	92,373.3557***
	(32,516.2080)	(27,066.9163)	(32,078.4289)	(26,486.3097)	(31,406.3983)
exchange rate EUR/USD	-244773.2641	-246294.1019	332,127.7293	330,427.4068	111,941.9935
	(726,779.7956)	(402,353.2312)	(584,149.3302)	(349,627.9930)	(553,835.7797)
Unemployment rate	35,857.0180	35,845.4841*			
	(40,576.0142)	(19,724.1459)			
public inv	224,565.5456***	224,564.8812***			256,288.5267***
	(64,455.5971)	(65,292.0293)			(74,462.3329)
SPREAD german buns 10y			547.9958	547.9126**	
			(512.0005)	(213.0880)	
Constant	10,731.2593	2958948.9968***	397,611.7210	3345962.3446***	-287230.8892
	(739,972.9285)	(497,557.5688)	(665,144.2866)	(467,452.9373)	(684,012.5935)
Observations	432	432	432	432	432
R-squared	0.0482	0.7105	0.0388	0.7011	0.0458

The regression accounting for the economic/legal effects the second dataset, exhibit the same result like when this effects were tested for the first dataset.

In addition, for the second set of data, it was applied a Hausman test. For a panel data, this test can be used to differentiate fixed effects model and random effects model in panel data. In this case the, the Hausman test suggested that the random effects model was preferred. In this test, usually the value of 0,1 is used has the frontier between fixed effects and random effects.

Table IX - Hausman test.

VARIABLES	(1) ctaxefective	(2) ctaxefective	(3) ctaxefective	(4) ctaxefective
ssecurity perc GDP	-0.6110***	0.3520***	0.3513***	-0.1952**
	(0.1507)	(0.1050)	(0.1050)	(0.0798)
CTU	-0.3130**	-0.3167***	-0.3357***	-0.2137***
	(0.1378)	(0.0813)	(0.0833)	(0.0639)
R&D Expenditures	-0.0000			
	(0.0000)			
SPREAD german buns 10y	-0.0010		0.0006	
	(0.0009)		(0.0006)	
exchange rate EUR/USD		-23.7964***	-24.0016***	-23.6856***
		(0.9869)	(1.0062)	(0.7928)
Corruption		-0.8924***	-0.8892***	
		(0.0541)	(0.0542)	
public inv				3.4451***
				(0.1403)
Constant	32.9887***	127.4643***	127.3932***	42.6590***
	(1.4405)	(4.8554)	(4.8554)	(1.0923)
Observations	432	432	432	432
Number of Country	24	24	24	24

5. Conclusions

The objective of this work was to understand the extent to which taxes and other variables have influenced FDI in Portugal from 1996 to 2013. The previous literature, has unanimously consider that taxes do exert a negative impact on FDI. Furthermore, this work also tries to capture the effects of economic legal variables. For two data sets, I have applied two different OLS regressions, one accounting for fiscal effects, and other, for both economic and legal effects. The results of the two regressions were similar for the two data sets. For fiscal effects, I have found that effective tax rate are positively correlated with FDI and nominal tax rates and social security as a percentage of GDP have a negative impact in FDI. When testing for the economic/legal effects, the exchange rate and corruption are negatively correlated with FDI. The unit labor costs,

public investment, the spread and unemployment rate have been found to be positively correlated with FDI. Nevertheless, except for unemployment rate and public investment, the signal of this variables was unexpected and against some of the previous literature. As mentioned before, the studies about FDI are flexible regarding the variables tested, the objectives of the studies and economic sectors under analysis so, my study, as others on this subject presents some limitations. The most noticeable could be, the small time frame of this study, the non-differentiation of FDI flows by different industry groups, because some industries might be more sensible to some variables considered on this study than others, and the fact that this study concerns only one county, Portugal. These limitations might be worth to explore in further studies.

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