Adoption of the Euro: The Cases of Spain and Portugal

Kayla Bouchard
The University of Akron
Department of Economic
Senior Project
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Abstract

Portugal and Spain are two countries who first adopted the euro in 1999. When it went into circulation in 2002, Portugal experienced slowed economic growth and higher unemployment, whereas Spain did not. This paper examines the components of gross domestic product to forecast the period right after the euro went into circulation. The disparity between the forecasted and actual values for Portugal’s unemployment rate is believed to be due to the European Central bank taking control of monetary policy and having no control over its own interest rate. Spain is believed to not have experienced its own increase in unemployment due to economic growth being driven by its own domestic housing market.
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I. Introduction

The similarities between Spain and Portugal are striking. The countries are neighbors, at the southwest corner of Europe: both spent much of the 20th century governed by dictators; in both, dictatorship came to an end in the mid 1970's. In both countries the late 1970's were characterized by a social and wage explosion, and the 1980's by a return to economic and political stability (Olivier Blanchard and Juan F. Jimeno, 1995; Mário Centeno and Miguel C. Coelho, 2018).

Both countries joined the European Union (EU) in 1986. The countries labor markets are similar. Portugal and Spain’s unemployment rates are mirrors of each other (see figure 1). The exception is the period of 2002-2007, during this period, Portugal’s unemployment rate continued to rise whereas Spain’s unemployment rate decreased.

Data Retrieved from Worldbank

Figure 1: Unemployment Rate of Spain and Portugal

Variable
- Portugal
- Spain

Date
- 01/1986
- 06/1988
- 12/1990
- 01/1992
- 01/1994
- 06/1995
- 01/1997
- 06/1999
- 01/2001
- 03/2005
- 12/2007

Unemployment Rate (%)
The economies of these two countries are also similar. Both countries Gross Domestic Product (GDP) growth rates are similar (see figure 2). The two had similar trends, never straying far from each other for an extended period of time however, during 2002-2007, Spain experienced continued positive growth where Portugal experienced slowed growth, even negative during 2003.

![Figure 2: GDP Growth Rate of Spain and Portugal](image)

Triggered by the commitment to join the EMU, Portugal experienced a sharp drop in interest rates and expectations of faster growth both led to a decrease in private saving and an increase in investment (See figure 3). The result was high output growth, decreasing unemployment, increasing wages, and fast increasing current account deficits (Olivier Blanchard, 2007).
II. Literature Review

The overall effects of EMU integration were very positive for Spain. Integration contributed to macroeconomic stability, it imposed fiscal discipline and central bank independence, and it dramatically lowered the cost of capital (Sebastián Royo, 2010). One of the key benefits was the dramatic reduction in short-term and long-term nominal interest rates (see figure 4).

Figure 5: Portugal Gross Savings (% of GDP)

Data Retrieved from Worldbank
There are undeniable benefits of adopting the common currency, and the most important of these are a greater monetary stability, reduced transaction costs, decreased exchange rate volatility and lower interest rates (Cristian Ştefan Ovidiu, 2011). The euro was launched on 1 January 1999: for the first three years it was an ‘invisible’ currency, only used for accounting purposes and electronic payments. Coins and banknotes were launched on 1 January 2002. Following the adoption of the euro, Portugal experienced a recession, while Spain experienced a slight downturn however, the GDP growth rate never fell below 2%. Between 2000 and 2012, the Portuguese economy grew less than the United States during the Great Depression (Ricardo Reis, 2013). In addition to slowed economic growth, Portugal experienced an increase in its unemployment rate, while Spain experienced a decrease in its unemployment rate.
III. Theoretical Discussion

The Single Market of the European Union is the common area between the EU countries where goods, services, capital and persons can circulate freely. The creation of a ‘Single Market’ was a part of the long cycle of economic integration that Europe began at the end of the Second World War. Regional integration benefits the members countries by ensuring access to the markets of their partners, lessening the risk and uncertainty as regards the effects of trade liberalization on domestic industry, easing the task of policy coordination, and reducing the cost of infant industry production (Bela Balassa and Ardy Stoutjesdijk, 1975). Both Portugal and Spain signed the Single European Act in 1986. This Act provided the basis for a six-year program aimed at sorting out the problems with the free flow of trade across EU borders and thus created the ‘Single Market’ (Single European Act, 1986). With the creation of the ‘Single Market’ from the SEA, the next step in integration is to create a single currency that would in turn further integrate the markets of the participating countries.

The creation of a single currency follows the theory of an optimum currency area. This theory states that an,’ optimum currency area is a region where no fiscal or monetary intervention is needed to bring the economy back to its equilibrium” (Oleksandra Stoykova, 2018). The father of this theory, Robert Mundell, argued that,” transaction and information costs increase with a number of currencies” and “a huge number of small currency areas makes foreign exchange market too thin” (Stoykova, 2018). Peter Kenen furthered the optimum currency area theory by emphasizing that fiscally integrated regions are suitable for a monetary union (Stoykova, 2018). The adoption of the euro was expected to force under performing countries into reform since monetary and fiscal policies were out of the hands of the countries governments (Jesús Fernández-Villaverde, Luis Garicano, and Taño Santos, 2013). The Treaty
on European Union states that the European System of Central Banks has the responsibility of implementing monetary policy and the European Central Bank may act as a fiscal agent (Treaty on European Union pp 149, 158).

The IS-LM model, which stands for "investment-savings" (IS) and "liquidity preference-money supply" (LM) is a Keynesian macroeconomic model that shows how the market for economic goods (IS) interacts with the loanable funds market (LM) or money market. In the case of Spain and Portugal, both countries gave up the control of their own monetary policy therefore, in the IS-LM model, Spain and Portugal can only directly influence the IS side.

IV. Data

All of the data used in this analysis comes from the world bank and the federal reserve of economic data. Complete time series were available for all of the variables (See table 1). All of the variables are representative of two different time series, one for Spain and one for Portugal. A table of summary statistics gives a synopsis of the variables (See table 2).

<table>
<thead>
<tr>
<th>Table 1: Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable Name</td>
</tr>
<tr>
<td>GDP growth (annual %) - Spain &amp; Portugal</td>
</tr>
<tr>
<td>3-Month or 90-day Rates and Yields: Interbank Rates for Spain &amp; Portugal</td>
</tr>
<tr>
<td>Unemployment, total (% of total labor force) (national estimate) - Spain &amp; Portugal</td>
</tr>
<tr>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Foreign direct investment, net inflows (% of GDP) - Spain &amp; Portugal</td>
</tr>
<tr>
<td>Foreign direct investment, net outflows (% of GDP) - Spain &amp; Portugal</td>
</tr>
<tr>
<td>Final Consumption Expenditure (current US$) - Spain &amp; Portugal</td>
</tr>
</tbody>
</table>

### Table 2: Summary Statistics

<table>
<thead>
<tr>
<th></th>
<th>Consumption</th>
<th>FDI Inflow</th>
<th>FDI Outflow</th>
<th>GDP</th>
<th>Three Month Rate</th>
<th>Government</th>
<th>Unemployment</th>
<th>Net Trade</th>
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<tr>
<td><strong>Spain</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min</td>
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<td>1.347</td>
<td>0.1502</td>
<td>-1.031</td>
<td>2.963</td>
<td>3.77E+10</td>
<td>10.35</td>
<td>-3.46E+09</td>
</tr>
<tr>
<td>1st Quarter</td>
<td>3.93E+11</td>
<td>1.58</td>
<td>0.3533</td>
<td>2.632</td>
<td>5.128</td>
<td>8.18E+10</td>
<td>16.18</td>
<td>-2.65E+09</td>
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<tr>
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<td>2.045</td>
<td>0.7846</td>
<td>3.742</td>
<td>10.503</td>
<td>9.87E+10</td>
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<tr>
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<td>9.604</td>
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<td>2.7618</td>
<td>4.575</td>
<td>13.256</td>
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<tr>
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<td>9.8997</td>
<td>5.547</td>
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<td></td>
<td></td>
<td></td>
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<tr>
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<tr>
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<td>-1.02E+09</td>
</tr>
<tr>
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<td>0.55097</td>
<td>4.046</td>
<td>12.037</td>
<td>1.78E+10</td>
<td>5.215</td>
<td>-8.25E+08</td>
</tr>
</tbody>
</table>
V. Methodology

This analysis will build a vector autoregressive model (VAR), using GDP growth (annual %) as the response variable with 3-Month or 90-day Rates and Yields Interbank Rates, final consumption expenditure (current US$), foreign direct investment, net inflows (% of GDP), foreign direct investment, net outflows (% of GDP), general government final consumption expenditure (current US$), unemployment total (% of total labor force) (national estimate), and net trade: value goods as the predictor variables, for both Spain and Portugal. The analysis will focus on the performance in the years leading up to the introduction of the euro and then up to the financial crisis of 2007.

A VAR model will be built for each Portugal and Spain, using data from 1986 to 2001. The first VAR is of Portugal (See equation 1). The second VAR is of Spain (See equation 2). In both equations the predictor variables, with a single lag, are represented by “X”.

\[
\text{GDP Growth Rate Portugal} = X + \text{const} \\
\text{(Equation 1)}
\]

\[
\text{GDP Growth Rate Spain} = X + \text{const} \\
\text{(Equation 2)}
\]

These years are chosen because 1986 is when both Spain and Portugal joined the European Union and 2001 is the year before the euro went into full circulation. Once the VAR models are
made then they will be used to create a forecast of the countries respective GDP growth rates up to 2007, before the financial crisis.

![Figure 5: Portugal Actual 2002-2007](image)
Conclusions, based on knowledge of economic integration, optimal currency areas and the IS-LM model, will be made to explain differences between the forecasted and actual values (See figures 5 & 6). Furthermore, comparisons will be made as to the reason(s) Spain’s GDP Growth rate remained higher than Portugals during the 1999-2007 time period, when the two countries are extremely similar.
VI. Results

The predicted values of the variables with a 95% confidence interval for Portugal and Spain are shown in Figures 7 and 8 respectively. In both countries, the forecasted 3 month rate decreased whereas the actual values increased. This is because both countries do not set their own target interest rates, the European Central Bank has control. In Portugal, the forecasted unemployment rate was to decrease but the actual unemployment rate increased.

Figure 7: Portugal Predicted 2002-2007

![Forecast charts showing predicted and actual values for various economic indicators for Portugal and Spain.](image-url)
The only variable that was outside of the forecasted 95% confidence interval was Portugal’s unemployment rate. This disparity is due to the fact that Portugal’s interest rate increased resulting in decreased investment. This decrease in investment spending slows job growth and lowers GDP growth. The government of Portugal continued to increase government spending to mitigate the loss that decreased investment spending caused but the European Central Bank controlled money flow so they were unable to increase spending to fully cover the loss. The loss of investment spending combined with not enough expansionary monetary policy
resulted in the higher unemployment that Portugal experienced after the advent of the euro. Spain did not experience the increased unemployment that Portugal did because Spain was in the midst of an economic expansion driven by a housing bubble (See figure 9). The decrease in Spain's unemployment was driven by seasonal and part-time workers in the housing market (Martín, Moral-Benito, and Schmitz, 2019).

Economic integration to a monetary union can reduce the costs of trade, improve the availability of goods and services, and increase consumer purchasing power in member nations. Employment opportunities tend to improve because trade liberalization leads to market expansion, technology sharing, and cross-border investment. However, as seen in the case of Portugal, economic integration can have a short term negative impact due to the member countries giving up control of their own monetary policy and conforming to the rules and regulations of overseeing bodies.
VIII. References


Organization for Economic Co-operation and Development, 3-Month or 90-day Rates and Yields: Interbank Rates for Portugal [IR3TIB01PTM156N], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/IR3TIB01PTM156N, March 10, 2021.

Organization for Economic Co-operation and Development, 3-Month or 90-day Rates and Yields: Interbank Rates for Spain [IR3TIB01ESM156N], retrieved from FRED, Federal
Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/IR3TIB01ESM156N, March 10, 2021.


World Bank, World Development Indicators
# 86-07 Portugal
portugal <- read.table("E:\Spring 2021\Senior Project\Data\Senior Project_Portugal.csv", sep = ",", header = TRUE)
colnames(vardata.p.86_07) <- cbind("Consumption", "FDIInflow", "FDIOutflow", "GDP", "3MonthRate", "Government", "Unemployment","NetTrade")

# 86-07 Spain
spain <- read.table("E:\Spring 2021\Senior Project\Data\Senior Project_Spain.csv", sep = ",", header = TRUE)


consumption.p <- ts(portugal$Final.consumption.expenditure..current.US.....Portugal, start = c(1986,1), end = c(2007,1), frequency = 1)

fdiinflow.p <- ts(portugal$Foreign.direct.investment..net.inflows....of.GDP....Portugal, start = c(1986,1), end = c(2007,1), frequency = 1)

fdioutflow.p <- ts(portugal$Foreign.direct.investment..net.outflows....of.GDP....Portugal, start = c(1986,1), end = c(2007,1), frequency = 1)

gdp.p <- ts(portugal$GDP.growth..annual......Portugal, start = c(1986,1), end = c(2007,1), frequency = 1)

government.p <- ts(portugal$General.government.final.consumption.expenditure..current.US.....Portugal, start = c(1986,1), end = c(2007,1), frequency = 1)

unemployment.p <- ts(portugal$Unemployment..total....of.total.labor.force...national.estimate....Portugal, start = c(1986,1), end = c(2007,1), frequency = 1)


# 86-07 Spain

spain <- read.table("E:\Spring 2021\Senior Project\Data\Senior Project_Spain.csv", sep = ",", header = TRUE)


consumption.s <- ts(spain$Final.consumption.expenditure..current.US.....Spain, start = c(1986,1), end = c(2007,1), frequency = 1)

fdiinflow.s <- ts(spain$Foreign.direct.investment..net.inflows....of.GDP....Spain, start = c(1986,1), end = c(2007,1), frequency = 1)

fdioutflow.s <- ts(spain$Foreign.direct.investment..net.outflows....of.GDP....Spain, start = c(1986,1), end = c(2007,1), frequency = 1)
gdp.s <- ts(spain$GDP.growth..annual......Spain, start = c(1986,1), end = c(2007,1), frequency = 1)
government.s <-
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c(1986,1), end = c(2007,1), frequency = 1)
unemployment.s <-
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frequency = 1)
# 86-01 Portugal
portugal_86_01 <- read.table("E:\Spring 2021\Senior Project\Data\Senior Project_Portugal_86-01.csv", sep = ",", header = TRUE)
consumption.p.86_01 <-
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fdiinflow.p.86_01 <-
ts(portugal_86_01$Foreign.direct.investment..net.inflows....of.GDP....Portugal, start = c(1986,1),
end = c(2001,1), frequency = 1)
fdioutflow.p.86_01 <-
ts(portugal_86_01$Foreign.direct.investment..net.outflows....of.GDP....Portugal, start =
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gdp.p.86_01 <- ts(portugal_86_01$GDP.growth..annual......Portugal, start = c(1986,1), end =
c(2001,1), frequency = 1)
three monthrate.p.86_01 <-
ts(portugal_86_01$X3.Month.or.90.day.Rates.and.Yields_.Interbank.Rates.for.Portugal, start =
c(1986,1), end = c(2001,1), frequency = 1)
end = c(2001,1), frequency = 1)
unemployment.p.86_01 <-
ts(portugal_86_01$Unemployment..total....of.total.labor.force...national.estimate....Portugal, start =
c(1986,1), end = c(2001,1), frequency = 1)
government.p.86_01 <-
ts(portugal_86_01$General.government.final.consumption.expenditure..current.US.....Portugal,
start = c(1986,1), end = c(2001,1), frequency = 1)
# 86-01 Spain
spain_86_01 <- read.table("E:\Spring 2021\Senior Project\Data\Senior Project_Spain_86-01.csv", sep = ",", header = TRUE)
consumption.s.86_01 <- ts(spain_86_01$Final.consumption.expenditure..current.US.....Spain,
start = c(1986,1), end = c(2001,1), frequency = 1)
fdiinflow.s.86_01 <- ts(spain_86_01$Foreign.direct.investment..net.inflows....of.GDP....Spain, start = c(1986,1), end = c(2001,1), frequency = 1)
fdioutflow.s.86_01 <- ts(spain_86_01$Foreign.direct.investment..net.outflows....of.GDP....Spain, start = c(1986,1), end = c(2001,1), frequency = 1)
gdp.s.86_01 <- ts(spain_86_01$GDP.growth..annual......Spain, start = c(1986,1), end = c(2001,1), frequency = 1)
threeomthrate.s.86_01 <- ts(spain_86_01$X3.Month.or.90.day.Rates.and.Yields_.Interbank.Rates.for.Spain, start = c(1986,1), end = c(2001,1), frequency = 1)
nettrade.s.86_01 <- ts(spain_86_01$Net.Trade..Value.Goods.for.Spain, start = c(1986,1), end = c(2001,1), frequency = 1)
unemployment.s.86_01 <- ts(spain_86_01$Unemployment..total....of.total.labor.force...national.estimate....Spain, start = c(1986,1), end = c(2001,1), frequency = 1)
government.s.86_01 <- ts(spain_86_01$General.government.final.consumption.expenditure..current.US.....Spain, start = c(1986,1), end = c(2001,1), frequency = 1)

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gdp.p.02_07 <- ts(portugal_02_07$GDP.growth..annual......Portugal, start = c(2002,1), end = c(2007,1), frequency = 1)
unemployment.p.02_07 <- ts(portugal_02_07$Unemployment..total....of.total.labor.force...national.estimate....Portugal, start = c(2002,1), end = c(2007,1), frequency = 1)
government.p.02_07 <-
  ts(portugal_02_07$General.government.final.consumption.expenditure..current.US.....Portugal,
    start = c(2002,1), end = c(2007,1), frequency = 1)
# 02-07 Spain
spain_02_07 <- read.table("E:\Spring 2021\Senior Project\Data\Senior Project_Spain_02-07.csv", sep = ",", header = TRUE)
consumption.s.02_07 <- ts(spain_02_07$Final.consumption.expenditure..current.US.....Spain,
    start = c(2002,1), end = c(2007,1), frequency = 1)
fdiinflow.s.02_07 <- ts(spain_02_07$Foreign.direct.investment..net.inflows....of.GDP....Spain,
    start = c(2002,1), end = c(2007,1), frequency = 1)
fdioutflow.s.02_07 <- ts(spain_02_07$Foreign.direct.investment..net.outflows....of.GDP....Spain,
    start = c(2002,1), end = c(2007,1), frequency = 1)
gdp.s.02_07 <- ts(spain_02_07$GDP.growth..annual......Spain, end = c(2007,1), frequency = 1)
threemonthrate.s.02_07 <-
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nettrade.s.02_07 <- ts(spain_02_07$Net.Trade..Value.Goods.for.Spain, start = c(2002,1), end =
    c(2007,1), frequency = 1)
unemployment.s.02_07 <-
  ts(spain_02_07$Unemployment..total....of.total.labor.force...national.estimate....Spain, start =
    c(2002,1), end = c(2007,1), frequency = 1)
government.s.02_07 <-
  ts(spain_02_07$General.government.final.consumption.expenditure..current.US.....Spain, start =
    c(2002,1), end = c(2007,1), frequency = 1)
# model portugal
vardata.p.86_01 <- cbind(consumption.p.86_01, fdiinflow.p.86_01, fdioutflow.p.86_01,
  gdp.p.86_01, threemonthrate.p.86_01, government.p.86_01, unemployment.p.86_01,
  nettrade.p.86_01)
summary(vardata.p.86_01)
colnames(vardata.p.86_01) <- cbind("Consumption", "FDIInflow", "FDIOutflow", "GDP",
  "3MonthRate", "Government", "Unemployment","NetTrade")
lagselect.p <- VARselect(vardata.p.86_01, lag.max = 5, type = "const")
lagselect.p$selection
var.p.1 <- VAR(vardata.p.86_01, p= 1, ic = c("AIC"), type = "const", season = NULL)
var.p.1
var.predict.p <- predict((var.p.1), h = 6 , level = 0.95)
var.predict.p
summary(var.predict.p)
plot(var.predict.p)
vardata.p.02_07 <- cbind(consumption.p.02_07, fdiinflow.p.02_07, fdiinflow.p.02_07, 
gdp.p.02_07, threemonthrate.p.02_07, government.p.02_07, unemployment.p.02_07, 
nettrade.p.02_07)
colnames(vardata.p.02_07) <- cbind("Consumption", "FDIInflow", "FDIOutflow", "GDP", 
"3MonthRate", "Government", "Unemployment","NetTrade")
plot(vardata.p.02_07)
# model spain
vardata.s.86_01 <- window(ts.union(consumption.s.86_01, fdiinflow.s.86_01, 
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unemployment.s.86_01, nettrade.s.86_01))
summary(vardata.s.86_01)
lagselect.s <- VARselect(vardata.s.86_01, lag.max = 5, type = "const")
lagselect.s$selection
var.s.1 <- VAR(vardata.s.86_01, p = 1, ic = c("AIC"), type = "const", season = NULL)
var.s.1
var.predict.s <- predict((var.p.1), h = 6 , level = 0.95)
var.predict.s
plot(var.predict.s)
vardata.s.02_07 <- cbind(consumption.s.02_07, fdiinflow.s.02_07, fdiinflow.s.02_07, 
gdp.s.02_07, threemonthrate.s.02_07, government.s.02_07, unemployment.s.02_07, 
nettrade.s.02_07)
colnames(vardata.s.02_07) <- cbind("Consumption", "FDIInflow", "FDIOutflow", "GDP", 
"3MonthRate", "Government", "Unemployment","NetTrade")
plot(vardata.s.02_07)