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Measuring Redenomination Risks in the Euro Area - New Evidence from Survey Data

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Abstract

This article introduces a new indicator to measure redenomination risks in Euro area countries. The measure is based on survey data. The influence of this indicator in determining sovereign bond yield spreads is tested using an ARDL-approach. The results for ten EMU countries in the period June 2012 to January 2018 show that the risk of a depreciation is almost abandoned for Euro area countries, i.e. the former crisis countries Ireland and Portugal. If anything an appreciation may occur for some countries once they leave the EMU. The only countries facing depreciation problems once leaving the monetary union are Italy and to some extent Spain.

Keywords: Redenomination Risk, Euro Area, Exit

JEL-codes: E43, F45, G01

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1 Introduction

Since the financial crisis in 2008/09 and the subsequent European debt crisis it has become less clear whether all current member countries of the European Economic and Monetary Union (EMU) will keep the common currency or reintroduce a new national one. Therefore, financial markets should price in these potential redenomination risks and thus they should be part of some kind of bond spreads, e.g. sovereign bond yields to some risk-free rate.

Even before the financial crisis determinants of those spreads have been investigated empirically (Bernoth et al., 2004; Gomez-Puig, 2006 or Manganelli and Wolswijk, 2009). This research intensified considerably after the financial crisis and the European debt crisis started, because at that time bond spreads started to widen considerably. So it does not come as a surprise that several articles found a changing influence of the determinants (Bernoth and Erdogan, 2012; Aßmann and Boysen-Hogrefe, 2012; Afonso et al., 2015 or Paniagua, 2017) or there is a breakpoint in the relationship when the sample period is expanded to the European debt crisis (Constantini et al., 2014).

But also new determinants were considered to explain at least part of the rising yield spreads seen in the crisis period. One of these additional determinants is contagion spreading from one country to others. Arghyrou and Kontonikas (2012), De Santis (2014), Gomez-Puig and Sosvilla-Rivero (2016) or Ehrmann and Fratzscher (2017) find indeed a role for this determinant in explaining part of the yield spreads especially in the southern peripheral countries.

Another additional determinant is the redenomination risk, i.e. that one or more countries may leave the EMU or that even the whole EMU collapses. In this case the leaving countries would have to reintroduce a national currency which could result in an appreciation or depreciation of this currency to the (potentially no longer existent) Euro. Several papers have tried to investigate empirically this redenomination risk and the associated changes in the exchange rates. Up to date there are five different approaches

to quantify the redenomination risk in the EMU empirically.

First, there are structural models, i.e. new Keynesian general equilibrium models. Kriwoluzky et al. (2015) calibrate such a model for Greece. They find that without exit expectations bond spreads would have been 1.5 to 3.5 percentage points lower. Thus, redenomination risk accounts for more than 15 percent of the yield spread at the height of the crisis. However, these kind of models rest on a lot of assumptions regarding the structural form and parameter values.

A second strand of literature models the redenomination risk as the residual component (Di Cesare et al., 2012; Dewachter et al., 2015 or Afonso et al., 2018). These studies compare the observed bond spread with the part of the spread being explained by fundamental factors. The difference between the two is assumed to be the redenomination risk. In order to generate reliable estimates of the redenomination risk using this approach all fundamental factors need to be accounted for, which is a tough task given changing influences of the determinants and new ones emerging especially in the crisis period.

Third, redenomination risk can be calculated by using bond yields issued in different currencies, i.e. those in Euro or US-Dollar for EMU countries (De Santis, 2015 or Krishnamurthy et al., 2018). While the prior should be subject to redenomination risk, as it is very likely that a country leaving the EMU will repay their bonds in the new currency and not the Euro[1], US-Dollar denominated bonds have to be repaid in US-Dollar. Thus, when it is expected that the new currency depreciates once a country leaves the EMU this should result in a positive spread between the Euro- and US-Dollar-issued bonds. The reverse is true when the new currency is expected to appreciate. However, this type of analysis may face the problem that the Euro denominated bond market is typically much larger than the US-Dollar denominated market, since EMU countries typically issue debt in their home currency. Therefore, liquidity issues need to be addressed.

Fourth, redenomination risks are addressed by using market based exit probabilities.

[1]This is for sure in a situation where the EMU completely falls apart since there is in this case no longer the Euro.

These were measured e.g. by using the Intrade indicator of one country declaring its exit from the EMU at a certain date (Klose and Weigert, 2014). Thus, the prices of this bet can be interpreted as exit probabilities. However, the indicator does not tell anything about which country will exit, so no individual exit probabilities can be calculated. Moreover, the Intrade indicator is no longer available since platform got bankrupt in March 2013.

Here we use the fifth option which is using survey data. To the best of our knowledge up to date no one has used those to quantify redenomination risks.[2] Using survey data has the advantage that questions are much more precise than those data delivered by the markets. Therefore, it is possible to account individual exit probabilities of each EMU country. So we are not only able to estimate the expected depreciation of peripheral countries but also the possible appreciations in core countries, e.g. if the EMU collapses.

The remainder of the article is organized as follow: In section 2 we show which determinants are normally considered as fundamental factors explaining yield spreads and how redenomination risks fit into this setting. Section 3 translates the considerations of section 2 into a econometrically testable equation and provides insights in the data used, i.e. to measure redenomination risk. In section 4 the results are presented, while section 5 finally concludes.

2 Theoretical Considerations

In order to account for redenomination risks we expand the theoretical exposition used by Bernoth et al. (2012) which is based on a simple version of a portfolio model. According to this (Equation 1) the sovereign bond spread being the sovereign bond yield (r) of a certain country i in period t subtracted by some risk-free rate (r^*) at period t[3] is influenced by three determinants.

[2] Di Cesare et al. (2012) are the only ones who used some kind of these data, since the compare their residual results to the google indicator for different phrases concerning an Euro break-up. However, these phrases are simply counted by Google, thus it tells nothing about the context in which it is used or to which country the phrase applies.

[3] Please note that the risk-free rate is assumed to be the same for all EMU countries.

$$r_{it} - r_t^* = p_{Default_{it}}(Fundamentals_{it}) \cdot Haircut_{it}^e + Liquidity_{it} + Global_t \tag{1}$$

First, the default risk being the probability of a default of the respective country in a certain period ($p_{Default_{it}}$) times the expected haircut on the bond ($Haircut_{it}^e$) once a default is declared. The default probability should vary with changing fundamentals ($Fundamentals_{it}$) in the country under investigation, so e.g. rising debt or a downgrading by rating agency should result in an increase in the default probability.

Second, bond spreads should rise the lower the liquidity of the underlying bond ($Liquidity_{it}$), since larger or more liquid markets make matching of buying and selling assets easier.

Third, a global risk component ($Global_t$) is added, i.e. there are times when individuals are more or less willing to invest their money in bonds. E.g. this willingness is lower in times of a global financial crisis. By definition the global component is equal for all countries and does only vary over time. However, the influence on certain bonds may be different, meaning that global investors tend to relocate their investments from assumed unsafe countries to safer ones. Those flows are called safe haven flows, which have taken place between the peripheral and core countries in the financial crisis period.

However, in a common monetary union, equation (1) does only hold when it is assumed to be irreversible. Once this condition is no longer fulfilled a redenomination premium as given in equation (2) has to be introduced (Klose and Weigert, 2014).

$$\begin{aligned} r_{it} - r_t^* = & p_{Default_{it}}(Fundamentals_{it}) \cdot Haircut_{it}^e + Liquidity_{it} + Global_t \\ & + p_{Exit_{it}} \cdot Devaluation_{it}^e \end{aligned} \tag{2}$$

The redenomination premium is simply the probability of a certain country leaving the EMU at a certain point in time ($p_{Exit_{it}}$) times the expected devaluation of the newly introduced currency vis-a-vis the Euro once it is introduced ($Devaluation_{it}^e$). Please note that an expected appreciation of the newly introduced currency vis-a-vis the Euro in case

of an exit would result in a lowering of the bond spread because the value of the bond is increasing with redenomination. Equation (2) will thus be the starting point for our empirical investigation, which we will describe in detail in the next section.

3 Data and Estimation

According to our theoretical approach of the previous section four explaining variables are needed to estimate the sovereign yield spread. In this section we will focus on which variables are used to fulfill this task and how they are introduced into an econometric framework.

3.1 The Data Issue

Since the main innovation of this article is given by our survey based measure of redenomination risk, we will start describing this variable in detail. The survey we use is conducted by sentix[4]. This platform asks a questionnaire every week to people subscribed to it. These more than 4000 people among them about 900 institutional investors are asked what they expect how financial markets will evolve in the future. Once every month (normally at the end of the month) in this questionnaire a question regarding the future of the EMU is included. Sentix asks whether one expects at least one country leaving the EMU in the next 12 months. If a participant answers with yes a new window pops-up where he/she can name up to three countries he/she is expecting to leave in the next year. Based on this question the Euro Area Break-Up Index is computed which is built as the number of exit votes for a specific country divided by the number of participants in the questionnaire. Thus for every EMU country an individual exit probability can be computed as given in equation (3). Since the exit probabilities are given by the survey data the estimated coefficient in our econometric specification can be interpreted as the expected depreciation (positive coefficient) or appreciation (negative coefficient) of

[4]see https://www.sentix.de/

the newly introduced national currency.

$$p_{Exit_{it}} = \frac{\#Exit - Votes_{it}}{\#Participants_t} \tag{3}$$

Sentix provides three different measures of the Break-Up Index. One is the index using only responses from institutional investors and one for the remaining, so-called private, investors. The third is the mean of both indices being the overall index. We will use all three in the following but our main conclusions are based on the overall index. The questionnaire including the question for the Euro Area Break-Up Index was asked first in June 2012 thus at the height of the European debt crisis.[5] So this is the natural starting point for our empirical analysis. The end of the sample is January 2018 due to data availability. For the ten EMU countries under investigation in this study the overall exit probabilities are given in Figure 1.

- Figure 1 about here -

All remaining variables are chosen to match the maturity of the Break-Up Index of one year. So for government bond yields we use those with a residual maturity of one year. Since we want to estimate the redenomination risks for either peripheral and core countries we cannot use the German bond yield as the risk-free rate in our spread because by construction this would exclude the largest Euro area economy, Germany, from our analysis. Therefore, we take the ECB deposit rate as the risk-free rate even though it is strictly speaking an overnight interest rate and only valid for banks who can deposit their money with the ECB. However, this interest rate has also become a benchmark for their clients since banks tend to hand over this interest rate to others in an environment of excess liquidity being one sign of ECB extraordinary measures since the financial crisis started and with this being present in our whole sample period.

[5]ECB-president Mario Draghi gave his famous "Whatever it takes" speech in London on 26. July 2012. This event is normally seen as being a turning point in diverging bond spreads. See e.g. Krishnamurthy et al. (2018) upon this issue.

As our measure of default risk we use CDS premia again with a maturity of one year. CDS premia are used since those should include all default information (rising debt, changing ratings, etc.) in real time. Thus, by using this variable we safe degrees of freedom in our estimation, which we would need, when all variables influencing default risk were modelled individually. Moreover, many of those variables do not change in a monthly frequency as we use it in our analysis. However, using CDS premia may induce an estimation problem in the case of a redenomination causing a credit event thus triggering CDS. The International Swaps and Derivatives Association (ISDA) published documents on this issue. In a first version (ISDA, 2003) a credit event in case of exit from the EMU is only caused when the newly introduced currency is not issued by a G7-country or a country with a AAA rating status. This would exclude Germany, France and Italy (as G7-countries) and the Netherlands (as a AAA-country) from a credit event in case of redenomination. But for the other countries in our sample this would hold.[6] Due to the European debt crisis and the risk of redenomination ISDA changed their definition in this point. According to the new version (ISDA, 2014) a credit event is triggered if there is a redenomination into another currency as the Canadian-Dollar, US-Dollar, Japanese Yen, UK-Pound, Swiss Franc or the Euro.[7] This means that a reintroduction of a national currency would in all EMU countries cause a credit event.[8] However, there is also the condition that a redenomination must cause an implied haircut that is an exit must cause a depreciation of the newly introduced currency, in order to trigger an credit event. This is exactly what we want to test here. But since the definition is not quite clear especially for our sample period where both definitions were used, we will conduct an additional robustness check of our results.

The measure used for the liquidity of the bond is as usual the bid-ask-spread. In order

[6] We assume that after an exit from the EMU all countries would introduce a new national currency and do not use another countries currency just to not default.

[7] The conversion from the old to the new ISDA definition took place in September 2014 so in the midst of our sample period.

[8] Gros (2018) uses the difference in both definitions as a measure of redenomination risk for Italy. Note however, that this may be feasible for Italy but probably not for other EMU countries since they are either no G7- or AAA-countries or not expected to depreciate their currency when leaving the EMU.

to match the one year maturity all bid-ask-spreads of bonds maturing up to six months before or after the one year ahead date are taken into account by using a weighted average of them. So suppose for the bid-ask-spread in January 2015 this would mean to build the weighted average of all bid-ask-spreads of bonds maturing between July 2015 (six month before the one year ahead date in January 2016) and July 2016 (six month after the one year ahead date). We expect the bonds spreads to rise with rising bid-ask-spreads which means lower liquidity.

Finally, global risk is measured by the spread in US-corporate (BBB) bonds and US-government bonds as it is frequently done in this kind of studies (see e.g. von Hagen et al., 2011; Bernoth and Erdogan, 2012 or Klose and Weigert, 2014). With rising global risk, i.e. a rising US-bond spread, also the EMU sovereign bond spreads should rise, thus we expect a positive coefficient. This does, however, not hold if the country is expected to receive safe haven flows from other countries because it is viewed to be less risky.

We are able to collect these data for ten EMU countries. These are Austria, Belgium, Germany, Spain, Finland, France, Ireland, Italy, Netherlands and Portugal. Please note that we can unfortunately not present results for Greece because this country was in large parts of our sample period completely financed by the European Financial Stability Facility (EFSF) or the European Stability Mechanism (ESM), so there are simply no data on e.g. CDS premia given our maturity.

3.2 Estimation

Given our data explanations of the previous subsection equation (2) can be rewritten as follows:

$$\begin{aligned} r_{it} - r_t^{ECB} =& \alpha_{0i} + \alpha_{1i} \cdot CDS_{it} + \alpha_{2i} \cdot (Bid - Ask_{it}) + \alpha_{3i} \cdot (US - Bonds_t) \\ &+ \alpha_{4i} \cdot Exit_{it} + \alpha_{5i} \cdot Trend_t + \epsilon_t \end{aligned} \tag{4}$$

According to usual diagnostics, a constant (α_{0i}) and a time-trend ($Trend_t$) are added

to our estimation. However, it is found that equation (4) cannot be estimated in a straightforward fashion due to stationarity concerns in the underlying data. Some of our variables are found to be I(0) others tend to be I(1) according to standard Augmented-Dickey-Fuller tests (see Table 1).[9]

- Table 1 about here -

In order to account for this mixture of I(0) and I(1) we use the Bounds testing Autoregressive Distributed Lag (ARDL) approach of Peseran et al. (2001). This estimation technique does not require all variables to be either I(0) or I(1). The ARDL-approach employs a conditional error correction model. So equation (4) written in this form delivers:

$$\begin{aligned}\Delta(r_i - r^{ECB})_t =& \alpha_{0i} + \sum_{j=1}^{p-1} \gamma_{ji} \Delta(r_i - r^{ECB})_{t-j} + \sum_{j=1}^{p_1-1} \gamma_{ji}^1 \Delta CDS_{it-j} + \sum_{j=1}^{p_2-1} \gamma_{ji}^2 \Delta(Bid - Ask)_{it-j} \\ &+ \sum_{j=1}^{p_3-1} \gamma_{ji}^3 \Delta(US - Bonds)_{it-j} + \sum_{j=1}^{p_4-1} \gamma_{ji}^4 \Delta Exit_{it-j} + \alpha_i (r_i - r^{ECB})_{t-1} \\ &+ \alpha_{1i} \cdot CDS_{it-1} + \alpha_{2i} \cdot (Bid - Ask_{it-1}) + \alpha_{3i} \cdot (US - Bonds_{t-1}) \\ &+ \alpha_{4i} \cdot Exit_{it-1} + \alpha_{5i} \cdot Trend_t + \epsilon_t \end{aligned} \tag{5}$$

We estimate equation (5) using a maximum lag length of nine. Please note that the optimal number of lags can vary for each variable and country. The best specifications are identified by the Akaike-criterion. To determine whether the specification can be assumed to incorporate only I(0) or I(1) regressors Peseran et al. (2001) present two types of critical values. Those are based on a Wald-test that all level regressors in equation (5) are not statistically significantly different from zero. If the corresponding F-statistic is below the lower critical value the regressors can thus be interpreted as being I(0). If the F-statistic is above the upper critical value (as it is mostly the case for our estimations) a stable long-run relationship between the interest rate spread and the exogenous variables is given. If

[9] In fact, only for Ireland all country-specific data are found to be stationary. However, since the US-corporate-government bond spread appears to be I(1) even for Ireland the same estimation technique has to be chosen.

the F-statistic is between the lower and upper critical value the result is inconclusive.

4 Estimation Results

In this section we will present the estimation results of equation (5) for our set of countries. Please note, that we do only present the long-run specifications.[10] In a first sub-section we present the baseline results. In a second part we conduct a robustness check accounting for the potential of an exit triggering a credit default. In a final third sub-section time-varying estimations are conducted since e.g. redenomination risks may vary over time.

4.1 Baseline Results

The baseline results are presented in Table 2. For all countries except Germany[11] we find a stable long-term relationship since all F-statistics exceed the upper critical values at least at a ten percent level.

- Table 2 about here -

When it comes to the influence of our explanatory variables, CDS premia indeed tend to have a positive influence on interest rate spreads. Only for Italy we find a significantly negative influence. The same holds with respect to the bid-ask-spread. Here only for Austria and the Netherlands the effect is negative. The US corporate-sovereign-bond-spread, however, displays a mainly negative response in our country sample. For Belgium, Finland, France, Ireland and the Netherlands this is the case hinting to safe haven flows into these countries.

Our main focus is, however, on the exit influence. The picture here is quite clear cut. For five of the ten countries we find a significant negative response to bond spreads

[10] The results for the short-run dynamics are available upon request.

[11] We will still interpret the results for Germany since in estimations using exit probabilities of only institutional or private investors (Tables 3 and 4) a stable long-term relationship is given with only marginally different point estimates.

associated with an implied appreciation of the newly introduced national currency in case of an exit from the EMU. This holds for Austria, Belgium, Germany, France and the Netherlands. But the estimated appreciation differs widely among those countries being largest in Belgium with an implied appreciation of 75 percent and lowest in France with only 5 percent. Another four countries do not exhibit a significant response of the exit variable on bond spreads, thus they would neither appreciate nor depreciate their currency in case of an exit. This is especially good news since these four countries are Spain, Finland, Ireland and Portugal, thus three of them are countries most hurt from the financial and European debt crisis. So they tend to have regained confidence by the financial markets by conducting economic reforms which may have led to vanished redenomination risks. The only country experiencing an appreciation in case of an exit would be Italy with an appreciation amounting to 5 percent.[12]

- Tables 3 and 4 about here -

The results are mainly robust across the different measures of the exit variable, incorporating only data from institutional or private investors. I.e. the group of appreciating countries, of those countries not altering their exchange rate significantly and Italy being the only country exhibiting a depreciation is found in all specifications.

4.2 Robustness Check

In the previous part we have seen that only Italy is expected to depreciate its currency when leaving the EMU. So according to the ISDA 2014 standards only for this country a credit default would occur. However, considering the old ISDA 2003 definition Italy would be safe since it is a G7-country. But for other countries not being G7 or having a AAA-rating a default would occur in case of an exit.[13] Therefore, we conduct a robustness-check

[12]The fact that only Italy is expected to depreciate may be due to the country sample. There may be other countries, e.g. Greece, which are also expected to depreciate once leaving the EMU.

[13]This being said for Germany, France and the Netherlands inference is clear since they are on the one hand either G7- or AAA-countries and on the other hand not expected to depreciate their currency in

by adding the product of the CDS-premia and the exit variable since this would give us the influence of an exit induced credit default on the interest rate spread. The influence of the exit variable can then be calculated by dividing the coefficient of the product by the influence of the CDS (α_{4i}/α_{1i}).

$$\begin{aligned}\Delta(r_i - r^{ECB})_t =& \alpha_{0i} + \sum_{j=1}^{p-1} \gamma_{ji} \Delta(r_i - r^{ECB})_{t-j} + \sum_{j=1}^{p_1-1} \gamma_{ji}^1 \Delta CDS_{it-j} + \sum_{j=1}^{p_2-1} \gamma_{ji}^2 \Delta(Bid - Ask)_{it-j} \\ &+ \sum_{j=1}^{p_3-1} \gamma_{ji}^3 \Delta(US - Bonds)_{it-j} + \sum_{j=1}^{p_4-1} \gamma_{ji}^4 \Delta Exit_{it-j} \cdot \Delta CDS_{it-j} \\ &+ \alpha_i (r_i - r^{ECB})_{t-1} + \alpha_{1i} \cdot CDS_{it-1} + \alpha_{2i} \cdot (Bid - Ask_{it-1}) \\ &+ \alpha_{3i} \cdot (US - Bonds_{t-1}) + \alpha_{4i} \cdot Exit_{it-1} \cdot CDS_{it-1} + \alpha_{5i} \cdot Trend_t + \epsilon_t \end{aligned} \tag{6}$$

Again the results are presented using the three specifications of the exit variable, namely the overall index, the one incorporating only institutional and the one with only private investors. For all three robustness checks the coefficients of the explanatory variables besides the exit indicator are broadly comparable to those of the baseline specification.

- Tables 5 to 7 about here -

When it comes to the influence of the exit variable it becomes an even tougher task to come up with significant estimates for the implied exit variable especially in the specification with only institutional investors. However, the overall picture concerning implied appreciations or depreciations is unchanged, i.e. Austria, Belgium, Germany France and the Netherlands tend to appreciate once leaving the EMU, while Italy is the only country in our sample facing a depreciation in case of an exit. One noteworthy change is given in the private exit estimates (Table 7). Here for Ireland the implied exit influence is found to

case of an exit. Therefore, a credit event would never occur for those countries, meaning CDS-premia and exit probabilities are truly independent from each other, thus the specification given in equation (5) is the correct one. However, for reasons of comparability we also include the results for these three countries in the robustness check.

be significantly negative. This even points to an appreciation of Ireland once they would leave the EMU instead of no effect as we proposed based on the other results. This is actually even better news that Ireland has undertaken the necessary reforms not only to abandon risks of currency depreciation but also to convince financial markets that it is nowadays assumed to be a strong member of the EMU again.

4.3 Rolling Estimates

Finally, we analyze whether the influence of the various explanatory variables may be time-varying. Since the robustness-check did not deliver any new insights, we feel legitimized to use our baseline equation in the following. The analysis is conducted for the overall exit variable since we have seen that results do not differ much between the three specifications. Time-varying coefficients are estimated using a rolling 30 observations window.[14] This means that after one estimation is carried out, the first observation is dropped and the next observation is included for the next estimation. Suppose for example an estimation carried out with the starting period being January 2015. 30 observations in this case mean the sample period ranges up to June 2017. For the next estimation values in January 2015 are dropped and instead values for July 2017 are included. This procedure is reiterated for all windows possible. In order to save degrees of freedom the number of lags in the short-run dynamics is restricted to one.

In order to get the matching of the time-varying coefficients right, we built average coefficients. This means that the time-varying coefficient of one variable at a certain period is the average of all estimations where the respective period was part of the estimation. For example the average coefficient of a variable for January 2015 is based on the coefficient in the abovementioned window, but also on the 29 windows before, because all of them include data for January 2015. The same procedure is followed for the p-values used to validate whether the coefficients are on average significant.[15] Figures 2-6 show the

[14] Also other window sizes were employed. The results do not differ much and are available upon request.

[15] This procedure turned out to be quite restrictive due to the fact that conventional significance level

time-varying influence of our various explanatory variables on the interest rate spreads. Moreover, the fitted value is compared to the actual spreads and the significance of the estimates is shown.

- Figures 2 to 6 about here -

For some countries the rolling-estimates mirror the true interest rate spreads quite well (e.g. Germany, Spain and Italy) while for others the fit is less good (e.g. France or the Netherlands). While for many countries no significant influence of the exit variable can be identified, some interesting insights can be drawn, since we find for five countries a significant influence at least at a ten percent level in some periods. These countries are Belgium, Germany, Spain, Finland and Italy.

For Belgium only in the end of the year 2012 a significant influence of the redenomination risk can be verified. Here a significant decrease in interest rate spreads is amounting to up to -0.2 percentage points is estimated, pointing to a appreciation if Belgium would have introduced a national currency.

With respect to Germany two periods of a significant influence of the exit variable and thus implied redenomination issues are present. However, both periods turn out to be different in the expected exchange rate adjustment. First, in the beginning of the sample (June to August 2012) a redenomination in Germany would have led to a depreciation of the national currency. This result may be due to the uncertain situation of a Euro area break-up at this time, i.e. what would have happened to the large TARGET2-claims by the Bundesbank. In the second period from January to September 2017 the exit variable exhibits a negative influence on yield spreads, thus implying an appreciation in case of an exit.

In Spain also an implied depreciation in the beginning of the sample period is found (June to July 2012). Here the influence on yield spreads was quite substantial with

are 1, 5 or 10 percent. So if only a few estimates of the 30 coefficients the average coefficient is based on are highly insignificant, it is hard to find empirically significant average estimates, even though many of the 30 estimates may be significant.

an increase of up to 2 percentage points. From June 2017 to January 2018 again a depreciation is induced by our results. However, the influence on the yield spreads is with below 0.1 percentage points much lower than in the previous period. The result for the latter period my be due to the uncertain situation with the economically powerful state of Catalonia at that time.

Finland exhibits a mainly significant decrease in yield spreads in the period ranging from June 2012 to April 2013 pointing to an appreciation of the national currency in this period. The influence is decreasing the yield spreads by as much as 25 basis points.

Finally, Italy is the only country with an induced depreciation in the second half of our sample period. In the period ranging from May 2015 to February 2017 the influence of the exit variable is consistently found to drive up yield spreads by as much as 50 basis points. This maximum is found in November 2016 and thus corresponds closely to the declined referendum by former Prime Minister Matteo Renzi on 04. December 2016.

5 Conclusions

In this article we have used a survey indicator to account for redenomination risks besides controlling for other factors influencing interest rate spreads of ten EMU countries. The good news is that redenomination risks seem to have vanished for most of the Euro area countries. If anything redenomination risks remain with respect to the northern (core) countries and represent appreciation risks which are less risky from a debt-sustainability perspective.

We can think of three possible explanations for this: First, the Euro crisis considerably calmed down since the ECB intervened in the markets via the "Whatever it takes" speech by its president and the introduction of the subsequent programs. Second, reforms on a European level, i.e. the introduction of the ESM in September 2012 and the introduction of the banking union in May 2014, contributed to the development in redenomination risks. Third, national reforms and consolidation effort i.e. in the former crisis countries in

the south of Europe convinced financial markets that an exit from the EMU is no longer a desirable option for them.

If the first explanation would be true, in our opinion this should hold for all countries equally, so also for Italy and Spain. But we do see that these countries even after the ECB intervened heavily via e.g. its Asset Purchase Programme are still subject to redenomination risks. However, it may be good news that monetary policy is not the key in abandoning redenomination risks, since those measures will clearly not be part of a long-term framework of the ECB but are bound to extraordinary situations.

In our opinion the second explanation may tell part of the story, since we observe that the smaller former crisis countries Ireland and Portugal face no longer redenomination risks. This may be the case since those countries can nowadays be rescued by European facilities like the ESM. The bad news is that this does not apply to larger countries like Italy and Spain. So the problem of being too big to fail remains present also for sovereigns.

Moreover, there seems to be a correlation between political reforms and risks of a depreciation in southern European countries, i.e. Italy[16] and to some extent Spain, thus part of the explanation has to be seen on a national level. Putting it the other way around there are other former crisis countries like Ireland or Portugal which tend to have overcome the risk of depreciation, probably due to credible economic reforms. This being said it should be the goal for those countries to remain on this path and for the others to take steps in this direction.

[16]This may be even more true for the new government in Italy being responsible since June 2018 and tend to abandon economic reforms, thus risk spreads are rising considerably (Gros, 2018). However, this period is not part of our sample.

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Figures

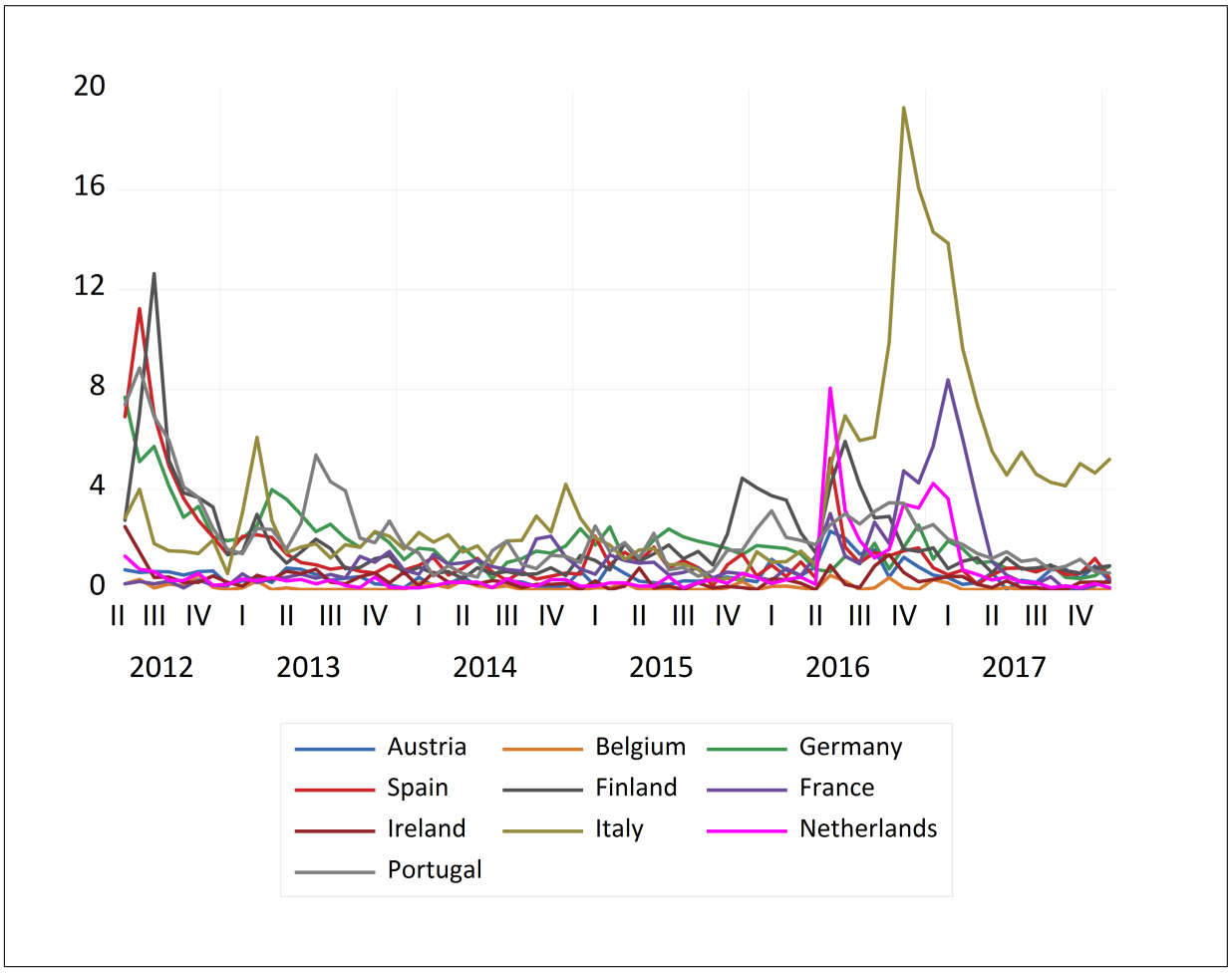
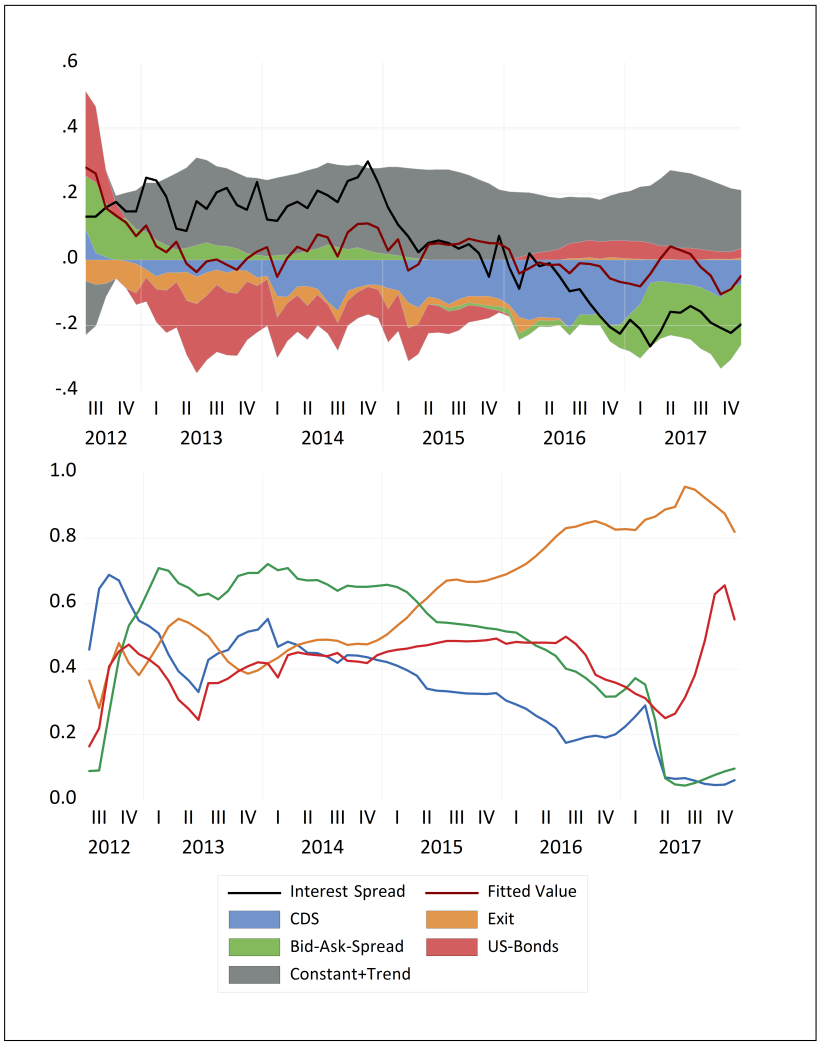
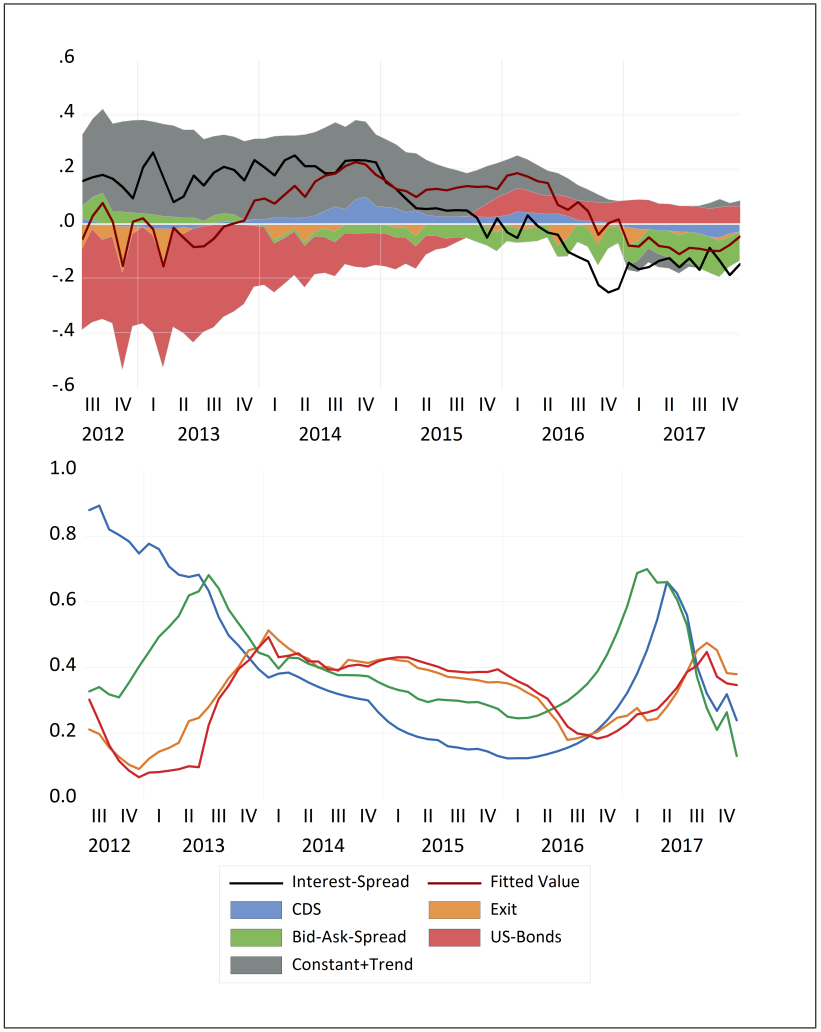


Figure 1: Country Specific Exit Probabilities; *Notes: In percent based on the SENTIX Euro Area Break-Up Index.*

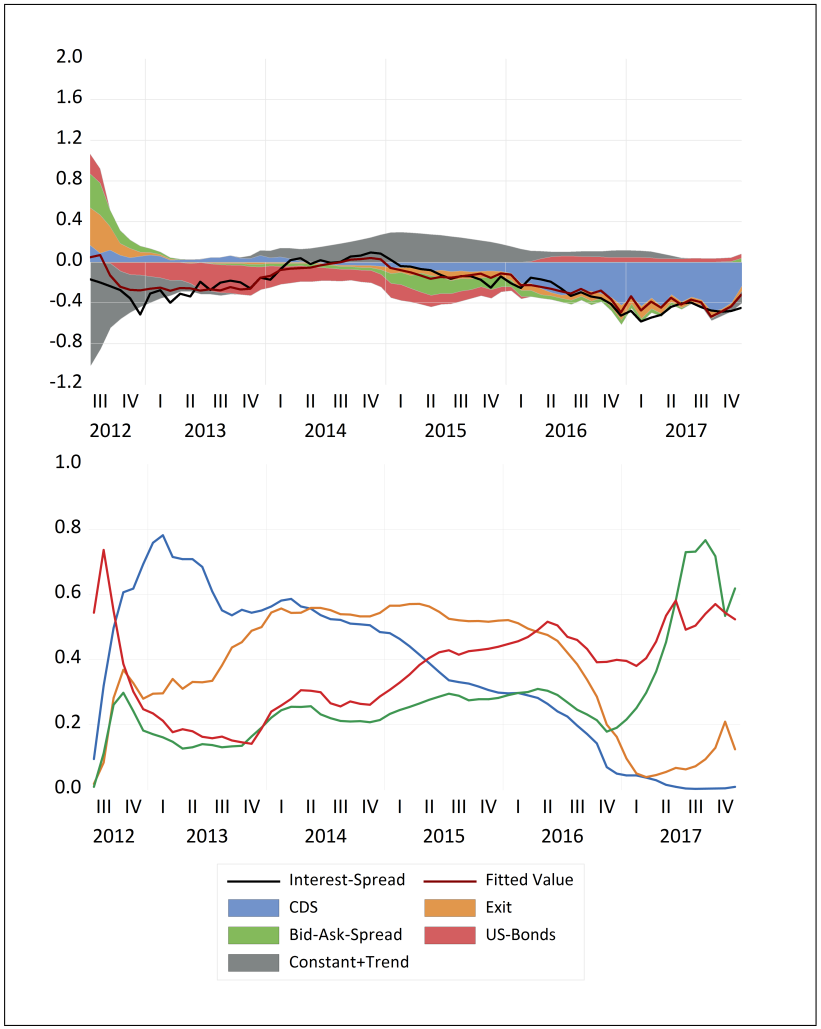


(a) Austria

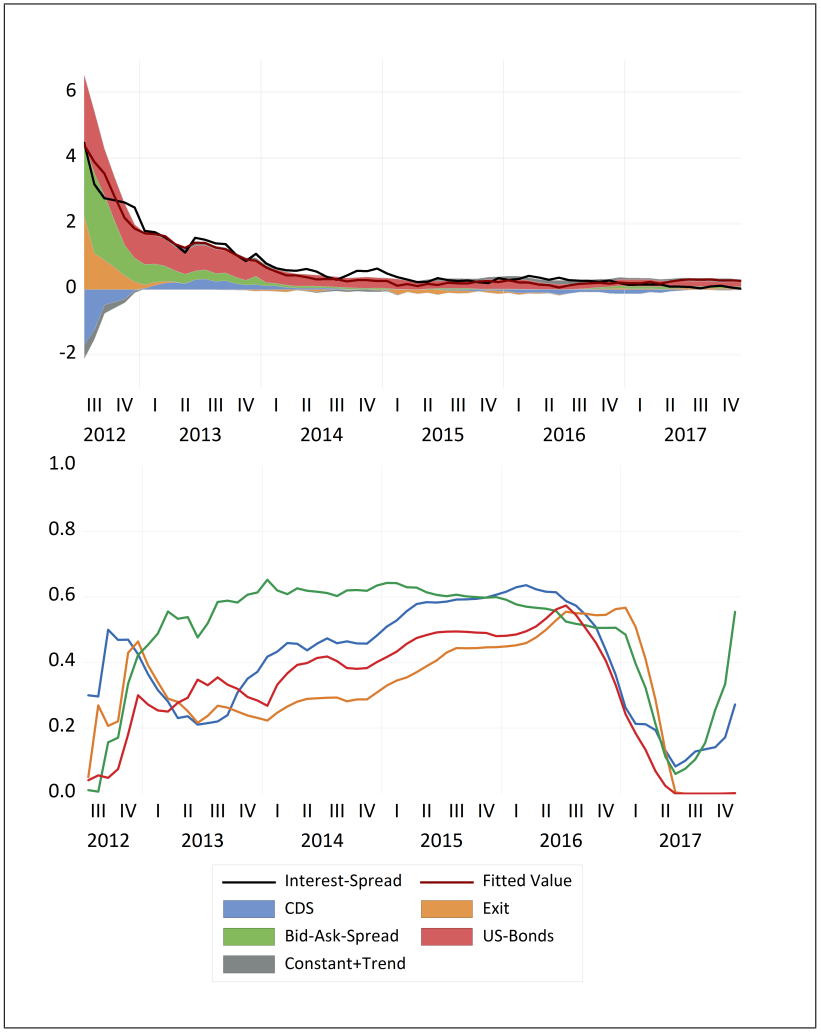


(b) Belgium

Figure 2: Time-Varying Spread Contributions - Austria and Belgium; *Upper graph = Contributions, lower graph = corresponding p-values.*

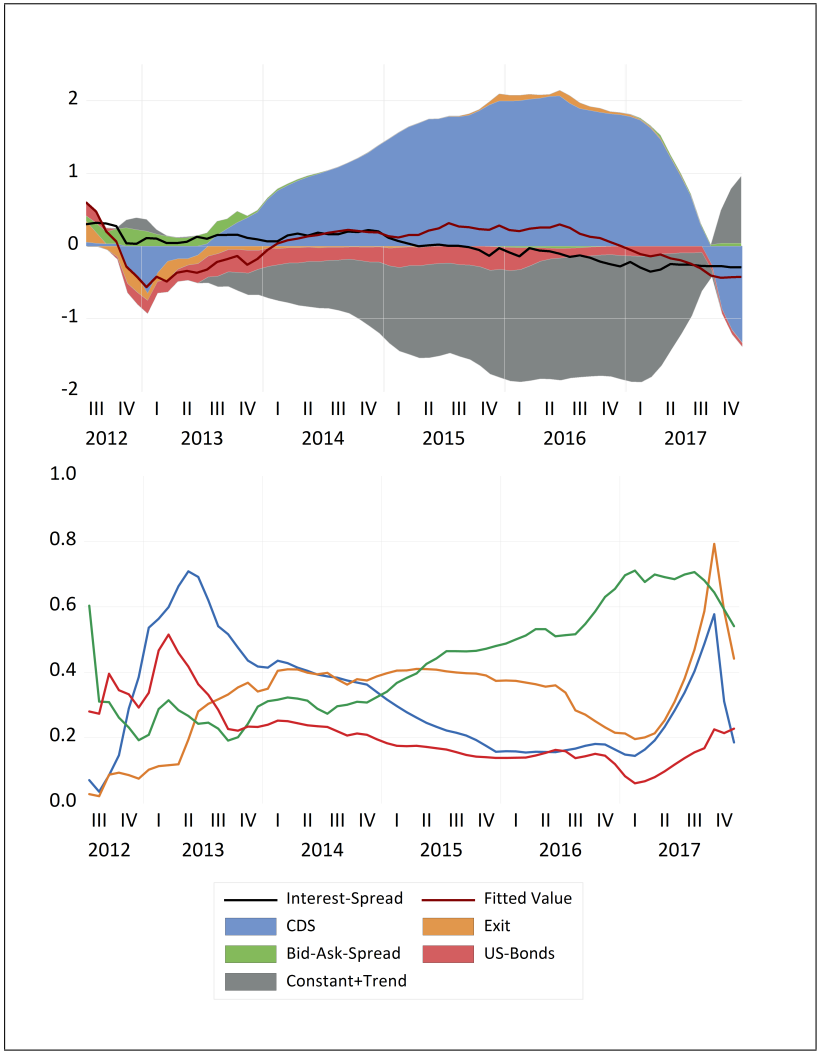


(a) Germany

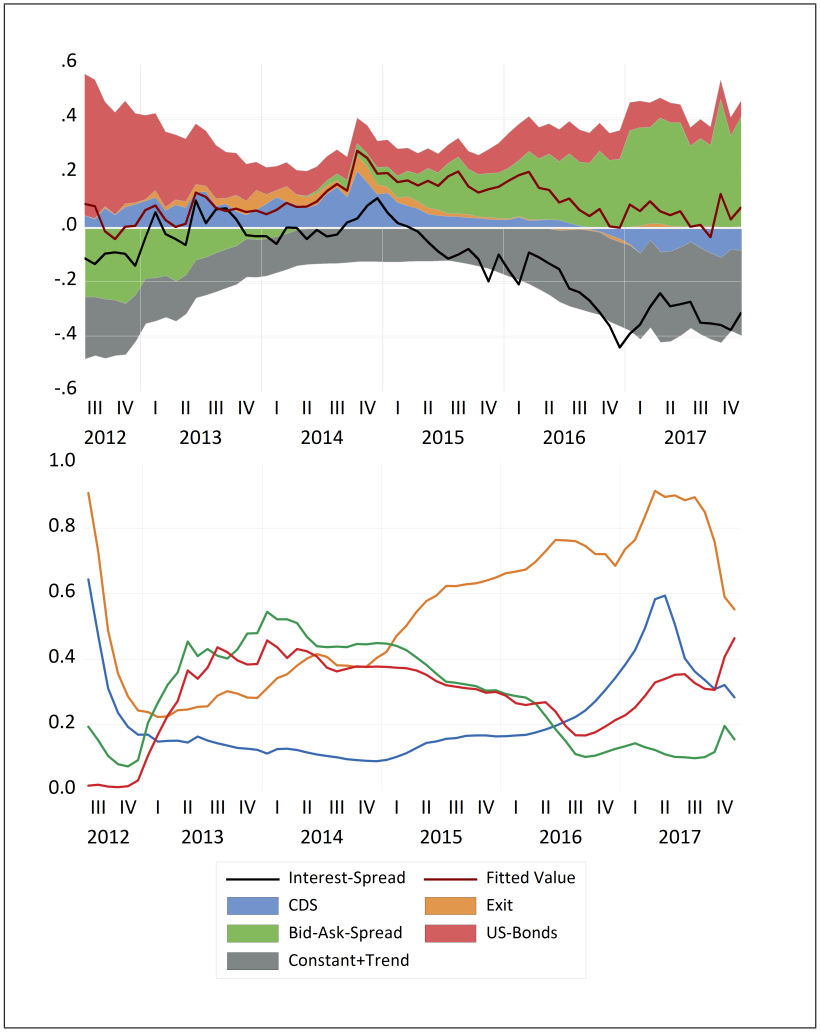


(b) Spain

Figure 3: Time-Varying Spread Contributions - Germany and Spain; *Upper graph = Contributions, lower graph = corresponding p-values.*

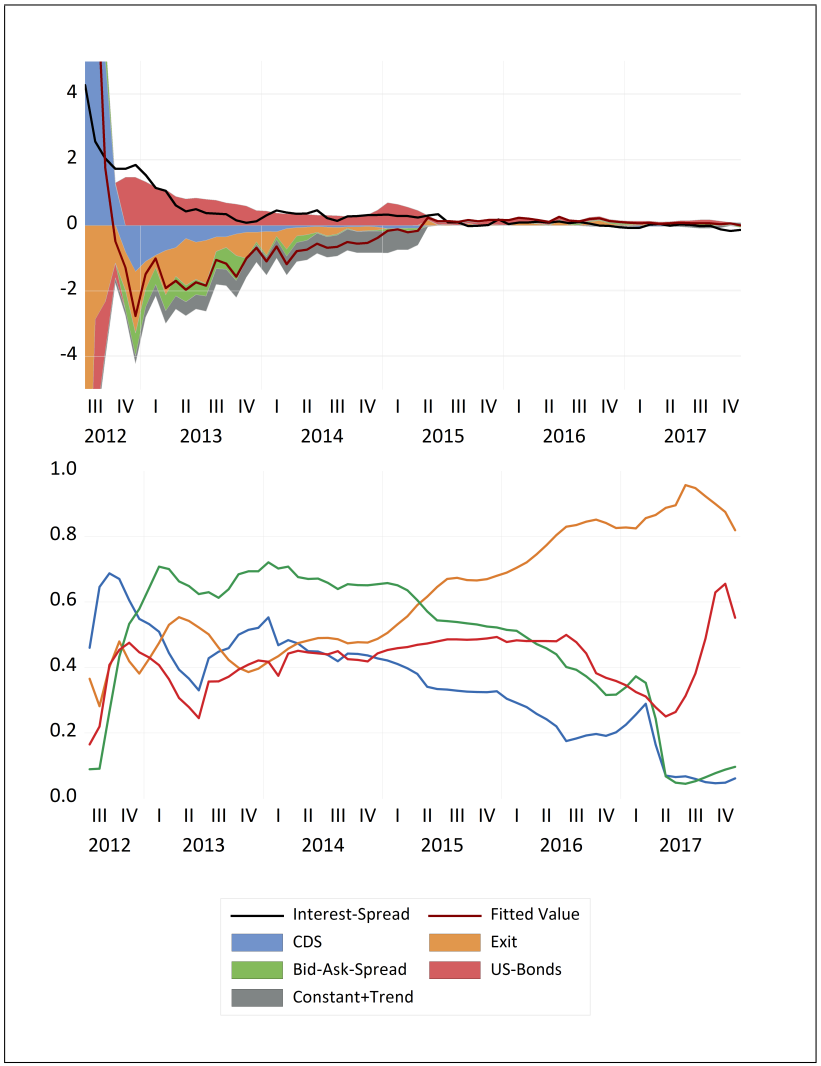


(a) Finland

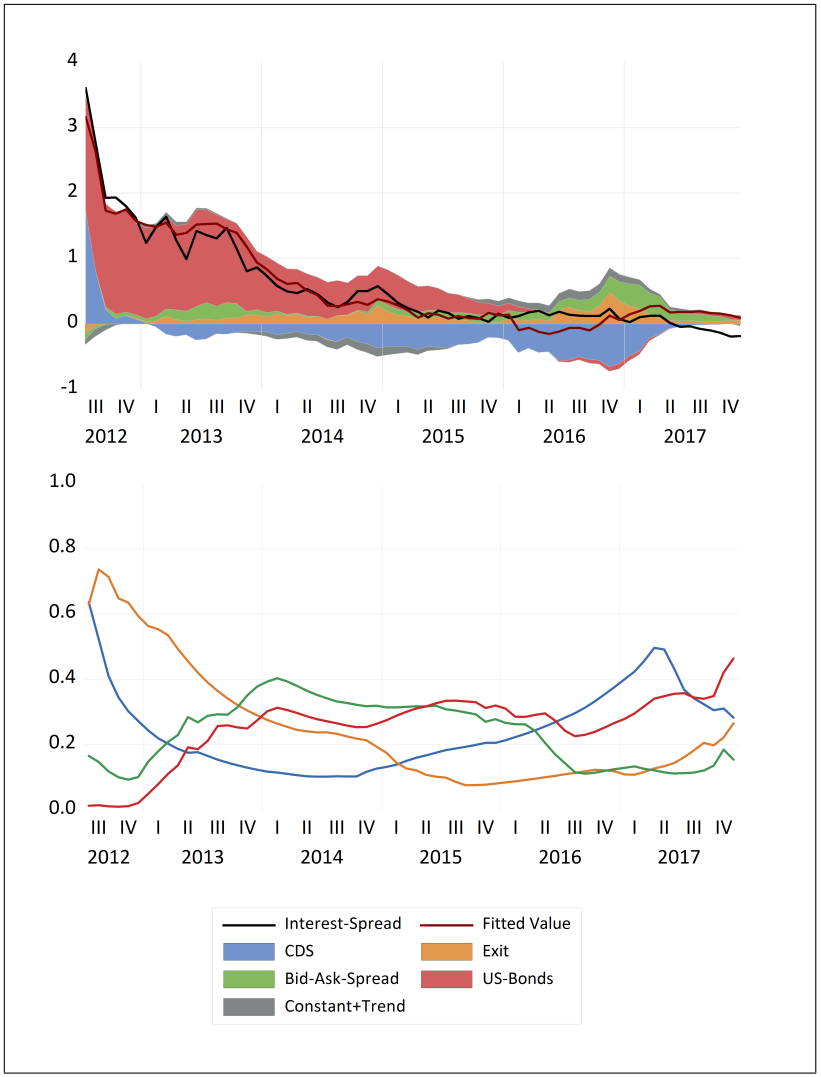


(b) France

Figure 4: Time-Varying Spread Contributions - Finland and France; *Upper graph = Contributions, lower graph = corresponding p-values.*

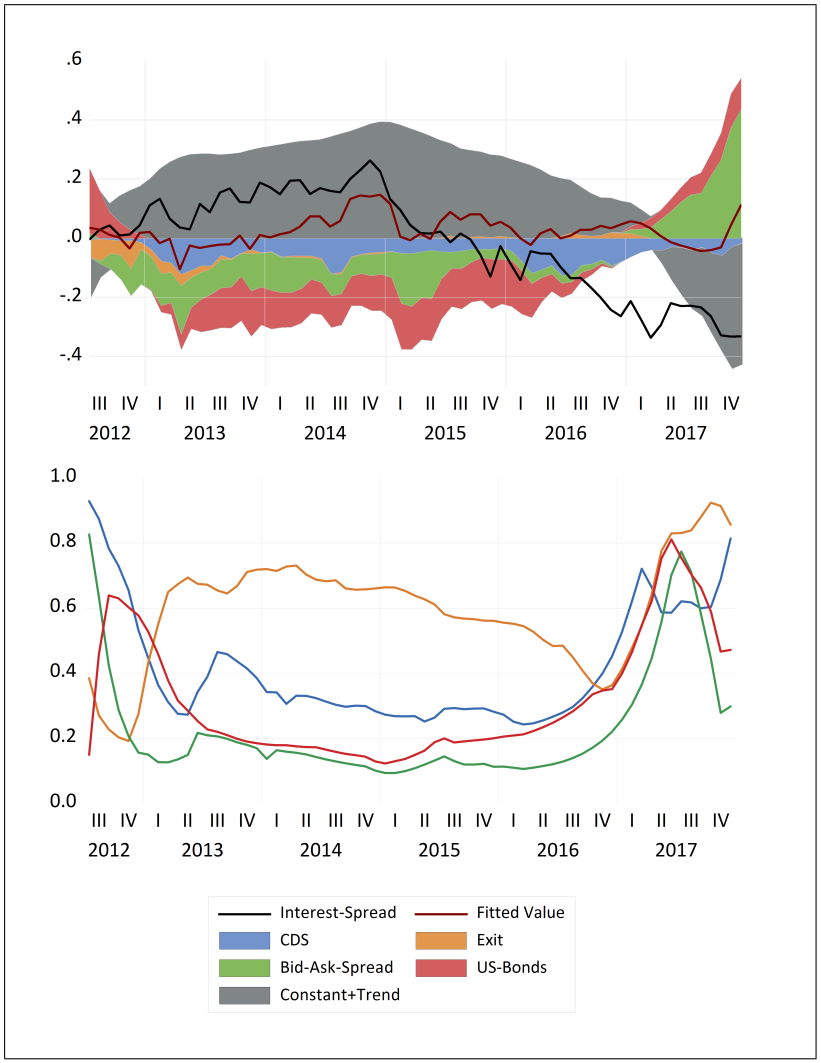


(a) Ireland

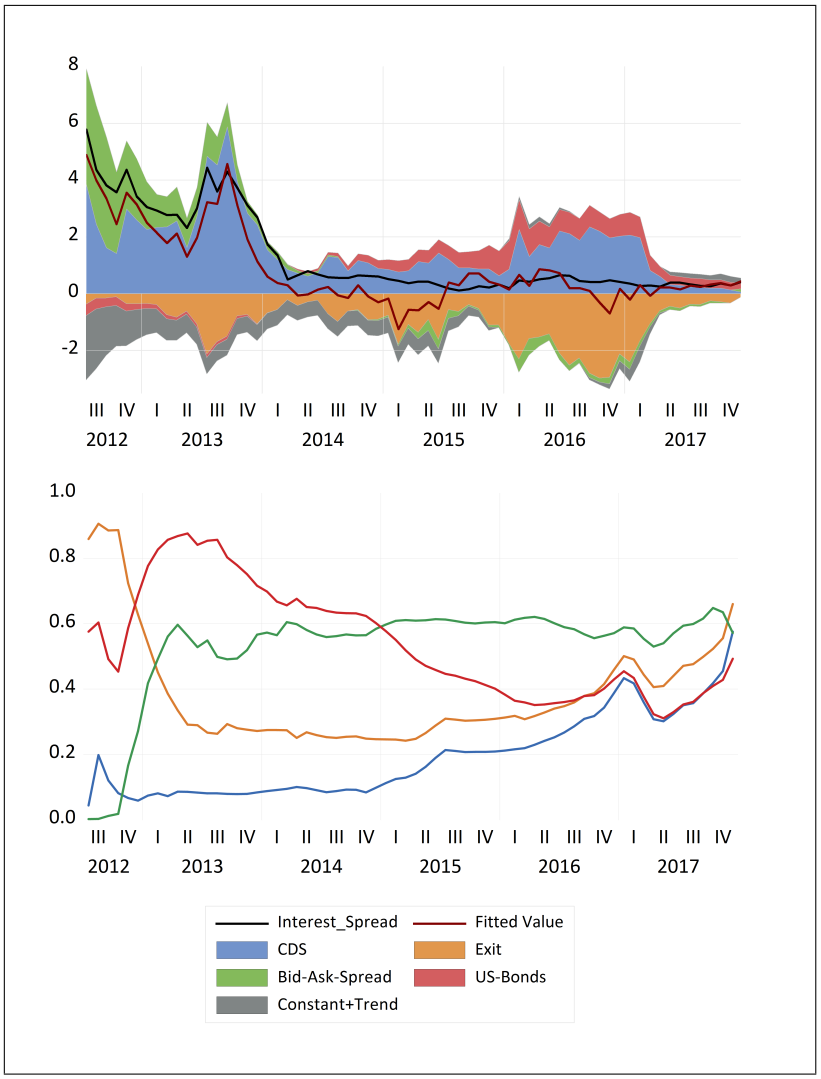


(b) Italy

Figure 5: Time-Varying Spread Contributions - Ireland and Italy; *Upper graph = Contributions, lower graph = corresponding p-values.*



(a) Netherlands



(b) Portugal

Figure 6: Time-Varying Spread Contributions - Netherlands and Portugal; *Upper graph = Contributions, lower graph = corresponding p-values.*

Tables

Table 1: ADF Stationarity Tests

	AT	BE	DE	ES	FI	FR	IE	IT	NL	PT
$Interest - Spread$	-3.64**	-2.60	-2.02	-3.87**	-2.57	-2.62	-9.92***	-5.26***	-3.75**	-2.36
CDS	-22.14***	-24.72***	-1.47	-6.28***	-4.71***	-12.26***	-4.56***	-7.33***	-14.79***	-8.66***
$Bid - Ask - Spread$	-1.38	-11.25***	-1.64	-2.10	-3.84**	-2.13	-3.86**	-1.41	-2.84	-2.71
$Exit$	-4.31***	-3.56**	-6.07***	-3.87**	-3.51**	-2.50	-7.55***	-2.32	-4.70***	-3.32*
$Exit_I$	-5.10***	-8.49***	-6.20***	-4.38***	-3.72**	-3.12	-7.98***	-2.41	-5.27***	-3.71**
$Exit_P$	-5.21***	-2.77	-6.55***	-3.85**	-3.49**	-2.33	-6.49***	-2.43	-4.36***	-3.96**
$US - Spread$	-2.32									
$\Delta(Interest - Spread)$	-9.25***	-9.25***	-9.68***	-13.09***	-7.90***	-8.70***	-5.14***	-6.55***	-8.07***	-8.62***
$\Delta(CDS)$	-13.11***	-15.34***	-6.05***	-11.89***	-14.58***	-8.47***	-5.32***	-5.51***	-6.03***	-6.45***
$\Delta(Bid - Ask - Spread)$	-8.79***	-3.77**	7.73***	-8.85***	-4.91***	-10.47***	-7.46***	-9.45***	-9.22***	-6.87***
$\Delta(Exit)$	-11.65***	-11.26***	-6.68***	-7.09***	-13.34***	-7.75***	-7.92***	-7.24***	-11.12***	-9.00***
$\Delta(Exit_I)$	-11.99***	-10.07***	-8.96***	-8.33***	-13.64***	-9.01***	-9.90***	-8.13***	-7.22***	-9.43***
$\Delta(Exit_P)$	-13.00***	-12.50***	-5.73***	-15.78***	- 8.90***	-7.58***	-9.79***	-7.25***	-10.85***	-11.15***
$\Delta(US - Spread)$	-6.10***									

Notes: BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, IE=Ireland, IT=Italy, NL=Netherlands, PT=Portugal; $\Delta(x)$=first difference, Augmented Dickey-Fuller-Tests are conducted by adding an individual trend and intercept, T-statistics of the tests are displayed, */**/*** signal significance at the 10%/5%/1% level.

Table 2: Estimation Results

	AT	BE	DE	ES	FI	FR	IE	IT	NL	PT
$Interest - Spread(-1)$	-0.67***	-0.40***	-1.23***	-0.35***	-0.30***	-0.65***	-0.39***	-1.12**	-1.22***	-0.22***
	(0.14)	(0.09)	(0.35)	(0.08)	(0.09)	(0.15)	(0.07)	(0.42)	(0.26)	(0.07)
$Constant$	0.21**	0.19***	1.25***	0.13	-7.22	0.20***	0.29***	1.14***	1.14***	-0.06
	(0.10)	(0.06)	(0.32)	(0.08)	(4.95)	(0.06)	(0.08)	(0.36)	(0.24)	(0.18)
CDS	0.03**	0.00	-0.04	0.01***	11.86	0.02**	0.02***	-0.01*	-0.01	0.00
	(0.01)	(0.01)	(0.04)	(0.00)	(8.97)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)
$Bid - Ask - Spread$	-0.59**	0.13	8.95**	-0.83	0.97	-0.59	0.01*	8.46***	-8.06***	3.41***
	(0.25)	(0.26)	(3.09)	(2.09)	(0.85)	(1.08)	(0.00)	(1.73)	(0.99)	(1.07)
$US - Spread$	-0.03	-0.11***	-0.24	-0.04	-0.18**	-0.18***	-0.45***	0.14	-0.10***	-0.34
	(0.04)	(0.04)	(0.20)	(0.11)	(0.09)	(0.04)	(0.14)	(0.11)	(0.02)	(0.43)
$Exit$	-0.15***	-0.72***	-0.27**	0.01	-0.02	-0.05***	-0.07	0.05**	-0.09***	0.11
	(0.05)	(0.17)	(0.11)	(0.05)	(0.02)	(0.01)	(0.10)	(0.02)	(0.02)	(0.24)
$Trend$	-0.01***	-0.01***	-0.02***	-0.01	-0.01***	-0.00***	-0.01***	-0.02**	-0.01***	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
$ARDL - Lags$	(2,6,2,5,7)	(1,3,3,0,5)	(8,9,9,9,9)	(1,3,3,2,0)	(1,0,0,0,7)	(1,6,0,8,7)	(1,4,2,0,0)	(9,8,9,7,8)	(8,8,8,7,8)	(1,1,0,0,2)
$F - Bounds - Test$	4.96^{+}	4.16^{+}	3.14	6.52^{+}	4.11^{+}	8.37^{+}	9.62^{+}	4.33^{+}	11.12^{+}	3.96^{+}

Notes: AT=Austria, BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, IE=Ireland, IT=Italy, NL=Netherlands, PT=Portugal; standard errors in parenthesis, */**/*** signal significance at the 10%/5%/1% level, for F-Bounds-Test + signals F-statistic above upper critical value and - below critical value at least at a ten percent level.

Table 3: Estimation Results - Institutional Investors

	AT	BE	DE	ES	FI	FR	IE	IT	NL	PT
$Interest - Spread(-1)$	-0.53***	-0.33***	-0.83***	-0.35***	-0.31***	-0.73***	-0.44***	-0.97**	-1.41***	-0.24***
	(0.13)	(0.08)	(0.14)	(0.08)	(0.10)	(0.16)	(0.08)	(0.41)	(0.29)	(0.07)
$Constant$	0.28***	0.17***	1.05***	0.13*	0.16**	0.21***	0.28***	1.24***	1.28***	-0.12
	(0.09)	(0.05)	(0.16)	(0.08)	(0.07)	(0.07)	(0.07)	(0.38)	(0.26)	(0.19)
CDS	-0.01	-0.00	-0.12***	0.01***	0.07	0.02**	0.01***	-0.02*	-0.01*	0.01**
	(0.01)	(0.01)	(0.02)	(0.00)	(0.10)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)
$Bid - Ask - Spread$	-0.37	0.18	11.02***	-0.86	-0.28	-2.05*	-0.40***	11.06***	-7.12***	3.20***
	(0.34)	(0.26)	(2.34)	(2.08)	(0.56)	(1.01)	(0.13)	(2.93)	(0.72)	(0.98)
$US - Spread$	0.03	-0.14**	-0.54***	-0.04	-0.17**	-0.08*	-0.08	0.25	-0.10***	-0.22
	(0.05)	(0.06)	(0.13)	(0.11)	(0.08)	(0.04)	(0.08)	(0.18)	(0.01)	(0.42)
$Exit$	-0.18***	-0.47**	-0.21**	0.01	0.01	-0.03***	-0.19	0.09**	-0.08***	-0.21
	(0.06)	(0.20)	(0.07)	(0.04)	(0.02)	(0.01)	(0.16)	(0.04)	(0.01)	(0.18)
$Trend$	-0.01***	-0.01***	-0.02***	-0.01	-0.01***	-0.01***	-0.01***	-0.03***	-0.01***	0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
$ARDL - Lags$	(1,0,7,4,7)	(1,3,0,3,5)	(9,7,9,8,7)	(1,3,3,2,0)	(3,1,4,0,0)	(1,7,6,8,1)	(4,4,2,0,4)	(9,8,9,8,8)	(8,8,8,7,6)	(2,1,0,0,1)
$F - Bounds - Test$	4.15^{+}	3.47	10.08^{+}	6.54^{+}	3.43	5.80^{+}	8.15^{+}	4.08^{+}	10.97^{+}	3.90^{+}

Notes: AT=Austria, BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, IE=Ireland, IT=Italy, NL=Netherlands, PT=Portugal; standard errors in parenthesis, */**/*** signal significance at the 10%/5%/1% level, for F-Bounds-Test + signals F-statistic above upper critical value and - below critical value at least at a ten percent level.

Table 4: Estimation Results - Private Investors

	AT	BE	DE	ES	FI	FR	IE	IT	NL	PT
$Interest - Spread(-1)$	-0.75***	-0.11	-1.32***	-0.36***	-0.26***	-0.76***	-0.38***	-1.52***	-1.08***	-0.20***
	(0.15)	(0.10)	(0.34)	(0.08)	(0.09)	(0.18)	(0.07)	(0.36)	(0.27)	(0.07)
$Constant$	0.27***	0.06	1.53***	0.13	-8.75*	0.23***	0.29***	1.41***	1.06***	-0.12
	(0.09)	(0.06)	(0.43)	(0.08)	(4.68)	(0.08)	(0.08)	(0.31)	(0.25)	(0.18)
CDS	-0.03**	-0.04	-0.07	0.01***	16.76	0.02***	0.01	-0.01***	-0.00	-0.01
	(0.01)	(0.05)	(0.04)	(0.00)	(11.20)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
$Bid - Ask - Spread$	-0.65***	0.83	8.63***	-0.73	1.23	-1.39	-0.44***	7.55***	-8.58***	4.90***
	(0.22)	(1.52)	(1.92)	(2.06)	(1.04)	(1.07)	(0.15)	(1.03)	(1.33)	(1.65)
$US - Spread$	-0.06*	-0.06	-0.40	-0.04	-0.22	-0.11**	-0.07	0.06	-0.12***	-0.46
	(0.03)	(0.14)	(0.25)	(0.11)	(0.16)	(0.04)	(0.09)	(0.05)	(0.02)	(0.51)
$Exit$	-0.14***	-1.50	-0.12	-0.01	-0.02	-0.03***	-0.06	0.04***	-0.10***	0.49
	(0.04)	(1.21)	(0.12)	(0.06)	(0.05)	(0.01)	(0.10)	(0.01)	(0.02)	(0.30)
$Trend$	-0.01***	-0.01**	-0.02***	-0.01	-0.01***	-0.01***	-0.01***	-0.02***	-0.01***	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
$ARDL - Lags$	(2,6,3,5,7)	(3,4,5,2,3)	(9,8,9,9,9)	(1,3,3,2,0)	(1,0,0,6,7)	(4,6,6,8,0)	(1,4,2,0,0)	(9,6,9,9,7)	(8,8,8,7,8)	(1,1,2,2,0)
$F - Bounds - Test$	5.36^{+}	2.61^{-}	9.16^{+}	6.51^{+}	4.49^{+}	7.18^{+}	9.58^{+}	5.53^{+}	8.07^{+}	4.81^{+}

Notes: AT=Austria, BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, IE=Ireland, IT=Italy, NL=Netherlands, PT=Portugal; standard errors in parenthesis, */**/*** signal significance at the 10%/5%/1% level, for F-Bounds-Test + signals F-statistic above upper critical value and - below critical value at least at a ten percent level.

Table 5: Robustness Check - Accounting for Credit Default in Case of Exit

	AT	BE	DE	ES	FI	FR	IE	IT	NL	PT
$Interest - Spread(-1)$	-0.69***	-0.35***	-0.56***	-0.39***	-0.31***	-0.58***	-0.40***	-0.73***	-0.97***	-0.27***
	(0.15)	(0.10)	(0.13)	(0.08)	(0.10)	(0.15)	(0.09)	(0.18)	(0.22)	(0.06)
$Constant$	0.15	0.07	0.74***	0.20**	0.17**	0.14**	0.25***	0.78***	0.84***	0.01
	(0.11)	(0.06)	(0.23)	(0.08)	(0.08)	(0.07)	(0.07)	(0.19)	(0.20)	(0.02)
CDS	0.04***	0.02**	-0.23	0.01***	0.04	0.02**	0.01**	0.01**	0.02	0.01**
	(0.01)	(0.01)	(0.23)	(0.00)	(0.11)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)
$Bid - Ask - Spread$	-0.61***	0.65	14.21***	-1.58	-0.27	0.03	-0.80***	8.04***	-9.33***	1.92***
	(0.19)	(0.41)	(4.18)	(2.10)	(0.58)	(1.40)	(0.19)	(1.64)	(1.26)	(0.63)
$US - Spread$	-0.02	-0.07	-0.83**	-0.05	-0.16*	-0.15***	-0.03	0.07	-0.09***	-0.49
	(0.04)	(0.06)	(0.33)	(0.10)	(0.08)	(0.05)	(0.09)	(0.07)	(0.02)	(0.30)
$Exit \cdot CDS$	-0.04***	-0.01***	0.05	-0.00	0.00	-0.00***	-0.01	0.00***	-0.03***	0.00
	(0.01)	(0.00)	(0.08)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)
$Trend$	-0.01***	-0.01***	-0.01***	-0.01**	-0.01***	-0.01***	-0.01***	-0.02***	-0.01***	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
impl. Exit	-0.79***	-0.61**	-0.20	-0.04	0.09	-0.19***	-0.07	0.05***	-1.80*	0.06
	(0.20)	(0.25)	(0.15)	(0.07)	(0.37)	(0.06)	(0.49)	(0.01)	(0.88)	(0.09)
$ARDL - Lags$	(2,7,2,5,7)	(1,0,5,4,5)	(5,7,9,6,7)	(1,1,3,2,3)	(3,1,4,0,0)	(3,6,5,8,0)	(1,4,2,0,4)	(7,5,7,7,4)	(8,8,8,7,6)	(2,0,0,2,2)
$F - Bounds - Test$	5.05^{+}	3.37	6.79^{+}	7.45^{+}	3.38	7.92^{+}	10.41^{+}	4.55^{+}	12.95^{+}	8.96^{+}

Notes: AT=Austria, BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, IE=Ireland, IT=Italy, NL=Netherlands, PT=Portugal; standard errors in parenthesis, */**/*** signal significance at the 10%/5%/1% level, for F-Bounds-Test + signals F-statistic above upper critical value and - below critical value at least at a ten percent level.

Table 6: Robustness Check Institutional Investors - Accounting for Credit Default in Case of Exit

	AT	BE	DE	ES	FI	FR	IE	IT	NL	PT
$Interest - Spread(-1)$	-0.50***	-0.35***	-0.34***	-0.31***	-0.31***	-0.54***	-0.35***	-0.62***	-1.00***	-0.26***
	(0.12)	(0.09)	(0.09)	(0.10)	(0.10)	(0.14)	(0.07)	(0.14)	(0.24)	(0.07)
$Constant$	0.28***	0.16***	-0.29***	0.12	0.18**	0.12*	0.24***	0.35**	-0.69***	0.02
	(0.09)	(0.05)	(0.08)	(0.08)	(0.08)	(0.07)	(0.07)	(0.16)	(0.15)	(0.17)
CDS	0.04	0.01	-0.12	0.01***	0.05	0.02**	0.01**	0.00	0.89***	0.01***
	(0.11)	(0.06)	(0.09)	(0.00)	(0.10)	(0.01)	(0.01)	(0.01)	(0.22)	(0.00)
$Bid - Ask - Spread$	-0.45	0.28	-1.70	-0.60	-0.28	0.42	-0.80***	3.02*	0.01	1.93**
	(0.34)	(0.29)	(2.05)	(2.11)	(0.56)	(1.56)	(0.19)	(1.59)	(0.01)	(0.75)
$US - Spread$	0.02	-0.13**	-0.16*	-0.04	-0.17**	-0.14***	-0.03	-0.07	-9.08***	-0.57
	(0.06)	(0.05)	(0.08)	(0.11)	(0.08)	(0.06)	(0.10)	(0.07)	(1.30)	(0.35)
$Exit \cdot CDS$	-0.03***	-0.05**	0.01	-0.00	0.01	-0.00***	-0.00	0.00	-0.10***	0.00
	(0.01)	(0.02)	(0.04)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)	(0.02)	(0.00)
$Trend$	-0.01***	-0.01***	-0.01***	-0.01**	-0.01***	-0.01***	-0.01***	-0.01***	-0.03***	0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
impl. Exit	-0.70	-3.24	-0.10	-0.02	0.11	-0.22**	-0.07	0.02	-4.11	-0.01
	(1.52)	(14.61)	(0.37)	(0.07)	(0.32)	(0.09)	(0.54)	(0.09)	(5.42)	(0.05)
$ARDL - Lags$	(1,0,7,4,5)	(1,2,2,3,5)	(1,6,0,2,5)	(1,3,3,2,0)	(3,1,4,0,0)	(3,6,5,8,0)	(1,3,2,0,4)	(3,6,3,4,3)	(8,8,8,7,6)	(1,1,0,2,2)
$F - Bounds - Test$	4.57^{+}	3.77^{+}	3.77^{+}	6.53^{+}	3.43	7.62^{+}	12.57^{+}	3.62^{+}	12.08^{+}	3.31

Notes: AT=Austria, BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, IE=Ireland, IT=Italy, NL=Netherlands, PT=Portugal; standard errors in parenthesis, */**/*** signal significance at the 10%/5%/1% level, for F-Bounds-Test + signals F-statistic above upper critical value and - below critical value at least at a ten percent level.

Table 7: Robustness Check Private Investors - Accounting for Credit Default in Case of Exit

	AT	BE	DE	ES	FI	FR	IE	IT	NL	PT
$Interest - Spread(-1)$	-0.69***	-0.17*	-0.50***	-0.39***	-0.27***	-0.59***	-0.52***	-0.74***	-0.88***	-0.17*
	(0.13)	(0.09)	(0.13)	(0.08)	(0.14)	(0.15)	(0.08)	(0.17)	(0.22)	(0.09)
$Constant$	0.18*	0.05	0.87***	0.21**	-12.08*	0.16**	0.31***	0.79***	0.76	-0.07
	(0.10)	(0.06)	(0.19)	(0.08)	(6.45)	(0.07)	(0.07)	(0.17)	(0.20)	(0.18)
CDS	0.04***	0.01	-0.31**	0.01***	22.26	0.02**	0.02***	0.02**	0.03*	0.00
	(0.01)	(0.01)	(0.14)	(0.00)	(16.47)	(0.01)	(0.00)	(0.01)	(0.02)	(0.01)
$Bid - Ask - Spread$	-0.71**	1.10	11.94***	-1.58	1.38	-0.09	-0.47***	8.05****	-9.98***	3.45**
	(0.26)	(1.11)	(3.98)	(2.06)	(1.91)	(1.39)	(0.13)	(1.47)	(1.59)	(1.54)
$US - Spread$	-0.02	-0.05	-0.99***	-0.05	-0.22*	-0.16***	-0.06	0.09	-0.07**	-0.11
	(0.04)	(0.09)	(0.29)	(0.10)	(0.13)	(0.05)	(0.06)	(0.07)	(0.02)	(0.54)
$Exit \cdot CDS$	-0.04***	-0.02*	0.05	-0.00	-0.01	-0.00***	-0.00*	0.00***	-0.04***	0.00
	(0.01)	(0.01)	(0.04)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)
$Trend$	-0.01***	-0.01***	-0.02***	-0.01**	-0.01***	-0.01***	-0.01***	-0.02***	-0.01***	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
impl. Exit	-0.84***	-3.44	-0.16**	-0.02	-0.00	-0.17***	-0.07**	0.04***	-1.32***	1.42
	(0.20)	(11.04)	(0.05)	(0.07)	(0.00)	(0.05)	(0.03)	(0.01)	(0.44)	(261.58)
$ARDL - Lags$	(1,7,2,4,7)	(4,4,5,1,2)	(8,5,9,7,9)	(1,1,3,2,3)	(3,5,0,0,7)	(3,6,5,8,0)	(4,4,2,0,3)	(7,5,7,7,5)	(8,8,8,6,8)	(1,2,0,0,2)
$F - Bounds - Test$	5.67^{+}	3.97^{+}	7.42^{+}	7.21^{+}	3.96^{+}	7.75^{+}	10.05^{+}	5.69^{+}	13.27^{+}	2.82

Notes: AT=Austria, BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, IE=Ireland, IT=Italy, NL=Netherlands, PT=Portugal; standard errors in parenthesis, */**/*** signal significance at the 10%/5%/1% level, for F-Bounds-Test + signals F-statistic above upper critical value and - below critical value at least at a ten percent level.