A WORK PROJECT, PRESENTED AS PART OF THE REQUIREMENTS FOR THE AWARD OF A MASTER'S DEGREE IN ECONOMICS FROM THE NOVA SCHOOL OF BUSINESS AND ECONOMICS

Non-linearities in Fiscal Multipliers in EU15: A Panel Data Threshold Model

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Abstract In this work project, we use the approach considered in Kramer et al. (2012) which is based on a Panel Data Threshold model in order to study the different effects that fiscal policy has on gross domestic product (GDP) whenever economies face negative or positive output gaps. Our sample includes the 15 EU countries in 2000 and uses data from 2000Q1 until 2016Q2. We find that the value of the output gap that makes the model shift from one regime to another is -0.73% and only when the output gap is smaller than that value does the fiscal multiplier become significant and GDP and Government Expenses are positively correlated. In our analysis, we use Investment as an endogenous variable because of the accelerator effect.

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1. Introduction

Europe has suffered considerably from the collateral effects of the financial crisis of 2008, especially due to the sovereign debt crisis which was a side effect of the previously mentioned crisis because of the increase in investor's risk perception. This last crisis affected many European countries, namely Greece, Portugal and Ireland that needed bailouts to return to the markets.

Meanwhile, governments tried to reduce their expenses and increase their revenues by reducing services and increasing taxes in those countries. The expected effects were, of course, contractionary but countries felt that the consolidation of public accounts were more important than making GDP return to its normal level in the short run and giving those countries more favorable conditions in the future to achieve their potential GDP.

This line of thought was instigated by the high interest rates that those countries had to pay to have access to funds in the markets because investors felt that these countries would not be able to repay their debt at those levels. So, states tried to show that they were doing an enormous effort to make things right.

Nevertheless, the effects of the so called austerity measures were not as anticipated and the contractionary effects were even larger than excepted. For instance, Greece drowned into a spiral of impoverishment and its GDP lost more than 100 billion dollars in solely five years, which represents a drop of more than 30% while its public debt level to GDP never stopped increasing. Portugal suffered massively, too, but the Portuguese government was more successful in implementing those measures and GDP is growing at modest rates since 2013.

The purpose of this study is to show that the effects were not as planned because multipliers are not fixed and change when the economic conditions change. What we will try to prove is that it is wrong to use multipliers obtained in regular periods when you are facing an atypical event such as a crisis.

To do so, we will use the 15 countries that composed the European Union (EU) from 2000 until 2016 (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom), and we will set up a Panel data regression threshold model, in order to show that an increase in government expenditures has different impacts on GDP growth depending on whether we are in a positive or negative output gap period.

This paper is organized as follows. Section 2 presents a literature review. Section 3 introduces the model we will use. Section 4 describes the data. Section 5 presents our empirical results. Section 6 provides some robustness tests, and Section 7 puts forward the conclusions.

2. Literature Review

As a consequence of the crisis and the effects of policies with underestimated results the subject of varying fiscal multipliers has started to arise and economists restarted to see fiscal policy as a matter of study.

Even so, there are not many studies that look at fiscal multipliers in the way that we are proposing in this work project as most of them use structural VAR methodologies or just a narrative approach.

Structural VAR studies use recursive identification (Galí *et al*., 2007) or extremely complex structures (Blanchard and Perotti, 2002). The first approach obtains an instant multiplier of 0.8 and two years after a response of 1.8, whereas, the second finds a peak spending multiplier between 0.9 and 2 depending on some assumptions that the authors made.

In the narrative approach, authors look at newspapers or government reports in order to get external information that may help them identify exogenous fiscal shocks. Romer and Romer (2010) and Ramey (2011b) were some of the authors that used this approach. Usually they find multipliers from 0.6 to 1.2 depending on the sample and the underlying assumptions made.

However, since the Great Recession and the Sovereign Debt Crisis, economists started to argue that fiscal multipliers may behave in a non-linear way depending on the state of the economy. Almunia *et al.* (2010) and DeLong and Summers (2012) showed that during the early 1930s (Great Depression) fiscal multipliers were larger and Corsetti *et al.* (2012) used dummy variables to show that fiscal multipliers increase during financial crisis.

To study this, we can use dummy variables, as Corsetti *et al.* have done, but we think that using a threshold and allowing the model decide when the economy is in one state or the other could eventually be more reliable.

Some economists thought in the same way and used a method similar to ours relating the regimes to GDP growth and the Output Gap (see e.g. Baum *et al.*, 2012b;

Bachmann and Sims, 2012; Candelon and Lieb, 2013, Nunes and Poirier, 2014). Other authors on the other hand used other variables in other to capture these states (see e.g. Afonso *et al.*, 2011; Baum *et al.*, 2012a; and Ferraresi *et al.*, 2014).

Nonetheless, our work is somehow different because it looks at the global EU15 and uses a panel data threshold model to reinforce that idea. This type of models was first introduced by Hansen (1999, 2000) and to the best of our knowledge there has been no application of this method to this particular subject. Chang *et al.* (2009) applied it to the relationship between tourism specialization and economic development and Kremer *et al.* (2012) used it to analyze the connection between inflation and growth.

Our goal is to show that fiscal multipliers change conditionally on the output gap, but using different samples of countries during several quarters. Our focus will be the fifteen countries that were part of the European Union in the early 2000s.

3. The Model

The model we used is an extension of the approach introduced by Hansen (1999) which was developed by Kremer, Bick and Nautz (2012). Since we used their model, we will explain it in an extremely similar way as they did.

This model allows the original setup to have endogenous regressors. Hence, we will use GDP growth as our dependent variable and Investment growth as our endogenous regressor, due to the Accelerator Theory that shows that investment variations are highly correlated with variations in the output.

The model of interest can be written as:

$$y_{it} = \alpha_i + \beta_1 x_{it} I(g_{it} \leq \gamma) + \beta_2 x_{it} I(g_{it} > \gamma) + \varepsilon_{it} ,$$

where i = 1,…, 15 represents the first 15 countries joining the European Union by alphabetical order and t=1,…, 62 is the time index. α_i is the country-specific fixed effect. The error term is i.i.d. with mean 0 and variance σ^2. I(.) is the function that indicates the regime, and which is defined by the threshold variable, g_{it} corresponds to the output gap, and γ is the threshold level. x_{it} is a vector of explanatory variables which may include lagged values of the dependent variable, as well as exogenous and endogenous variables.

3.1. Fixed-effects elimination

We start the estimation process by removing the fixed effects, α_i, through a fixed-effects transformation. To do so, we have to eliminate the country-specific fixed effects without going against the distributional assumptions underlying Hansen (1999) and Caner and Hansen (2004).

In this dynamic model, the transformation proposed by Hansen (1999) leads to inconsistency because the lagged variable is always correlated with the transformed individual errors. Hence, to overcome this problem, Kremer *et al.* (2012) used the forward orthogonal deviations transformation proposed by Arellano and Bover (1995) to eliminate the fixed effects. This transformation is especially virtuous because it avoids serial correlation of the transformed error terms.

This transformation is not a simple first difference or the subtraction of the mean from each observation. In this process the average of all future available observations of a variable is considered.

The transformation is given by:

$$\varepsilon_{it}^{*} = \sqrt{\frac{T-t}{T-t+1}}\left[\varepsilon_{it} - \frac{1}{T-t}\left(\varepsilon_{i(i+1)} + \cdots + \varepsilon_{iT}\right]\right.,$$

where T is the total number of observations, (T=62 in our case).

Looking at the variance of the error terms, we observe that the error terms are uncorrelated:

$$Var(\varepsilon_i) = \sigma^2 I_T \Rightarrow Var(\varepsilon_i^{*}) = \sigma^2 I_{T-1}.$$

3.2. Estimation

Following Caner and Hansen (2004), we then estimate a reduced form regression for the endogenous variables as a function of the instruments and replace them by their predicted values. In the second step, the main equation presented before is estimated by least squares for a specific threshold value γ.

The threshold value γ is estimated by minimizing the sum of squared residuals. The second step is repeated for a strict subset of the support of the threshold variable g and γ is fixed as the one that has the smallest sum of squared residuals. Standard errors and all statistic inference are robust to heteroskedasticity.

4. Data

As previously indicated, this paper focuses on the 15 countries that constituted the EU from 1995 until 2004, they are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.

The variables used are GDP, Government Expenditures, Inflation and Output Gap. GDP and government expenditures were obtained from Eurostat, GDP at market prices and final consumption expenditure of general government were the items chosen, both at current prices and seasonally and calendar adjusted. Inflation was obtained from the OECD and Output Gap was obtained from the IMF for some countries and from the OECD for others.

To avoid scale problems, GDP and Government Expenditures were used in per capita values. To do so, we looked for Total Population in Eurostat and computed the ratio.

All data is quarterly and refers to the period between 2000Q1 and 2016Q2. The starting point was chosen because of data limitations for some countries which did not report quarterly data until the beginning of the 2000s.

To compute inflation and output gap, we used a GDP weighted average. During that time, the mean quarterly GDP of those 15 countries was 2859 billion euros, the mean quarterly inflation was 0.43% and the economies spent more time with a negative output gap than with a positive one, as 516 observations reveal an output gap below zero.

5. Empirical Results

To get the answers that we are looking for, we apply the panel threshold model to our data in order to see if fiscal policy has different effects on GDP.

As mentioned before, our model consists of GDP as the dependent variable and Government Expenses, Investment, Private Consumption, Real Exchange Rate, Population, Prices and Lagged GDP as explanatory ones. All these variables are expressed in growth terms. Output Gap is the variable that makes the model change between states.

Investment growth is considered as endogenous due to the accelerator effect proposed by Jorgenson (1963) which says that variations in investment are highly correlated with variations in GDP growth.

As instruments, we use lags of the endogenous variable: investment growth. In our application we just used one lag.

5.1. Threshold selection

The first step to get our results is to endogenously select the threshold value that shifts our model from one regime to another. We decided to use just one threshold that minimizes the sum of squared residuals as clarified before.

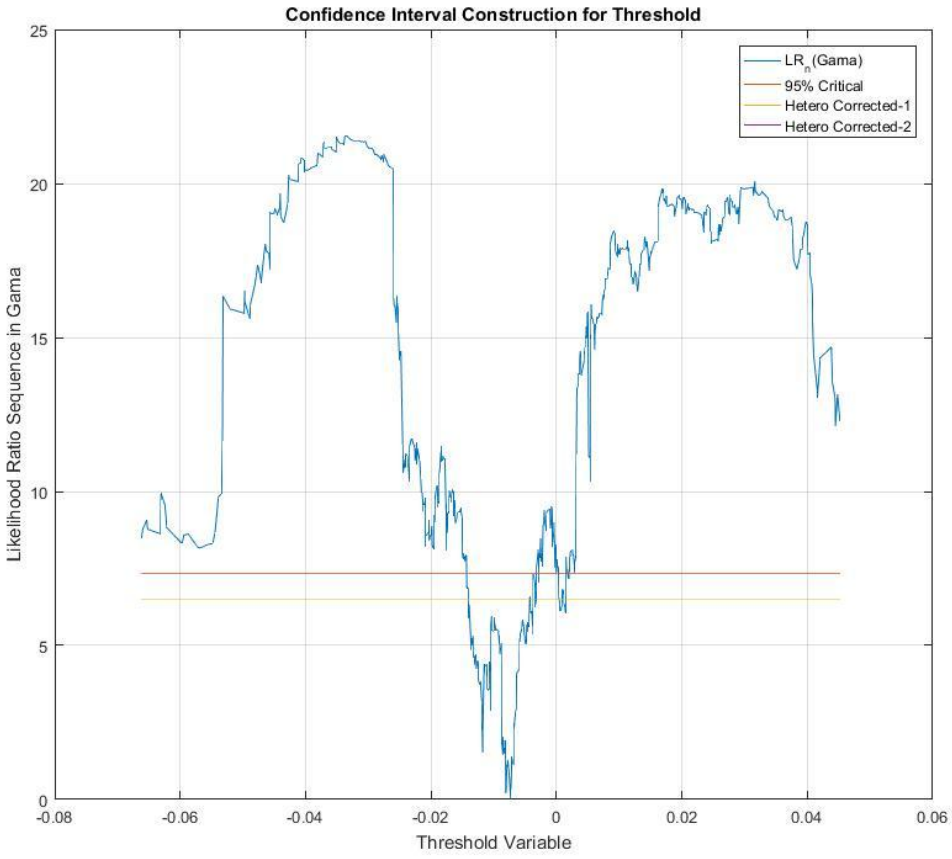

Figure 1 - Threshold selection

As can be observed from figure 1, our model provides the result that the value of the output gap that makes the economy shift from one regime to another is -0.7307%.

The 95% confidence interval is between -1.4303% and 0.1527%. This shows that when the output gap gets slightly negative or zero, the economy changes its behavior towards government expenses.

5.2. Slopes and Standard Errors

For the variables which do not depend on the regimes we observe that all variables, with the exception of Inflation and Real Exchange Rate change, are significant.

Variables	Estimates	Standard Errors	95% Confidence Interval
$\Delta^{\%}$ **Investment**	0.2048*	0.0522	0.1011 – 0.3061
$\Delta^{\%}$ **GDP$_{t-1}$**	0.2983*	0.0881	0.1310 – 0.4768
$\Delta^{\%}$ **Consumption**	0.4005*	0.0557	0.2815 – 0.5011
Inflation	-0.0564	0.0766	-0.1933 – 0.1120
$\Delta^{\%}$ **Real Ex. Rate**	-0.0194	0.0269	-0.0784 – 0.0300
$\Delta^{\%}$ **Population**	-0.4350**	0.1878	-0.8066 – -0.0638

Table 1 - Regime Independent Variable

Regarding Government Expenses, we found that its behavior is only significant when the output gap is negative. This reinforces the idea that governments must intervene when the economy is facing negative output gaps and that interventions when the economy is overheated are pointless.

$\Delta^{\%}$ Government Expenses	Estimates	Standard Errors	95% Confidence Interval
Output Gap < -0.7307%	0.1021*	0.0342	0.0429 – 0.1778
Output Gap > -0.7307%	0.0357	0.0331	-0.0067 – 0.1253

Table 2 - Regime Dependent Variable

This model also allows for a constant term whenever the threshold variable is below the threshold value, so, whenever we are facing an output gap below -0.007307, the economy tends to grow, but at low levels.

Constant Term	Estimate	Standard Error	95% Confidence Interval
Output Gap < -0.7307%	0.0011*	0.0005	0.0005 – 0.0026

Table 3 – Regime Specific Constant Term

These results confirm that fiscal policy is an important tool whenever economies are in recession.

In order to confirm our findings, we also performed some robustness tests by changing the countries selected and the time frame that we are analyzing.

6. Robustness Tests

In order to see if our conclusions hold under different circumstances, we decided to perform some robustness checks by changing the data frame.

*/**/*** indicate significance at the 1/5/10% level

We will analyze the results of running the model without the "PIGS" countries and the results of a model just with "PIGS" countries. Furthermore, we will also redo the analysis by discarding the period after 2009 as well as looking only at the period after 2009.

When trying to perform the model with GDP growth or lagged GDP growth as threshold variable, the results showed that the threshold value is fixed for high levels of growth, which is a problem because one regime ends up with extremely few observations.

6.1. Without "PIGS"

During the years that we are considering, four countries received external aid. Portugal, Ireland, Greece and Spain got through the crisis with even more difficulties than the rest of the EU countries. In order to see if their removal from our sample changes our conclusions significantly, we decided to redo the entire model with just 11 countries, i.e., without the so-called "PIGS".

Threshold Value	95% Confidence Interval
-0.7307%	-1.1922% – -0.3751%

Table 4 - Threshold Value Without PIGS

Variables	Estimates	Standard Errors
$\Delta^{\%}$ **Investment**	0.3055*	0.0530
$\Delta^{\%}$ **GDP$_{t-1}$**	0.1546**	0.0633
$\Delta^{\%}$ **Consumption**	0.4183*	0.0738
Inflation	-0.0862	0.0778
$\Delta^{\%}$ **Real Ex. Rate**	0.0144	0.0243
$\Delta^{\%}$ **Population**	-0.3035	0.2848

Table 5 - Regime Independent Variables Without PIGS

$\Delta^{\%}$ Government Expenses	Estimates	Standard Errors
Output Gap < -0.7307%	0.1520*	0.0506
Output Gap > -0.7307%	0.0358**	0.0499

Table 6 - Regime Dependent Variable Without PIGS

Constant Term	Estimate	Standard Error
Output Gap < -0.7307%	0.0006**	0.0005

Table 7 - Regime Specific Constant Term Without PIGS

These results confirm our previous results and reinforce them, since we can see that in the 11 countries that did not face external aid during the crisis, fiscal policy has an even greater weight during the recession periods.

However, even though it is true that these results reinforce our previous findings, it means that in PIGS, things are not so well behaved as in the other countries.

6.2. "PIGS"

In this restricted sample, the results go against our previous findings. However, the fact that only Investment, Real Exchange Rate and Government Expenses in periods in which the output gap is above the threshold value are significant, reinforces the idea that these countries should be seen as outliers.

Threshold Value	95% Confidence Interval
-3.0733%	-8.6247% – -2.9149%

Table 8 - Threshold Value for PIGS

Variables	Estimates	Standard Errors
$\Delta^{\%}$ **Investment**	0.2359**	0.1030
$\Delta^{\%}$ **GDP$_{t-1}$**	0.3246***	0.1817
$\Delta^{\%}$ **Consumption**	0.1480	0.1300
Inflation	0.1505	0.2007
$\Delta^{\%}$ **Real Ex. Rate**	-0.2415**	0.0973
$\Delta^{\%}$ **Population**	-0.9096**	0.4007

Table 9 - Regime Independent Variables for PIGS

$\Delta^{\%}$ Government Expenses	Estimates	Standard Errors
Output Gap < -3.0733%	0.0055	0.0559
Output Gap > -3.0733%	0.0914**	0.0478

Table 10 - Regime Dependent Variable for PIGS

Constant Term	Estimate	Standard Error
Output Gap < -3.0733%	-0.0047**	0.0020

Table 11 - Regime Specific Constant Term for PIGS

Even though it seems that the results go against the previous ones, we have to look carefully at this output. Firstly, we can see that the standard errors increased in every variable which shows that these countries went through agitated moments which increased the uncertainty of the parameters a lot.

Also, this model presents a very low threshold value that is only observable after the sovereign debt crisis in these four countries, and, so, it is important to understand that one regime is purely showing us results from the crisis whereas the other is just allowing us to understand what happened before it.

Furthermore, we cannot forget that economies have a tendency to go to equilibrium and that equilibrium is when the output gap is close to zero, so, although these countries applied some contractionary measures, the economy had pressure to

go to equilibrium, i.e., to grow. This explains why when governments were diminishing their expenses, GDP did not fall as much as was expected.

In sum, this model in this subsamble demonstrates a lot of uncertainty measured by the standard errors, has a low threshold value and the pressure of the economy to go to equilibrium is quite high and contractionary measures have no great contractionary effects.

6.3. No Crisis

The crisis that began in 2009 showed another side of the economy. A side that no one had ever seen before and that could only be related to the Great Depression of 1929 even though the world was completely different back then.

So, it is legitimate to think that the years that followed 2008 introduced a great change in the way that we now perceive crises. Also, we can think that the economic world changed its behavior and it is now acting in a different way.

To prove this, we decided to run the model without any data from 2009 and onwards. In this period, negative growth rates were extremely rare with just 5.2% of the observations showing this phenomenon, whereas in the period after 2009 we can see a terrifying value of 27.6% of GDP shrinking.

To understand what changed, we decided to redo the model.

Threshold Value	95% Confidence Interval
1.0126%	0.8591% – 4.0041%

Table 12 - Threshold Value Before 2009

Variables	Estimates	Standard Errors
$\Delta^{\%}$ **Investment**	0.3399*	0.0545
$\Delta^{\%}$ **GDP$_{t-1}$**	0.0637***	0.0975
$\Delta^{\%}$ **Consumption**	0.3530*	0.0709
Inflation	-0.0810	0.1478
$\Delta^{\%}$ **Real Ex. Rate**	0.0666	0.0265
$\Delta^{\%}$ **Population**	0.7173	0.5671

Table 13 - Regime Independent Variables Before 2009

$\Delta^{\%}$ Government Expenses	Estimates	Standard Errors
Output Gap < 1.0126%	0.0119*	0.0612
Output Gap > 1.0126%	0.1908*	0.0427

Table 14 - Regime Dependent Variable Before 2009

Constant Term	Estimate	Standard Error
Output Gap < 1.0126%	0.0011*	0.0008

Table 15 - Regime Specific Constant Term Before 2009

Those last years changed a lot the behavior of the economy as this results show exactly the opposite tendency regarding government expenses before the crisis.

Nonetheless, we must understand that only in 18 observations do we see contractionary measures (understanding contractionary measures as reductions of government expenses), which makes us look almost exclusively to how GDP reacted to expansionary measures during the so-called Great Moderation, this creates sort of a puzzle because it is not easy to understand why economies tended to deviate from equilibrium in a positive way.

However, this can be interpreted as one of the reasons why the crisis was so hard to overtake. Constantly overheated economies for a long time generate bubble effects way more easily and it is undeniable that during the period that we are considering, we had several markets, especially the real estate market, living in an economic bubble (Lewis, 2010).

6.4. Just Crisis

If it is interesting to look at what happened before the crisis, it is also interesting to look at what happened afterwards.

In this period, GDP decreased in several countries in several moments and economies were constantly facing negative output gaps. It is a period where economists were using trial and error in an attempt to surpass the problem because this was an all-new phenomenon.

In this period we can see increases and decreases of all variables that we use in our model and it has a great weight on the way that our main results are presented because these periods correspond to almost half of the whole sample.

Threshold Value	95% Confidence Interval
-0.9041%	-6.6190% – -0.3946%

Table 16 - Threshold Value After 2009

Variables	Estimates	Standard Errors
$\Delta^{\%}$ **Investment**	0.1714	0.1132
$\Delta^{\%}$ **GDP$_{t-1}$**	0.3320**	0.1421
$\Delta^{\%}$ **Consumption**	0.4248*	0.1137
Inflation	0.0346	0.1075

$\Delta^{\%}$ **Real Ex. Rate**	-0.0675	0.0472
$\Delta^{\%}$ **Population**	-0.1645	0.1787

Table 17 - Regime Independent Variables After 2009

$\Delta^{\%}$ Government Expenses	Estimates	Standard Errors
Output Gap < -0.9041%	0.1314*	0.0446
Output Gap > -0.9041%	-0.0035	0.0587

Table 18 - Regime Dependent Variable After 2009

Constant Term	Estimate	Standard Error
Output Gap < -0.9041%	0.0017***	0.0008

Table 19 - Regime Specific Constant Term After 2009

In this period, we see that the economy is mainly driven by changes in private consumption and that fiscal policy is just significant when the output gap is below the threshold level, reinforcing the conclusions of the main model with the whole sample.

However, during this period, economies passed three quarters of the whole time below the threshold value.

7. Conclusion

This work project tried to understand whether fiscal policy has different effects in moments of positive or negative output gap. To do so, we used a panel data threshold model allowing for endogenous regressors proposed by Kramer *et al*. (2012).

The objective was to study if the fiscal multiplier varies in a non-linear way. That non-linearity was provided by the state of the economy, depending on whether we were facing a positive or a negative output gap. Our purpose was to understand what governments can do when facing a recession period.

Considering the whole sample, we found what other studies often unveil: namely that fiscal policy is stronger when potential GDP is higher than actual GDP and, in our case, only in this scenario is fiscal policy significant to variations in GDP.

Our results suggest a threshold value of -0.7307% for the output gap, when the economy shifted from one regime to another, dividing the sample into two regimes. In the negative regime (calling negative regime the one where the output gap was below the threshold value), the fiscal multiplier was 0.102, which means that whenever governments raise their expenses in 1 p.p., *ceteris paribus*, GDP grwoth increased by 0.102 p.p., whereas, in the positive regime, the fiscal multiplier found was 0.036, however it was not statistically significant.

Nevertheless, since we studied 15 EU countries in the period between 2000 and 2016, one could easily imagine that this sample is quite troubled because of the crisis. So we performed two kinds of robustness checks: one with and another without the "PIGS" countries and one with the years after and another with the years before 2009.

In the first case, we found that without the "PIGS", our model still behaves in the same way, the threshold value remains the same and the fiscal multiplier even gets larger in the negative regime. However, when studying just the PIGS, we get a smaller threshold value (-3.07%) and find that when the output gap is below the threshold, the fiscal multiplier is not significant. One possible explanation for this is that these countries faced periods of austerity while their GDP was already significantly below its potential.

In the second case, removing the years after 2009, the threshold value becomes 1.01% and government expenses are significant and positive when the output gap is larger than that value, which is contrary to the previous findings. An explanation for this is that this period was marked by overheated economies and expansionary measures, which created a bubble effect that distorted the results. When looking at the sample from 2009 onwards, we find that our conclusions hold. In this case, the threshold value is -0.90% and fiscal policy is only significant when the output gap is below that value.

Our analysis would benefit from a larger sample. Unfortunately, many countries did not collect quarterly data before 2000. One interesting development for future work is the estimation of a panel data threshold Vector Autoregressive Model combining all the literature that is being developed in the Threshold Vector Autoregressive Models with the work of Hansen (1999, 2000) in the context of panel data threshold models.

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9. Appendix

9.1. Descriptive Statistics

All statistics are based in quarterly changes.

Output Gap	MEAN	MAX	MIN	MEDIAN	STD. DEV.
Austria	-0.12%	3.75%	-3.67%	-0.36%	2.00%
Belgium	-0.02%	2.94%	-2.15%	-0.14%	1.30%
Denmark	-0.04%	4.52%	-3.61%	-0.75%	2.38%
Finland	-0.42%	6.02%	-4.88%	-0.45%	2.83%
France	-0.05%	2.89%	-3.00%	-0.03%	1.63%
Germany	-0.34%	3.01%	-4.79%	-0.09%	1.68%
Greece	-1.54%	9.77%	-14.48%	0.17%	7.89%
Ireland	1.56%	10.37%	-8.62%	4.27%	6.94%
Italy	-0.94%	2.89%	-4.98%	0.13%	2.71%
Luxembourg	-0.13%	6.01%	-4.12%	-0.23%	2.09%
Netherlands	-0.40%	3.99%	-3.53%	-0.92%	2.24%
Portugal	-1.62%	4.45%	-8.07%	-0.43%	3.63%
Spain	-0.52%	5.58%	-7.99%	1.93%	4.28%
Sweden	-0.30%	4.78%	-6.24%	-0.68%	2.51%
United Kingdom	-0.27%	4.21%	-4.56%	0.14%	2.32%

Table 20 - Output Gap Descriptive Statistics

GDP Growth	MEAN	MAX	MIN	MEDIAN	STD. DEV.
Austria	0.78%	1.63%	-0.84%	0.76%	0.48%
Belgium	0.77%	1.53%	-0.78%	0.78%	0.47%
Denmark	0.66%	1.85%	-1.51%	0.70%	0.65%
Finland	0.72%	2.16%	-1.90%	0.79%	0.82%
France	0.64%	1.28%	-0.87%	0.74%	0.47%
Germany	0.61%	1.59%	-1.42%	0.70%	0.57%
Greece	0.34%	2.48%	-2.37%	0.33%	1.55%
Ireland	1.49%	8.63%	-2.91%	1.52%	2.26%
Italy	0.47%	1.50%	-1.34%	0.68%	0.59%
Luxembourg	1.31%	3.48%	-1.59%	1.38%	1.06%
Netherlands	0.69%	1.99%	-0.99%	0.73%	0.62%
Portugal	0.57%	1.65%	-1.30%	0.79%	0.76%
Spain	0.87%	2.08%	-0.99%	1.03%	1.02%
Sweden	0.83%	5.27%	-4.39%	0.91%	1.78%
United Kingdom	0.63%	3.90%	-5.42%	0.96%	1.98%

Table 21 – GDP Growth Descriptive Statistics

Government Expenses Growth	MEAN	MAX	MIN	MEDIAN	STD. DEV.
Austria	0.87%	2.09%	-0.54%	0.82%	0.52%
Belgium	1.01%	2.19%	0.27%	0.94%	0.45%
Denmark	0.82%	1.98%	-0.41%	0.89%	0.56%
Finland	1.05%	2.14%	-0.09%	1.11%	0.53%
France	0.76%	1.57%	0.26%	0.77%	0.31%
Germany	0.68%	1.57%	-0.34%	0.69%	0.40%
Greece	0.51%	3.30%	-4.25%	1.52%	2.10%
Ireland	1.22%	4.40%	-2.82%	1.18%	1.72%
Italy	0.58%	2.22%	-0.78%	0.30%	0.89%
Luxembourg	1.60%	3.00%	-0.20%	1.69%	0.71%
Netherlands	1.04%	2.78%	-0.39%	0.83%	0.89%
Portugal	0.51%	2.32%	-3.54%	0.71%	1.29%
Spain	1.10%	2.53%	-3.26%	1.61%	1.24%
Sweden	0.92%	4.18%	-2.74%	1.00%	1.43%
United Kingdom	0.87%	3.69%	-3.19%	1.37%	1.64%

Table 22 – Government Expenses Growth Descriptive Statistics

Investment Growth	MEAN	MAX	MIN	MEDIAN	STD. DEV.
Austria	0.60%	2.32%	-2.18%	0.72%	0.99%
Belgium	0.83%	3.29%	-2.26%	0.96%	1.37%
Denmark	0.53%	4.85%	-5.58%	0.65%	1.95%
Finland	0.56%	4.38%	-4.95%	0.82%	1.67%
France	0.67%	2.20%	-2.79%	0.85%	1.08%
Germany	0.40%	3.28%	-2.69%	0.41%	1.36%
Greece	-0.56%	7.44%	-9.08%	-0.22%	3.96%
Ireland	1.78%	10.50%	-8.36%	2.12%	4.42%
Italy	0.16%	2.42%	-3.09%	0.60%	1.31%
Luxembourg	1.45%	7.03%	-6.13%	1.29%	2.70%
Netherlands	0.49%	3.83%	-3.25%	0.81%	1.56%
Portugal	-0.41%	2.54%	-5.52%	0.13%	1.97%
Spain	0.45%	3.30%	-6.44%	1.43%	2.46%
Sweden	1.00%	5.92%	-6.05%	1.22%	2.25%
United Kingdom	0.57%	4.87%	-7.57%	0.98%	2.77%

Table 23 – Investment Growth Descriptive Statistics

Consumption Growth	MEAN	MAX	MIN	MEDIAN	STD. DEV.
Austria	0.73%	1.53%	0.05%	0.68%	0.36%
Belgium	0.71%	1.48%	-0.45%	0.63%	0.42%
Denmark	0.72%	2.00%	-1.09%	0.72%	0.57%
Finland	0.95%	1.90%	-0.57%	1.03%	0.53%
France	0.65%	1.40%	-0.54%	0.73%	0.44%
Germany	0.50%	1.06%	-0.37%	0.52%	0.27%
Greece	0.41%	2.58%	-2.65%	0.83%	1.53%
Ireland	0.92%	2.92%	-3.38%	1.29%	1.43%
Italy	0.48%	1.32%	-0.67%	0.63%	0.50%
Luxembourg	0.92%	2.53%	-0.14%	0.96%	0.53%
Netherlands	0.50%	1.48%	-1.14%	0.49%	0.52%
Portugal	0.62%	1.75%	-1.44%	0.93%	0.86%
Spain	0.81%	2.04%	-1.63%	0.81%	0.96%
Sweden	0.75%	4.40%	-3.36%	0.83%	1.56%
United Kingdom	0.57%	3.90%	-5.05%	0.82%	1.93%

Table 24 – Private Consumption Growth Descriptive Statistics

Inflation	MEAN	MAX	MIN	MEDIAN	STD. DEV.
Austria	0.48%	0.92%	0.01%	0.45%	0.21%
Belgium	0.48%	1.37%	-0.31%	0.47%	0.31%
Denmark	0.44%	1.03%	0.03%	0.49%	0.22%
Finland	0.38%	1.12%	-0.26%	0.35%	0.32%
France	0.36%	0.82%	-0.11%	0.42%	0.21%
Germany	0.36%	0.76%	-0.06%	0.38%	0.19%
Greece	0.54%	1.37%	-0.59%	0.72%	0.52%
Ireland	0.47%	1.33%	-1.55%	0.56%	0.65%
Italy	0.46%	0.98%	-0.10%	0.53%	0.26%
Luxembourg	0.50%	1.06%	-0.03%	0.54%	0.25%
Netherlands	0.47%	1.08%	0.00%	0.44%	0.25%
Portugal	0.51%	1.18%	-0.38%	0.61%	0.38%
Spain	0.55%	1.21%	-0.26%	0.65%	0.40%
Sweden	0.30%	1.06%	-0.35%	0.25%	0.31%
United Kingdom	0.52%	1.17%	-0.01%	0.50%	0.28%

Table 25 – Inflation Descriptive Statistics

Real Ex. Rate Perc. Change	MEAN	MAX	MIN	MEDIAN	STD. DEV.
Austria	0.05%	1.13%	-1.14%	0.10%	0.52%
Belgium	0.11%	1.26%	-1.49%	0.12%	0.58%
Denmark	0.07%	1.74%	-1.73%	0.08%	0.72%
Finland	0.06%	1.87%	-2.16%	0.11%	0.86%
France	0.02%	1.87%	-1.87%	0.11%	0.76%
Germany	-0.02%	1.64%	-1.92%	0.05%	0.77%
Greece	0.10%	2.06%	-2.15%	0.18%	0.76%
Ireland	0.12%	2.89%	-2.62%	0.40%	1.18%
Italy	0.11%	2.06%	-1.79%	0.18%	0.79%
Luxembourg	0.17%	1.37%	-1.03%	0.23%	0.45%
Netherlands	0.10%	1.44%	-1.48%	0.06%	0.66%
Portugal	0.11%	1.53%	-1.18%	0.13%	0.58%
Spain	0.17%	1.89%	-1.72%	0.28%	0.67%
Sweden	-0.08%	2.88%	-3.85%	0.08%	1.48%
United Kingdom	-0.16%	2.12%	-5.36%	-0.04%	1.47%

Table 26 – Real Exchange Rate Percentage Change Descriptive Statistics

Population Growth	MEAN	MAX	MIN	MEDIAN	STD. DEV.
Austria	0.12%	0.36%	0.04%	0.11%	0.06%
Belgium	0.15%	0.23%	0.01%	0.16%	0.05%
Denmark	0.10%	0.21%	0.01%	0.09%	0.03%
Finland	0.09%	0.12%	0.01%	0.10%	0.03%
France	0.14%	0.20%	-0.04%	0.14%	0.04%
Germany	-0.01%	0.30%	-0.45%	-0.01%	0.12%
Greece	-0.01%	0.09%	-0.29%	0.04%	0.11%
Ireland	0.32%	0.83%	-0.03%	0.38%	0.23%
Italy	0.10%	0.46%	-0.53%	0.12%	0.13%
Luxembourg	0.43%	0.70%	0.00%	0.42%	0.14%
Netherlands	0.10%	0.19%	0.00%	0.10%	0.04%
Portugal	0.02%	0.28%	-0.27%	0.03%	0.12%
Spain	0.23%	0.47%	-0.16%	0.33%	0.20%
Sweden	0.16%	0.31%	0.03%	0.18%	0.07%
United Kingdom	0.16%	0.38%	0.01%	0.16%	0.07%

Table 27 – Population Growth Descriptive Statistics