

Public Opinion on the European Monetary Union in Interaction with the National Context



European Institute

ANONYMISED USER

Course Paper

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1 Introduction

The European Union is often claimed to suffer from a lack of legitimacy, missing connection with the electorate and being heavily influenced by elites and technocrats. Public opinion research tries to verify such claims by examining the way in which public opinion interacts with policy outcomes. This exploratory paper is a contribution to the branch of literature aiming to explain the formation of public opinion. It does so by questioning whether national factors are of substantial importance to explaining support for the European Monetary Union (EMU). The empirical evidence presented in this work is somewhat mixed, which is arguably due to an omitted-variable-bias problem. Yet, considering all results together, the conclusion is drawn that public support for EMU is more influenced by internationally shared events than by idiosyncratic national events. This conclusion follows from the observation that changes in the national context did not seem to have a systemic impact on the trend in public opinion. It is further concluded that there is a negative relation between distrust towards the national government and support for European policy. Thirdly, self-interest is found to be an ambiguous factor in explaining support for European policy, at the national level.

The paper will proceed by providing an overview of the relevant literature. In particular, it will introduce two streams of literature to which the design of this research will be tied, the suggestions made in a meta-analysis by Hobolt & De Vries (2016) are embraced. A time-series approach is deemed most appropriate to explore the hypotheses introduced in the consecutive section. An analysis and conclusion make the last two sections. The conclusion will provide a detailed discussion of the analysis, outline its implications as well as highlight the methodology's weaknesses. Finally, a more nuanced answer to the research question is provided and an attempt is made to guide further research.

2 Literature Review

An initial stream within the public opinion literature, attempted to identify the factors that shape public opinion on European integration. In general, this literature finds many variables such as: political, economic, social, cultural and historical factors to matter in the determination of the public's opinion. [See for instance, Anderson & Hecht (2018), Sánchez-Cuenca (2000), Gabel & Palmer (1995), Kaltenthaler & Anderson (2001), Mahler et al. (2000) and Lechler (2019)]. Public attitudes towards integration are thus non-static but endogenous to a large variety of factors.

However, the by the above literature identified variables may shape public opinion differently in each member state, or alternatively phrased: country specific circumstances may matter. Although not explicitly controlling for the above variables, Anderson & Hecht (2018) find that public support for the EU over the period 1952-2017 followed an inverted-U shaped pattern in France and Italy, a more stable trend in the United Kingdom and a more S-shaped pattern in Germany. Mahler et al. (2000) do explicitly control for many economic variables but find a substantial portion of the variance in the support for the European Union to remain unexplained. This illustrates the difficulty in capturing all relevant variables and gives rise to the importance of country fixed effects where possible.

A second key point of this stream of literature is that the public forms attitudes that are consistent with their own self-interest. One of the main implications of this literature is therefore that elites and politicians should pay attention to the effect European integration has on the public's welfare (Gabel & Palmer, 1995). A statement that is confirmed by the relative importance citizens attach to EU social policy in forming their opinion about European integration (Hooghe, 2003). The latter research also finds elites to focus more on the internalization of externalities and the benefits of economies of scale. Both citizens and elites are found to have an aversion of Europeanising high-spending policies.

Yet, it is not to be said that the importance of self-interest is limitless: discrete emotions, cosmopolitanism, EU-related knowledge and altruism are all found to influence support for European integration on the individual voter level. [See for instance, Vasilopoulou & Wagner (2017), Kuhn et al. (2018), Marquart et al. (2019), Bechtel et al. (2014) and Mahler et al. (2000)]. Self-interest is therefore merely to be thought of as what prevails when aggregating individual opinions.

A more recent and expanding stream within the public opinion literature focusses on identifying the factors that determine when public opinion acts as a constraint upon governments. Târlea et al. (2019) examines the policy-making process over the period 2010-2015 and analyses 40 EMU reforms. Governments with highly exposed financial sectors were found to be more likely to support European integration, as integration was believed to minimize the risk of costly bailouts. Citizens' support for integration, the euro or euro-sceptic parties were found to have no systemic impact. It might thus be concluded that in the context of EMU, or at least during the period of the European debt crisis, public opinion was irrelevant to policy-makers, or at least not acted upon.

Hagemann et al. (2017) illustrate that in a broader context public opinion does matter to governments and eventually for the policy outcome. Hagemann and co-authors, find governments to be more likely to oppose legislative proposals that increase the level and scope of EU authority when domestic electorates are sceptical about the EU. Moreover, governments are found to be more responsive to public opinion when the issue is salient in domestic party politics. A finding consistent with (De Bruycker, 2017) that finds political elites to use media more when issues are publicly salient and attract intense mobilisation by civil society groups. Under non-crisis circumstances, governments may thus be susceptible to the opinion of the public. Particularly when the issue is controversial or heavily contested in domestic party politics.

However, if a European political issue is not deemed salient by the electorate, the public's opinion is expected to little constraint the policy-making process. Schoen (2019) who focuses on the 2017 German federal election, for instance concludes that voters did perceive parties to differ on their stances regarding European integration, but not to care much about these differences when voting.

Hobolt & De Vries (2016) provide a meta-analysis on the study of public opinion in relation to European integration and call for an increased attention to the national context in which public opinion is shaped. This proposition connects to the first stream of literature described above. In particular, it calls to delve deeper into the importance and composition of the aforementioned country fixed effects and to explore the importance of self-interest in a national context.

A second suggestion Hobolt and De Vries make, is to increase the literature on the linkage between the change in support for EU-policy and the change in support for the national government. This proposition connects to the second stream of literature described. In particular, it will focus on the identification of factors determining when public opinion on Europe acts as a constraint upon the national policy-making process.

Time-series analysis is little used within the study of political science, but could provide valuable techniques to explore the above propositions. However, much public opinion research in relation to the European Union is constraint to the use of Eurobarometer survey data, which is infrequently measured and contains many questions that are only posed over a relatively short period of time. Both these issues cause most of the survey questions to have an insufficient number of observations to be analysed with a time-series approach. Yet, this exploratory paper will try to overcome this problem by focusing on Eurobarometer questions with relatively many observations¹ and performing the analysis on multiple states. The use of time-series analysis in public opinion research is however not new, Toshkov (2011) already did this and inspired the paper's methodological approach.

3 Methodology

To examine the national context in which public opinion on EMU and ultimately the European Union is shaped, the member-states Germany and Italy were selected. Both states experience a powerful position within the European Union, yet both are known to hold very different views about EMU and its single currency. This is likely to be due to very different *national* contexts in which opinions are formed. Cultural, political, historical, ethno-graphic, etc, variables all differ heavily between the states. It is therefore expected that public opinion on EMU evolves differently within each of these states and that both states, at least in theory, are minimally subject to each other's idiosyncratic shocks affecting public opinion². Examples of such shocks would be drastic changes in national political affairs or EMU's policy outcomes interacting with *national* cultural values. This independence is supported by the very different trends observed in the support for EMU, see figure 1 and figure 2 in the appendix.

The dependent variable of this paper is the percentage of Eurobarometer respondents in Germany and Italy being in favour of the statement: *A European Economic and Monetary Union with one single currency, the euro*, over the period April 2000 to November 2019. The Eurobarometer is a by the European Commission administered large-scale representative population survey of the European Union to which participants are invited on a random basis. The survey is conducted in person and recorded semi-annually by nationally hired survey agencies. Its large scale, random selection and extensive efforts to ensure respondents understand the survey task, ensure that the by the Eurobarometer obtained estimates of public opinion are near identical to that of the mean and variance of the European population. When using Eurobarometer data, one can

¹This might introduce a selection bias if the set of questions that are posed for a longer period of time are so for a non-observed reason. Alternatively, different survey questions can be pooled to obtain observations over a longer time span. This was tried but no sufficiently similar questions were found.

²By means of international trade and other economic mechanisms such national shocks may be transmitted abroad, the analysis will therefore control for the changes in real GDP.

thus be certain that confounding factors resulting from possible selection biases in the sampling of respondents are of no issue to the analysis.

The three independent variables of this paper are “self-interest”, “the support for the national government” and the “national context”. Measurements for self-interest were obtained from the Eurobarometer and *Eurostat*. Self-interest is both measured by the absolute change in real GDP per capita, seasonally and calendar adjusted, and the percentage of Eurobarometer respondents in Germany and Italy indicating that they expect their life to be generally worse next year. A positive relation between self-interest and the support for EMU is expected based on the findings of the previous literature and the expectation that the public deems national GDP and their future welfare to be intertwined with the performance of EMU. The intuition behind the latter expectation is that EMU substantially influences national policy outcomes and thus EMU’s performance might be regarded as one of the main factors responsible for national economic and social conditions. As such the variable “self-interest” tries not so much to capture whether the EMU is in the public’s interest but whether the public perceives it to be.

The support for the national government is measured by the percentage of Eurobarometer respondents indicating that they tend not to trust their national government. This variable allows to explore the relation between the change in support for the national government and the change in the support for EMU. Sánchez-Cuenca (2000) theorized that when citizens have a more positive attitude towards the functioning of EU institutions and a more negative attitude towards the functioning of national political institutions, then the citizens’ support for European integration might be higher because of a relatively low opportunity cost of transferring power to the supranational level. This theoretical predication will be tested as part of this research.

The importance of the national context in which public support for EMU and the euro is shaped, will also be more directly tested by testing the dependent variable for structural breaks in their series. It is expected that besides a substantial share of common European shocks, as for instance the great recession and the European debt crisis, member-states are subject to national shocks in public opinion that have the capability of changing the trend of the series.

To summarize the above expectations, the following three hypotheses are formulated:

H1 : *The public perceives EMU to be in their own interest.*

H2 : *Support for the national government partly offsets support for EMU.*

H3 : *Public opinion on EMU is subject to member-state specific shocks.*

The three hypotheses will respectively be explored by means of an autoregressive model (AR), a vector autoregressive model (VAR) and structural break testing. Stationarity of both the dependent and independent variables was visually inspected by means of the autocorrelation functions (ACF) and the partial autocorrelations functions (PACF), and tested by the augmented Dickey-Fuller test, Phillips-Perron test and KPSS test. All variables were stationary either at

level or first difference. Note however that the series only comprises 40 observations per state, which is likely to be too few to obtain an unbiased estimate. The conclusions of this paper should therefore be interpreted with caution. A stronger methodological approach would have been to create a cross-sectional dataset from the raw Eurobarometer data. Yet, I only found these files towards the end of the research project. To compensate for the lack of internal validity, the third hypothesis will be explored with data for all countries being a member of the European Union in the year 2000. Time was too restricted to follow a similar approach in exploring the other two hypotheses.

4 Analysis

The optimal number of lags to include in the analysis was selected following the Bayesian information criterion (BIC) but verified with a visual inspection of the ACF and PACF. Despite the concerns regarding the internal validity of the estimators, there is consistency in the sign of reported coefficients in table 1. The negative relation between current and past values of the support for EMU follows naturally from the stationarity of the series, that is stationarity implies a constant mean of the series. If the change in real GDP per capita increases with one standard deviation, then this is in both countries associated with an increase in the change of support for EMU, but in Italy more so than in Germany. Yet, neither of the coefficients is found to be statistically significant. Only in Italy is an increase in the number of respondents expecting next year to be worse associated with less support for EMU. An increase in distrust towards the national government is in both countries associated with less support for EMU. This finding contradicts the expectation outlined in the previous section, but might be explained by the public finding it difficult to disentangle the national government's performance from that of the European Institutions. This relation will be further explored in table 2. The signs of the coefficients on the intercepts are consistent with the trends in the support for EMU. (See figure 1 & figure 2 in the appendix).

In sum, the evidence for the public perceiving EMU to be in its own interest is mixed. Some statistically insignificant indication is found for the public ascribing changes in real GDP to EMU, but a negative relation is found between changes in expected welfare and changes in the support for EMU.

Δ Percentage point in favour of EMU	I	II
	Germany	Italy
L . Δ Percentage point in favour of EMU	-0.548*** (0.13)	-0.572*** (0.13)
Δ Real.GDP.PC (<i>standardized</i>)	0.109 (0.47)	0.398 (0.43)
Δ Percentage point expected welfare deterioration	0.018 (0.18)	-0.417* (0.22)
Δ Percentage point distrust national government	-0.304*** (0.10)	-0.373*** (0.10)
Intercept	0.893** (0.39)	-0.190 (0.35)
N	38	38
Method	OLS	OLS

*** if $p < 0.01$, ** if $p < 0.05$ and * if $p < 0.10$

Table 1: AR(1)

Table 2 further examines the unexpected sign of the statistically significant coefficients on the support for the national government in table 1. A VAR(1) model on the variables in first difference illustrates that the above findings are robust to excluding the self-interest measures and only considering the lagged version of distrust towards the national government. (Current values of the regressors cannot be included due to otherwise introduced serial correlation between error terms). When reversing the model, the relationship disappears and R-squared drops to near zero. The coefficients on the lag of the dependent variable and intercept remain consistent with the expectations as outlined above.

A Granger-causality test was conducted to strengthen the evidence that changes in distrust towards the national government are predictive for changes in the support for EMU, but not vice versa. Consistent with the VAR(1) coefficients, such a relation was only statistically significant for the case of Italy.

Because of the concerns expressed by Toshkov (2011) regarding the inappropriateness of estimating VAR(p) models with variables that are not of integration order zero and the consecutive loss in variation from differencing, both variables of table 2 were tested for cointegration in their levels. An Engle-Granger two-step cointegration test was used and tested for robustness with a Johansen cointegration test. Both tests failed to conclude that there is a linear combination of the two variables that is stationary. Hence, the analysis is forced to stick with the VAR(1) in first-difference.

In sum, table 2 is consistent with the findings of table 1 by still illustrating statistically significant coefficients of the same sign on the lag of distrust towards the national government in Italy. The relation is still negative for the case of Germany but not statistically significant anymore. Taking the findings of table 1 and table 2 together, no evidence is found in the context of EMU that supports the theory of Sánchez-Cuenca (2000). Namely, that support for national and supranational governments would partly offset each other.

	I	II
	Germany	Italy
Δ Percentage point in favour of EMU:		
L.Δ Percentage point in favour of EMU	-0.482*** (0.16)	-0.566*** (0.15)
L.Δ Percentage point distrust national government	-0.046 (0.11)	-0.405*** (0.13)
Intercept	1.319* (0.73)	-0.595 (0.64)
Adjusted R^2	0.1734	0.2997
Δ Percentage point distrust national government:		
L.Δ Percentage point in favour of EMU	-0.220 (0.24)	0.070 (0.21)
L.Δ Percentage point distrust national government	-0.333* (0.17)	-0.140 (0.18)
Intercept	0.188 (1.11)	0.491 (0.91)
Adjusted R^2	0.04616	-0.02636
ΔPercentage point distrust national government GRANGER CAUSES	NO	YES
ΔPercentage point in favour of EMU		
ΔPercentage point in favour of EMU GRANGER CAUSES	NO	NO
ΔPercentage point distrust national government		
Cointegration	NO	NO
N	38	38
Method	OLS	OLS

*** if $p < 0.01$, ** if $p < 0.05$ and * if $p < 0.10$

Table 2: VAR(1)

When testing each state's series for structural breaks in the mean value of respondents in favour of EMU and the euro, it is observed that such breaks heavily correlate across states. Table 3 reports that support in western European member-states tended to increase between the years 2000 and 2007, tended to decrease between 2008 and 2011, and tended to increase again between 2015 and 2017. Southern European states show a reverse pattern in support during the first block, a fairly similar pattern during the second block and a similar pattern during the third block. The northern states experienced much less breaks in their series but if they did, followed a pattern similar to western European states.

This might imply that all states tended to blame EMU and the euro during the great recession and the European debt crisis, but recovered from this as soon as macroeconomic circumstances tended to improve. The fact that the publics in southern European states tended to develop a more negative stance towards EMU and the euro during the 2000s, might be explained by these countries suffering from austerity measures and stricter budgetary rules following the introduction and revisions of the European Stability and Growth Pact between 1997 and 2005 (European Commission, 2020).

The timing of the breaks, as well as the confidence intervals do not precisely overlap between countries. This might be explained by a variety of reasons, for instance: the shocks hitting countries non-synchronously, differences in the speed at which publics adjust their opinion as for example explained by cultural factors, or the occurrences of national political, social and economic events.

Overall, the findings imply that it are not national events that most dominantly shape public opinion on EMU, but international events. Member-state specific shocks may cause minor fluctuations around the mean, but do not seem to have the power to alter the mean of a series. Yet, it might be the case that monetary policy is an unrepresentative policy area, because international (economic) shocks may have an exceptionally large magnitude in this area. It would be interesting to test the robustness of these findings by comparing the breaks to those observed in less international-crisis prone policy areas such as for instance innovation policy. Finally, the international shocks do not seem to affect member-states equally, as for instance Austria and Finland express a rather constant support for EMU and the euro.

	Early Break	Middle Break	Late Break
Western states			
Austria			
Belgium	2002 (2); + <i>2001(2) – 2004(2)</i>	2009(1); - <i>2008(1) – 2009(2)</i>	2016(2); + <i>2015(2) – 2018(2)</i>
Germany	2002 (2); + <i>2001(1) – 2006(1)</i>	2013 (1); + <i>2012(2) – 2014(1)</i>	2016(1); + <i>2015(2) – 2016(2)</i>
France	2002 (2); + <i>2001(1) – 2003(2)</i>	2009(1); - <i>2008(1) – 2011(1)</i>	2016(2); + <i>2016(1) – 2019(1)</i>
Ireland	2003(2); + <i>2003(1) – 2005(1)</i>	2010(1); - <i>2009(1) – 2010(2)</i>	2015(2); + <i>2015(1) – 2017(1)</i>
Luxembourg		2009(1); - <i>2003(2) – 2017(1)</i>	
Netherlands	2006(2); + <i>2006(1) – 2007(2)</i>	2009(2); - <i>2008(2) – 2010(1)</i>	2015(2); + <i>2015(1) – 2017(1)</i>
Southern states			
Italy	2003(1); - <i>2002(2) – 2003(2)</i>	2011(1); - <i>2010(2) – 2012(1)</i>	2016(2); + <i>2015(2) – 2017(2)</i>
Greece	2004(2); - <i>2004(1) – 2005(1)</i>	2008(1); + <i>2007(2) – 2008(2)</i>	2011(1); + <i>2007(2) – 2012(1)</i>
Portugal		2007(1); - <i>2006(1) – 2008(2)</i>	2015(1); + <i>2014(2) – 2015(2)</i>
Spain	2004(2); - <i>2003(1) – 2005(2)</i>		2016(1); + <i>2015(2) – 2016(2)</i>
Northern states			
Denmark		2011(1); - <i>2010(2) – 2011(2)</i>	
Finland	2002(2); + <i>2001(1) – 2003(2)</i>		
Sweden		2010(2); - <i>2010(1) – 2011(2)</i>	
Average			
EU		2009(2); - <i>2008(2) – 2010(2)</i>	2016(2); + <i>2016(1) – 2017(2)</i>

The table reports the estimated break points in the mean of the series. Member-states were selected based on their year of joining the EU (before the year 2000). The +/- behind the estimated break point indicates whether the mean abruptly increased (+) or decreased (-) over the respective part of the series. The time windows in italic correspond to the 5-percent confidence intervals belonging to the estimated break points.

Table 3: Structural Break Estimation

5 Conclusion

This exploratory paper provided a contribution towards the literature on the formation of public opinion and aimed to explore the importance of national factors in the formation of public opinion on EMU. Statistically insignificant and mixed empirical findings were presented on the relation between self-interest and EMU. When considering the economic measure for self-interest, *changes in real GDP*, a positive relation was found. When considering the somewhat more social measure, *changes in expected welfare*, a negative relation was found. Note however, that the by the analysis reported estimations are mere correlations. Therefore, any observed relationship might be spurious. That is, omitted variable biases may exist. The purpose of the first hypothesis was mostly to set the stage for the second, as well as to attempt to replicate the results of the previous literature.

Statistically significant results were presented for a negative relation between changes in the share of the public distrusting the national government and changes in the share of the public being in favour of EMU. Such a negative relation might be explained by the public not perceiving EU-institutions and national governments as being substitutes to each other, the public finding it difficult to isolate the performance of the national government from that of the European institutions, or a positive relationship between the performance of the European institutions and that of the national government.

However, if the observed Granger-causality can be generalised beyond the case of Italy, the above explanations should be revisited: Increases in distrust towards the national government would then be predictive of decreases in support for EMU, but changes in the support for EMU would not be predictive for changes in the distrust towards the national government. A potential explanation for such a relation, would be a situation in which a subset of the public supports both the national and supranational government but then for some national reason, following national political developments, switches to opposing both the national and supranational government.

Yet, considering the findings for the third hypothesis, a generalisation of the observed Granger-causality across member-states might be unlikely. Not national shocks are found to dominate the development of public opinion on EMU, but internationally noted shocks. It can however be questioned how representative monetary policy is for other European policy areas.

Taking together the negative relation between distrust towards the national government and support for EMU, the assumption that this observed relationship is non-spurious and the fact that structural breaks in public opinion on EMU seem to be internationally correlated. It might be concluded that public opinion on EMU is largely determined at the supranational level and that political wins at the European level have the potential to improve political support at the national level.

If it would be proven that the regression results presented in this paper are spurious and the coefficient changes sign, then political wins by the European

Union will offset support for the national government and the findings will be consistent with the theory outlined by Sánchez-Cuenca (2000) after all. One way to prove the latter is by including potentially omitted variables into the model. The political stance of the media and the degree of media coverage devoted to a policy area are examples of possible confounding effects.

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Appendix

Data Sources

In case of missing observations linear interpolation was used. *(See the attached Excel-file for the few instances this was applied).*

Support for EMU (dependent variable) European Commission - Eurobarometer, accessed April 17 2020.

Absolute change in real GDP, seasonally and calendar adjusted Eurostat - GDP and main components (output, expenditure and income), accessed April 17 2020.

Population OECD - Population Indicator, accessed April 17 2020.

Expected welfare European Commission - Eurobarometer, accessed April 17 2020.

Distrust towards national government European Commission - Eurobarometer, accessed April 17 2020.

Dependent Variable Against Time

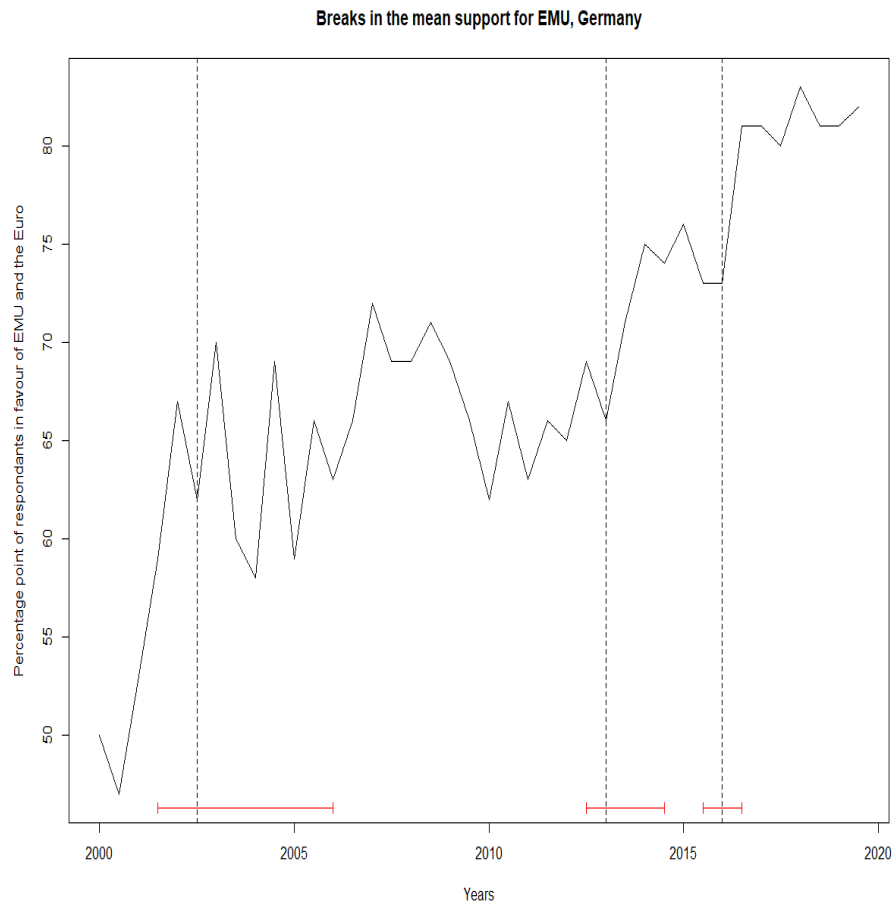


Figure 1: Germany

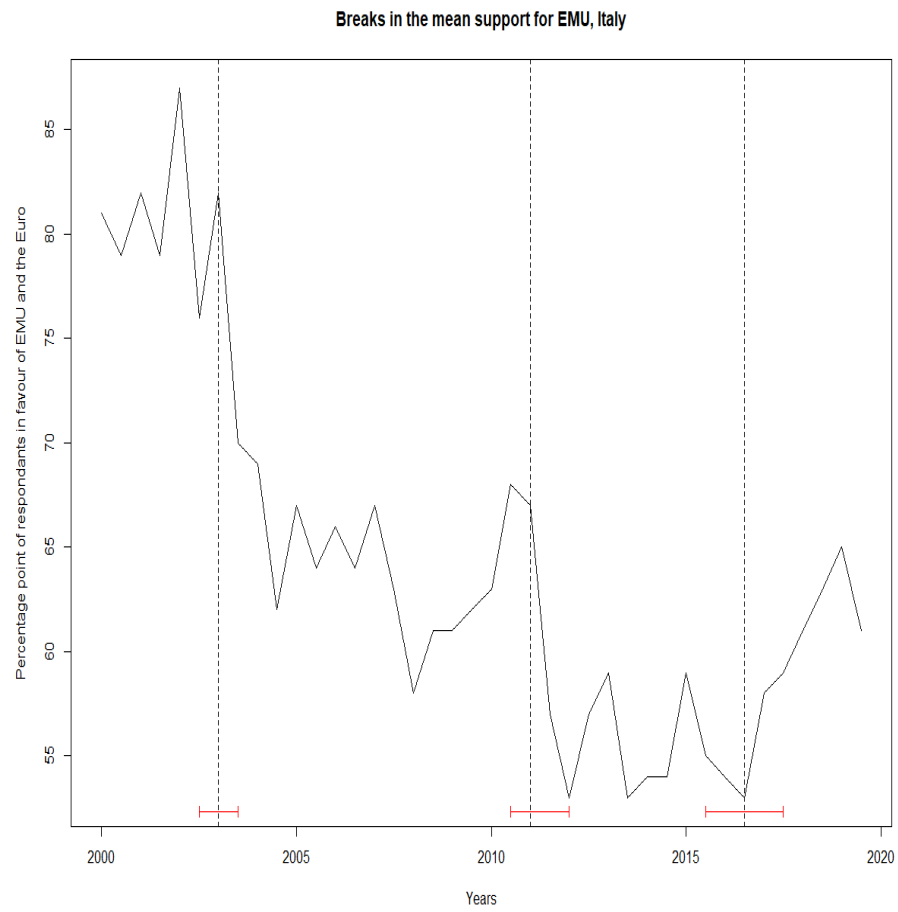


Figure 2: Italy

```
# title: "Course Paper, R-code"
# author: "ANONYMISED USER"
# date: "17 April 2020"
```

```
# Import Data
require(readxl)
library(readxl)
EU483_data_upload <- read_excel("EU483 data upload.xlsx")
```

```
# Preparing the data for Germany
seriesEMU <- ts(EU483_data_upload[,3], start = c(2000,1), frequency = 2)
seriesGDP <- ts(EU483_data_upload[,4], start = c(2000,1), frequency = 2)
seriesDT <- ts(EU483_data_upload[,5], start = c(2000,1), frequency = 2)
seriesWL <- ts(EU483_data_upload[,6], start = c(2000,1), frequency = 2)

library(fUnitRoots)
unitrootTest(seriesEMU, lags = 0, type = c("c"),
  title = "ADF Test, intercept but no time trend, MacKinnon p-values")
#### n = bootstrap p-value which corrects for small sample bias in the asymptotic p-values

library(forecast)
auto.arima(seriesEMU, d=1,max.p=15, max.order=15,max.q=0,ic = c("bic"),
  seasonal=FALSE,trace=FALSE, stepwise =FALSE, allowmean)
unitrootTest(seriesEMU, lags = 1, type = c("c"),
  title = "ADF Test, intercept but no time trend, MacKinnon p-values")

library(tseries)
pp.test(seriesEMU)
kpss.test(seriesEMU)

DseriesEMU <- diff(seriesEMU)
plot(DseriesEMU)
unitrootTest(DseriesEMU, lags = 0, type = c("c"))
pp.test(DseriesEMU)
kpss.test(DseriesEMU)

unitrootTest(seriesGDP, lags = 0, type = c("c"))
pp.test(seriesGDP)
kpss.test(seriesGDP)
SseriesGDP <- (seriesGDP-mean(seriesGDP))/stdev(seriesGDP)

unitrootTest(seriesDT, lags = 0, type = c("c"))
pp.test(seriesDT)
kpss.test(seriesDT)
DseriesDT <- diff(seriesDT)
unitrootTest(DseriesDT, lags = 0, type = c("c"))
pp.test(DseriesDT)
kpss.test(DseriesDT)

unitrootTest(seriesWL, lags = 0, type = c("c"))
pp.test(seriesWL)
kpss.test(seriesWL)
DseriesWL <- diff(seriesWL)
unitrootTest(DseriesWL, lags = 0, type = c("c"))
pp.test(DseriesWL)
kpss.test(DseriesWL)
```


Lag selection Germany

```
par(mfrow=c(2,1))
acfpl <- pacf(DseriesEMU, plot=FALSE)
acfpl$lag <- acfpl$lag * 2
plot(acfpl, xlab="Lag (half years)", main="", col="red", pch=1, ylab="")
title("ACF for the first difference in EMU")
pacfpl <- pacf(DseriesEMU, plot=FALSE)
pacfpl$lag <- pacfpl$lag * 2
plot(pacfpl, xlab="Lag (half-years)", main="", col="red", pch=1, ylab="")
title("PACF for the first difference in EMU")

library(dynlm)
lm1 <- dynlm(formula = DseriesEMU ~ L(DseriesEMU,1) + L(DseriesEMU,2))
summary(lm1)

library(forecast)
maxlag<-5
fit <- auto.arima(DseriesEMU, d=0,max.p=maxlag, max.order=maxlag,max.q=0,ic = c("aic"),
  seasonal=FALSE,trace=FALSE, stepwise =FALSE, allowmean)
print(fit)

fit <- auto.arima(DseriesEMU, d=0,max.p=maxlag, max.order=maxlag,max.q=0,ic = c("bic"),
  seasonal=FALSE,trace=FALSE, stepwise =FALSE, allowmean)
print(fit)
```

Preparing the data for Italy

```
seriesEMU2 <- ts(EU483_data_upload[,7], start = c(2000,1), frequency = 2)
seriesGDP2 <- ts(EU483_data_upload[,8], start = c(2000,1), frequency = 2)
seriesDT2 <- ts(EU483_data_upload[,9], start = c(2000,1), frequency = 2)
seriesWL2 <- ts(EU483_data_upload[,10], start = c(2000,1), frequency = 2)

library(fUnitRoots)
unitrootTest(seriesEMU2, lags = 0, type = c("c"),
  title = "ADF Test, intercept but no time trend, MacKinnon p-values")
#### n = bootstrap p-value which corrects for small sample bias in the asymptotic p-values

library(forecast)
auto.arima(seriesEMU2, d=0,max.p=15, max.order=15,max.q=0,ic = c("bic"),
  seasonal=FALSE,trace=FALSE, stepwise =FALSE, allowmean)
unitrootTest(seriesEMU2, lags = 2, type = c("c"),
  title = "ADF Test, intercept but no time trend, MacKinnon p-values")

library(tseries)
pp.test(seriesEMU2)
kpss.test(seriesEMU2)
DseriesEMU2 <- diff(seriesEMU2)
plot(DseriesEMU2)
unitrootTest(DseriesEMU2, lags = 0, type = c("c"))
pp.test(DseriesEMU2)
kpss.test(DseriesEMU2)

unitrootTest(seriesGDP2, lags = 0, type = c("c"))
pp.test(seriesGDP2)
kpss.test(seriesGDP2)
SseriesGDP2 <- (seriesGDP2-mean(seriesGDP2))/stdev(seriesGDP2)

unitrootTest(seriesDT2, lags = 0, type = c("c"))
pp.test(seriesDT2)
kpss.test(seriesDT2)
DseriesDT2 <- diff(seriesDT2)
unitrootTest(DseriesDT2, lags = 0, type = c("c"))
pp.test(DseriesDT2)
kpss.test(DseriesDT2)

unitrootTest(seriesWL2, lags = 0, type = c("c"))
pp.test(seriesWL2)
kpss.test(seriesWL2)
DseriesWL2 <- diff(seriesWL2)
unitrootTest(DseriesWL2, lags = 0, type = c("c"))
pp.test(DseriesWL2)
kpss.test(DseriesWL2)
```

Lag selection Italy

```
par(mfrow=c(2,1))
acfpl <- pacf(DseriesEMU2, plot=FALSE)
acfpl$lag <- pacfpl$lag * 2
plot(acfpl, xlab="Lag (half years)", main="", col="red",pch=1,ylab="")
title("ACF for the first difference in EMU")
pacfpl <- pacf(DseriesEMU2, plot=FALSE)
pacfpl$lag <- pacfpl$lag * 2
plot(pacfpl, xlab="Lag (half-years)", main="", col="red",pch=1,ylab="")
title("PACF for the first difference in EMU")

library(dynlm)
lm12 <- dynlm(formula = DseriesEMU2 ~ L(DseriesEMU2,1) + L(DseriesEMU2,2) + L(DseriesEMU2,3))
summary(lm12)

library(forecast)
maxlag<-6
fit2 <- auto.arima(DseriesEMU2, d=0,max.p=maxlag, max.order=maxlag,max.q=0,ic = c("aic"),
  seasonal=FALSE,trace=FALSE, stepwise =FALSE, allowmean)
print(fit2)

fit2 <- auto.arima(DseriesEMU2, d=0,max.p=maxlag, max.order=maxlag,max.q=0,ic = c("bic"),
  seasonal=FALSE,trace=FALSE, stepwise =FALSE, allowmean)
print(fit2)
```

AR(1) - Table 1

```
library(lmtest)
m <- cbind(SseriesGDP,DseriesDT, DseriesWL)
M <- m[-1,]
res1 <-arima(DseriesEMU,xreg = M, order = c(1,0,0), method = "CSS") #OLS
coefest(res1)

fit_res1 <- fitted(res1)
plot(DseriesEMU, type="l", col="green")
par(new=TRUE)
plot(fit_res1, type="l", col="red")

library(lmtest)
m2 <- cbind(SseriesGDP2,DseriesDT2, DseriesWL2)
M2 <- m2[-1,]
res12 <-arima(DseriesEMU2,xreg = M2, order = c(1,0,0), method = "CSS") #OLS
coefest(res12)

fit_res12 <- fitted(res12)
plot(DseriesEMU2, type="l", col="green")
par(new=TRUE)
plot(fit_res12, type="l", col="red")
```

VAR(1) - Table 2

```
library(vars)
W <- data.frame(DseriesEMU, DseriesDT)
modelVAR <- VAR(W, lag.max = 2, type = "const", ic = "AIC")
summary(modelVAR)
causality(modelVAR, cause = "Distrust.government")
causality(modelVAR, cause = "FOR.EMU")
```

```
lm2 <- dynlm(formula = seriesEMU ~ seriesDT)
residuals_lm2 <- resid(lm2)
plot(residuals_lm2)
unitrootTest(residuals_lm2, lags = 0, type = c("c"))
pp.test(residuals_lm2)
kpss.test(residuals_lm2)
```

```
library(vars)
W2 <- data.frame(DseriesEMU2, DseriesDT2)
modelVAR2 <- VAR(W2, lag.max = 1, type = "const", ic = "AIC")
summary(modelVAR2)
causality(modelVAR2, cause = "Distrust.government.IT")
causality(modelVAR2, cause = "FOR.EMU.IT")
```

```
lm22 <- dynlm(formula = seriesEMU2 ~ seriesDT2)
residuals_lm22 <- resid(lm22)
plot(residuals_lm22)
unitrootTest(residuals_lm22, lags = 0, type = c("c"))
pp.test(residuals_lm22)
kpss.test(residuals_lm22)
```

```
A <- data.frame(seriesEMU2, seriesDT2)
johanson <- ca.jo(A, ecdet = "cons", type = "trace", K = 2)
summary(johanson)
```

Testing for Structural breaks - Table 3

```
library(strucchange)
```

```
## Germany
bp_EMU <- breakpoints(seriesEMU~1, breaks=5)
summary(bp_EMU)
ci_bp_EMU <- confint(bp_EMU)
ci_bp_EMU
```

```
par(mfrow=c(1,1))
plot(seriesEMU,pch=1,xlab="Years", ylab="Percentage point of respondents in favour of EMU and the Euro")
title("Breaks in the mean support for EMU, Germany")
lines(bp_EMU)
lines(ci_bp_EMU)
```

```
## Italy
bp_EMU_IT <- breakpoints(seriesEMU2~1, breaks=5)
summary(bp_EMU_IT)
ci_bp_EMU_IT <- confint(bp_EMU_IT)
ci_bp_EMU_IT
```

```
par(mfrow=c(1,1))
plot(seriesEMU2,pch=1,xlab="Years", ylab="Percentage point of respondents in favour of EMU and the Euro")
title("Breaks in the mean support for EMU, Italy")
lines(bp_EMU_IT)
lines(ci_bp_EMU_IT)
```

```
seriesAUS <- ts(EU483_data_upload$Austria, start = c(2000,1), frequency = 2)
seriesBEL <- ts(EU483_data_upload$Belgium, start = c(2000,1), frequency = 2)
seriesDEN <- ts(EU483_data_upload$Denmark_NO_EURO, start = c(2000,1), frequency = 2)
seriesFIN <- ts(EU483_data_upload$Finland, start = c(2000,1), frequency = 2)
seriesFRA <- ts(EU483_data_upload$France, start = c(2000,1), frequency = 2)
seriesGRE <- ts(EU483_data_upload$Greece, start = c(2000,1), frequency = 2)
seriesIRE <- ts(EU483_data_upload$Ireland, start = c(2000,1), frequency = 2)
seriesLUX <- ts(EU483_data_upload$Luxembourg, start = c(2000,1), frequency = 2)
seriesNET <- ts(EU483_data_upload$Netherlands, start = c(2000,1), frequency = 2)
seriesPOR <- ts(EU483_data_upload$Portugal, start = c(2000,1), frequency = 2)
seriesSPA <- ts(EU483_data_upload$Spain, start = c(2000,1), frequency = 2)
seriesSWE <- ts(EU483_data_upload$Sweden_NO_EURO, start = c(2000,1), frequency = 2)
seriesEU <- ts(EU483_data_upload$EU, start = c(2000,1), frequency = 2)
```

```

## Austria
bp_seriesAUS <- breakpoints(seriesAUS~1, breaks=5)
summary(bp_seriesAUS)

par(mfrow=c(1,1))
plot(seriesAUS,pch=1,xlab="Years", ylab="Percentage point of respondents in favour of EMU and the Euro")
title("Breaks in the mean support for EMU, Austria")
lines(bp_seriesAUS)

## Belgium
bp_seriesBEL <- breakpoints(seriesBEL~1, breaks=5)
summary(bp_seriesBEL)
ci_bp_seriesBEL <- confint(bp_seriesBEL)
ci_bp_seriesBEL

par(mfrow=c(1,1))
plot(seriesBEL,pch=1,xlab="Years", ylab="Percentage point of respondents in favour of EMU and the Euro")
title("Breaks in the mean support for EMU, Belgium")
lines(bp_seriesBEL)
lines(ci_bp_seriesBEL)

## Denmark
bp_seriesDEN <- breakpoints(seriesDEN~1, breaks=5)
summary(bp_seriesDEN)
ci_bp_seriesDEN <- confint(bp_seriesDEN)
ci_bp_seriesDEN

par(mfrow=c(1,1))
plot(seriesDEN,pch=1,xlab="Years", ylab="Percentage point of respondents in favour of EMU and the Euro")
title("Breaks in the mean support for EMU, Denmark")
lines(bp_seriesDEN)
lines(ci_bp_seriesDEN)

## Finland
bp_seriesFIN <- breakpoints(seriesFIN~1, breaks=5)
summary(bp_seriesFIN)
ci_bp_seriesFIN <- confint(bp_seriesFIN)
ci_bp_seriesFIN

par(mfrow=c(1,1))
plot(seriesFIN,pch=1,xlab="Years", ylab="Percentage point of respondents in favour of EMU and the Euro")
title("Breaks in the mean support for EMU, Finland")
lines(bp_seriesFIN)
lines(ci_bp_seriesFIN)

## France
bp_seriesFRA <- breakpoints(seriesFRA~1, breaks=5)
summary(bp_seriesFRA)
ci_bp_seriesFRA <- confint(bp_seriesFRA)
ci_bp_seriesFRA

par(mfrow=c(1,1))
plot(seriesFRA,pch=1,xlab="Years", ylab="Percentage point of respondents in favour of EMU and the Euro")
title("Breaks in the mean support for EMU, France")
lines(bp_seriesFRA)
lines(ci_bp_seriesFRA)

## Greece
bp_seriesGRE <- breakpoints(seriesGRE~1, breaks=5)
summary(bp_seriesGRE)
ci_bp_seriesGRE <- confint(bp_seriesGRE)
ci_bp_seriesGRE

par(mfrow=c(1,1))
plot(seriesGRE,pch=1,xlab="Years", ylab="Percentage point of respondents in favour of EMU and the Euro")
title("Breaks in the mean support for EMU, Greece")
lines(bp_seriesGRE)
lines(ci_bp_seriesGRE)

## Ireland
bp_seriesIRE <- breakpoints(seriesIRE~1, breaks=5)
summary(bp_seriesIRE)
ci_bp_seriesIRE <- confint(bp_seriesIRE)
ci_bp_seriesIRE

par(mfrow=c(1,1))

```

```

plot(seriesIRE,pch=1,xlab="Years", ylab="Percentage point of respondents in favour of EMU and the Euro")
title("Breaks in the mean support for EMU, Ireland")
lines(bp_seriesIRE)
lines(ci_bp_seriesIRE)

## Luxembourg
bp_seriesLUX <- breakpoints(seriesLUX~1, breaks=5)
summary(bp_seriesLUX)
ci_bp_seriesLUX <- confint(bp_seriesLUX)
ci_bp_seriesLUX

par(mfrow=c(1,1))
plot(seriesLUX,pch=1,xlab="Years", ylab="Percentage point of respondents in favour of EMU and the Euro")
title("Breaks in the mean support for EMU, Luxembourg")
lines(bp_seriesLUX)
lines(ci_bp_seriesLUX)

## Netherlands
bp_seriesNET <- breakpoints(seriesNET~1, breaks=5)
summary(bp_seriesNET)
ci_bp_seriesNET <- confint(bp_seriesNET)
ci_bp_seriesNET

par(mfrow=c(1,1))
plot(seriesNET,pch=1,xlab="Years", ylab="Percentage point of respondents in favour of EMU and the Euro")
title("Breaks in the mean support for EMU, Netherlands")
lines(bp_seriesNET)
lines(ci_bp_seriesNET)

## Portugal
bp_seriesPOR <- breakpoints(seriesPOR~1, breaks=5)
summary(bp_seriesPOR)
ci_bp_seriesPOR <- confint(bp_seriesPOR)
ci_bp_seriesPOR

par(mfrow=c(1,1))
plot(seriesPOR,pch=1,xlab="Years", ylab="Percentage point of respondents in favour of EMU and the Euro")
title("Breaks in the mean support for EMU, Portugal")
lines(bp_seriesPOR)
lines(ci_bp_seriesPOR)

## Spain
bp_seriesSPA <- breakpoints(seriesSPA~1, breaks=5)
summary(bp_seriesSPA)
ci_bp_seriesSPA <- confint(bp_seriesSPA)
ci_bp_seriesSPA

par(mfrow=c(1,1))
plot(seriesSPA,pch=1,xlab="Years", ylab="Percentage point of respondents in favour of EMU and the Euro")
title("Breaks in the mean support for EMU, Spain")
lines(bp_seriesSPA)
lines(ci_bp_seriesSPA)

## Sweden
bp_seriesSWE <- breakpoints(seriesSWE~1, breaks=5)
summary(bp_seriesSWE)
ci_bp_seriesSWE <- confint(bp_seriesSWE)
ci_bp_seriesSWE

par(mfrow=c(1,1))
plot(seriesSWE,pch=1,xlab="Years", ylab="Percentage point of respondents in favour of EMU and the Euro")
title("Breaks in the mean support for EMU, Sweden")
lines(bp_seriesSWE)
lines(ci_bp_seriesSWE)

## EU
bp_seriesEU <- breakpoints(seriesEU~1, breaks=5)
summary(bp_seriesEU)
ci_bp_seriesEU <- confint(bp_seriesEU)
ci_bp_seriesEU

par(mfrow=c(1,1))
plot(seriesEU,pch=1,xlab="Years", ylab="Percentage point of respondents in favour of EMU and the Euro")
title("Breaks in the mean support for EMU, European Union average")
lines(bp_seriesEU)
lines(ci_bp_seriesEU)

```