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DISSERTATION

TAX POLICY AND ENTREPRENEURIAL ACTIVITY

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GUIDANCE:

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Abstract

This study analyzes the impact of the tax benefits for inland regions in Portugal. More specifically, we evaluate the effect of this policy change on firm entry and on two regional socio-demographic characteristics: child birth and divorce rate.

Previous studies suggest that reducing taxes increases the level of profit opportunities and, thus, the entry of new firms. They also find that in periods of economic prosperity, life conditions improve and the divorce rate increases, while there is no conclusive evidence about the exact relationship between income and child birth.

To test these predictions, we use a matched employer-employee dataset (QP – "Quadros de Pessoal") to estimate firms entry between the period 1997 and 2007. Regional socio-demographic data come from Statistics Portugal (INE – "Instituto Nacional de Estatística").

Contrary to our expectations, we find that the introduction of the policy reduce firm entry, as well as the child birth and divorce rate. We obtain similar results using an instrumental variable. The negative effect on firm entry persists even when we divide our sample into the different stages of the policy introduction. These results are not consistent in restricted samples (nearby counties).

*JEL Classification***:** H25, H32, L26, M13, R11, R58

Keywords: Firm Entry, Tax Benefits, Entrepreneurial Activity, Corporate Tax Rate, Regional Economics

Resumo

Esta dissertação analisa o impacto da política dos benefícios fiscais para as regiões do interior em Portugal. Mais especificamente, avaliamos o efeito desta mudança de política na entrada de novas empresas e em duas características regionais sócio-demográficas: taxa de natalidade e taxa de divórcio.

Estudos anteriores sugerem que a redução de impostos aumenta a rendibilidade das empresas e, portanto, a entrada de novas empresas. Também sugerem que em períodos de prosperidade económica, as condições de vida melhoram e a taxa de divórcio aumenta, enquanto que não há evidências conclusivas sobre a relação exata entre o rendimento e a natalidade.

Para testar estas hipóteses, usámos uma base de dados empregador-empregado (QP – "Quadros de Pessoal") para avaliar as empresas estabelecidas entre o período de 1997 e 2007. Os dados regionais sócio-demográficos foram recolhidos do INE ("Instituto Nacional de Estatística").

Contrariamente ao esperado, a introdução da política reduz a entrada de novas empresas, assim como a taxa de natalidade e de divórcio. Obtemos resultados semelhantes usando uma variável instrumental. O efeito negativo na entrada de empresas persiste mesmo quando dividimos a nossa amostra nas diferentes fases da introdução da política. Estes resultados não são consistentes nas amostras restritas (concelhos vizinhos).

*Classificação JEL***:** H25, H32, L26, M13, R11, R58

Palavras-chave: Entrada de Empresas, Benefícios Fiscais, Actividade Empresarial, Taxa de IRC, Economia Regional

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List of Abbreviations

QP – Quadros de Pessoal

MESS – Ministry of Employment and Social Security

INE – Instituto Nacional de Estatística

PS – Partido Socialista

PSD – Partido Social Democrata

1. Introduction

Entrepreneurship plays an important role in the economy. It stimulates competition and economic growth by fostering innovation, productivity, and job creation (Ardagna and Lusardi, 2008; Carree and Thurik, 2010; Fernandes, et al., 2011; Hansson, 2012; Parker, 2009). To encourage entrepreneurial activity and correct market failures, governments around the world have implemented several policies (Parker, 2009), such as subsidies and grants to specific start-ups, entry deregulation reforms, and tax cuts. Among those, the most common policy used by the governments to promote firm entry is taxation (Da Rin, et al., 2011).

Despite creating complexity in the tax system and rising compliance and administrative costs for both tax payers and governments, tax incentives encourage new firms to start their activities (Mintz and Andersen, 1992). Governments usually use tax incentives instead of expenditure policies. First, because it is politically more appealing for the government to provide a reduction in taxes rather than give a subsidy to a firm, and then because the administrative burden of determining which firm should benefit from the policy decreases for tax incentives (Mintz and Andersen, 1992).

Tax policy can affect entrepreneurial activity in several ways. It influences not only the decision to establish a new business, but also the firm organizational structure and profitability (Bruce and Mohsin, 2006). Taxes have a strong impact on the organizational form of firms. In fact, the choice of the organizational form is frequently made to reach tax advantages or to decrease their taxable base (Luna and Murray, 2010). Besides, tax policy also influences the cost of capital, which affects in the end the hiring and investment decisions of the firm (Bruce and Mohsin, 2006).

Previous studies found that tax policy has an ambiguous effect on entrepreneurial activity. A higher tax rate can reduce firm entry by lowering the entrepreneurial returns,

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but it can also increase firm entry due to the rewards from tax avoidance or evasion (Bruce and Mohsin, 2006; Bruce and Deskins, 2012). On the other hand, tax rate reductions provide a monetary benefit that might increase or decrease entrepreneurial activity (Fossen and Steiner, 2009; Da Rin, et al., 2011; Bacher and Brülhart, 2013).

Also, tax benefits can be used as an instrument to promote regional growth by attracting investment and creating jobs, especially in economically less developed regions (Fernandes, et al., 2011). The reduction of local taxes can contribute to attract more entrepreneurs and develop those regions (Rathelot and Sillard, 2008).

In this study, we evaluate the effect of reducing corporate taxes on firm entry in the less favored regions by taking into account a Portuguese tax reform. This reform was introduced in 1999 by the government, who created tax benefits for the inland region. Their main goal was to fight human desertification and promote economic recover. Our research questions are: Does reducing corporate taxes affect entrepreneurial activity? How does it affect the regional socio-demographic characteristics?

To answer our research question, we use a matched employer-employee dataset (QP – "Quadros de Pessoal"), which includes detailed information about the founders and their firms between 1997 and 2007. In addition we collect data from the Statistics Portugal (INE – "Instituto Nacional de Estatística") on child birth rate and divorce rate.

Our results suggest a negative effect between the policy of tax benefits and firm entry, as well as the child birth and divorce rate. We found that the introduction of the policy reduced the entry of new firms, the child birth rate and the divorce rate. These results are not consistent in restricted samples (nearby counties). When we divide our sample into the three stages of the policy introduction, we found that the policy continues to reduce the entry of new firms. In the second stage, we found that both child birth rate and the divorce rate increased.

This study has several policy implications. Previous studies suggest that reducing corporate tax increases investment, creates new jobs and contributes to the economic growth, especially in less developed regions. In our study, we find a negative effect which suggest that reducing taxation is not enough to promote entrepreneurial activity in less developed regions.

The remaining sections of this study are structured as follows. The next section provides an overview of the main literature regarding the impact of the corporate taxation on entrepreneurial activity and presents the main hypotheses. Section 3 describes the policy of tax benefits for inland in Portugal . Section 4 describes our data and presents the descriptive statistics. Section 5 presents the empirical methodology and the results of this study. Finally, section 6 concludes.

2. Literature Review and Hypothesis

Tax policy is a very common instrument used by governments to promote economic activity. Their main goal is to encourage the creation of new firms in order to stimulate innovation, competition, employment and economic growth (Da Rin et al., 2010). For a region, stimulating new firms is a way to promote economic growth (Parker, 2005; Fritsch, 2008). Taxes allow the government to redistribute income from wealthy to poor citizens. Also, taxes can have strong effects on entrepreneurship, since it is a very important driver for innovation and economic development (Block, 2016). New firms bring new capacities into the market and are, for that reason, an important element of the market process (Fritsch, 2008).

The rate at which new enterprises enter an industry has led to increasing pressure on policy makers to improve the conditions for entrepreneurial activity (Kneller and McGowan, 2012). Governments usually make use of tax policy instead of structural reforms, since it is easier to change tax rates in the budget law (Da Rin et al., 2011). Different kind of taxes (personal income and corporate taxes) affect firm entry decisions.

In this section, we will start by evaluating the impact of personal income taxes and then, the impact of corporate income taxes on entrepreneurship. Then, we evaluate several characteristics of taxes and we conclude this section by analyzing the impact of tax policies on regional demographic characteristics.

2.1. Personal Income Taxes

Personal income taxes apply to the personal income of an individual. Several studies have analyzed the effects of taxes on self-employment and suggested that tax policy has an ambiguous effect on entrepreneurial activity (Bruce and Mohsin, 2006). On one

hand, the literature shows a negative link between tax rates and self-employment (Fölster, 2002; Bruce and Mohsin, 2006; Baliamoune-Lutz and Garello, 2013). In fact, high tax rates leads to lower levels of self-employment, as taxes reduce the expected return that an individual receives by undertaking a risky business and an additional effort associated with being self-employed (De Mooij and Nicodeme, 2010; Hansson, 2012). On the other hand, high taxes might drive individuals into self-employment because it provides tax-sheltering opportunities, which include both avoiding and evading taxation. For example, the main reason for the increase of self-employed individuals is due to the ease of underreporting taxable income, which allows, in an illegally way, to pay less taxes (Schuetze and Bruce, 2004; Gentry and Hubbard, 2005). Also, income taxes might encourage entrepreneurial activity as self-employed individuals earn substantial personal non-pecuniary returns which are untaxed (Hall and Sobel, 2006). Furthermore, higher after-tax earnings appeal individuals to become self-employed (Fossen, 2008). To sum up, the effect of personal income taxes on self-employed individuals is ambiguous.

2.2. Corporate Taxes

Corporate income taxes are the taxes paid by firms on their taxable income. Most studies found that lower taxation increases the level of profit opportunities, so it is expected to increase the entry of new firms (Djankov et al., 2010; Da Rin et al., 2011; Barros, 2016). Using data on firm entry in 17 European countries during the period between 1997 and 2004, Da Rin et al. (2011) found evidence of a significant negative effect of corporate income taxation on entry rates. This effect is concave, suggesting that tax reductions affect entry rates only check below a certain threshold tax level.

Similarly, Djankov et al. (2010) found that a higher corporate tax burden significantly decreases the gains from entrepreneurship and hence, the rate of firm entry.

Another fact that leads to the entry of new firms is incorporation. This is a legal way of creating a corporate entity. In this way, entrepreneurs pay corporate tax on their business profits and are able to choose if they pay themselves a salary as a director of their firm or dividends to avoid payroll taxes (Parker, 2009). If corporate income tax rates increase, the profits decrease for incorporated firms and hence, reducing incentives for individuals to become entrepreneurs (Block, 2016). Thus, the level of tax rates influences the decision of incorporate or not. Egger et al.'s (2008) model examines the decision to incorporate considering the level of tax rates. Higher effective corporate tax rate decreases a firm's probability of incorporating. Also, existing entrepreneurs seem to be much less receptive to tax policy changes than those that are initiating a new business (Kneller and McGowan, 2012).

Therefore, we expect to find a negative correlation between corporate income tax rates and entrepreneurial activity.

Hypothesis 1: A reduction on corporate taxes increases firm entry.

2.3. Tax Structure

Some studies have analyzed how the tax structure affects entrepreneurial activity. Not only the tax rate influences the probability of an individual moving to entrepreneurship, but also its progressivity/structure and the relation between different taxes: personal versus corporate income taxes (Hansson, 2012). Usually, corporate taxes are flat, unlike the personal income tax which is likely to be progressive with marginal tax rates that increase with income (Parker, 2009).

The literature presents ambiguous results for the effect of tax progressivity on entrepreneurial activity. Tax progressivity can lower entrepreneurship by reducing the size of profit opportunity, but it can also lead to an increase for individuals who can take advantage of tax evasion (Gentry and Hubbard, 2000). Later on, Gentry and Hubbard (2005) conclude that both the level of the marginal tax rate and the progressivity of the tax have a negative effect in entrepreneurial entry. Entry rates might also be affected by the complexity of corporate income tax system and by tax burdens. Bacher and Brülhart (2013) evaluated the effect of corporate income tax schedule on firm births, using Swiss micro-level data. They examined three effects: effect of the average tax burden, effect of progressivity, and effect of the complexity of the system. They found that lower average tax rates and less tax code complexity promote firm births, while reduced progressivity deters it.

Associated with these issues, Cullen and Gordon (2007) developed a model that examine the importance of the tax structure and found that the impact of taxes on entrepreneurial risk-taking depends on the kind of taxes. Their model showed the effect of the tax structure on self-employment operated through three channels: first income-shifting, the tax structure offers incentives to shift income from highly taxed labor income to lower taxed corporate income, or vice versa; second risk-subsidy, the tax structure encourages risk-taking as it allows incorporation and losses can be deducted against highly taxed labor earnings; third risk-sharing. As higher corporate income taxes create a risk-sharing effect, this lowers the entrepreneur's risk-premium and encourages entry. According to Cullen and Gordon (2007), raising the income tax has an ambiguously positive effect on the probability of individuals to become self-employed, since all the three channels encourage risk-taking.

2.4. Regional Demographic Characteristics

One of the most common instruments used by governments to promote the less developed regions is the tax benefits. Tax benefits usually contribute to the development of regions, especially those with less financial resources (Sequeira and Sá, 2008). It is expected that these incentives are capable of strengthen the economic and social characteristics of those regions. In this way, they usually promote investment and, thus, the creation of employment opportunities, and encourage economic activity, which increases public revenues and public services (Sequeira and Sá, 2008; Fernandes, et al., 2011). This encouragement in the backward regions would lead to localized incentives (Klemm, 2010).

Some studies found a positive relationship between income and child birth (Rupert, 2008). New entry brings new investment and stimulates employment, creating better life conditions for people who live in the less developed regions (Sequeira and Sá, 2008; Fernandes, et al., 2011). As such, there is a tendency for people to migrate to those regions, in which they may find better life conditions. So, new firm entries promote regional social and economic growth (Fernandes, et al., 2011). The migration inflows will be associated with an increase on child birth rate. On the other hand, some studies found some factors that have a negative impact on child birth (Galor and Weil, 1996; Adserà, 2004). According to Galor and Weil (1996), there is a negative relationship between income and child birth. They found that higher wages for women will make them spend more of their time working. This will then raise the opportunity cost of having a child, which will lead to a decrease on child birth rate. Other explanation to this negative impact is the labor market instability. Confronted with this instability, women postpone or even abandon the idea of having a child, as this would reduce lifetime income and increase employment uncertainty (Adserà, 2004). The negative

relationship between income and child birth is considered a theoretical puzzle for some economists, since it is expected that as the income goes up, the child birth should also go up (Rupert, 2008).

Despite all the empirical work, there is no conclusive evidence about the exact relationship between income and child birth. In this way, we will test our hypothesis according to our expectations. Thus, we expect to find that with the entry of new firms the birth rate increases, since more people will migrate to eligible regions. Also, as the life conditions improve, the number of child birth rate would also increase. Thus, we expect

Hypothesis 2: A reduction on corporate taxes increases regional child birth.

Some authors find that in periods of prosperity the divorce rate increases (South, 1985; Trent and South, 1989). In this periods, the participation of female workers in the labor market increases. And this, by consequence, will have a strong negative impact on the divorce rate (South, 1985; Trent and South, 1989; Weiss, Tzeng and Mare, 1995; 1997; Jalovaara, 2003). According to Jalovaara (2003), the risk of divorce is associated with the spouses' socioeconomic position. Women who were employed and whose her husbands also are employed had stable marriages. If the husband have a high income, the risk of divorce is low. In contrast, if the wife have also a high income, this increases the risk of divorce, especially if it exceeds the husband income. Tzeng and Mare (1995) also find that if wives work more than their husbands, this rises the chances of disruption. Besides, positive changes in wives' socioeconomic and labor force characteristics increase the probability of divorce.

Therefore, as regional economic activity increases due to tax cuts, we expect an increase on the divorce rate. Individuals will probably be more focused at work, more tired and they will spend less time at home. We expect

Hypothesis 3: A reduction on corporate taxes increases regional divorce rate.

3. Tax Benefits for Inland Regions

To better frame the paper's results, we will briefly describe the policy of tax benefits for inland regions in Portugal. Appendix A presents the laws and documents associated with tax benefits for inland regions.

This policy started by the Law nr. 127-B/97 which gave legislative authorization for the incumbent government at the time (PS) to create a system of fiscal incentives for the micro and small firms. Then, it was created the *Projeto de Lei 522/VII*, which was a legislative initiative from PSD[1] over the legislative authorization of the previous law. After its approval, the government created the Law nr. 171/99 in order to create tax benefits to attract new firms for less developed regions, help fight population migration out of inland areas and promote economic and social recovering of those regions. The main goal was to boost the regional economy of those regions.

The corporate tax rate suffered several modifications (see Figure 1). According to No. 2 of the article 7 of the Law nr. 171/99, the corporate tax rate for new firms located in eligible counties was 20% and it lasted for the first five years of activity. In non-eligible counties, new firms faced a corporate tax rate of 32%. According to *Ofício-Circulado 147*, the beneficiary areas were chosen according to population density, tax deficiency and inequalities of social, economic and cultural opportunities. Table B1 of Appendix B presents the complete list of eligible counties.

The fiscal incentives were then updated and integrated in *Estatuto dos Benefícios Fiscais* through a new article 39.º - B. The article 83º of the Law nr. 53-A/2006, changed the corporate tax rate to 15% for new firms located in the same eligible counties, while the corporate tax rate for non-eligible counties was 25%. This law was revoked by the article 73º of the Law nr. 67-A/2007, which changed again the corporate

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[1] By Luís Marques Mendes, Manuela Ferreira Leite, Fernando Santos Pereira, Artur Torres Pereira, José Cesário, Álvaro Amaro, Manuel Moreira and Carlos Coelho.

tax rate from 15% to 10% benefiting the new firms, while the normal tax in the country remained at 25%.

4. Data and Descriptive Statistics

4.1. Data

Data on firm entry come from a matched employer-employee database (QP - *"Quadros de Pessoal"*).

QP is a mandatory survey submitted annually to the Portuguese Ministry of Employment and Social Security (MESS) by firms with at minimum one employee. This database gathers detailed information on more than 220,000 firms and 2 million individuals per year, which covers almost the entire Portuguese private sector from 1986 to 2012. Annually, for each firm, the following data is available: entry year, location, size, industry, number of establishments, initial capital and ownership structure.

Data on regional demographic characteristics, namely child birth rate and the divorce rate came from INE.

4.2. Sample

From QP, we select all new firms established between 1997 and 2007. We exclude non-profit firms and start-ups in the primary sector. Next, we compute the total number of firms by county and year. In total, we ended up with 35,508 county year observations, corresponding to 21,912 eligible counties and 13,596 non-eligible counties.

4.3. Descriptive Statistics

Table 1 provides the descriptive statistics for our sample divided into eligible and non-eligible counties. We consider three periods: (1) the period before the introduction of

the policy, (2) the period when the policy is introduced with a corporate tax rate of 20%, and (3) the period when the corporate tax rate suffers another reduction to 15%.

The eligible counties are associated with an increase in the number of new firms. The average number of new firms per county is 0.85 between the period 1997 and 1999, 1.33 in the period between 2000 and 2004, and 1.41 between 2005 and 2007. Regarding population, population density and purchasing power, we notice that with the introduction of the policy, the population and population density decreased, while the purchasing power increased. The average population remained around the 14,000, population density was, on average, approximately 54 and, in the period after the policy, decreased to approximately 53, and purchasing power was, on average, 53.81 before the introduction of the policy and increased to 58.57 between the period 2000 and 2004, and to 64.26 between 2005 and 2007. Concerning the socio-demographic characteristics, we notice that after the introduction of the policy, the child birth rate decreased (before the introduction of the policy it was approximately 9 and after decreased to 8 between 2000 and 2004, and to 7 between 2005 and 2007), while the divorce rate increased (remaining, on average, around 1). To sum up, the eligible counties present an increase in the number of new firms, in the purchasing power and in the divorce rate. In contrast, population in these regions does not increase, and the child birth rate decreases.

The non-eligible counties are also associated with an increase in the number of new firms. The average number of new firms per county is 5.07 between the period 1997 and 1999, 7.70 in the period between 2000 and 2004, and 8.80 between 2005 and 2007. In these regions we see that population, population density and purchasing power have increased in the period after the introduction of the policy. Regarding the socio-demographic characteristics, we notice that in the period after the introduction of the

policy, the child birth rate decreased (before the introduction of the policy it was 10.91 and after decreased to 10.74 between 2000 and 2004, and to 9.94 between 2005 and 2007), while the divorce rate increased (was, on average, 1 and after the policy increased to 2). Thus, the non-eligible counties present an increase in the number of new firms, population, population density, purchasing power and in the divorce rate, while the child birth rate decreases.

5. Empirical Methodology and Results

In this section, we evaluate the impact of the policy of tax benefits for inland regions on firm entry and on the regional socio-demographic characteristics. For this, we use a difference-in-differences approach. The idea is to compare outcomes in counties in which the tax benefits policy is introduced to counterfactuals which are formed by observed outcomes in non-eligible counties prior and after the policy.

5.1. Firm Entry

To evaluate if the policy increases firm entry, we start by analyzing the full sample of 269 counties at different stages of the policy. Next, we reduce our sample to neighboring counties (75 counties) and to counties which distant themselves less than 20 Km (41 counties) (see Figure 2 and 3). From the analysis we exclude the years 2000 and 2005 because they coincide with the years of the introduction of the policy.

Let E_{imy} be the number of newly formed firms, measured as logarithm, in county i at month m and year y. We assess the impact of tax benefits using the following equation:

$$E_{imy} = \delta_m + \omega_y + \rho_i + \beta Policy_{iy} + X'_{iy} + \varepsilon_{imy} \qquad (1)$$

where i denotes county, y is entry year and m is entry month.

Our variable of interest is $Policy_{iy}$. It is a dummy variable equaling one for the eligible counties after the tax benefit policy is implemented, and zero otherwise.

We also include a vector of counties characteristics, X'_{iy} to control for regional characteristics. We add county's population and population density, measured on logarithms, purchasing power and one-stop shop dummy, which equals one if the county has a one-stop shop and zero otherwise. We introduce these variables because:

purchasing power controls for richer counties, population and population density because entrepreneurs create more firms where there is more population. One-stop shop controls for other policies which affect the creation of new firms.

Our specification includes county, year and month dummies to control for region, year and monthly fixed effects. δ_m are month dummy variables, ω_y are year dummies covering the period from 1997 until 2007 and ρ_i are county dummies. The standard errors are clustered at the county level.

Table 2 presents the results for the specification (1) using all 269 counties and Table 3 presents the results for the specification (1) using the restricted sample.

The introduction of the policy reduced the number of new firms in 4.3% (Column 1 of Table 2). When we restrict the sample to neighbor counties and counties which distant less than 20 Km, we find that this number reduced to 3% and 2.5%, respectively, but these coefficients lose statistical significance (Column 1 and 2 of Table 3). This negative relationship between the dependent variable and our variable of interest leads us to reject our *Hypothesis 1* that suggest that the policy of tax benefits to inland areas increases firm entry.

In terms of controls, we find that population density and one-stop shop influence the entry of new firms. The counties with more population density create more 49.8% firms and the one-stop shop increased firm entry by 5.1% (Column 1 of Table 2). When we restrict our sample to neighbor counties these values change to 24.1% and 15.4%, respectively (Column 1 of Table 3). In the counties that distant less than 20 Km, only the one-stop shop have a positive impact (Column 2 of Table 3).

Since the policy vary along the years, we divided our data into three periods: 1997 and 1999, where the policy was not implemented; 2000 and 2004, where the policy was implemented and corporate tax was 20% and the period between 2005 and 2007, where

the corporate tax rate further decreased to 15%. During the same period, the corporate tax rate faced by new firms in non-eligible counties was 32% for 2000 and 2001, 30% for 2002 and 2003, and 25% between 2004 and 2007.

Our baseline specification changes to:

$$E_{imy} = \delta_m + \omega_y + \rho_i + \beta_1 Policy1_{iy} + \beta_2 Policy2_{iy} + X'_{iy} + \varepsilon_{imy} \qquad (2)$$

In this case, $Policy1_{iy}$ is a dummy variable equaling one for the eligible counties and years when the corporate tax rate applied to new firms was of 20% and zero otherwise. $Policy2_{iy}$ is a dummy variable equaling one for the eligible counties and years when the corporate tax rate reduced to 15% and zero otherwise.

The results for the specification (2) are presented in Column (2) of Table 2. Once again, the results show a negative relationship between the dependent variable and our variables of interest. The coefficient associated with $Policy1_{iy}$ is negative and not statistically significant, while the one associated with $Policy2_{iy}$ is -0.065 which suggest that the second time that tax benefits were introduced, the number of new firms reduced by 6.5%. Thus, we do not find support for *Hypothesis 1* which stated that the policy of tax benefits to inland areas increases firm entry.

Once again, we find that the population density and the one-stop shop influence the entry of new firms. The counties with higher population density create more 58.4% firms and the one-stop shop increased firm entry by 5.3%.

The error term in the previous model could be endogenous, because it is correlated with our explanatory variable, Policy, and this creates a bias problem. We will then apply an instrumental variable estimation. We assume that the policy was implemented to favor the mayors of the political party of PSD, the party that proposed the policy. For this

reason, we introduce an instrumental variable, Z_{iy}, which is equal to one for the counties whose mayor is from PSD, and zero otherwise.

Column (3) of Table 2 and Column (3) and (4) of Table 3 present the results for specification (1) using our instrumental variable.

We find that the introduction of the policy reduces the number of new firms by 6.9%. When we restrict the sample to counties which distant less than 20 Km this number changes to -35.1%. On the other hand, we notice that for neighbor counties, with the introduction of the policy, the number of new firms increased 66.3%.

5.2. Regional Socio-Demographic Characteristics

In the following sections we test the impact of the policy on two regional demographic characteristics: child birth rate and divorce rate, using the following equation:

$$Y_{iy} = \omega_y + \rho_i + \beta Policy_{iy} + X'_{iy} + \varepsilon_{iy} \tag{3}$$

where *i* denotes the county and *y* is the year.

First, we evaluate child birth rate measured as number of live births occurred during a year over the average population of that period. This measure is expressed in number of live births per 1000 inhabitants.

 As mentioned before, our variable of interest is $Policy_{iy}$, a dummy variable equaling one if the policy is implemented in county *i* and year *y*, and zero otherwise. X'_{iy} includes regional control variables (population and population density, measured as logarithm, and purchasing power).

As noted on *Hypothesis 2* we expect the number of child births to increase on the regions that had access to tax benefits.

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Table 4 presents the results for the specification (3) using all 269 counties and Table 5 presents the results for the specification (3) using the restricted sample.

The coefficient associated with $Policy_{iy}$ is negative and it is not statistically significant. But, when we restrict the sample to neighbor counties and counties which distant less than 20 Km, we find that the introduction of the policy increased the child birth rate in 0.154 and 0.323, respectively. This leads us to accept our *Hypothesis 2* that suggested that the policy of tax benefits to inland regions would lead to an increase on child birth rates.

In terms of controls, we find that both population and purchasing power have a positive influence on the child birth rate, while the population density exercise a negative effect. In the counties with more population we see an increase of the child birth rate of 6.077 and the ones with more purchasing power increase it by 0.016. When we restrict our sample to the counties which distant less than 20 Km, these values change to 5.055 and 0.025, respectively. In the neighbor counties, we also see that the ones with more purchasing power increase the child birth rate by 0.024 and the ones with more population density increase it 0.190.

Column (2) of Table 4 presents the results for specification (2) considering three time periods and by substituting the variable $Policy_{iy}$ with two variables: $Policy1_{iy}$ and $Policy2_{iy}$ as in specification (2). The coefficient associated with $Policy1_{iy}$ is -0.098, which suggest that the first time that tax benefits were introduced, the child birth rate decreased by 0.098, while the coefficient associated with $Policy2_{iy}$ is 0.104, which suggest that the second time that tax benefits were introduced, the child birth rate increased by 0.104. Thus, we find partial support for *Hypothesis 2*, which stated that the policy of tax benefits to inland regions would lead to more child births.

In this equation, we find once again that, in terms of controls, both population and purchasing power have a positive influence on the child birth rate, while the population density has a negative effect. The counties with more population increased by 6.739 the child birth rate and the ones with more purchasing power increased it by 0.015.

Column (3) of Table 4 and Column (3) and (4) of Table 5 presents the results for specification (3) using our instrumental variable.

The introduction of the policy negatively impact the child birth rate, but with the introduction of our instrumental variable this coefficient turns statistically significant to 0.310. When we restrict our sample to counties that distant less than 20 Km this coefficient changes to -0.412, while for neighbor counties this value remains positive but it is not statistically significant. This leads us to reject our *Hypothesis 2*.

Next, we evaluate the impact of the policy on the divorce rate, measured as the number of divorces observed during a year, over to the average population of that period. This measure is expressed by the number of divorces per 1000 inhabitants. As in the previous specifications, $Policy_{iy}$ is the main variable for this analysis. The vector X'_{iy} represents the counties characteristics, namely population and population density, measured as logarithm, and purchasing power.

As noted on *Hypothesis 3* we expect the number of divorces to increase in the regions that had access to tax benefits.

The results are presented in Table 6, using all 269 counties and in Table 7, using the restricted sample.

The introduction of the policy reduced the divorce rate by 2.4%. When we restrict the sample to neighbor counties and counties which distant less than 20 Km, we find that this rate reduces to 8.5% and 7%. This negative relationship between the dependent

variable and our variable of interest leads us to reject our *Hypothesis 3* that suggest that the policy of tax benefits to inland areas increases the divorce rate.

In terms of controls, we find that population, population density and purchasing power have a positive influence on the divorce rate. The counties with more population increase the divorce rate by 1.033, the ones with more population density increase the rate by 0.661 and the counties with more purchasing power increase by 0.007 the divorce rate. When we restrict our sample to the counties that distant less than 20 Km we see that, regarding population density and purchasing power, these values increase to 0.883 and 0.009, respectively. In the neighbor counties, only the purchasing power have a positive impact of 0.004.

Again, Column (2) of Table 6 presents the results for specification (2) considering three time periods and by substituting the variable $Policy_{iy}$ with two variables: $Policy1_{iy}$ and $Policy2_{iy}$ as in specification (2). The coefficient associated with $Policy1_{iy}$ is -0.081, which suggest that the first time that tax benefits were introduced, the divorce rate reduced by 8.1%, while the coefficient associated with $Policy2_{iy}$ is 0.099, which suggest that the second time that tax benefits were introduced, the divorce rate increased by 9.9%. Thus, we do not find support for *Hypothesis 3* (which stated that the policy of tax benefits to inland areas increases the divorce rate) in the first stage of the policy but in the second stage we accept it.

In this equation, we find once again that, in terms of controls, population, population density and purchasing power have a positive influence on the divorce rate. The counties with more population increase the divorce rate by 1.634, the ones with more population density increase this rate by 0.350 and the ones with more purchasing power increase it by 0.007.

Again, Column (3) of Table 5 and Columns (3) and (4) of Table 7 present the results for specification (3) using our instrumental variable.

Once again we find that the introduction of the policy have a negative impact on the divorce rate, in this case, of 0.372. When we restrict our sample to counties that distant less than 20 Km this value changes to -0.513, while for neighbor counties this value becomes positive but it is not statistically significant. This leads us to the same conclusion as before, rejecting our *Hypothesis 3*.

In terms of controls, we find again that counties with more population and purchasing power have more divorces, but in the ones with higher population density the divorce rate decreases. When we restrict our sample to neighbor counties we see that, as before, the counties with more purchasing power have more divorces, and we notice in this case that also the counties with higher population density have more divorces. In the counties which distant less than 20 Km, we notice that as before the population density and purchasing power continue to have a positive impact on the divorce rate, but the values are not statistically significant.

6. Conclusion

The aim of our study was to analyze the effect of a policy of tax benefits to inland areas in Portugal between the period of 1997 until 2007. Specifically, we analyzed the effect of this policy on firm entry and on child birth rate and divorce rate.

Through the literature review, it was found that the majority of the studies argue that the tax reductions contribute to the entry of new firms. To contribute for this discussion, we analyzed the Portuguese case by comparing a set of inland eligible regions with non-eligible regions.

We found that the policy does not have a positive effect on the entry of new firms, nor on the child birth and divorce rate. This is not consistent with our hypotheses. The negative effect on firm entry persists even when we divide our sample into the different stages of the policy introduction. These results are not consistent in restricted samples (nearby counties). As the policy was implemented in regions economically less developed, our results suggest that the tax benefits were not enough to promote entrepreneurial activity nor the development of a region. Also, these results can be explained by the inconsistency of fiscal policies.

Giving this results, governments should find ways to attract new entrepreneurs, domestic and foreign, to invest in the less developed regions. To do so, it is necessary a long-term plan which involves an investment on infrastructures capable of offering good conditions to entrepreneurs to develop their investments and conditions of fixing the population in these territories.

This study could be further developed by analyzing other county variables, like the number of schools or hospitals, the crime rate and using an economic variable like the GDP, with a more enlarged dataset. Regional level data on socio-demographic

characteristics was unavailable. It would also be useful to study similar fiscal policies that encourage entrepreneurship.

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Figure 1 – Corporate Tax Rate Applied to New Firms (1997-2007; %)

Corporate Tax Rate
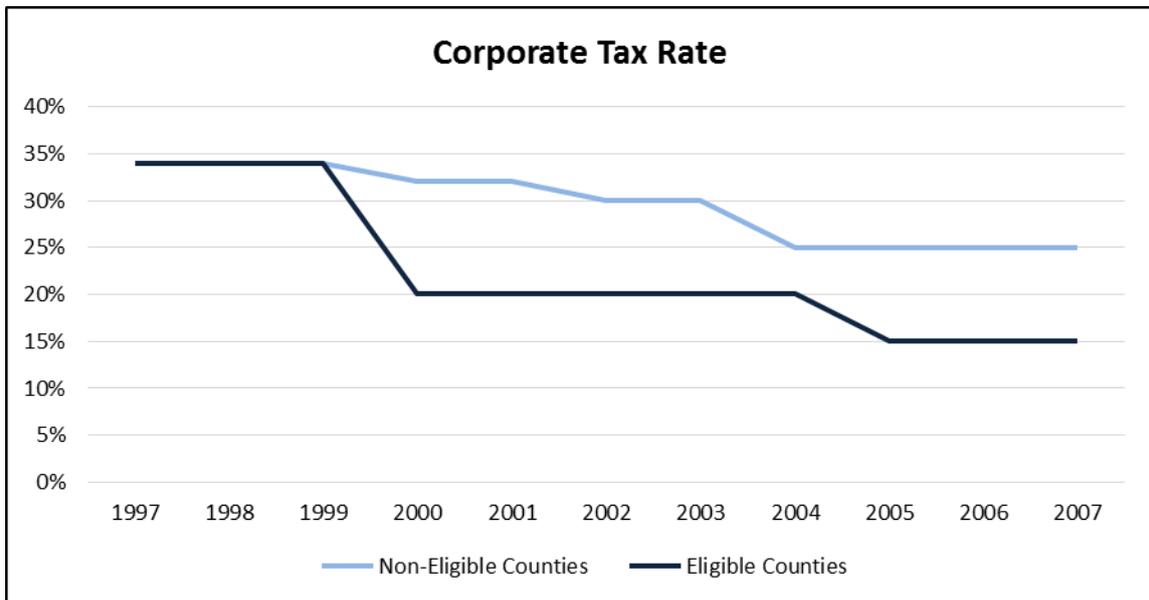
Source: Law nr. 171/99, of 18/9 and Law nr. 67-A/2007

Figure 2 – Neighbor Counties
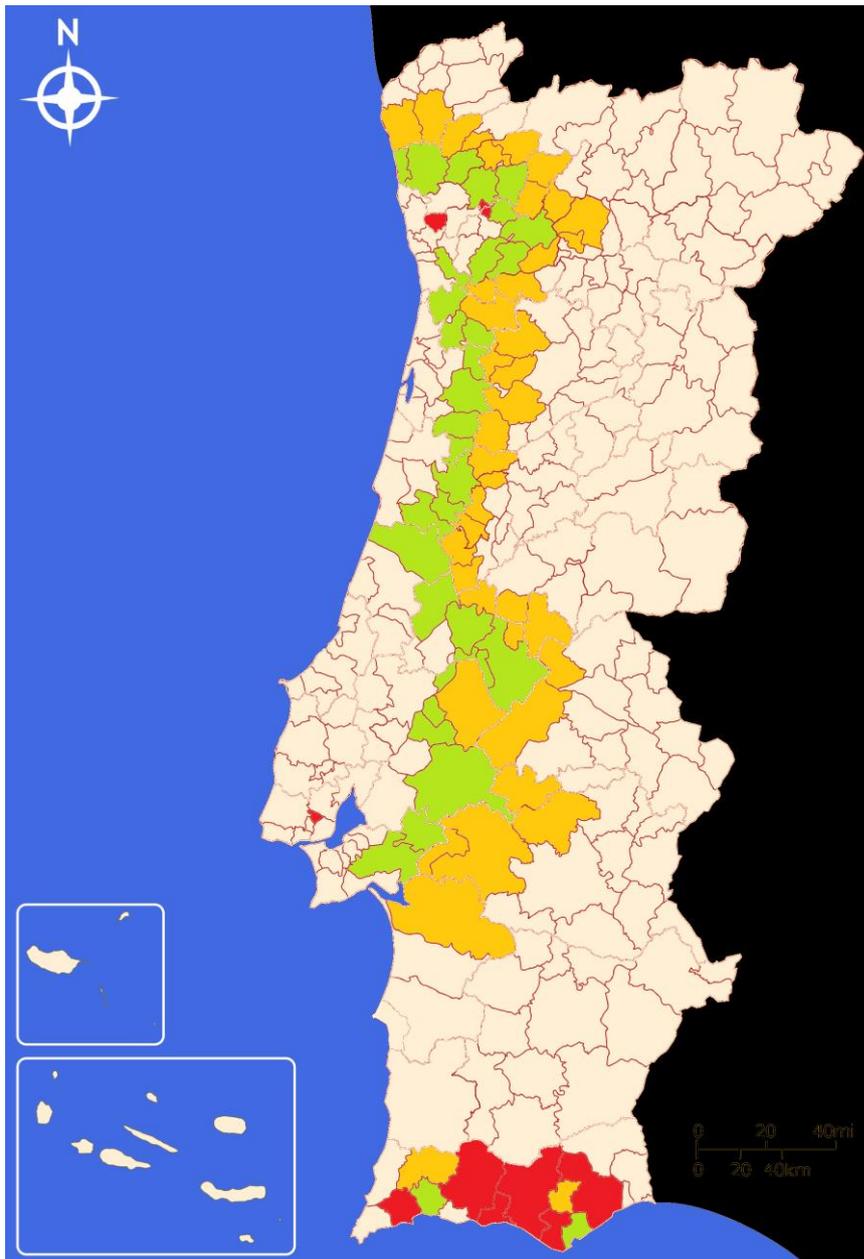
Source: Oficio-Circulado 147, 30/03/2001 – Direcção de Serviços do IRC

Notes: In red are the counties which were not included in our analysis, in green are the neighbor counties and in yellow are the eligible counties used to this test.

Figure 3 – Counties which distant themselves less than 20 Km
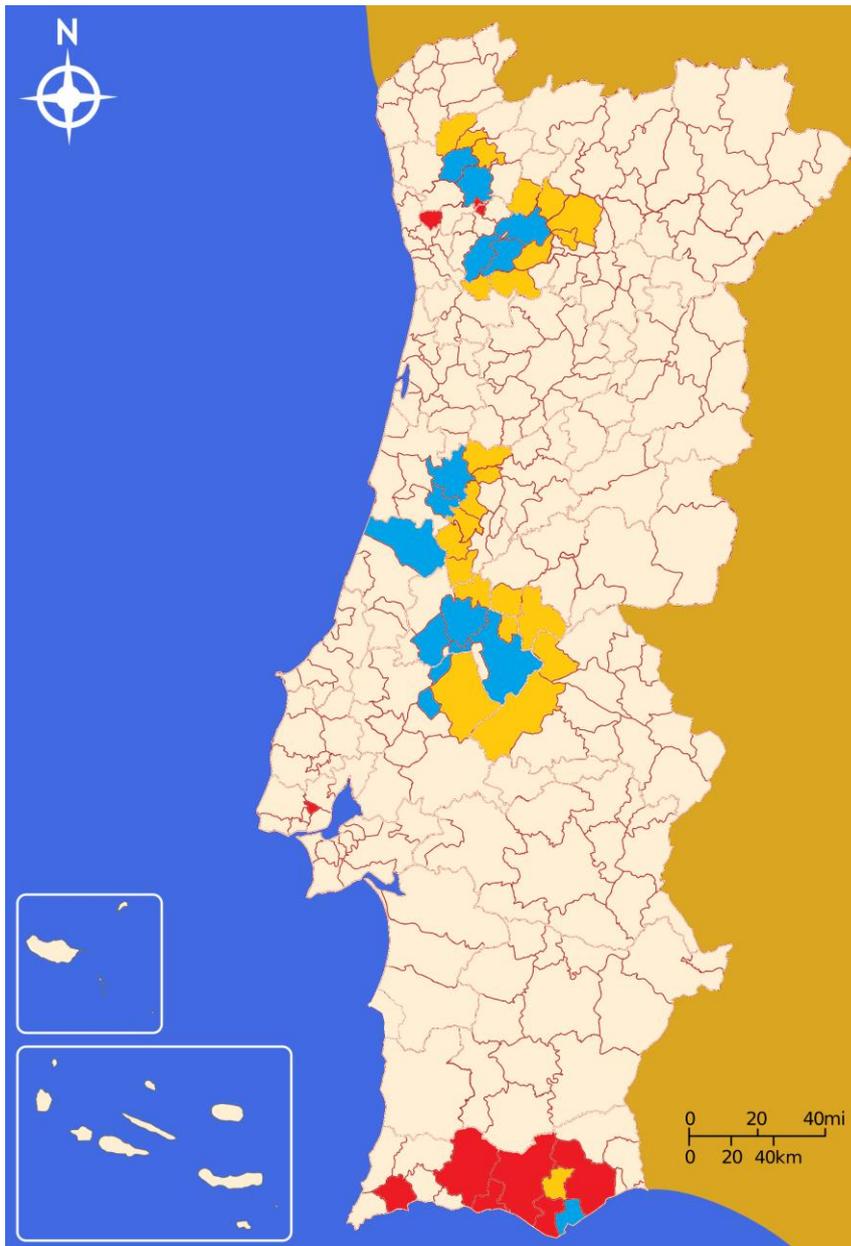

Source: Oficio-Circulado 147, 30/03/2001 – Direcção de Serviços do IRC and

http://www.adistanciaentre.com/

Notes: In red are the counties which were not included in our analysis, in blue are the

counties which distant less than 20 Km from the eligible counties, represented in

yellow, used to this test.

Table 1: Descriptive Statistics

Panel A – Eligible Firms

| | Before | | | | | | After | | | | | |
| | Between 1997 and 1999 | | | Between 2000 and 2004 | | | Between 2005 and 2007 | | |
	Obs.	Mean	S.D.	Obs.	Mean	S.D.	Obs.	Mean	S.D.
Number of new firms	5976	.8534137	1.964607	9960	1.334137	3.846095	5976	1.406627	4.158248
Population	5976	14192.99	13227.75	9960	14141.79	13631.82	5976	14084.15	13922.77
Population density	5976	53.57193	48.39772	9960	52.75853	50.25605	5976	52.55518	50.71003
Purchasing Power	5976	53.81201	14.68121	9960	58.56931	14.19542	5976	64.26418	14.91044
Birth rate	5976	8.569277	2.206856	9960	8.173133	2.161526	5976	7.334337	1.900287
Divorce rate	5976	.8355422	.4943887	9960	1.31012	.6609334	5976	1.486546	.6879912

Panel B – Non-Eligible Firms

| | Before | | | | | | After | | | | | |
| | Between 1997 and 1999 | | | Between 2000 and 2004 | | | Between 2005 and 2007 | | |
	Obs.	Mean	S.D.	Obs.	Mean	S.D.	Obs.	Mean	S.D.
Number of new firms	3708	5.066073	10.58898	6180	7.698382	18.25849	3708	8.800971	23.85019
Population	3708	66866.86	81195.85	6180	69010.41	80795.92	3708	70833	80801.53
Population density	3708	649.2549	1345.6	6180	667.1497	1268.832	3708	671.6234	1248.95
Purchasing Power	3708	82.99133	36.49837	6180	86.19225	31.98699	3708	91.1121	27.30462
Birth rate	3708	10.91197	2.238992	6180	10.73825	1.976975	3708	9.941424	1.967694
Divorce rate	3708	1.425243	.6612716	6180	2.085825	.8091	3708	2.20356	.701148

This table reports descriptive statistics for firms established between 1997 and 2007, and respective firms' and counties' characteristics for eligible and non-eligible counties. All data was retrieved from QP- Quadros de Pessoal.

Table 2: Impact of the Policy of Tax Benefits for Inland Areas on Firm Entry – Total Sample

VARIABLES	(1) Total Sample	(2) Different Stages	(3) IV Total Sample
policy	-0.043**		-0.069*
	(0.021)		(0.038)
lnpop	0.251	0.148	0.258
	(0.186)	(0.205)	(0.186)
lnden	0.498***	0.584***	0.427***
	(0.152)	(0.160)	(0.115)
pp	-0.001	-0.000	-0.001
	(0.001)	(0.001)	(0.001)
onestop	0.051**	0.053**	0.051**
	(0.025)	(0.026)	(0.025)
policy1		-0.029	
		(0.023)	
policy2		-0.065**	
		(0.026)	
Observations	16,904	15,178	16,904
R-squared	0.784	0.782	0.784

Notes: The table reports estimated coefficients for equation (1) and (2). The dependent variable is the logarithm of newly formed firms. Region, month and year fixed effects are included but not reported. Standard errors clustered at the county level are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 3: Impact of the Policy of Tax Benefits for Inland Areas on Firm Entry –
Restricted Sample

VARIABLES	(1) Neighbor Counties	(2) Counties Distant <20Km	(3) IV Neighbor Counties	(4) IV Counties Distant <20Km
policy	-0.030	-0.025	0.663***	-0.351**
	(0.032)	(0.046)	(0.178)	(0.165)
lnpop	0.398***	0.815	0.464***	1.061**
	(0.117)	(0.506)	(0.122)	(0.536)
lnden	0.241**	0.494	0.386***	-0.287
	(0.096)	(0.444)	(0.111)	(0.432)
pp	-0.001	0.003	0.002	0.000
	(0.002)	(0.004)	(0.002)	(0.003)
onestop	0.154***	0.220***	0.204***	0.208***
	(0.048)	(0.059)	(0.052)	(0.060)
Observations	5,295	2,833	5,295	2,833
R-squared	0.772	0.772	0.751	0.768

Notes: The table reports estimated coefficients for equation (1). The dependent variable is the logarithm of newly formed firms. Region, month and year fixed effects are included but not reported. Standard errors clustered at the county level are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 4: Impact of the Policy of Tax Benefits for Inland Areas on Regional Socio-Economic Activity (Child Birth Rate) – Total Sample

VARIABLES	(1) Total Sample	(2) Different Stages	(3) IV Total Sample
policy	-0.028		-0.310***
	(0.035)		(0.054)
lnpop	6.077***	6.739***	6.143***
	(0.279)	(0.325)	(0.278)
lnden	-1.868***	-2.152***	-2.645***
	(0.209)	(0.222)	(0.136)
pp	0.016***	0.015***	0.016***
	(0.001)	(0.001)	(0.001)
policy1		-0.098***	
		(0.034)	
policy2		0.104**	
		(0.044)	
Observations	32,280	29,052	32,280
R-squared	0.830	0.835	0.829

Notes: The table reports estimated coefficients for equation (3) and (4). The dependent variable is the child birth rate. Region and year fixed effects are included but not reported. Standard errors clustered at the county level are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 5: Impact of the Policy of Tax Benefits for Inland Areas on Regional Socio-Economic Activity (Child Birth Rate) – Restricted Sample

VARIABLES	(1) Neighbor Counties	(2) Counties Distant <20Km	(3) IV Neighbor Counties	(4) IV Counties Distant <20Km
policy	0.154***	0.323***	0.230	-0.412**
	(0.049)	(0.074)	(0.242)	(0.209)
lnpop	-0.158	5.055***	-0.166	5.218***
	(0.141)	(0.672)	(0.140)	(0.696)
lnden	0.190*	-2.182***	0.220	-3.635***
	(0.114)	(0.575)	(0.134)	(0.553)
pp	0.024***	0.025***	0.025***	0.015***
	(0.003)	(0.005)	(0.004)	(0.004)
Observations	9,000	4,920	9,000	4,920
R-squared	0.826	0.846	0.826	0.842

Notes: The table reports estimated coefficients for equation (3). The dependent variable is the child birth rate. Region and year fixed effects are included but not reported. Standard errors clustered at the county level are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

VARIABLES	(1) Total Sample	(2) Different Stages	(3) IV Total Sample
policy	-0.024*		-0.372***
	(0.012)		(0.021)
lnpop	1.033***	1.634***	1.115***
	(0.119)	(0.137)	(0.117)
lnden	0.661***	0.350***	-0.301***
	(0.094)	(0.100)	(0.053)
pp	0.007***	0.007***	0.008***
	(0.000)	(0.000)	(0.000)
policy1		-0.081***	
		(0.013)	
policy2		0.099***	
		(0.017)	
Observations	32,280	29,052	32,280
R-squared	0.739	0.742	0.733

Notes: The table reports estimated coefficients for equation (3) and (4). The dependent variable is the divorce rate. Region and year fixed effects are included but not reported. Standard errors clustered at the county level are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 7: Impact of the Policy of Tax Benefits for Inland Areas on Regional Socio-Economic Activity (Divorce Rate) – Restricted Sample

VARIABLES	(1) Neighbor Counties	(2) Counties Distant <20Km	(3) IV Neighbor Counties	(4) IV Counties Distant <20Km
policy	-0.085***	-0.070***	0.112	-0.513***
	(0.017)	(0.027)	(0.119)	(0.083)
lnpop	-0.035	0.031	-0.054	0.129
	(0.059)	(0.268)	(0.056)	(0.288)
lnden	0.034	0.883***	0.112*	0.007
	(0.053)	(0.230)	(0.058)	(0.231)
pp	0.004***	0.009***	0.005***	0.003
	(0.001)	(0.002)	(0.001)	(0.002)
Observations	9,000	4,920	9,000	4,920
R-squared	0.718	0.720	0.714	0.703

Notes: The table reports estimated coefficients for equation (3). The dependent variable is the divorce rate. Region and year fixed effects are included but not reported. Standard errors clustered at the county level are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Appendix A – Laws and Legal Documents on the Tax benefits to Inland Regions (1997-2007)

Law nr. 127-B/97, of 20/9 (Lei n.º 127-B/97, de 20de Dezembro de 1997 – I Série A), Legislative authorization for the government (PS) create a system of fiscal incentives for the micro and samll firms.

Projeto de Lei 522/VII, Legislative initiative of PSD over the legislative authorization above.

Law nr. 171/99, of 18/9 (Lei n.º 171/99, de 18 de Setembro de 1999), Combating desertification and recovery of development in inland areas.

Ofício-Circulado 147, 30 de Março de 2001, Definition of eligible counties and eligibility criteria.

Portaria 2086/2001, 13 de Dezembro de 2001 – II Série, Definition of eligible counties and eligibility criteria (equal to OF 147/2001).

Portaria 1467-A/2001, 31 de Dezembro de 2001 – I Série B, Definition of eligible counties and eligibility criteria (equal to OF 147/2001 and Portaria 2086/2001).

Law nr. 53-A/2006 (Lei n.º 53-A/2006, de 29 de Dezembro de 2006 – Série I nº249), Tax benefits are incorporated on *Estatuto dos Benefícios Fiscais*.

Law nr. 67-A/2007 (Lei n.º 67-A/2007, de 31 de Dezembro de 2007), Definition of the new corporate tax rates.

Appendix B – Eligible Counties Associated with the Tax Benefits to Inland Regions

Table B1: Eligible Counties

NUTS III	Counties
Alto Trás-os-Montes	Alfândega da Fé
	Boticas
	Bragança
	Chaves
	Macedo de Cavaleiros
	Miranda do Douro
	Mirandela
	Mogadouro
	Montalegre
	Murça
	Valpaços
	Vila Pouca de Aguiar
	Vimioso
	Vinhais
Ave	Póvoa de Lanhoso
	Vieira do Minho
Cávado	Amares
	Terras de Bouro
	Vila Verde
Douro	Alijó
	Armamar
	Carrazeda de Ansiães
	Freixo de Espada à Cinta
	Lamego
	Mesão Frio
	Moimenta da Beira
	Penedono
	Peso da Régua
	Sabrosa
	Santa Marta de Penaguião
	São João da Pesqueira
	Sernancelhe
	Tabuaço
	Tarouca
	Torre de Moncorvo
	Vila Flôr
	Vila Nova de Foz Côa
	Vila Real
Entre Douro e Vouga	Arouca
Minho-Lima	Arcos de Valdevez

	Caminha
	Melgaço
	Monção
	Paredes de Coura
	Ponte da Barca
	Ponte de Lima
	Valença
	Viana do Castelo
	Vila Nova de Cerveira
Tâmega	Baião
	Cabeceiras de Basto
	Castelo de Paiva
	Celorico de Basto
	Cinfães
	Mondim de Basto
	Resende
	Ribeira de Pena
Baixo Mondego	Penacova
Beira Interior Norte	Almeida
	Celorico da Beira
	Figueira de Castelo Rodrigo
	Guarda
	Manteigas
	Meda
	Pinhel
	Sabugal
	Trancoso
Beira Interior Sul	Castelo Branco
	Idanha-a-Nova
	Penamacor
	Vila Velha de Rodão
Cova da Beira	Belmonte
	Covilhã
	Fundão
Dão-Lafões	Aguiar da Beira
	Carregal do Sal
	Castro Daire
	Mangualde
	Mortágua
	Nelas
	Oliveira de Frades
	Penalva do Castelo
	Santa Combadão
	São Pedro do Sul
	Sátão

	Tondela
	Vila Nova de Paiva
	Viseu
	Vouzela
Pinhal Interior Norte	Alvaiázere
	Ansião
	Arganil
	Castanheira de Pêra
	Figueiró dos Vinhos
	Góis
	Lousã
	Miranda do Corvo
	Oliveira do Hospital Pampilhosa da Serra
	Pedrógão Grande
	Penela
	Tábua
	Vila Nova de Poiares
Pinhal Interior Sul	Mação
	Oleiros
	Proença-a-Nova
	Sertã
	Vila de Rei
Serra da Estrela	Fornos de Algodres
	Gouveia
	Seia
Médio Tejo	Ferreira do Zêzere
	Sardoal
Lezíria do Tejo	Chamusca
Alentejo Central	Alandroal
	Arraiolos
	Borba
	Estremoz
	Évora
	Montemor-o-Novo
	Mourão
	Portel
	Redondo
	Reguengos de Monsarás
	Sousel
	Vendas Novas
	Viana do Alentejo
	Vila Viçosa
Alentejo Litoral	Alcácer do Sal
	Grândola
	Odemira

	Santiago do Cacém
	Sines
Alto Alentejo	Alter do Chão
	Arronches
	Avis
	Campo Maior
	Castelo de Vide
	Crato
	Elvas
	Fronteira
	Gavião
	Marvão
	Monforte
	Mora
	Nisa
	Ponte de Sor
	Portalegre
Baixo Alentejo	Aljustrel
	Almodôvar
	Alvito
	Barrancos
	Beja
	Castro Verde
	Cuba
	Ferreira do Alentejo
	Mértola
	Ourique
	Serpa
	Vidigueira
Algarve	Alcountim
	Aljezur
	Castro Marim
	Monchique
	São Brás de Alportel
	Vila do Bispo
	Vila Real de Santo António

Source: Oficio-Circulado 147, 30/03/2001 – Direcção de Serviços do IRC