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Safe Haven Flows, Natural Interest Rates and Secular Stagnation – Empirical Evidence for Euro Area Countries

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Abstract

This article introduces a new measure to capture safe haven flows for twelve Euro area countries. Since those flows are suspected to alter the natural rate of interest, which is at the heart of the discussion whether certain countries face a period of secular stagnation, we estimate the natural rate including those flows explicitly. It is shown that adding this measure indeed changes the estimated natural rate and thus the degree of evidence of secular stagnation in various countries. It is found that the natural rate tends to decrease in countries with safe haven inflows and increases in countries with safe haven outflows.

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1 Introduction

The financial crisis of 2008/09 and the subsequent European debt crisis altered economic activities in various ways. One of them are international capital flows between the Euro area member countries. This can be seen, for instance, by changes in the balances of the ECB TARGET2-system where assets and liabilities rose substantially in many countries of the EMU (Sinn and Wollmershäuser, 2012; Hristov et al., 2019).

One potential reason for the increase in corresponding capital movements is safe haven flows, implying flows from presumably "unsafer" countries to "safer" ones. This pattern can have two dimensions: First, credit extended by creditors of "safer" countries to "unsafer" country borrowers are repatriated to the "safe" country. Second, savings from presumably "unsafer" countries are transferred to "safer" countries. While the former represents an activity by actors located in the "safe" country, the latter is an action stemming from the residents in "unsafer" countries. However, both have in common that there is some fear of "losing the money" if it is left in the "unsafe" country.

Unfortunately, the literature on safe haven flows is still quite scarce.[1] To the best of our knowledge there is no article trying to explicitly estimate the size of those safe haven flows within a currency union. We try to fill this gap here by estimating both types of capital movements explained above and summing them up to a measure of safe haven net assets. Safe haven flows are thus nothing else but the change in those safe haven net assets.

In our empirical study we focus upon twelve individual Euro area member countries. However, we do not focus on the role of the Euro itself as a safe haven asset in the rest of the world as, for instance, in Central, Eastern and Southeastern Europe

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[1]Baele et al. (2013), Beckmann and Scheiber (2012), Broner et al. (2013), De Santis (2012), Goldberg and Krogstrup (2019), Habib and Stracca (2013) and Hristov et al. (2019) are among the few relevant studies.

(which may be not so trustworthy anymore, see Beckmann and Scheiber, 2012).
We introduce two different types of safe haven flows: The first measure is based on
the overall capital movements. The second measure, moreover, accounts for fiscal
and monetary policies introduced in the aftermath of the financial crisis which were
clearly not endogenous safe haven flows but emergency actions for stressed countries.
We call this adjusted measure 'private' safe haven flows.

Knowing about the magnitude of those safe haven flows has important implica-
tions for economic policy, among others with respect to the controversial debate on
the relevance of secular stagnation, i.e. whether certain countries face a period of
structurally lower growth in the future (Borio et al., 2017; Baldwin and Teulings,
2014 and Summers, 2014). Therefore, we use our measure of safe haven flows in a
second step to quantify whether certain countries face indeed secular stagnation. We
do so by estimating the natural rate of interest with an extended model of Laubach
and Williams (2003) and compare it to the current real rate.

The remainder of this paper proceeds as follows. In section 2 the estimation
strategy and the results or the safe haven flows are presented. Section 3 adds
those safe haven flows to the model of determining the natural rate and shows
the corresponding results. Section 4 finally concludes and gives some guidance for
further research with respect to safe haven flows and the natural interest rate in the
Euro area.

2   Measuring Safe Haven Flows

In this section we explain how our measure of safe haven flows is built and present
the underlying results.

2.1 Methodology

To construct the safe haven flows we take foreign assets and foreign liabilities of the Euro area member countries under investigation here. We proceed like this because safe haven flows have varying effects on both items. For foreign assets safe haven flows are expected to decrease (increase) in "safe" ("unsafe" countries). With respect to foreign liabilities safe haven flows increase (decrease) in "safe" ("unsafe") countries.

For foreign assets and liabilities we then estimate fundamental values. The latter are supposed to be driven by a size and a price effect:

$$FA_{i,t} = c_a + \alpha \cdot TA_{i,t} + \beta \cdot (i_{d_{i,t}} - i_{d_{n-i,t}}) + \epsilon_{a,i,t} \tag{1}$$

$$FL_{i,t} = c_l + \gamma \cdot TL_{i,t} + \delta \cdot (i_{cr_{i,t}} - i_{cr_{n-i,t}}) + \epsilon_{l,i,t}. \tag{2}$$

Equation (1) estimates the fundamental equation for foreign assets (FA). Besides a constant (c) the stock of foreign assets is supposed to increase with the stock of total assets (TA). Therefore, the estimated coefficient gives the average share of foreign in total assets of a country. This being said, the estimated coefficients should lie in the range of 0 (totally closed economy) and 1 (totally open economy). Moreover, the level of foreign assets varies with interest rate differentials. Hence, we also include an interest rate spread, measuring a price effect. For assets the deposit rate is chosen since this is the interest rate an investor is interested in when transferring "his money" from one country to another. We calculate the deposit rate for each country (i_{d_i}) is calculated as a weighted average of the deposit rates to households and non-financial cooperations. The respective weights are determined by the size of the overall deposits in the two groups. For all Euro area member countries with the exception of Malta[2] the national deposit rates are constructed

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[2]Malta could not be included into the analysis due to missing data. Moreover, Cyprus, Estonia, Lithuania, Latvia, Slovenia and Slovakia are excluded from the analysis due to missing data or too

based on the weighting method explained above. The deposit rate spread is thus calculated using this rate and subtracting the average deposit rate of the other 17 Euro area countries ($i_{d_{n-i}}$) from it.[3] The weighting of the countries in the reference group is given by the size of the deposits.

The sample period starts in 1999Q4 for most of the countries.[4] This being said also the average deposit rate is calculated for all countries which provide data at the respective point in time. For all countries, the end of the sample period is 2018Q3. We would expect the coefficient of the deposit rate spread to be negative, as a rising spread makes domestic deposits more favorable thus foreign assets should be partly reallocated to the domestic country.

Equation (2) is estimating the stock of foreign liabilities (FL) by means of its fundamental drivers and follows the same principle and structure as equation (1). The size effect is now modeled by total liabilities (TL). Again, we expect a positive coefficient, signaling the average part of total liabilities financed by foreigners with 0 in case of a completely closed economy and 1 in case of a totally open economy. The price effect is now given by the credit rate spread, since differences in credit interest rates determine where to take a credit. The individual country credit rates (i_{cr_i}) are, as in the case of deposit rates further above, calculated by averaging the credit rates for non-financial cooperations and households, the latter being divided into consumption and housing credit rates. The weighting is again given by the credit volumes of each type. We construct the reference rate ($i_{cr_{n-i}}$) using the same procedure as for the deposit rate, it thus corresponds to the weighted average of the credit rates of the other 17 Euro area member countries. In contrast to equation (1)

short time samples when estimating the natural rate of interest. However, safe haven net asset data for those six countries are available from the authors upon request.

[3]In principle the deposit rate of the reference group could also include deposit rates of countries outside of the Euro area. However, in this case also exchange rate changes would have to be taken into account. Moreover, weighting the importance of these countries is getting even tougher. That is why we decided to keep the reference group to the other Euro area countries.

[4]Due to data availability the sample starts for Ireland in 2002Q1, for Finland, France, Luxembourg and Portugal in 2003Q1, for Greece in 2003Q4 and for Belgium in 2005Q1.

we expect the estimated coefficient of the credit rate spread to have a positive sign since an increasing rate makes non-domestic financing cheaper thus increasing the stock of foreign liabilities.

$$FA_{i,t} - \widehat{FA_{i,t}} = \epsilon_{a,i,t} \tag{3}$$

$$FL_{i,t} - \widehat{FL_{i,t}} = \epsilon_{l,i,t} \tag{4}$$

Following this procedure the fundamental values of foreign assets $(\widehat{FA})$ and foreign liabilities $(\widehat{FL})$ are estimated. Subtracting the fundamental from the actual level of foreign assets and liabilities thus gives us everything that is fundamentally unexplained (equations (3) and (4)). This difference should be due to safe haven motives.[5] Thus our residuals should measure safe have flows, or more precisely not the flow but the stock of safe haven net assets. Since an increasing stock of safe haven net assets (SH) should lower foreign assets and/or increase foreign liabilities in "safe" countries and vice versa, our measure of safe haven net assets is given by equation (5)

$$SH_{i,t} = \epsilon_{l,i,t} - \epsilon_{a,i,t}. \tag{5}$$

However, especially in the European debt crisis we have seen several measures taken by political authorities or balances used via the central bank system which are for sure not associated with safe haven flows and should thus not alter the safe

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[5]However, we cannot guarantee that safe haven considerations are the only influence in the residuals. Admittedly, the motive of risk diversification may also play a role. But since we are interested in estimating a time series of safe haven flows, we were simply not able to rely on the measures typically used in the literature to define safe haven currencies or assets (Baur and Lucey, 2010; Baur and McDermott, 2010; Hossfeld and McDonald, 2015 or Masujima, 2019) because those focus only on periods of financial stress. However, also a reversal of safe haven flows due to lowering financial stress should play a role. Therefore, our approach could be understood as measuring the potential for safe haven net assets at each point in time. Masujima (2019) develops a safe haven index for 14 currencies depending on different determinants. We are not able to use this approach because all countries investigated here have the same currency - the Euro.

haven net assets. Therefore, we add a robustness check replicating our results net of those measures. By this we construct a private foreign asset and foreign liability time series for all Euro area countries. We identified three measures in this respect:

First, the TARGET2-balances of the Eurosystem have to be acknowledged (Hristov et al., 2019). We observed substantial inter-country divergence in this measure, so some countries nowadays have large surpluses while others have deficits. However, those surpluses or deficits are related to the balance sheets of the Euro area member countries' national central banks and are, thus, not directly associated with private financial transactions. Therefore, the stock of foreign assets or liabilities are lowered by the TARGET2-balance in surplus countries or deficit countries, respectively.

Second, the rescue packages granted to Greece, Ireland, Portugal and Spain in the sovereign debt crisis have to be taken into account (De Santis, 2012). Therefore, the stock of foreign liabilities is reduced by the amount of these rescue packages in the respective countries.

Third, government bonds bought via the Securities Markets Programme (SMP) of the ECB from mid 2010 to 2012 have to be considered. Those bonds have been bought from Greece, Ireland, Portugal, Spain and Italy. We finally subtracted the amount of government bonds bought from the prevailing stock private foreign liabilities of the countries.[6]

2.2 Results

The results of the exercise are presented for the overall safe haven net assets (Tables 1 and 2) and the private safe haven net assets (Tables 3 and 4) as a robustness check. In both cases the estimates for foreign assets and foreign liabilities are shown. In general, the estimated coefficients have the expected sign and are mostly significant.

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[6]We do not subtract the second, even larger ECB purchase programme, the Public Sector Purchase Programme (PSPP), from the private liabilities. This is because in this programme the government bonds of each member country are mainly bought by their national central bank and not by the Eurosystem (Belke and Gros, 2019). Moreover, the PSPP is highly correlated with the TARGET2 balances (Deutsche Bundesbank, 2016) so we would induce a double counting here.

For the overall safe haven net assets (Table 1) the coefficient on total assets in the foreign assets equation and total liabilities in the foreign liabilities equation always bear the positive sign as expected from theory and are found to be highly significant across all countries. However, the estimated coefficients of total assets vary widely between countries, being lowest in Spain and Portugal with 0.16 and 0.17, respectively, while Ireland has the highest share of foreign assets in total assets with 0.87, thus being the most open economy. This pattern strongly corresponds with that found for the share of foreign liabilities in total liabilities. Again Spain is found to have the lowest value with 0.25 and Ireland the highest with 0.82. This being said, rather closed or open economies are equally found in assets and liabilities.

The deposit rate spreads are estimated to have the expected negative influence of foreign assets in all countries, although the coefficients are not always statistically significant from zero. Moreover, the size of the coefficient depends largely on the size of the country, thus larger countries have higher coefficients as foreign assets are measured in billion Euro. The same holds with respect to the credit rate spread in the foreign liabilities equation which, however, has the expected positive coefficient.

When using private instead overall safe haven net assets (Table 2) not much changes for most of the countries. However, there are some exceptions from this pattern. This holds i.e. for the crisis countries in the south of the Euro area (Greece, Spain, Italy and Portugal). In these countries the point estimates in the foreign liabilities equation change in magnitude although staying significant in most of the cases. This does not come as a surprise as these are exactly those countries being subject to fiscal rescue packages, TARGET2 deficits or SMP bond purchases.

Since the point estimates are not significantly changing the estimation results of overall and private safe haven net assets for most countries, it is no surprise that

the time series are rather similar in these cases (Figures 1 to 12).

- Figures 1 to 12 about here -

We do not want to comment on all countries here but focus on the most important results. First, for many countries the beginning of the financial crisis or the European debt crisis marked a turning point concerning safe haven flows. While countries like Germany, France or the Netherlands faced significant safe haven inflows afterwards, the crisis countries Greece, Spain and Italy are confronted with safe haven outflows. This is what we would expect since the Northern European countries are usually categorized as "safer" countries during the crisis while the Southern European countries appear to be less "safe" (De Santis, 2012, Habib and Stracca, 2013, and Hristov, Hülsewig and Wollmershäuser, 2019). Second, the substantial safe haven outflows in the Southern countries can only be seen when looking at private safe haven flows. For the overall safe haven flows there is almost no outflow. This is due to the fiscal and monetary programmes initiated during the crisis which were quite successful in keeping liquidity within the crisis countries. A special case in this respect is Italy since the safe haven outflows in this country appear to start not earlier than 2015, i.e. considerably later than for the other Southern European countries. However, also in this case private safe haven outflows turn out to be much higher than overall outflows.

3   Safe haven flows and natural interest rates

In this section we present our theoretical considerations concerning the impact of safe haven flows on the natural rate of interest prevailing in individual Euro area member countries. We demonstrate as an innovation how these flows can be integrated into a state-of-the-art model estimating the natural rate. Finally, we provide empirical evidence on systematic differences in natural rate estimates with and without safe haven flows for Euro area member countries.

3.1 Theoretical considerations

Safe haven flows may be crucial in determining the level of the natural interest rate, i.e. the rate that equates savings and investments in a country. The influence of international capital flows upon this rate is well known at least since Bernanke (2005) has developed his global "savings glut" hypothesis.[7] However, the direction of causality between interest rates and international capital flows in this context is not clear. While there are capital flows associated to interest rate changes, also capital flows driven by other factors tend to affect the level of the interest rate. Our approach has the advantage to focus only on the latter part of international capital flows, thus causality is clear in our context.

Moreover, the financial crisis tends to lower the availability of safe assets because of, for instance, sovereign bond downgrades by rating agencies (Caballero and Farhi, 2014). Thus, if countries are viewed to become "safer" or "unsafer" in a crisis this leads to safe haven flows. All else being equal, this results in a shift in the savings supply curve leading to higher savings in the "safe" countries and lower savings in the "unsafe" countries (Figure 13). By construction this leads to a lower natural rate of the "safe" country and an increase in the natural rate of the "unsafe" country. Especially in "safer" countries this may, however, lead to a period of secular stagnation if the natural interest rate is too low for the actual interest rate to be reached.[8] This is due to a lower bound of the actual real interest rate which should be at about minus two percent for Euro area countries, resulting from the zero lower bound in nominal rates and an inflation target of the ECB of below, but close to, 2 percent over the medium term.

- Figure 13 about here -

We estimate the natural rate of interest via the methodology introduced by

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[7]Lunsfeld and West (2019) tested for the correlation between the safe real rate and the current account to GDP for the US but found mixed results depending on the sample period chosen.

[8]For this definition see, for instance, Belke and Klose (2017).

Laubach and Williams (2003). However, we augment this framework in several ways. First, we add safe haven flows to the model which are supposed to influence the natural rate. Second, we optimize the lag-structure in the model to cope better with the results for each Euro area country individually.

Laubach and Williams (2003) estimate a state-space-model using two signal- and three state-equations.[9] We broadly follow this approach, i.e. we stick to their identification of endogenous and exogenous variables. We make use of two signal equations. One signal equation is an IS-curve estimating the influence of the lagged real interest gap $(r_{i,t} - r^*_{i,t})$ on the output gap $(Y_{i,t} - Y^*_{i,t})$ (equation (6)). The other signal equation is a Phillips-curve signaling the effect of lagged output gaps and energy prices measured as oil prices $(\pi^{oil}_{i,t})$ on inflation $(\pi_{i,t})$ (equation (7)). In order to save degrees of freedom we restrict the maximum lag order to three quarters. We add a constant (c_i) to both signal equations.

$$(Y_{i,t} - Y^*_{i,t}) = c_i + \sum_{j=1}^{3} \alpha_{y,i,j} \cdot (Y_{i,t-j} - Y^*_{i,t-j}) + \sum_{k=1}^{3} \alpha_{r,i,k} \cdot (r_{i,t-k} - r^*_{i,t-k}) + \epsilon_{1,i,t} \quad (6)$$

$$\pi_{i,t} = c_i + \sum_{l=1}^{3} \beta_{\pi,i,l} \cdot \pi_{i,t-l} + \sum_{m=1}^{3} \beta_{y,i,m} \cdot (Y_{i,t-m} - Y^*_{i,t-m}) + \sum_{n=1}^{3} \beta_{\pi^{oil},i,m} \cdot \pi^{oil}_{i,t-m} + \epsilon_{2,i,t} \quad (7)$$

Safe haven flows $(\Delta SH_{i,t})$, defined by the first difference of the safe haven net assets, are supposed to change the natural rate besides the growth rate of potential output (g_t) and additional factors (z_t) as already introduced in Laubach and Williams (2003) (equation (8)).[10]

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[9]Estimating the natural rate of interest using this framework with respect to the Euro area is well established in the literature. See e.g. Mesonnier and Rennes (2007), Garnier and Wilhelmsen (2009), Holsten et al. (2017) or Beyer and Wieland (2019) for estimates with respect to the Euro area as a whole. Belke and Klose (2017) as well as Belke and Klose (2019) also estimate different versions of this model with respect to individual Euro area member countries.

[10]We assume the additional factors to follow the same lag-structure as the potential growth rate, since we cannot observe this variable.

$$r_{i,t}^* = c_i + \sum_{o=0}^{3} \gamma_{g,i,o} \cdot g_{i,t-o} + \sum_{o=0}^{3} z_{i,t-o} + \sum_{p=0}^{3} \gamma_{SH,i,p} \cdot \Delta SH_{i,t-p} \tag{8}$$

The three unobserved variables potential output $(Y_{i,t}^*)$, its growth rate (g_t) and additional factors (z_t) are determined by the state-equations in line with Laubach and Williams (2003) (equations (9) to (11)). While the latter two variables are modeled as an AR(1)-process the former includes also AR(1)-term but additionally the growth rate of potential output.

$$Y_{i,t}^* = Y_{i,t-1}^* + g_{i,t-1} + \epsilon_{3,i,t} \tag{9}$$

$$g_t = g_{i,t-1} + \epsilon_{4,i,t} \tag{10}$$

$$z_t = z_{i,t-1} + \epsilon_{5,i,t} \tag{11}$$

Laubach and Williams (2003) recommend to estimate the system of equations in sequential steps. We follow this procedure to a large extent here, although with slightly different steps due to our modifications. As a first step we estimate equations (6) to (8) separately using OLS. In this context both unobservable variables - potential output and the natural real rate - are proxied by the Hodrick-Prescott-filtered (Hodrick and Prescott, 1997) output and real rate time series. The corresponding results are presented in Tables 3 to 6. In order to expand the degrees of freedom and thus generate more reliable estimates only the variables having a significant influence at least at the ten percent level or, if no variable of a specific channel reaches this threshold, the variable with the highest significance is then used in the following steps.

- Tables 3 to 6 about here -

As a second step we estimate the equations (6) to (8) simultaneously. We also add state-equation (9), thus modeling potential output within the model. However, at this stage we treat the influence of the potential growth rate as constant in line with Laubach and Williams (2003).

We use the estimation results of the second step to compute the median unbiased estimator (Stock, 1994) since the state-equations (10) and (11) are assumed to be biased towards zero due to the so-called pile-up problem (Stock and Watson, 1998 and Sargan and Bhargava, 1983). Therefore, we compute the median unbiased estimator for the potential growth rate as $\lambda_{g,i} = \frac{\sigma_{4,i}}{\sigma_{3,i}}$.[11]

Taking this as a starting point, we can now estimate in a third step the state-space-model with a time-varying potential growth rate. Based on these results the median unbiased estimator with respect to the additional variables (equation (11)) are computed as $\lambda_{z,i} = \frac{\sigma_{5,i}}{\sigma_{1,i}} \cdot \alpha_{r,i,k}$.[12]

As the fourth and final step we estimate the whole model with the two median unbiased estimators via maximum likelihood.

This procedure is carried out for three different specifications. First, we choose a specification excluding any safe haven flows. This variant can be interpreted as a benchmark Laubach and Williams model specification, although with a more flexible lag-structure as described above. For comparability reasons we have decided to impose exactly the same lag-structure in this benchmark model as in the model including safe haven flows, which is the second specification we estimate. In the third specification we employ our measure of private safe haven flows. Please note that the lag-structure of equation (8) may be different in this specification compared to the other two because of different significance levels in the first stage. However,

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[11]The results of the median unbiased estimators and the error terms are available from the authors upon request.

[12]Laubach and Williams divide this median unbiased estimator by $\sqrt{2}$ since they assume the first two lags of the real rate gap to have an equal influence on the output gap. However, we find that for all countries under investigation in only one country the real rate gap is influencing the output gap. Therefore, we do not need to make this correction.

it turns out that those differences are marginal.

3.2   Empirical results

In this section we present the empirical results of the final step explained above. Since our measure of safe haven flows is the limiting factor when it comes to the sample size, the sample period here starts also in 1999Q4 at the earliest and ranges until 2018Q3 for all countries under investigation here. For each country, data on real GDP, consumer prices, energy prices and interest rates have been collected besides the safe haven flow measures. All data are seasonally adjusted and taken from the OECD database. As the relevant interest rate we use the three-month interbank rate in line with other studies in this field (e.g. Mesonnier and Rennes,2007; Garnier and Wilhelmsen, 2009; Holsten et al., 2017).

In the following, we first convey the estimation results before presenting the time series of the two unobservable variables potential output (or more precisely the output gap) and the natural interest rate. All results are displayed for the three different specifications which are 1) the benchmark Laubach-Williams model, 2) the safe haven flows augmented model and 3) the private safe haven flows augmented model.

3.2.1   Parameter estimates

Tables 7 to 9 present the final results of the benchmark Laubach-Williams model and of the two safe haven flow augmented versions. Since in this final step only previously identified significant estimates (or estimates being closest to significance) are included, it does not come as a surprise that most final estimates turn out be significant as well. Moreover, most of the estimated coefficients show the expected sign. This holds particularly for the three most important linkages. These are: First, regarding the influence of the real rate gap on the output gap, the point estimates

reveal the expected negative impact although it proves to be significant in only four cases.

- Tables 7 to 9 about here -

Second, the response of potential output growth on the natural rate is mostly found to be positive if the sum of the respective coefficients is considered.

Third, our measure of safe haven flows exhibits the expected negative influence on the natural interest: Safe haven inflows reduce the natural rate and vice versa. Moreover, the results turn out to be highly significant independent from whether we use overall safe haven flows or private safe haven flows.

It is striking that the point estimates differ only slightly across the three specifications, even though safe haven flows are considerable and their difference in magnitude to private safe haven flows can be remarkable for some countries. Thus, we feel legitimized to argue at this stage that our estimates are overall valid. Therefore, we turn now to the generated time series for the two unobservable variables delivered by the model.

3.2.2 Output gap

In this section the results for the output gap estimates are presented. As described further above, they rely crucially on the estimates of the unobservable variable potential output. Figures 14 to 25 present our estimation results for the three specifications and countries. We do not want to comment in detail on every figure but limit ourselves to focus upon some striking features.

- Figures 14 to 25 about here -

Generally, our output gap estimates tend to be very similar irrespective of the chosen model. This holds i.e. for the evolution of the gaps while the magnitude might be different. Moreover, positive and negative output gaps tend to be more

persistent than gaps estimated with other techniques. E.g. de-trending methods like the Hodrick-Prescott filter would induce more frequent changes of positive to negative gaps and vice versa. This results also in absolutely larger output gap estimates when the Laubach-Williams model is applied compared to other methods.

Seen on the whole, thus, the output gap estimates tend to mimic the evolution of comparable output gap estimates like those taken from the AMECO database of the European Commission, although our gaps appear to be somewhat larger on average.

3.2.3 Natural interest rates

In this section the various country-specific estimates of natural interest rates are, on the one hand, compared to each other and, on the other hand, compared to the actual real rate. For the latter we use the concept of ex-ante real rates. The latter are calculated as the nominal interest rate minus expected inflation at the time the decision on e.g. loans has to be made. We proxy inflation expectations in the most convenient way as adaptive expectations and thus by the lagged inflation rate ($r_t = i_t - \pi_{t-1}$).[13] The alternative is to use ex-post real rates which are the rates that actually prevail until maturity of a credit. We also employ this alternative which leads to only marginal differences in our results.[14] Therefore, we stick to the ex-ante rates without loss of explanatory value.

Moreover, the estimates of the natural rates are in our figures accompanied by the $+/-$ one standard deviation confidence bands to account for the uncertainty surrounding those estimates[15] and to be able to draw inference on significant differences in the estimates.

- Figures 26 to 37 about here -

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[13]See also Hamilton et al. (2015) on this issue.

[14]The results are available from the authors upon request.

[15]Beyer and Wieland (2019) find that this kind of uncertainty can be quite large. We are able to confirm this finding with regard to our estimates. Nevertheless, significant differences between the different models can still be determined.

Several important results can be drawn from our estimations depicted in Figures 26 to 37. First, for Belgium, Spain, Finland, Ireland, Italy, Luxembourg and the Netherlands the estimates of the natural rate turn out to be rather similar irrespective of whether the benchmark Laubach-Williams model or the safe haven flow augmented versions are used. This finding is, however, partly due to the quite large uncertainty surrounding the estimates. But none of these countries appears to have a problem with secular stagnation since the actual real rate is broadly in line with the natural rate or, if anything, even below those, which is especially good news for the two countries that have been regularly categorized as crisis countries, Italy and Spain.

Second, for the remaining five countries we indeed find significant differences depending on whether safe haven flows are included into the model or not. These differences have in some cases even implications with respect to secular stagnation.

For Austria, natural rates tend to be quite similar up to 2014. However, from 2014 to 2017 the natural rate generated by the benchmark Laubach-Williams model falls rapidly while this is not the case for the safe haven flow augmented estimates. In the former case the natural rate is reaching empirical values of about minus four percent, thus reaching a territory where secular stagnation might be a concern. The result is, however, the only one that does not support our "story", since safe haven inflows into Austria were observed in this period, which should have lowered the natural rate instead of increasing it.

In Germany, we observe a significantly lower natural rate in 2016 and 2017 when the safe haven augmented models are applied compared to the standard model. This is a period characterized by safe haven inflows into Germany. Hence, this finding clearly supports our "story". This now lower natural rate reaches levels of about minus four percent which indicates per definition that Germany may have faced secular stagnation. This does not necessarily mean that economic growth was unfavorable in this period but rather that the country's growth performance could

have been better than what we have observed.

For France, the safe haven augmented natural rates turn out to be significantly higher from 2016 onwards. This corresponds to our prior since France exhibited safe haven outflows in this period. However, in no case a period of secular stagnation can be identified for France since the actual real rate is located considerably below every natural rate estimate.

With respect to Greece inference regarding the relevance of secular stagnation is again quite clear. From 2011 to 2017 natural rate estimates were, with levels down to minus six percent, clearly too low to be reached by the actual real rate.[16] Thus, secular stagnation tends to be present in the country in this period. While all estimates of the natural rate exhibit this overall trend, there are also significant differences between the various model results. In the period 2010 to 2012 the safe haven flow augmented natural rates tend to be significantly larger than the rate of the benchmark model. This holds even more for the rate using private safe haven flows. This pattern of results supports our theory, since this is exactly the period where (private) capital fled from Greece. In the years 2016 and 2017, however, the reverse seems to be true. Here the safe haven augmented rates are significantly lower than the benchmark rate, which is again in line with our "story" since safe haven outflows were at least partly reversed in this period as the most severe crisis appeared to be solved at that time.

Finally, for Portugal the inclusion of private safe haven flows into the model tends to increase the natural rate significantly from 2015 to 2018. Again this supports our prior since Portugal faced safe haven outflows in this period. Moreover, while the other two estimates may point to a period of secular stagnation in Portugal, the model including private safe haven flows clearly indicates that this is not the case. Thus, the weaker economic performance of the country has to be viewed as a cyclical rather than structural phenomenon.

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[16]This result is in line with Belke and Klose (2017) and Belke and Klose (2019).

4   Conclusions

The innovation of this paper on safe haven flows, natural interest rates and secular stagnation in Euro area member countries is twofold.

First, we have developed a new framework to determine intra Euro area safe haven flows for twelve member countries of the Eurosystem. Those flows are based on foreign asset and liability flows which are not based on either international interest rate changes or the size of the market. Even more, we disentangle the effects of the European fiscal rescue programmes either on the fiscal or monetary side and thus provided a time series of private safe haven flows. In general, the results support what is commonly expected, i.e. that safe haven flows went from Southern to Northern European countries in the aftermath of the financial crisis.

Second, we empirically check whether those safe haven flows alter the natural rate of interest, i.e. whether safe haven inflows tend to reduce this rate and vice versa. Using an augmented version of the Laubach-Williams model incorporating these safe haven flows, we are able to show that natural real rates change significantly for five of the twelve Euro area member countries investigated by us. For instance, for Germany the augmented natural rate tends to be lower, once safe haven inflows are taken into account, to such an extent which may even imply evidence of secular stagnation. For Portugal, on the contrary, secular stagnation seems to be absent if safe haven flows are added to the model. The same holds for France, where actual real rates are consistently found to lie below the level of the natural rate. Finally, for Greece natural rates are also significantly altered in periods of large safe haven in- or outflows a finding which is in line with theory.

The results gained here can be used in at least two different ways: First, we are, to the best of our knowledge, the first to develop a measure of safe haven flows which does not rely on countries with different currencies but on countries that share the same currency. Therefore, it is important to understand what determines those

flows. While it is certainly not interest rate changes or the market size, because we excluded those explicitly, other factors such as financial stress, macroeconomic uncertainty or public debt may play a role (Goldberg and Krogstrup, 2019). We leave this task for further research.

Second, while we have shown that safe haven flows help to explain the natural interest rate more precisely, it is just one explanatory variable which should be added to other more established determinants. Those are demographics, income inequality, changes in productivity or private and public debt to name just a few. The ultimate goal must be to find a model integrating all these determinants in one framework to arrive at a concise assessment of the level of the natural interest rate.

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Tables

Table 1: Safe Haven Estimates

	AT	BE	DE	ES	FI	FR	GR	IR	IT	LU	NL	PT
Foreign Assets												
Constant	206.07***	96.84	-5906.66***	-30.71	-152.89***	-113.00	139.74***	-895.75***	-736.81***	263.72***	1226.31***	41.69***
	(13.34)	(66.57)	(315.55)	(77.45)	(51.26)	(411.07)	(22.49)	(111.85)	(56.20)	(90.01)	(258.81)	(12.30)
Total Assets	0.38***	0.38***	0.56***	0.16***	0.48***	0.25***	0.36***	0.87***	0.25***	0.68***	0.62***	0.17***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)
Deposit Rate Spread	-110.69***	-242.65***	-565.31***	-243.72***	-95.74	-45.52	-89.93***	-380.46***	-131.21*	-251.74***	-268.07	-10.41*
	(14.37)	(64.37)	(170.33)	(73.49)	(96.99)	(181.83)	(27.92)	(109.44)	(68.37)	(79.54)	(241.59)	(6.16)
R^2	0.98	0.96	0.96	0.93	0.91	0.90	0.82	0.98	0.98	1.00	0.99	0.93
Foreign Liabilities												
Constant	158.82***	12.56	3338.94***	-300.69***	107.40***	-847.65***	-209.52***	-531.76***	731.49***	154.96**	-430.96***	52.79***
	(16.80)	(55.65)	(600.48)	(52.60)	(20.34)	(153.88)	(33.56)	(66.29)	(30.93)	(70.31)	(149.96)	(6.45)
Total Liabilities	0.36***	0.38***	0.40***	0.25***	0.43***	0.31***	0.49***	0.82***	0.27***	0.68***	0.58***	0.33***
	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
Credit Rate Spread	65.66***	9.80	636.99***	153.28***	61.01***	756.03***	28.99***	11.79	42.80***	267.97***	335.86***	22.21***
	(11.04)	(20.81)	(183.86)	(50.19)	(12.04)	(104.28)	(4.44)	(66.46)	(10.34)	(54.84)	(70.31)	(3.28)
R^2	0.97	0.95	0.92	0.97	0.95	0.96	0.86	0.99	0.99	1.00	0.99	0.99

Notes: AT=Austria, BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, GR=Greece, IR=Ireland, IT=Italy, LU=Luxembourg, NL=Netherlands, PT=Portugal; standard errors in parenthesis; ***/**/* means significance at the 1%/5%/10% level.

	AT	BE	DE	ES	FI	FR	GR	IR	IT	LU	NL	PT
Foreign Assets												
Constant	206.70***	96.99	-5320.61***	-2.51	-123.26**	-130.40	139.74***	-894.94***	-755.25***	268.08***	1237.60***	41.69***
	(13.35)	(66.57)	(322.12)	(76.65)	(56.71)	(412.95)	(22.49)	(111.96)	(59.67)	(89.95)	(265.20)	(12.30)
Total Assets	0.38***	0.38***	0.52***	0.17***	0.45***	0.25***	0.36***	0.87***	0.25***	0.68***	0.62***	0.17***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)
Deposit Rate Spread	-110.92***	-242.74***	-397.75**	-255.37***	-84.62	-47.72	-89.93***	-379.92***	-129.85*	-240.46***	-314.87	-10.41*
	(14.38)	(64.36)	(162.90)	(73.49)	(103.96)	(182.77)	(27.92)	(109.49)	(72.75)	(79.24)	(246.00)	(6.16)
R^2	0.98	0.96	0.95	0.93	0.87	0.90	0.82	0.98	0.98	1.00	0.99	0.93
Foreign Liabilities												
Constant	137.58***	-48.91	3347.77***	-185.87***	109.88***	-833.95***	146.70***	-536.61***	365.16***	155.16**	-431.16***	-29.85*
	(17.29)	(49.09)	(600.20)	(48.36)	(20.33)	(150.13)	(39.86)	(67.78)	(60.77)	(70.31)	(149.75)	(17.55)
Total Liabilities	0.35***	0.39***	0.40***	0.24***	0.43***	0.31***	0.44***	0.81***	0.23***	0.68***	0.58***	0.27***
	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Credit Rate Spread	64.22***	10.21	636.64***	7.96	61.30***	744.74***	30.97***	19.30	163.46***	267.95***	336.07***	43.12***
	(11.21)	(18.79)	(183.90)	(43.60)	(12.05)	(101.71)	(6.07)	(68.04)	(19.01)	(54.84)	(70.22)	(8.00)
R^2	0.97	0.96	0.93	0.97	0.95	0.96	0.90	0.98	0.96	1.00	0.99	0.85

Notes: AT=Austria, BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, GR=Greece, IR=Ireland, IT=Italy, LU=Luxembourg, NL=Netherlands, PT=Portugal; standard errors in parenthesis; ***/**/* means significance at the 1%/5%/10% level.

Table 3: IS-Curve

	AT	BE	DE	ES	FI	FR	GR	IR	IT	LU	NL	PT
Constant	-0.01	0.00	-0.01	-0.01	0.03	0.00	0.07	-0.04	-0.01	-0.03	-0.00	0.01
	(0.06)	(0.05)	(0.08)	(0.03)	(0.15)	(0.05)	(0.18)	(0.38)	(0.05)	(0.17)	(0.08)	(0.07)
Output Gap (-1)	1.15***	1.39***	1.17***	1.68***	0.95***	1.29***	0.77***	0.58***	1.37***	0.88***	1.12***	1.15***
	(0.12)	(0.18)	(0.12)	(0.12)	(0.16)	(0.14)	(0.14)	(0.13)	(0.13)	(0.13)	(0.14)	(0.13)
Output Gap (-2)	-0.06	-0.43	-0.27	-0.66***	-0.07	-0.27	0.23	0.13	-0.40*	0.09	-0.17	-0.21
	(0.12)	(0.29)	(0.19)	(0.23)	(0.21)	(0.22)	(0.18)	(0.15)	(0.21)	(0.18)	(0.21)	(0.20)
Output Gap (-3)	-0.28**	-0.16	-0.08	-0.10	-0.16	-0.19	-0.11	0.01	-0.17	-0.28**	-0.18	-0.10
	(0.13)	(0.17)	(0.13)	(0.13)	(0.15)	(0.15)	(0.14)	(0.14)	(0.13)	(0.13)	(0.14)	(0.13)
Real Rate Gap (-1)	-0.35	0.09	-0.68**	-0.07	-0.87	-0.39*	-0.13	0.43	-0.37	0.44	-0.16	-0.23
	(0.25)	(0.19)	(0.34)	(0.06)	(0.61)	(0.20)	(0.37)	(1.01)	(0.24)	(0.55)	(0.27)	(0.19)
Real Rate Gap (-2)	-0.48*	0.15	-0.03	-0.13**	0.47	0.34	-0.52	-1.55	-0.46*	-0.56	0.17	-0.07
	(0.26)	(0.20)	(0.34)	(0.06)	(0.62)	(0.21)	(0.38)	(1.24)	(0.26)	(0.60)	(0.27)	(0.20)
Real Rate Gap (-3)	-0.27	0.10	-0.09	0.07	-0.61	-0.08	0.30	0.93	0.19	0.37	-0.03	-0.53***
	(0.23)	(0.15)	(0.34)	(0.06)	(0.56)	(0.19)	(0.37)	(0.93)	(0.24)	(0.53)	(0.27)	(0.19)
R^2	0.86	0.87	0.82	0.98	0.76	0.88	0.81	0.48	0.89	0.67	0.78	0.84

Notes: AT=Austria, BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, GR=Greece, IR=Ireland, IT=Italy, LU=Luxembourg, NL=Netherlands, PT=Portugal; standard errors in parenthesis; ***/**/* means significance at the 1%/5%/10% level.

	AT	BE	DE	ES	FI	FR	GR	IR	IT	LU	NL	PT
Constant	0.44***	0.51*	0.22*	0.16	0.13	0.10	0.10	0.09	0.12	0.30**	0.34***	0.21**
	(0.12)	(0.25)	(0.12)	(0.10)	(0.09)	(0.08)	(0.09)	(0.06)	(0.07)	(0.15)	(0.11)	(0.08)
Inflation (-1)	0.17	-0.23	-0.01	0.32	0.17	0.73**	0.20	0.97***	0.36*	0.50*	0.09	-0.00
	(0.17)	(0.40)	(0.25)	(0.21)	(0.19)	(0.32)	(0.19)	(0.16)	(0.21)	(0.26)	(0.20)	(0.18)
Inflation (-2)	0.01	-0.05	0.15	0.34**	-0.09	0.30	0.38***	-0.20	0.33*	-0.29	0.03	0.23
	(0.18)	(0.39)	(0.25)	(0.16)	(0.19)	(0.29)	(0.18)	(0.20)	(0.19)	(0.26)	(0.20)	(0.16)
Inflation (-3)	-0.14	0.09	0.29	0.05	0.45**	-0.21	0.09	-0.13	0.08	0.12	-0.05	-0.03
	(0.18)	(0.39)	(0.23)	(0.21)	(0.19)	(0.26)	(0.16)	(0.14)	(0.21)	(0.27)	(0.20)	(0.17)
Output Gap (-1)	0.08	0.37*	0.10**	0.31	0.05	0.34***	0.00	0.04*	0.13*	-0.00	0.10	0.17**
	(0.06)	(0.19)	(0.05)	(0.25)	(0.05)	(0.10)	(0.06)	(0.02)	(0.07)	(0.04)	(0.08)	(0.08)
Output Gap (-2)	0.09	-0.23	-0.07	-0.43	0.04	-0.41**	0.11	-0.03	-0.11	0.05	0.00	-0.07
	(0.10)	(0.29)	(0.07)	(0.45)	(0.06)	(0.17)	(0.07)	(0.02)	(0.11)	(0.05)	(0.12)	(0.13)
Output Gap (-3)	-0.14*	0.02	-0.02	0.15	-0.10**	0.08	-0.06	0.01	0.03	-0.05	-0.05	-0.05
	(0.06)	(0.17)	(0.05)	(0.24)	(0.04)	(0.11)	(0.06)	(0.02)	(0.07)	(0.04)	(0.08)	(0.08)
Oil Inflation (-1)	0.02	0.07	0.02	0.02	0.06***	-0.03	0.05**	-0.02	0.02	0.01	-0.01	0.10***
	(0.02)	(0.05)	(0.03)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)
Oil Inflation (-2)	-0.03	0.00	-0.02	-0.06**	-0.01	-0.04	-0.03	-0.06*	-0.04	0.01	-0.01	-0.07**
	(0.02)	(0.05)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)
Oil Inflation (-3)	0.03	-0.01	-0.01	0.00	-0.00	0.02	-0.01	0.06	-0.01	0.01	0.05*	0.08*
	(0.02)	(0.05)	(0.03)	(0.03)	(0.02)	(0.03)	(0.02)	(0.06)	(0.02)	(0.03)	(0.03)	(0.03)
R^2	0.38	0.43	0.21	0.36	0.54	0.46	0.54	0.71	0.31	0.24	0.21	0.53

Notes: AT=Austria, BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, GR=Greece, IR=Ireland, IT=Italy, LU=Luxembourg, NL=Netherlands, PT=Portugal; standard errors in parenthesis; ***/**/* means significance at the 1%/5%/10% level.

Table 5: Natural Rate

	AT	BE	DE	ES	FI	FR	GR	IR	IT	LU	NL	PT
Constant	-0.74***	0.20	1.11***	-0.12***	-0.19***	0.10	-0.16***	0.28***	-0.01	-0.23**	-0.14**	0.03
	(0.11)	(0.00)	(0.05)	(0.03)	(0.02)	(0.07)	(0.02)	(0.03)	(0.02)	(0.11)	(0.07)	(0.02)
Growth Potential Output	-131.28**	-235.69***	-63.63***	-82.87***	-48.08***	-192.64***	-40.15***	12.21*	-60.99**	-54.45**	-191.65***	-177.32***
	(57.29)	(53.07)	(22.58)	(25.44)	(12.38)	(37.77)	(7.70)	(6.35)	(23.38)	(20.60)	(43.63)	(26.01)
Growth Potential Output (-1)	448.58**	633.48***	139.51**	250.83***	149.48***	556.90***	100.50***	-37.17*	184.88***	162.36***	559.25***	492.34***
	(172.91)	(152.73)	(66.14)	(75.32)	(35.65)	(109.03)	(22.68)	(18.99)	(69.63)	(60.42)	(126.20)	(75.97)
Growth Potential Output (-2)	-514.89***	-591.83**	-99.09	-256.04***	-159.45***	-557.41***	-80.53***	37.88*	-193.58***	-167.96	-555.18***	-460.26***
	(176.90)	(150.74)	(66.47)	(75.02)	(35.09)	(107.19)	(22.58)	(19.20)	(70.49)	(60.61)	(123.24)	(75.08)
Growth Potential Output (-3)	199.44***	192.66***	20.04	88.10***	58.57***	192.65***	19.90***	-13.13*	70.08***	60.15***	187.76	144.91***
	(61.22)	(51.10)	(22.92)	(25.13)	(11.81)	(35.87)	(7.60)	(6.56)	(24.25)	(20.74)	(40.65)	(25.15)
Safe Haven Flows	$-1.41e^{-3}$	$-8.30e^{-4}$	$-0.73e^{-5}$	$-5.28e^{-4}$	$-0.28e^{-3}$	$-1.58e^{-4}$	$0.83e^{-4}$	$-2.96e^{-4}$	$-1.22e^{-4**}$	$-3.06e^{-4}$	$-4.62e^{-4}$	$-4.79e^{-3}$
	$(2.03e^{-3})$	$(10.75e^{-4})$	$(9.95e^{-5})$	$(4.09e^{-4})$	$(1.01e^{-3})$	$(1.54e^{-4})$	$(7.77e^{-4})$	$(2.07e^{-4})$	$(0.55e^{-4})$	$(4.00e^{-4})$	$2.99e^{-4})$	$(3.03e^{-3})$
Safe Haven Flows (-1)	$-2.20e^{-3}$	$-13.53e^{-4}$	$-0.67e^{-5}$	$-1.07e^{-4}$	$-1.25e^{-3}$	$-0.71e^{-4}$	$-4.46e^{-4}$	$-3.44e^{-4}$	$-1.04e^{-4*}$	$-3.23e^{-4}$	$-5.77e^{-4*}$	$-7.99e^{-3**}$
	$(2.23e^{-3})$	$(11.09e^{-4})$	$(9.88e^{-5})$	$(4.08e^{-4})$	$(0.97e^{-3})$	$(1.60e^{-4})$	$(7.97e^{-4})$	$(2.22e^{-4})$	$(0.58e^{-4})$	$(4.04e^{-4})$	$(3.43e^{-4})$	$(3.39e^{-3})$
Safe Haven Flows (-2)	$-1.47e^{-3}$	$-5.40e^{-4}$	$-0.54e^{-5}$	$-0.67e^{-4}$	$-1.26e^{-3}$	$-0.29e^{-4}$	$-1.97e^{-4}$	$-3.32e^{-4}$	$0.51e^{-4}$	$-2.14e^{-4}$	$-2.99e^{-4}$	$10.11e^{-3***}$
	$(2.25e^{-3})$	$(10.63e^{-4})$	$(9.83e^{-5})$	$(4.08e^{-4})$	$(0.98e^{-3})$	$(1.62e^{-4})$	$(7.90e^{-4})$	$(2.26e^{-4})$	$(0.60e^{-4})$	$(4.07e^{-4})$	$(3.13e^{-4})$	$(3.39e^{-3})$
Safe Haven Flows (-3)	$-1.18e^{-3}$	$-0.82e^{-4}$	$-4.88e^{-5}$	$0.07e^{-4}$	$-0.93e^{-3}$	$-0.46e^{-4}$	$-2.43e^{-4}$	$-2.83e^{-4}$	$0.60e^{-4}$	$-3.73e^{-4}$	$-1.92e^{-4}$	$8.63e^{-3***}$
	$(2.13e^{-3})$	$(10.41e^{-4})$	$(9.97e^{-5})$	$(4.05e^{-4})$	$(0.93e^{-3})$	$(1.56e^{-4})$	$(7.93e^{-4})$	$(2.12e^{-4})$	$(0.59e^{-4})$	$(4.13e^{-4})$	$(2.75e^{-4})$	$(3.10e^{-3})$
R^2	0.58	0.69	0.90	0.40	0.87	0.77	0.84	0.81	0.66	0.57	0.77	0.77

Notes: AT=Austria, BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, GR=Greece, IR=Ireland, IT=Italy, LU=Luxembourg, NL=Netherlands, PT=Portugal; standard errors in parenthesis; ***/**/* means significance at the 1%/5%/10% level.

Table 6: Private Natural Rate

	AT	BE	DE	ES	FI	FR	GR	IR	IT	LU	NL	PT
Constant	-0.74*** (0.11)	0.20 (0.16)	1.10*** (0.05)	-0.11* (0.03)	-0.19*** (0.02)	0.10 (0.07)	-0.17*** (0.01)	0.28*** (0.03)	-0.01 (0.02)	-0.25** (0.11)	-0.15** (0.07)	0.04** (0.02)
Growth Potential Output	-135.32** (56.25)	-222.80*** (51.02)	-64.43** (22.31)	-67.38** (26.85)	-47.35*** (12.28)	-190.51*** (37.97)	-38.76*** (5.89)	11.86* (6.32)	-58.70** (22.25)	-56.55*** (20.56)	-185.00*** (43.59)	-148.38*** (20.84)
Growth Potential Output (-1)	460.80*** (169.07)	598.00*** (147.23)	143.15** (65.25)	205.12** (79.50)	146.57*** (35.44)	550.61*** (109.61)	95.20*** (17.09)	-36.07* (18.89)	172.80** (66.25)	170.04*** (60.43)	540.98*** (126.33)	415.58*** (61.96)
Growth Potential Output (-2)	-527.38*** (172.27)	-559.63*** (146.16)	-104.01 (65.49)	-210.84*** (79.15)	-155.80*** (35.00)	-551.22*** (107.74)	-74.13*** (16.76)	36.74* (19.10)	-176.22** (67.15)	-176.98*** (60.73)	-538.57*** (123.63)	-392.10*** (62.46)
Growth Potential Output (-3)	203.72*** (59.39)	183.05*** (49.96)	22.13 (22.55)	73.11*** (26.49)	57.09*** (11.83)	190.61*** (36.03)	17.39*** (5.56)	-12.74* (6.53)	62.44*** (23.15)	63.60*** (20.81)	182.80*** (40.87)	124.54*** (21.35)
Safe Haven Flows	$-1.72e^{-3}$ ($2.03e^{-3}$)	$-6.26e^{-4}$ ($12.40e^{-4}$)	$-0.43e^{-4}$ ($1.02e^{-4}$)	$-5.45e^{-4}$ ($5.16e^{-4}$)	$-0.16e^{-3}$ ($0.96e^{-3}$)	$-1.50e^{-4}$ ($1.52e^{-4}$)	$-0.69e^{-3}$ ($0.45e^{-3}$)	$-2.97e^{-4}$ ($2.06e^{-4}$)	$-7.31e^{-4}$*** ($2.61e^{-4}$)	$-3.93e^{-4}$ ($4.08e^{-4}$)	$-4.07e^{-4}$ ($2.93e^{-4}$)	$-3.68e^{-3}$** ($1.61e^{-3}$)
Safe Haven Flows (-1)	$-2.54e^{-3}$ ($2.19e^{-3}$)	$-10.97e^{-4}$ ($13.24e^{-4}$)	$-0.43e^{-4}$ ($1.03e^{-4}$)	$-2.41e^{-4}$ ($5.51e^{-4}$)	$-1.22e^{-3}$ ($0.96e^{-3}$)	$-0.70e^{-4}$ ($1.58e^{-4}$)	$-0.65e^{-3}$ ($0.45e^{-3}$)	$-3.60e^{-4}$ ($2.22e^{-4}$)	$-6.34e^{-4}$** ($2.78e^{-4}$)	$-4.10e^{-4}$ ($4.12e^{-4}$)	$-4.88e^{-4}$ ($3.33e^{-4}$)	$-4.24e^{-3}$** ($1.65e^{-3}$)
Safe Haven Flows (-2)	$-1.71e^{-3}$ ($2.22e^{-3}$)	$-0.20e^{-4}$ ($12.65e^{-4}$)	$0.35e^{-4}$ ($1.02e^{-4}$)	$-1.18e^{-4}$ ($5.49e^{-4}$)	$-1.39e^{-3}$ ($0.92e^{-3}$)	$-0.24e^{-4}$ ($1.60e^{-7}$)	$-1.14e^{-3}$** ($0.46e^{-3}$)	$-3.60e^{-4}$ ($2.25e^{-4}$)	$-4.44e^{-4}$ ($2.86e^{-4}$)	$-2.94e^{-4}$ ($4.15e^{-4}$)	$-2.18e^{-4}$ ($3.03e^{-4}$)	$-5.31e^{-3}$*** ($1.66e^{-3}$)
Safe Haven Flows (-3)	$-1.34e^{-3}$ ($2.13e^{-3}$)	$-6.05e^{-4}$ ($11.99e^{-4}$)	$-0.87e^{-4}$ ($1.02e^{-4}$)	$-3.18e^{-4}$ ($5.13e^{-4}$)	$-1.05e^{-3}$ ($0.88e^{-3}$)	$-0.39e^{-4}$ ($1.68e^{-7}$)	$-1.57e^{-3}$*** ($0.46e^{-3}$)	$-3.05e^{-4}$ ($2.12e^{-4}$)	$-5.69e^{-4}$* ($2.88e^{-4}$)	$-4.61e^{-4}$ ($4.22e^{-4}$)	$-1.45e^{-4}$ ($2.70e^{-4}$)	$-5.75e^{-3}$*** ($1.66e^{-3}$)
R^2	0.58	0.69	0.91	0.41	0.88	0.77	0.89	0.81	0.69	0.57	0.76	0.79

Notes: AT=Austria, BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, GR=Greece, IR=Ireland, IT=Italy, LU=Luxembourg, NL=Netherlands, PT=Portugal; standard errors in parenthesis; ***/**/* means significance at the 1%/5%/10% level.

Table 7: State-Space-Model

	AT	BE	DE	ES	FI	FR	GR	IR	IT	LU	NL	PT
IS-Curve												
Output Gap (-1)	1.28*** (0.13)	0.92*** (0.13)	0.68** (0.28)	1.45*** (0.31)	0.70 (0.67)	0.90*** (0.07)	0.91*** (0.10)	0.71*** (0.21)	1.63*** (0.19)	1.03*** (0.17)	0.98*** (0.16)	0.87*** (0.11)
Output Gap (-2)				-0.53* (0.28)					-0.70*** (0.17)			
Output Gap (-3)	-0.49*** (0.10)									-0.15 (0.24)		
Real Rate Gap (-1)			-0.67** (0.32)		-0.63 (0.54)	-0.64*** (0.15)						
Real Rate Gap (-2)	-0.38* (0.20)	-0.20 (0.27)		-0.21 (0.20)			-0.46 (0.47)	-0.30 (0.36)	-0.69*** (0.16)	-0.41 (0.65)	-0.50 (0.48)	
Real Rate Gap (-3)												-0.75 (0.92)
Phillips-Curve												
Constant	0.27*** (0.08)	0.32 (0.32)	0.26*** (0.08)				0.62* (0.37)			0.28 (0.18)	0.31*** (0.10)	0.38** (0.18)
Inflation (-1)	0.41*** (0.14)	0.41 (0.31)				0.49*** (0.17)		0.25 (0.30)	0.57*** (0.17)	0.46 (0.43)	0.10 (0.12)	
Inflation (-2)				0.63*** (0.20)			0.04 (0.28)		0.29 (0.20)			0.05 (0.16)
Inflation (-3)			0.24 (0.15)		0.47*** (0.15)							
Output Gap (-1)		0.09 (0.15)	0.00 (0.02)	0.02** (0.01)		0.29** (0.12)		0.33** (0.16)	0.02 (0.02)		0.00 (0.02)	0.03 (0.02)
Output Gap (-2)						-0.26** (0.11)	0.05* (0.03)					
Output Gap (-3)	-0.00 (0.02)				-0.06 (0.12)					-0.01 (0.01)		
Oil Inflation (-1)			0.03 (0.02)		0.09*** (0.02)					0.00 (0.04)		
Oil Inflation (-2)				-0.06* (0.03)			0.02 (0.03)	0.02 (0.03)	-0.07*** (0.02)	-0.03 (0.03)		
Oil Inflation (-3)	0.02 (0.02)	-0.02 (0.03)									0.05*** (0.02)	0.05 (0.03)
Natural Rate												
Constant	-3.72*** (0.44)		5.24*** (0.56)	3.46*** (0.55)	0.03 (0.50)		-1.31** (0.62)	-0.50 (0.35)		3.54*** (1.32)	1.48 (4.08)	
Growth Potential Output	2.13** (0.87)	-159.17** (80.49)	10.01*** (2.35)	-33.01*** (3.95)	-3.82*** (1.41)	14.66*** (1.18)	-35.76*** (7.77)	12.18*** (2.18)	123.79*** (28.91)	-86.22*** (8.44)	-30.06 (71.51)	8.03*** (1.44)
Growth Potential Output (-1)	5.87*** (0.86)	593.32*** (80.49)	-8.50*** (2.36)	29.77*** (4.02)	2.44 (1.61)	-9.44*** (1.12)	40.18*** (7.04)	-9.21*** (2.47)	-123.69*** (28.91)	96.51*** (8.44)	398.10*** (71.19)	-1.13 (1.02)
Growth Potential Output (-2)	-0.10 (0.17)	-441.75*** (49.22)		0.42*** (0.14)	1.26 (1.56)	-8.30* (4.89)	-11.27*** (1.35)	0.99 (0.70)	0.17 (1.87)	-20.78*** (2.93)	-358.31*** (64.22)	2.03*** (0.44)
Growth Potential Output (-3)	0.48** (0.20)	7.41 (47.18)		-0.32 (0.28)	0.32 (0.87)	2.63 (3.82)	8.73*** (1.23)	-4.35*** (0.77)	3.00*** (0.74)	6.27 (7.14)	-11.89 (9.53)	1.66*** (0.32)
log likelihood	−62.93	−68.10	−88.97	−64.51	−115.76	−29.17	−136.50	−200.45	−74.62	−125.44	−84.05	−88.55

Notes: AT=Austria, BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, GR=Greece, IR=Ireland, IT=Italy, LU=Luxembourg, NL=Netherlands, PT=Portugal; standard errors in parenthesis; ***/**/* means significance at the 1%/5%/10% level.

Table 8: State-Space-Model - Safe Haven Flows

	AT	BE	DE	ES	FI	FR	GR	IR	IT	LU	NL	PT
IS-Curve												
Output Gap (-1)	1.24*** (0.12)	0.98*** (0.18)	0.53* (0.28)	1.28*** (0.43)	0.47 (0.46)	0.98*** (0.02)	0.90*** (0.11)	0.75*** (0.17)	1.55*** (0.23)	0.51 (0.56)	0.99*** (0.32	0.90*** (0.09)
Output Gap (-2)				-0.39 (0.36)					0.66*** (0.20)			
Output Gap (-3)	-0.33** (0.14)									0.46 (0.61)		
Real Rate Gap (-1)			-0.56** (0.29)		-0.41 (0.45)	-0.64*** (0.15)						
Real Rate Gap (-2)	-0.38* (0.20)	-0.20 (0.27)		-0.21 (0.20)			-0.43 (0.48)	-0.30 (0.36)	-0.69*** (0.16)	-0.41 (0.65)	-0.50 (0.48)	
Real Rate Gap (-3)												-0.75 (0.92)
Phillips-Curve												
Constant	0.27*** (0.08)	0.23 (0.15)	0.26*** (0.09)				0.64* (0.37)			0.27 (0.23)	0.31** (0.13)	0.39** (0.16)
Inflation (-1)	0.41*** (0.13)	0.56*** (0.19)				0.51*** (0.15)		-0.05 (0.28)	0.45 (0.46)	0.46 (0.43)	0.10 (0.12)	
Inflation (-2)				0.57** (0.23)			0.04 (0.27)		0.30* (0.18)			0.06 (0.18)
Inflation (-3)			0.24 (0.15)		0.54*** (0.13)							
Output Gap (-1)		0.00 (0.03)	0.00 (0.02)	0.03* (0.02)		0.28** (0.14)		0.35** (0.15)	0.02 (0.02)		0.00 (0.02)	0.02 (0.02)
Output Gap (-2)						-0.28** (0.14)	0.05* (0.03)					
Output Gap (-3)	-0.00 (0.02)					-0.26 (0.22)				-0.00 (0.01)		
Oil Inflation (-1)			0.03 (0.02)		0.06*** (0.02)					0.01 (0.04)		
Oil Inflation (-2)				-0.05 (0.04)		0.02 (0.03)	0.02 (0.03)	-0.05*** (0.02)	-0.03 (0.02)			
Oil Inflation (-3)	0.02 (0.02)	-0.01 (0.03)									0.05*** (0.02)	0.05 (0.04)
Natural Rate												
Constant	-4.06*** (0.64)		8.61*** (0.88)	-6.56*** (0.12)	0.03 (0.50)		-1.08 (0.66)	-0.50 (0.34)		4.62 (3.04)	1.27 (1.47)	
Growth Potential Output	125.71*** (42.76)	-204.54** (64.16)	15.26*** (2.88)	10.19*** (1.16)	-3.82*** (1.41)	-14.96*** (2.47)	-37.11*** (9.35)	1.67*** (0.44)	448.70*** (21.87)	-55.72*** (19.47)	-39.75 (80.34)	-0.30 (1.25)
Growth Potential Output (-1)	338.25*** (33.20)	589.89*** (64.16)	-14.41*** (2.89)	16.45*** (1.36)	-4.37*** (1.32)	5.28* (3.11)	41.50*** (7.63)	4.99*** (0.66)	3.89 (44.27)	141.87*** (19.77)	402.93*** (86.42)	-8.76 (2.82)
Growth Potential Output (-2)	-457.37*** (29.22)	-550.50*** (53.05)		1.56*** (0.18)	3.22 (2.03)	6.48*** (0.74)	-11.51*** (2.42)	4.01 (2.85)	-453.10*** (22.41)	-146.42*** (19.91)	-365.34*** (78.42)	9.29** (4.02)
Growth Potential Output (-3)	0.63*** (0.07)	167.71 (13.37)		1.70*** (0.24)	4.81*** (1.31)	2.26*** (0.43)	9.07*** (1.64)	-11.11*** (2.18)	6.73*** (0.11)	63.55*** (20.21)	-0.17 (2.23)	5.85*** (1.36)
Safe Haven Flows				$-3.68e^{-3***}$ ($0.04e^{-3}$)		$-6.27e^{-4***}$ ($0.08e^{-4}$)			$-6.10e^{-3***}$ ($0.52e^{-3}$)		-11.89 (9.53)	
Safe Haven Flows (-1)	$-3.70e^{-3***}$ ($0.17e^{-3}$)	$-1.75e^{-2***}$ ($0.13e^{-2}$)					$-1.44e^{-2***}$ ($0.54e^{-2}$)	$-2.10e^{-2***}$ ($0.10e^{-2}$)	$-4.68e^{-3***}$ ($0.64e^{-3}$)		$-3.91e^{-4***}$ ($0.26e^{-4}$)	$-2.08e^{-2***}$ ($0.36e^{-2}$)
Safe Haven Flows (-2)					$-6.27e^{-3***}$ ($0.24e^{-3}$)							$-5.56e^{-2***}$ ($0.32e^{-2}$)
Safe Haven Flows (-3)			$-5.42e^{-4***}$ ($0.16e^{-4}$)							$-9.00e^{-3***}$ ($1.17e^{-3}$)		$-6.06e^{-2***}$ ($0.30e^{-2}$)
log likelihood	−64.59	−70.16	−84.86	−62.87	−109.23	−26.72	−136.38	−194.88	−54.36	−119.35	−78.08	−81.42

Notes: AT=Austria, BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, GR=Greece, IR=Ireland, IT=Italy, LU=Luxembourg, NL=Netherlands, PT=Portugal; standard errors in parenthesis; ***/**/* means significance at the 1%/5%/10% level.

Table 9: State-Space-Model - Private Safe Haven Flows

	AT	BE	DE	ES	FI	FR	GR	IR	IT	LU	NL	PT
IS-Curve												
Output Gap (-1)	1.24***	0.98***	0.53*	1.77***	0.47	0.98***	0.90***	0.75***	1.61***	0.51	0.97**	0.89***
	(0.12)	(0.18)	(0.28)	(0.13)	(0.46)	(0.02)	(0.10)	(0.16)	(0.24)	(0.57)	(0.47	(0.07)
Output Gap (-2)				-0.79***					-0.68***			
				(0.12)					(0.23)			
Output Gap (-3)	-0.34**									0.47		
	(0.14)									(0.59)		
Real Rate Gap (-1)			-0.56*			-0.41	-0.64***					
			(0.29)			(0.44)	(0.15)					
Real Rate Gap (-2)	-0.38*	-0.20		-0.21			-0.64	-0.30	-0.69***	-0.41	-0.50	
	(0.20)	(0.27)		(0.20)			(0.43)	(0.36)	(0.16)	(0.65)	(0.48)	
Real Rate Gap (-3)												-0.75
												(0.92)
Phillips-Curve												
Constant	0.27***	0.23	0.27***				0.60**			0.27	0.31**	0.38**
	(0.08)	(0.14)	(0.09)				(0.28)			(0.21)	(0.09)	(0.15)
Inflation (-1)	0.41***	0.57***				0.43***		-0.05	0.56***	0.45	0.10	
	(0.13)	(0.19)				(0.16)		(0.28)	(0.17)	(0.43)	(0.11)	
Inflation (-2)				0.63**			0.04		0.29			0.04
				(0.27)			(0.27)		(0.21)			(0.18)
Inflation (-3)			0.24		0.54***							
			(0.15)		(0.13)							
Output Gap (-1)		0.00	0.02	0.03*		0.37**		0.35**	0.02		0.00	0.07*
		(0.03)	(0.01)	(0.02)		(0.17)		(0.15)	(0.02)		(0.01)	(0.04)
Output Gap (-2)						-0.37**	0.04**					
						(0.17)	(0.02)					
Output Gap (-3)	-0.00					-0.26				-0.00		
	(0.02)					(0.21)				(0.01)		
Oil Inflation (-1)			0.03		0.06***					0.01		
			(0.02)		(0.02)					(0.04)		
Oil Inflation (-2)				-0.06		-0.02	0.02	-0.05***	-0.03			
				(0.04)		(0.01)	(0.03)	(0.02)	(0.03)			
Oil Inflation (-3)	0.02	-0.01									0.05**	0.08***
	(0.02)	(0.03)									(0.02)	(0.03)
Natural Rate												
Constant	-4.18***		8.76***	2.31***	0.02		-1.55**	-0.47		4.67	1.57	-0.42
	(0.65)		(0.89)	(0.06)	(0.50)		(0.76)	(0.34)		(2.98)	(1.18)	(0.29)
Growth Potential Output	74.67***	-195.32*	15.75***	15.14***	-3.82***	-11.81***	-40.68**	1.59***	899.74***	-55.60***	-19.07	-2.38
	(16.25)	(106.36)	(2.89)	(0.41)	(1.41)	(0.84)	(19.53)	(0.44)	(48.56)	(18.19)	(19.68)	(1.90)
Growth Potential Output (-1)	259.76***	577.72***	-14.51***	-2.39***	-4.36***	3.99***	53.39***	4.93***	-245.87	144.74***	385.62***	23.17
	(14.57)	(106.36)	(2.90)	(0.61)	(1.31)	(0.92)	(9.89)	(0.66)	(48.82)	(18.48)	(43.82)	(19.26)
Growth Potential Output (-2)	-327.56***	-531.73***		-4.75***	-3.17***	4.93***	-19.06	4.20	250.87***	-149.31***	-368.80***	45.71*
	(13.03)	(51.26)		(0.20)	(0.20)	(0.44)	(18.34)	(2.82)	(48.07)	(18.60)	(41.89)	(26.07)
Growth Potential Output (-3)	0.65***	151.86		-13.48***	4.84***	2.08***	15.03***	-11.17***	-896.99***	53.42***	-0.20	-61.06**
	(0.08)	(12.29)		(0.12)	(0.13)	(0.28)	(5.93)	(2.17)	(48.33)	(18.90)	(1.13)	(36.34)
Safe Haven Flows				-4.11e^{-3***}		-4.74e^{-4***}			-2.57e^{-3***}			-4.83e^{-2***}
				(0.04e^{-3})		(0.07e^{-4})			(0.34e^{-3})			(0.31e^{-2})
Safe Haven Flows (-1)	-4.99e^{-3***}	-2.21e^{-2***}						-2.09e^{-2***}	-2.54e^{-3***}		-6.64e^{-4***}	-2.08e^{-2***}
	(0.15e^{-3})	(0.13e^{-2})						(0.11e^{-2})	(0.40e^{-3})		(0.37e^{-4})	(0.36e^{-2})
Safe Haven Flows (-2)					-7.24e^{-3***}							-8.10e^{-2***}
					(0.24e^{-3})							(0.26e^{-2})
Safe Haven Flows (-3)			-7.92e^{-4***}				-1.58e^{-2***}		-4.67e^{-3***}	-9.20e^{-3***}		-8.00e^{-2***}
			(0.16e^{-4})				(0.32e^{-2})		(0.37e^{-3})	(1.13e^{-3})		(0.28e^{-2})
log likelihood	−64.53	−69.73	−84.67	−66.81	−109.20	−26.64	−131.71	−194.92	−49.08	−119.35	−77.32	−80.20

Notes: AT=Austria, BE=Belgium, DE=Germany, ES=Spain, FI=Finland, FR=France, GR=Greece, IR=Ireland, IT=Italy, LU=Luxembourg, NL=Netherlands, PT=Portugal; standard errors in parenthesis; ***/**/* means significance at the 1%/5%/10% level.
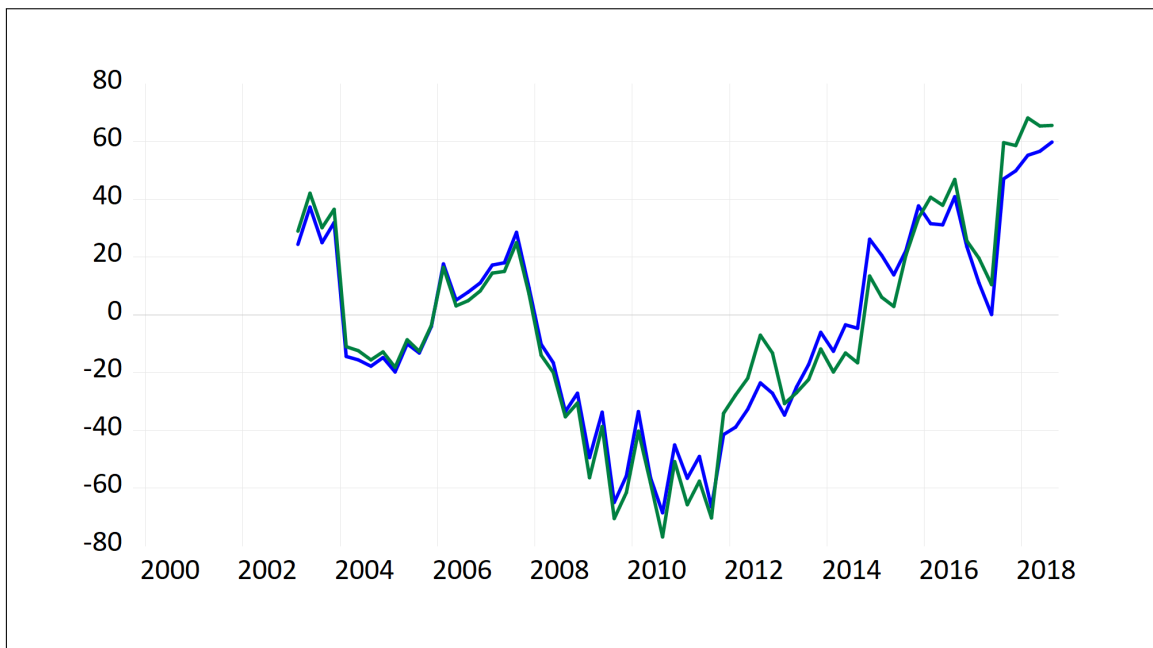
Figures
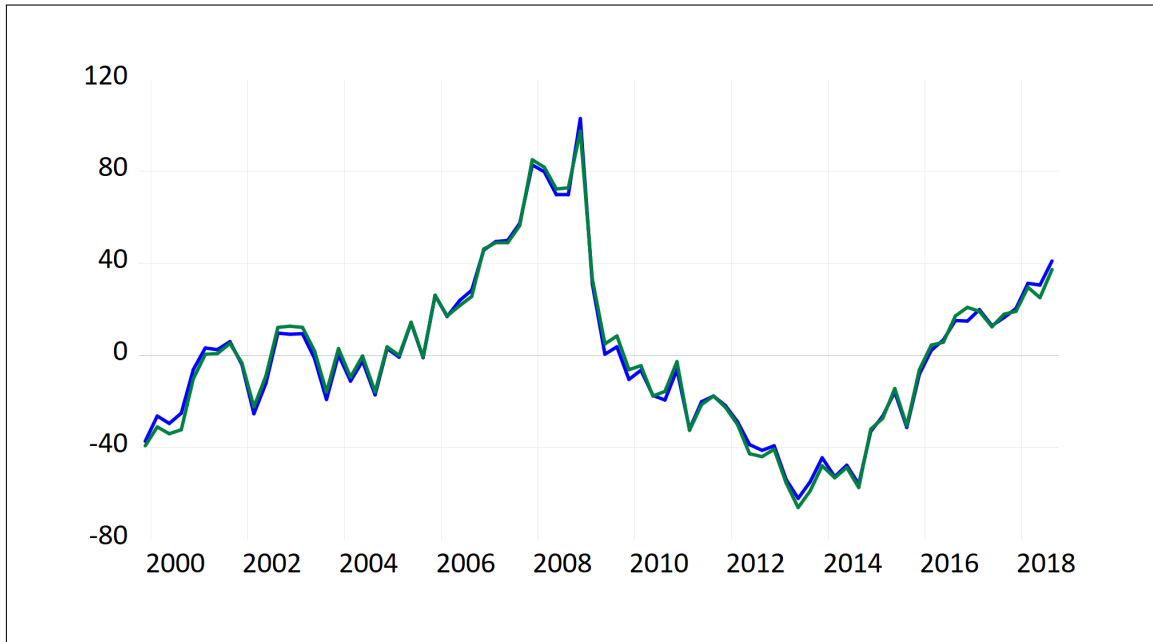
Figure 1: Safe Haven Net Assets Austria; *billion Euro; blue line = safe haven net assets, green line = private safe haven net assets.*
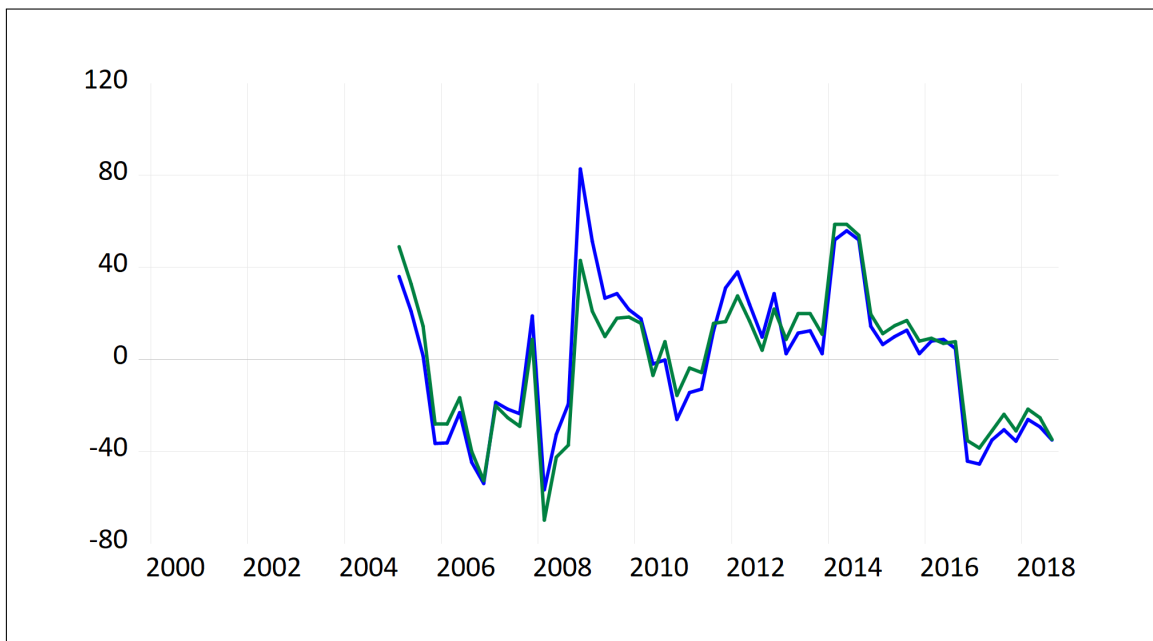
Figure 2: Safe Haven Net Assets Belgium; *billion Euro; blue line = safe haven net assets, green line = private safe haven net assets.*
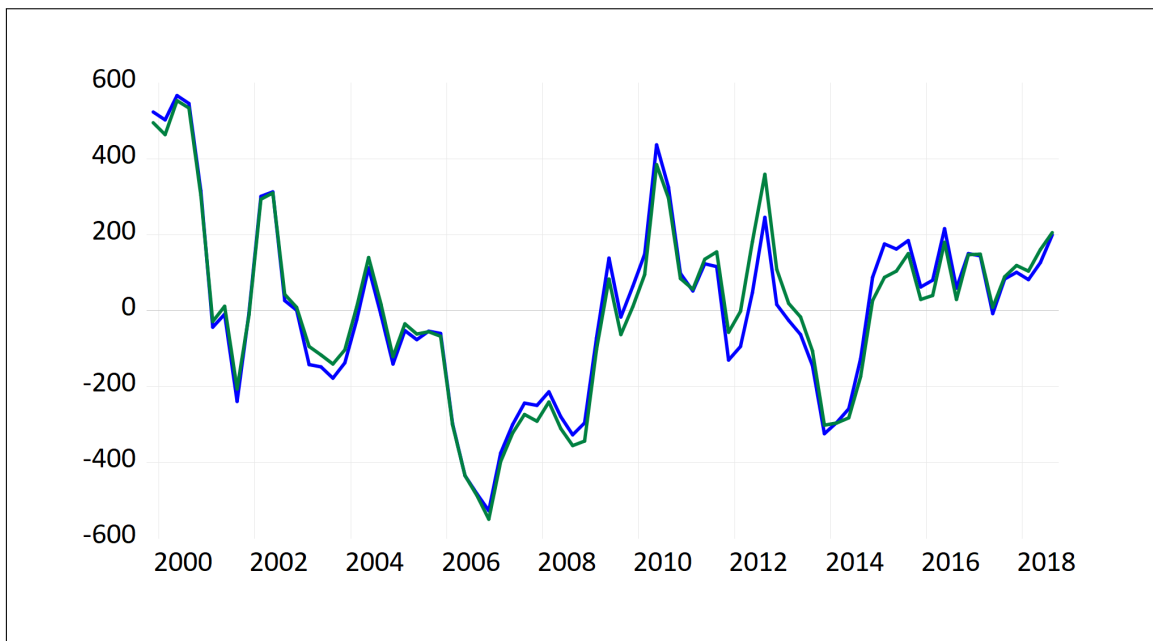
Figure 3: Safe Haven Net Assets Germany; *billion Euro; blue line = safe haven net assets, green line = private safe haven net assets.*
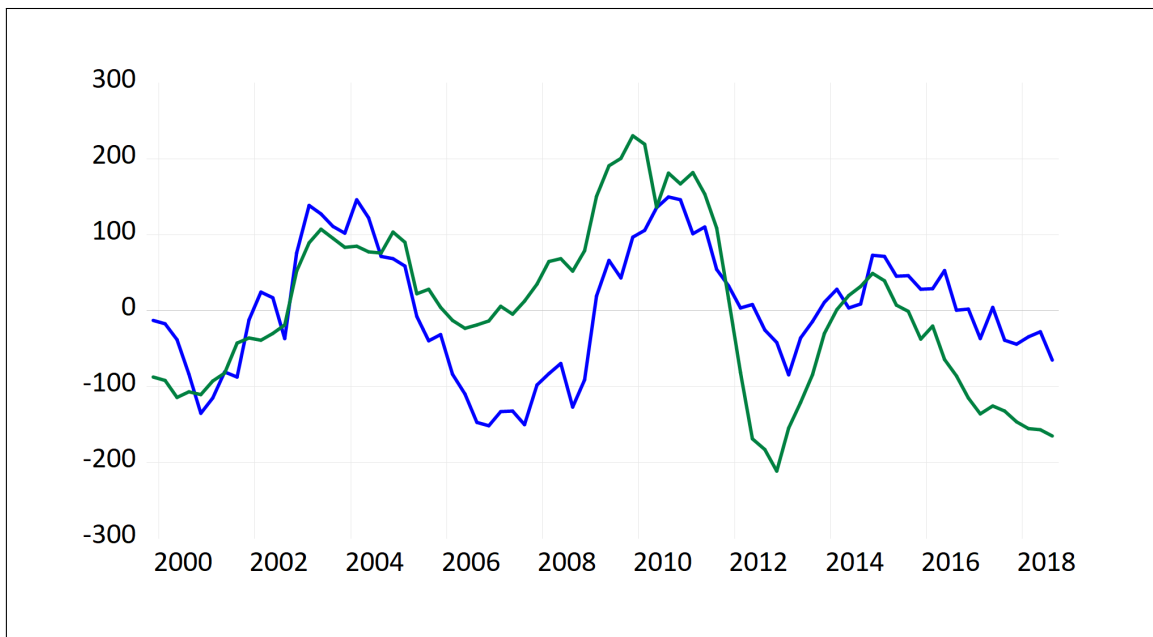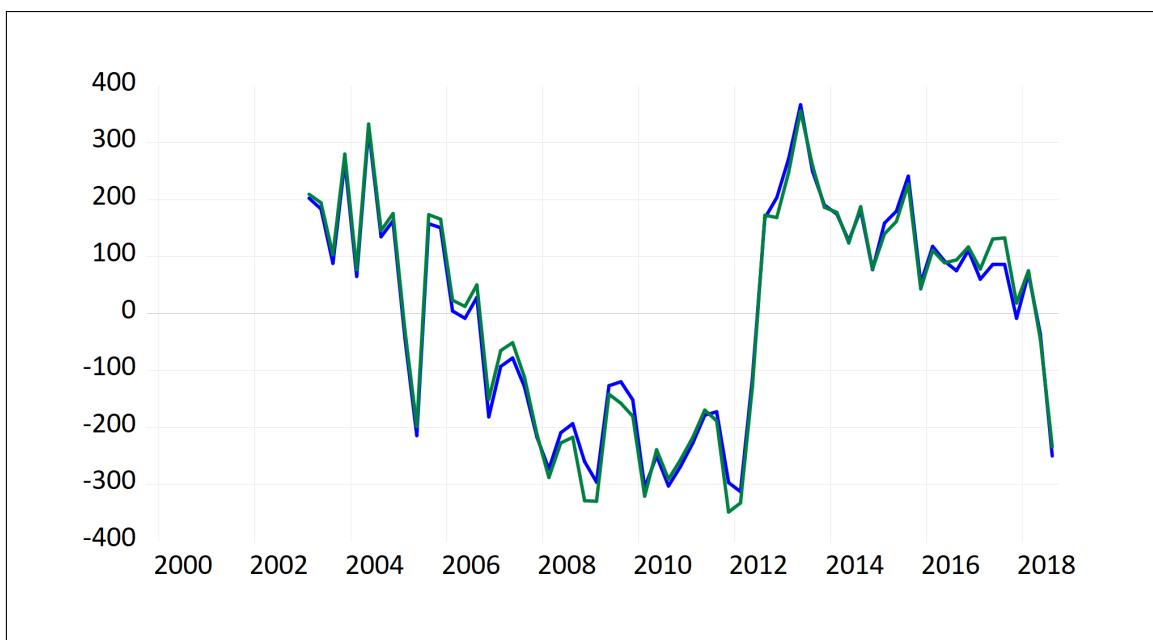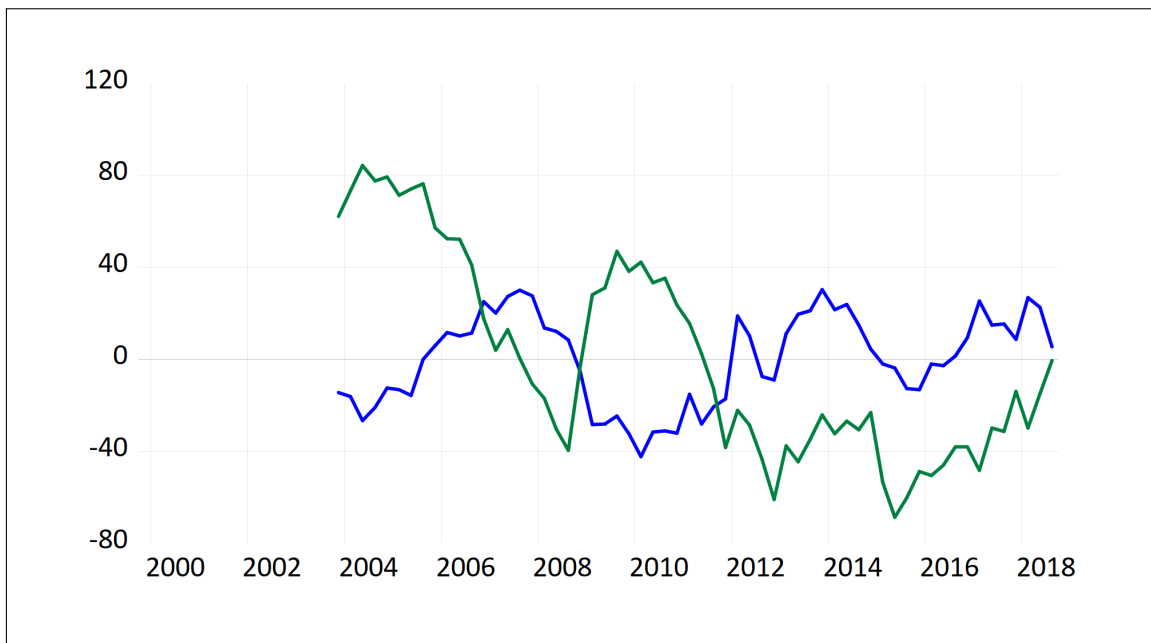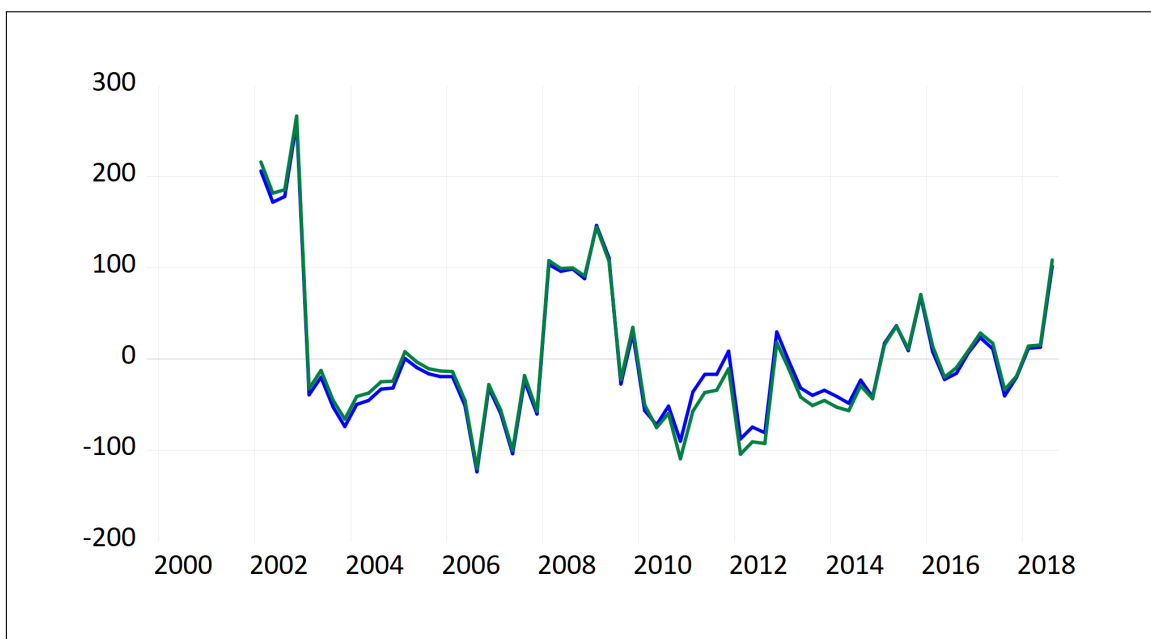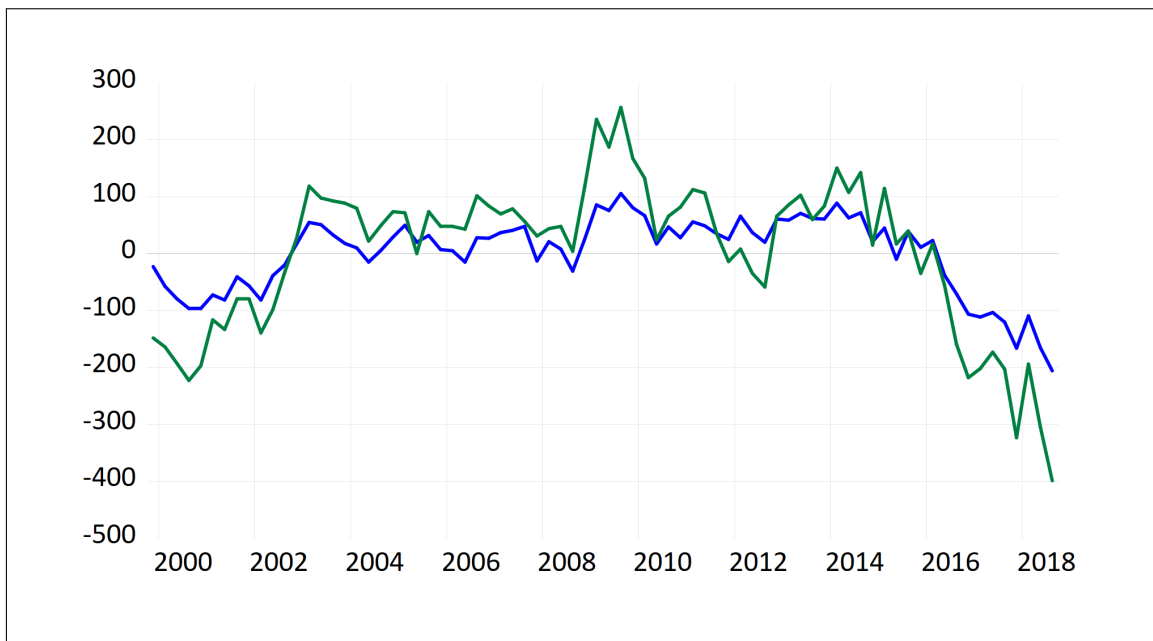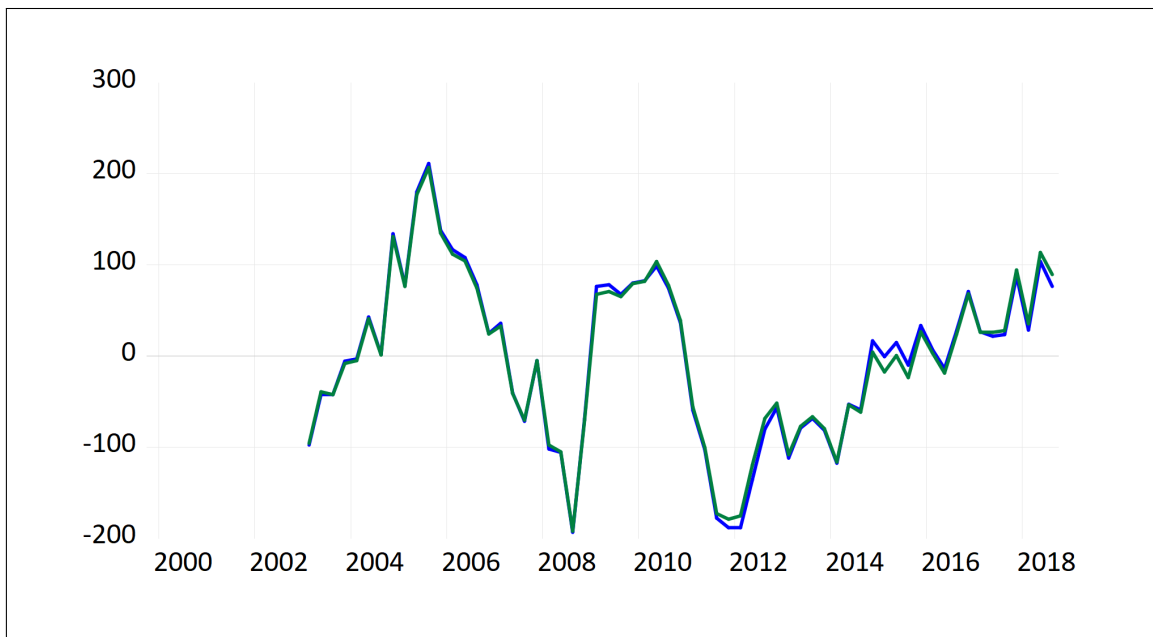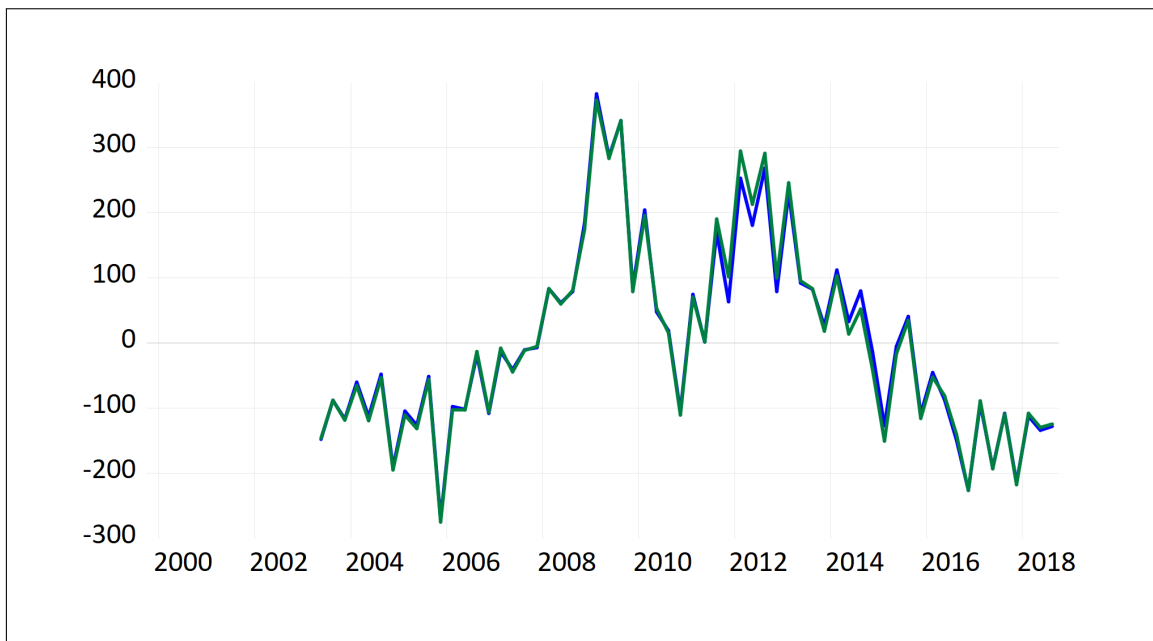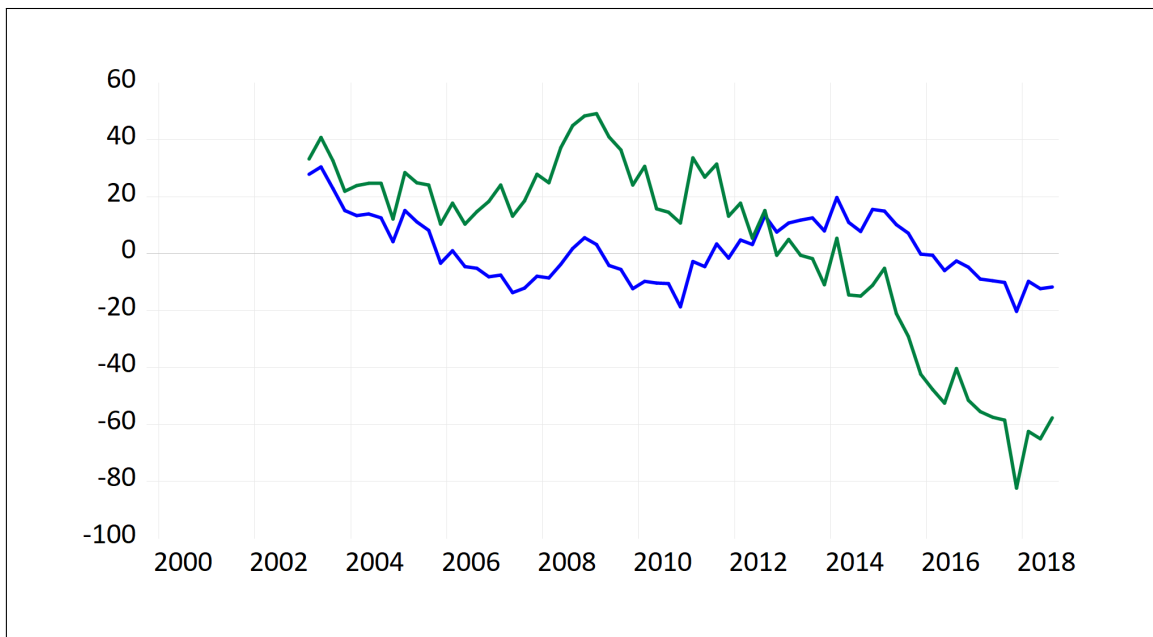

Figure 4: Safe Haven Net Assets Spain; *billion Euro; blue line = safe haven net assets, green line = private safe haven net assets.*

Figure 5: Safe Haven Net Assets Finland; *billion Euro; blue line = safe haven net assets, green line = private safe haven net assets.*

Figure 6: Safe Haven Net Assets France; *billion Euro; blue line = safe haven net assets, green line = private safe haven net assets.*

Figure 7: Safe Haven Net Assets Greece; *billion Euro; blue line = safe haven net assets, green line = private safe haven net assets.*

Figure 8: Safe Haven Net Assets Ireland; *billion Euro; blue line = safe haven net assets, green line = private safe haven net assets.*

Figure 9: Safe Haven Net Assets Italy; *billion Euro; blue line = safe haven net assets, green line = private safe haven net assets.*

Figure 10: Safe Haven Net Assets Luxembourg; *billion Euro; blue line = safe haven net assets, green line = private safe haven net assets.*

Figure 11: Safe Haven Net Assets Netherlands; *billion Euro; blue line = safe haven net assets, green line = private safe haven net assets.*

Figure 12: Safe Haven Net Assets Portugal; *billion Euro; blue line = safe haven net assets, green line = private safe haven net assets.*
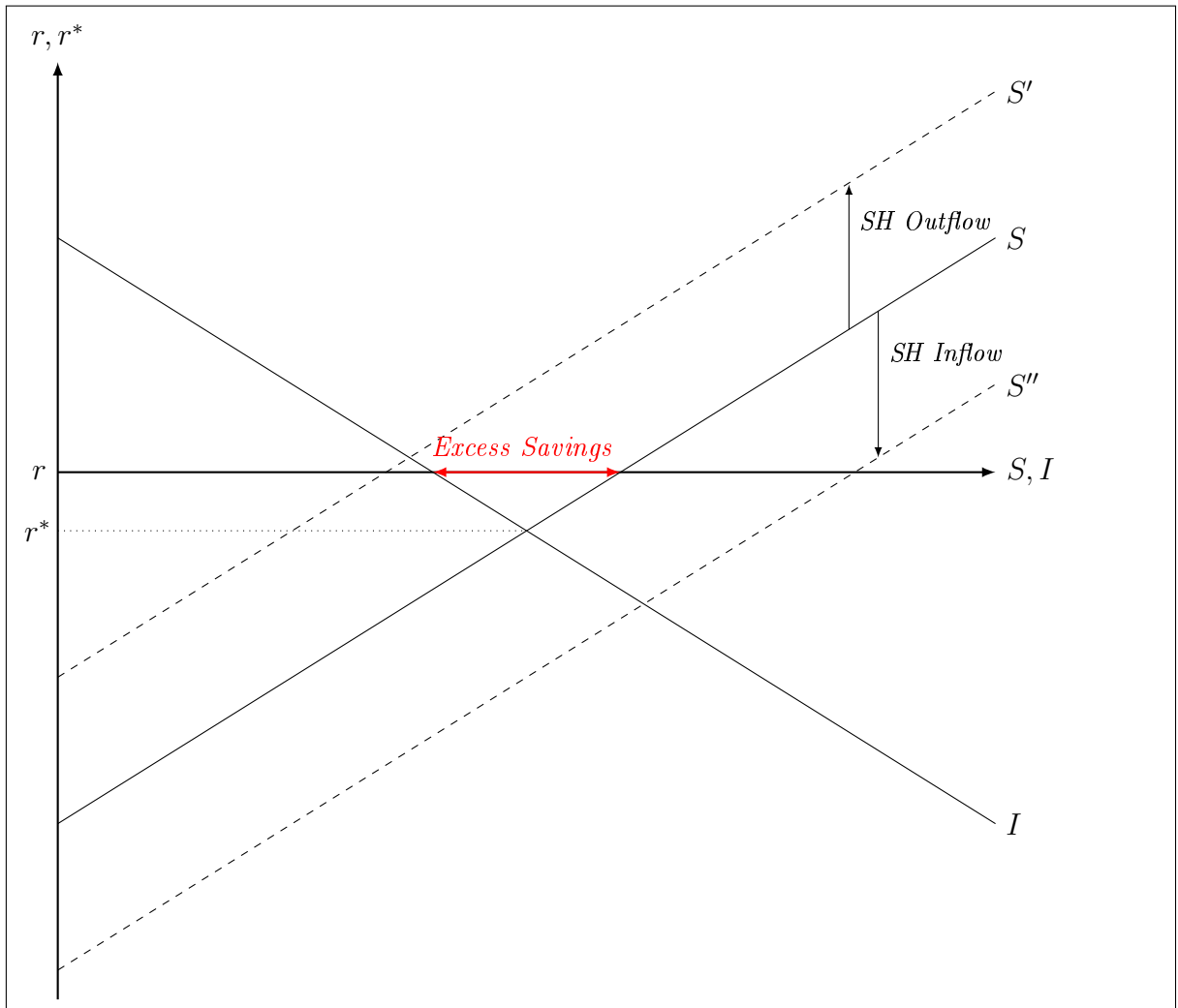
Figure 13: Real Interest Rates and Secular Stagnation; *S = Savings, I = Investments, r = Real Interest Rate, r* = Natural Real Interest Rate.*
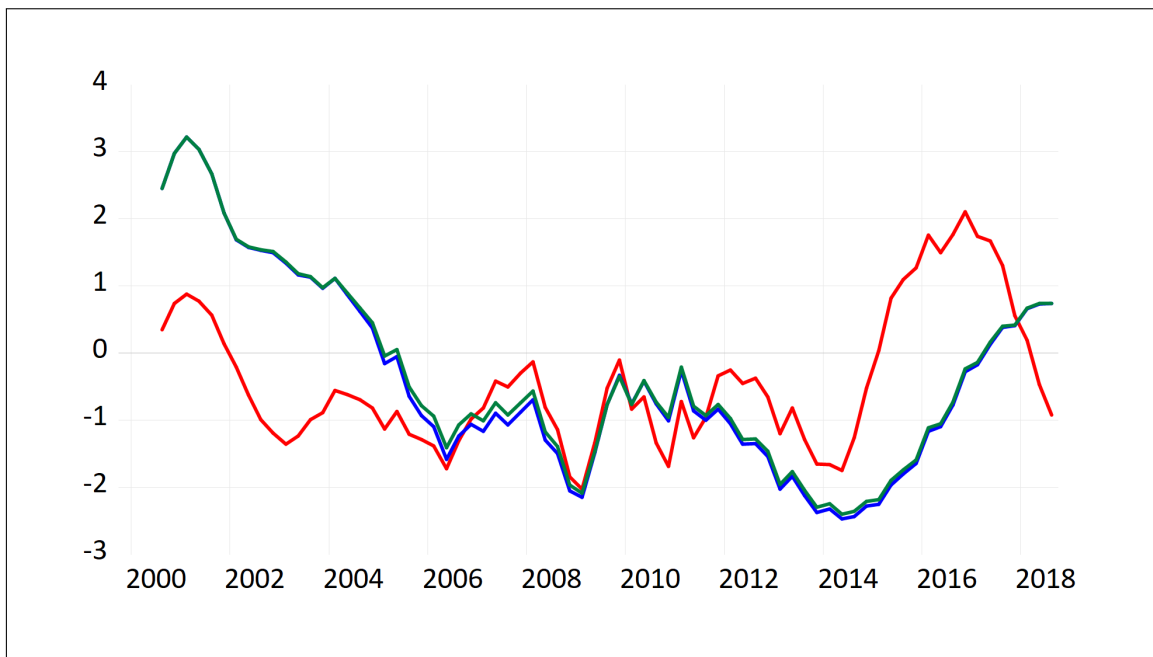
Figure 14: Ouput Gaps Austria; red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows.
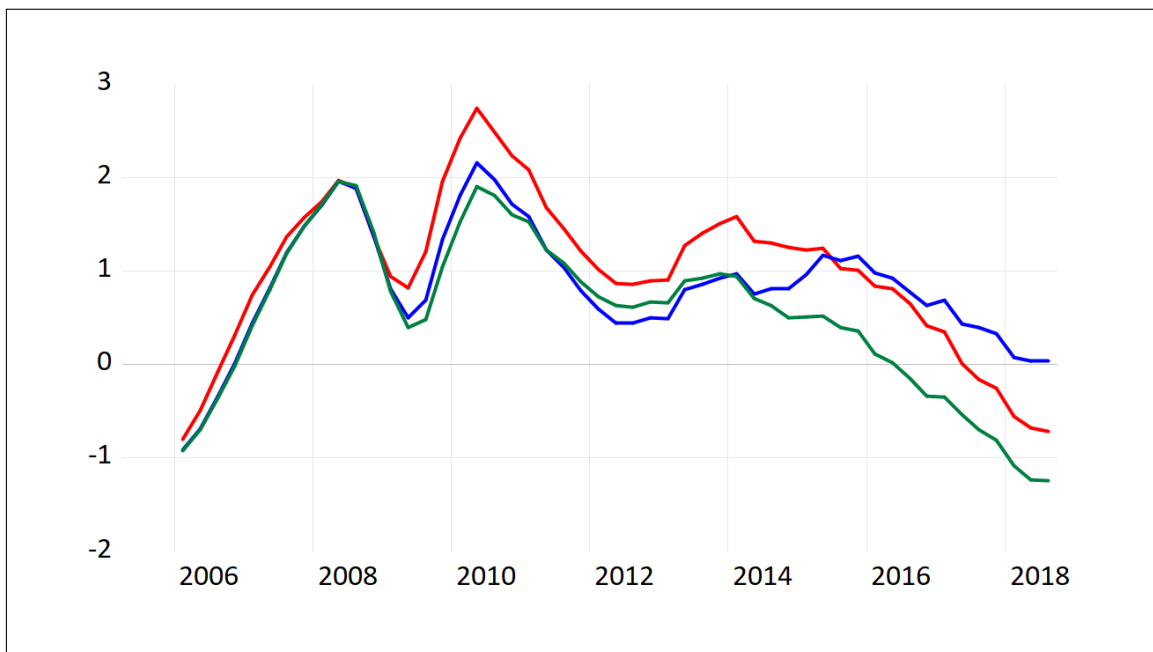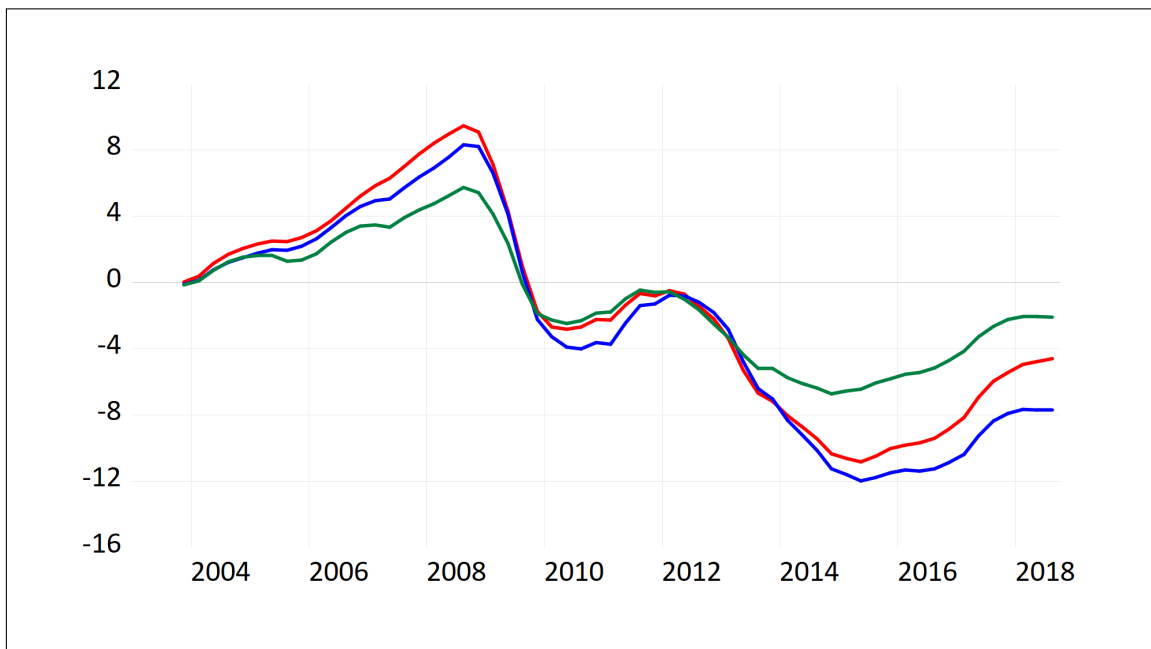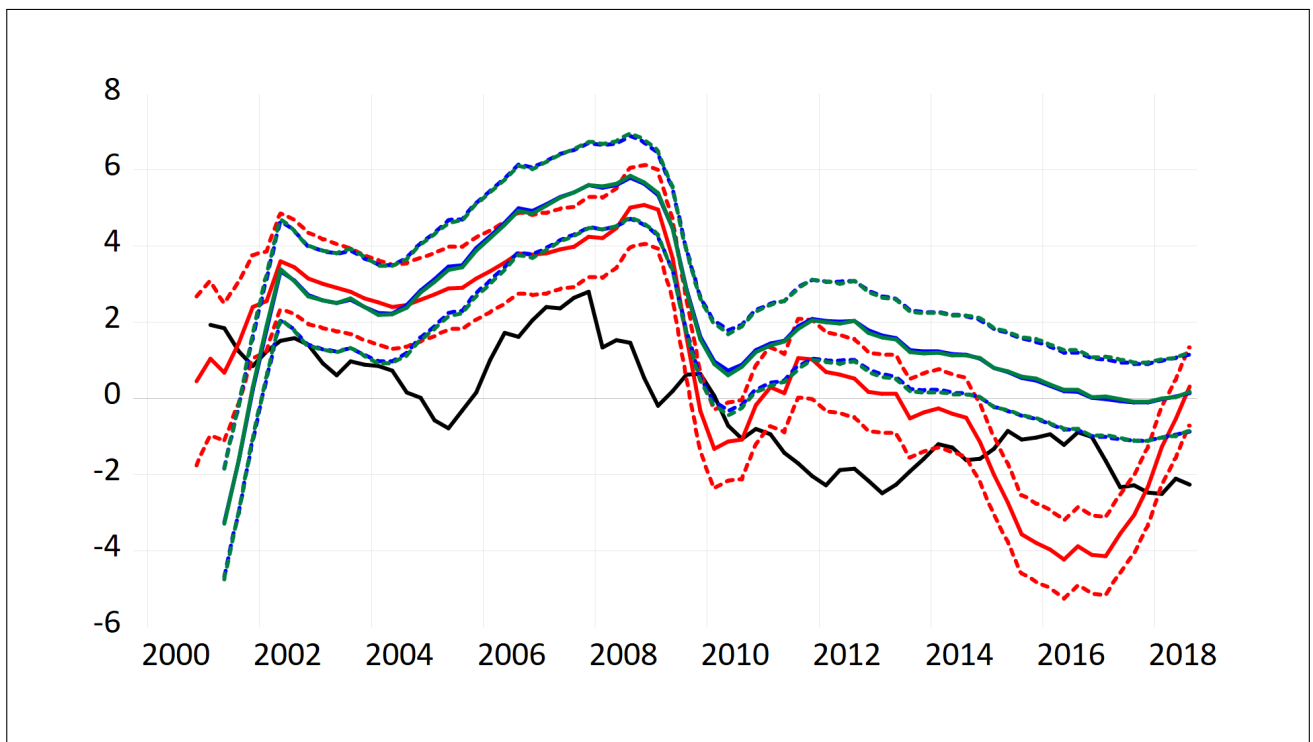

Figure 15: Ouput Gaps Belgium; red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows.
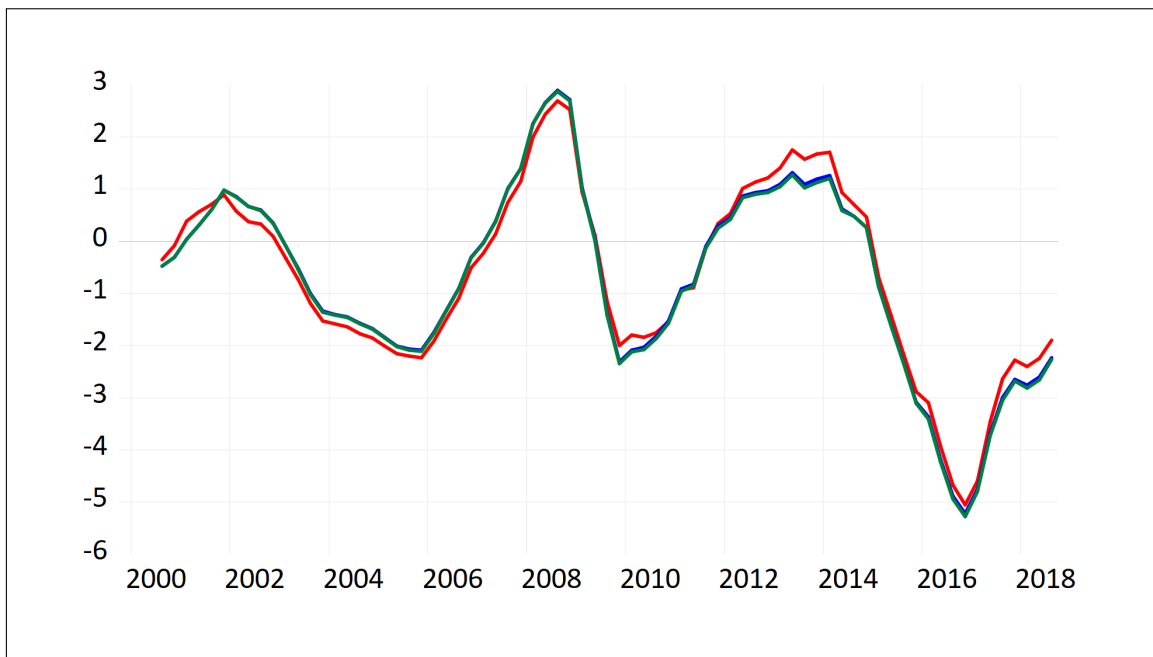
Figure 16: Ouput Gaps Germany; red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows.
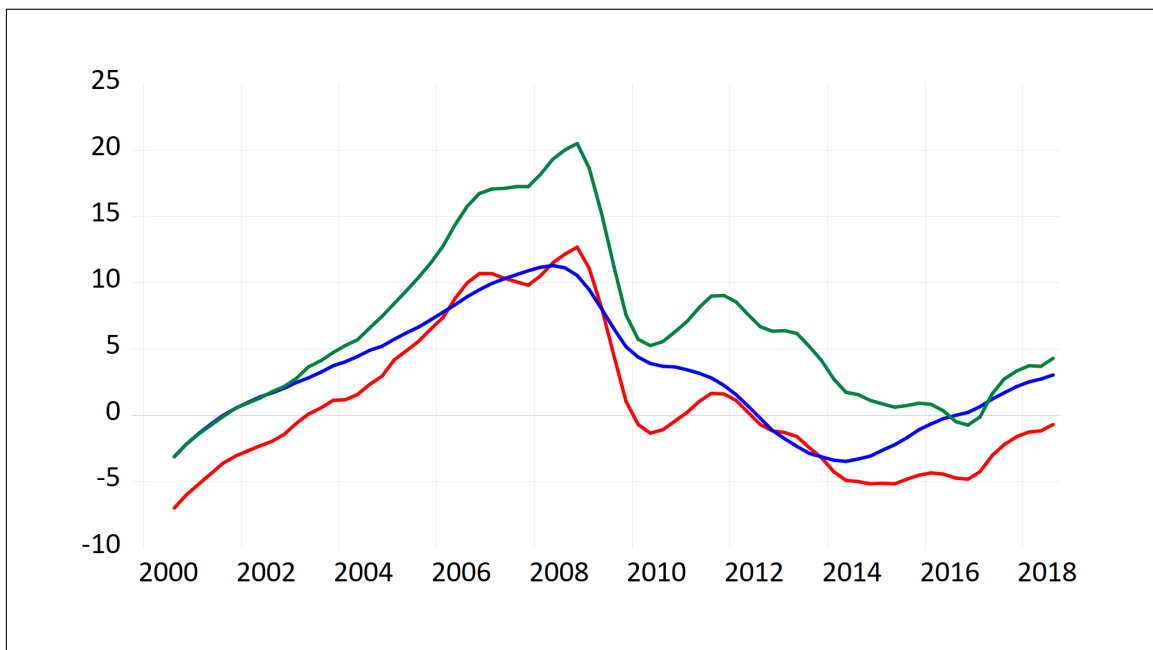
Figure 17: Ouput Gaps Spain; red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows.
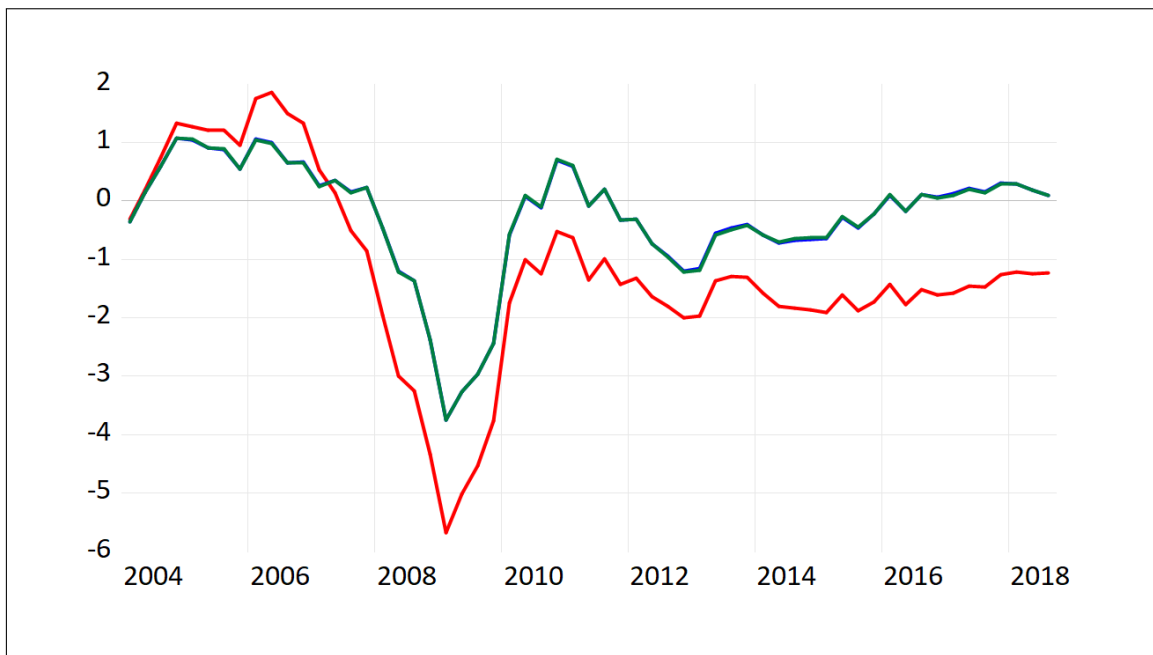
Figure 18: Ouput Gaps Finland; red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows.
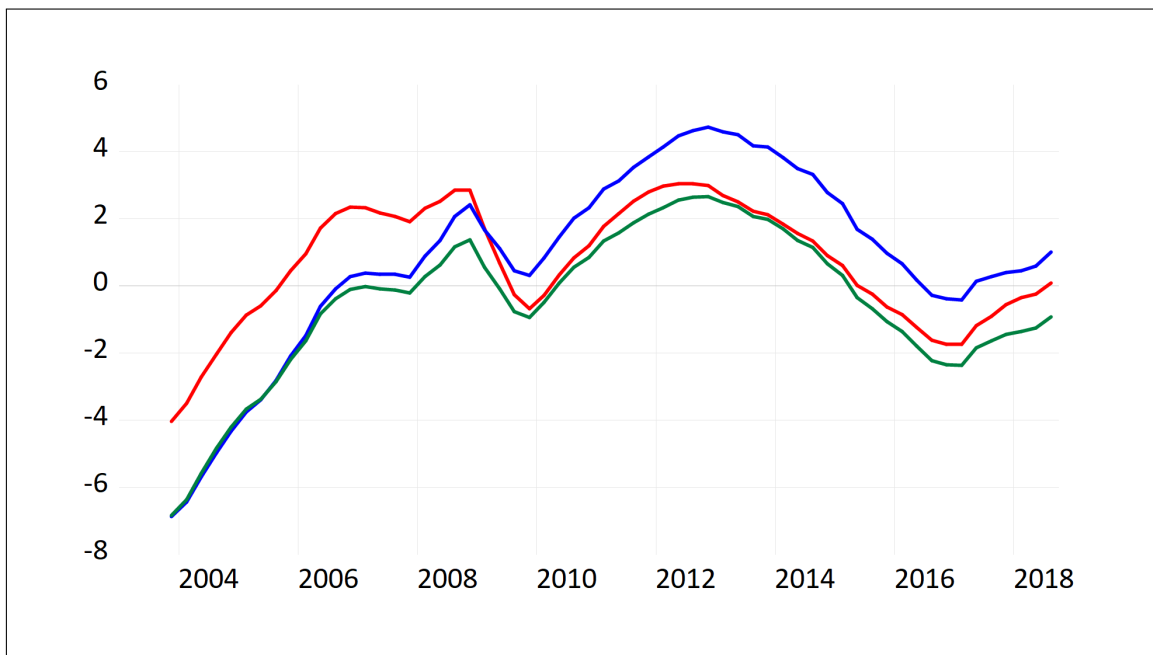
Figure 19: Ouput Gaps France; red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows.
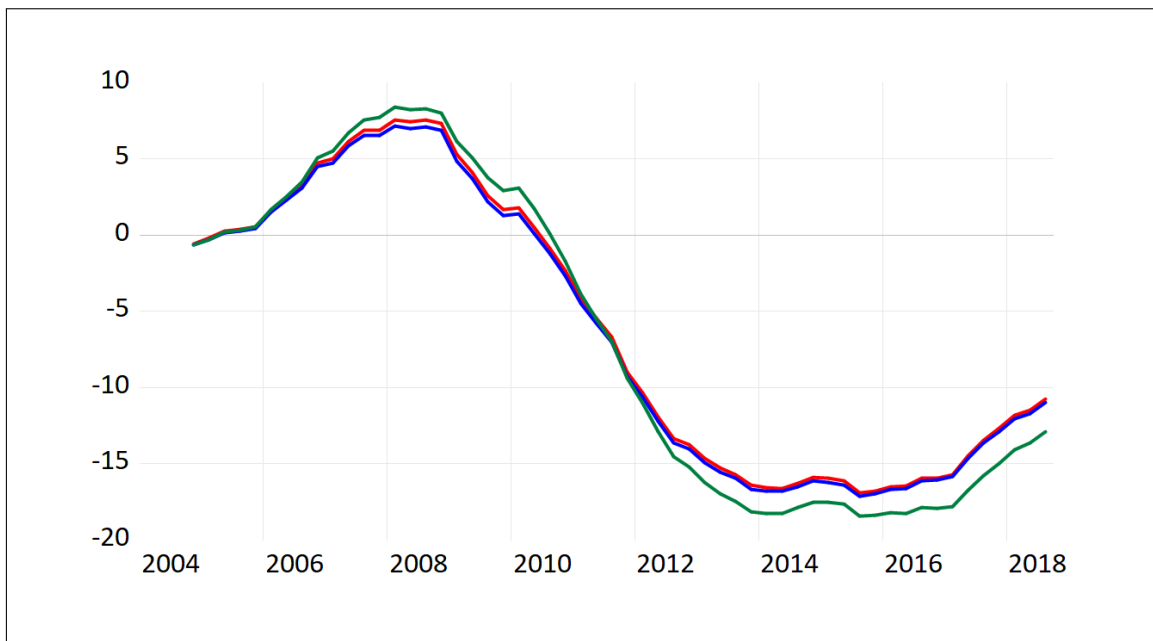
Figure 20: Ouput Gaps Greece; red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows.
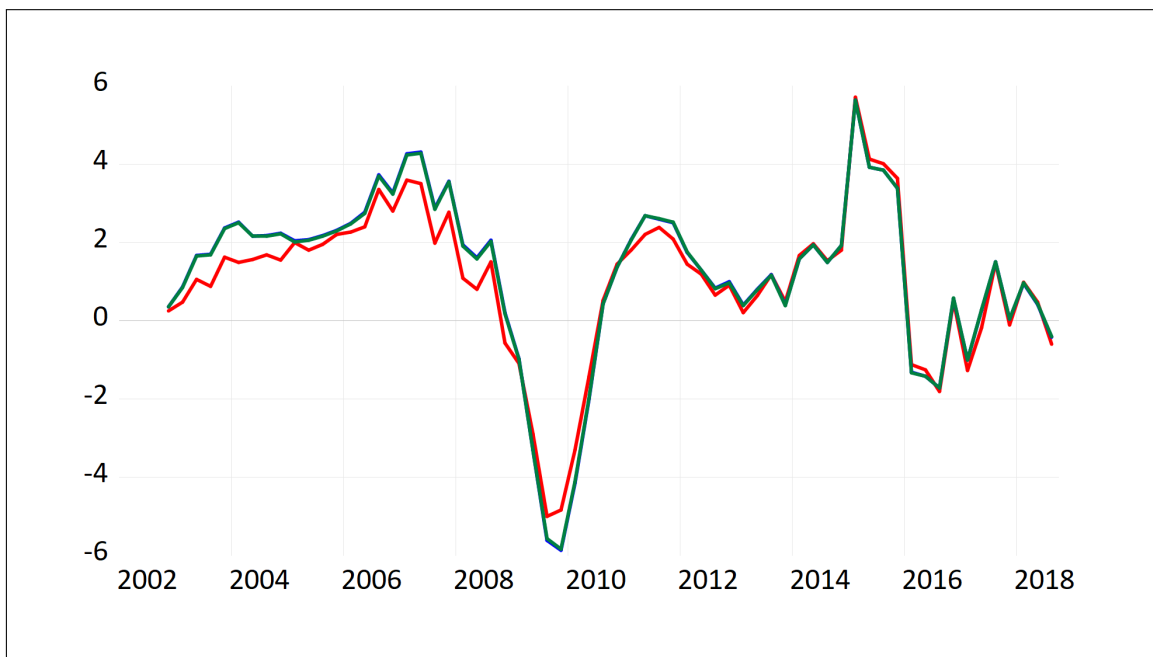
Figure 21: Ouput Gaps Ireland; red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows.
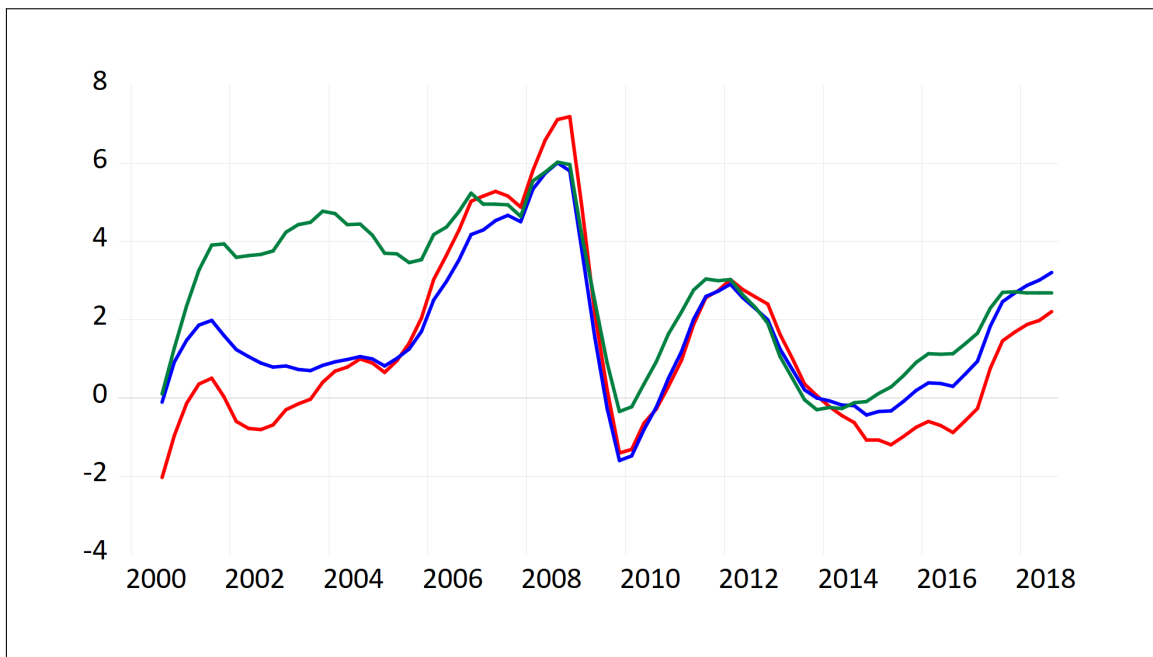
Figure 22: Ouput Gaps Italy; red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows.
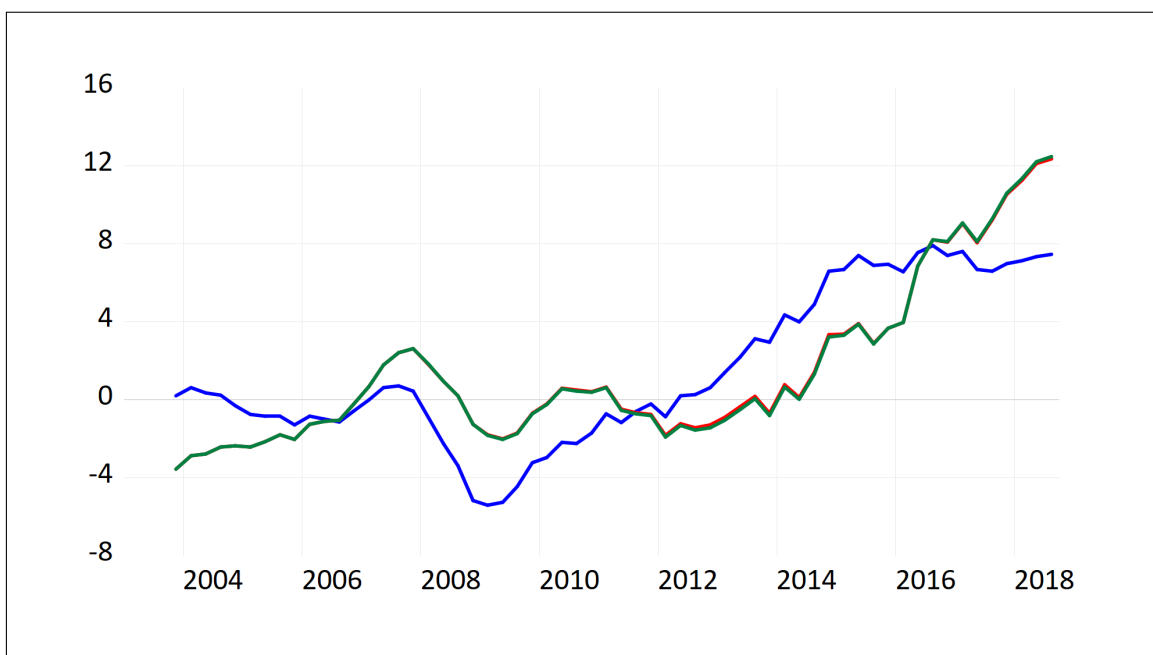
Figure 23: Ouput Gaps Luxembourg; red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows.
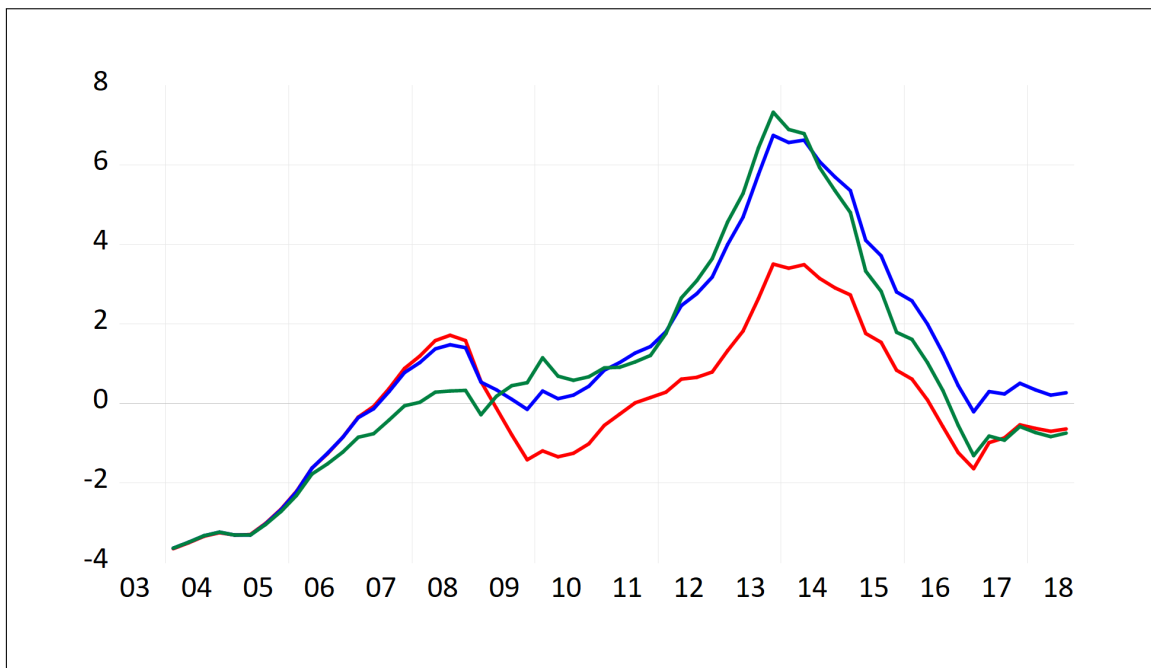
Figure 24: Ouput Gaps Netherlands; red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows.

Figure 25: Ouput Gaps Portugal; red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows.
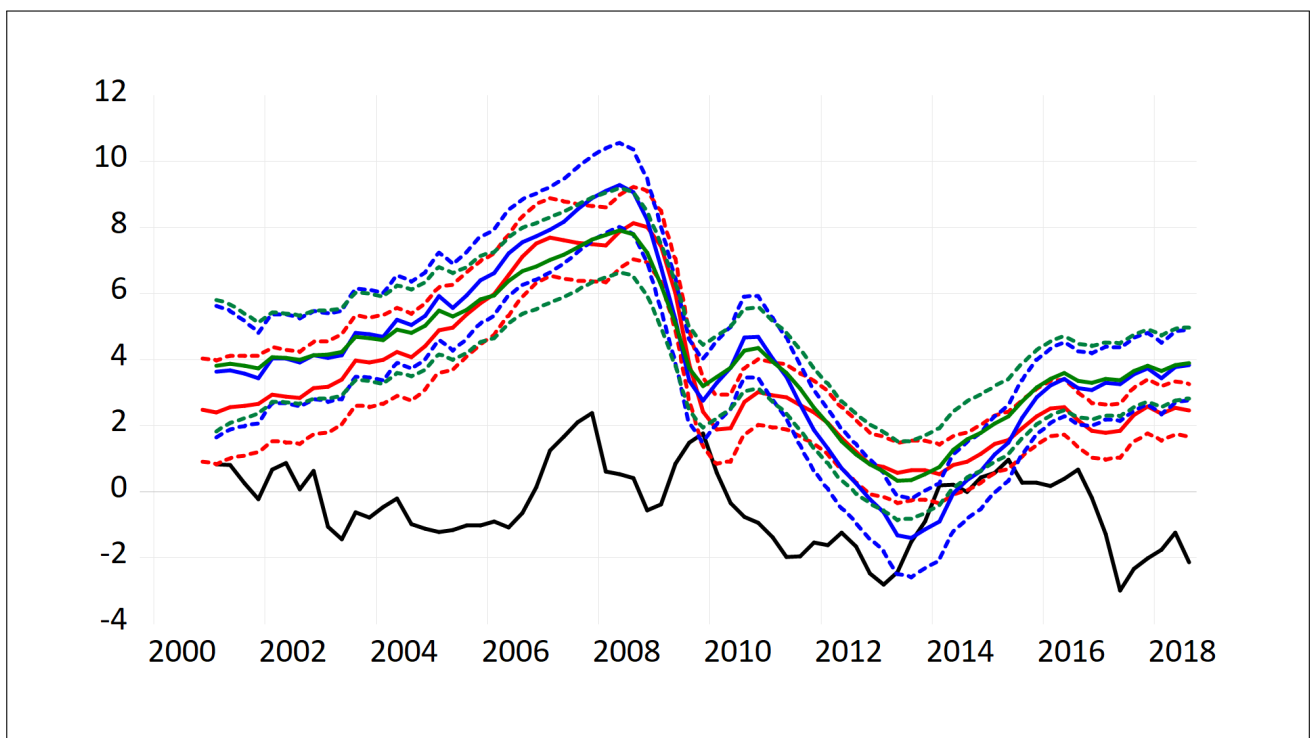
Figure 26: Real and Natural Interest Rates Austria; black line = ex-ante real interest rate, red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows, dashed lines +/- one standard deviation.
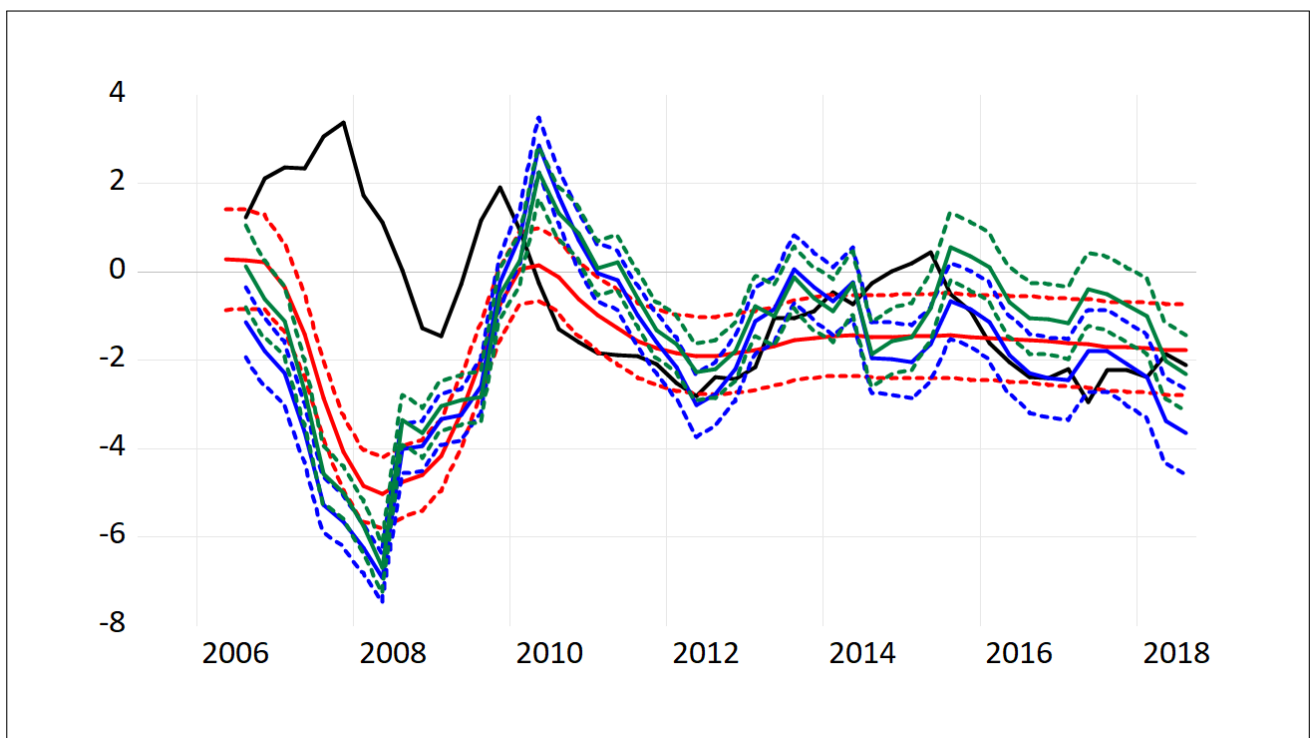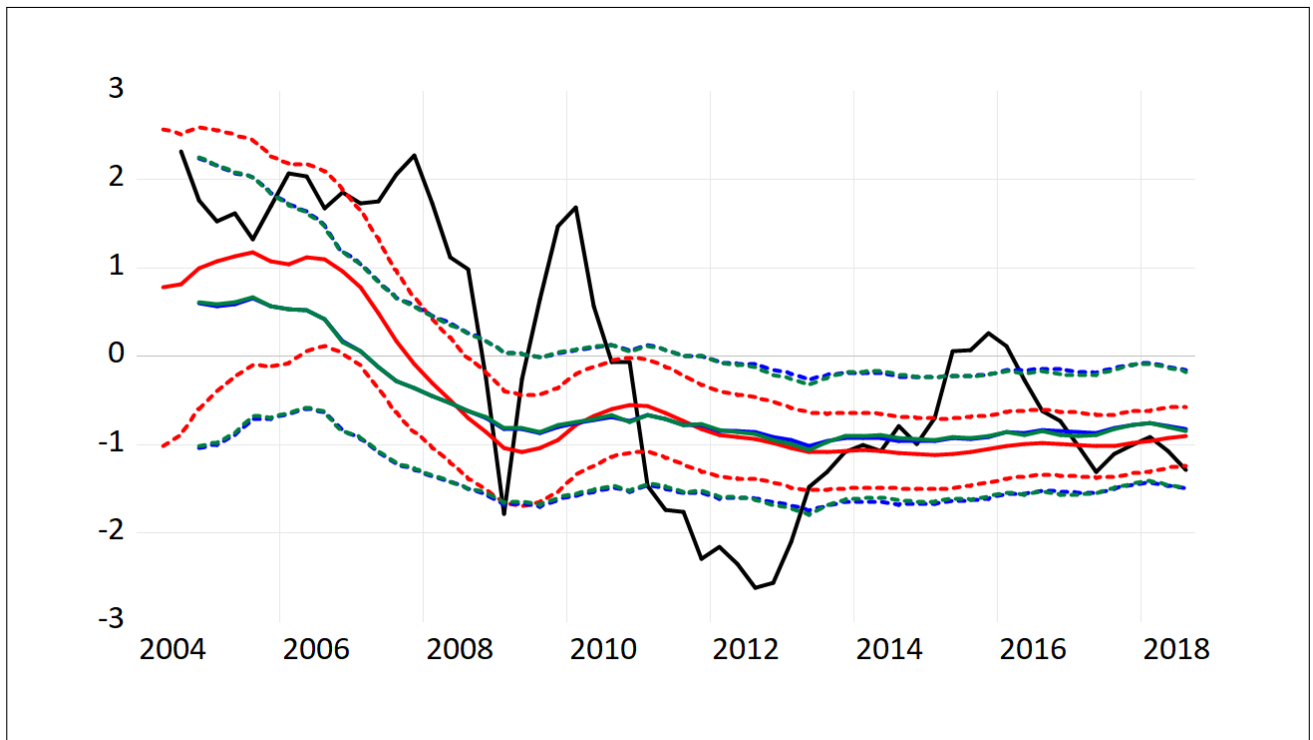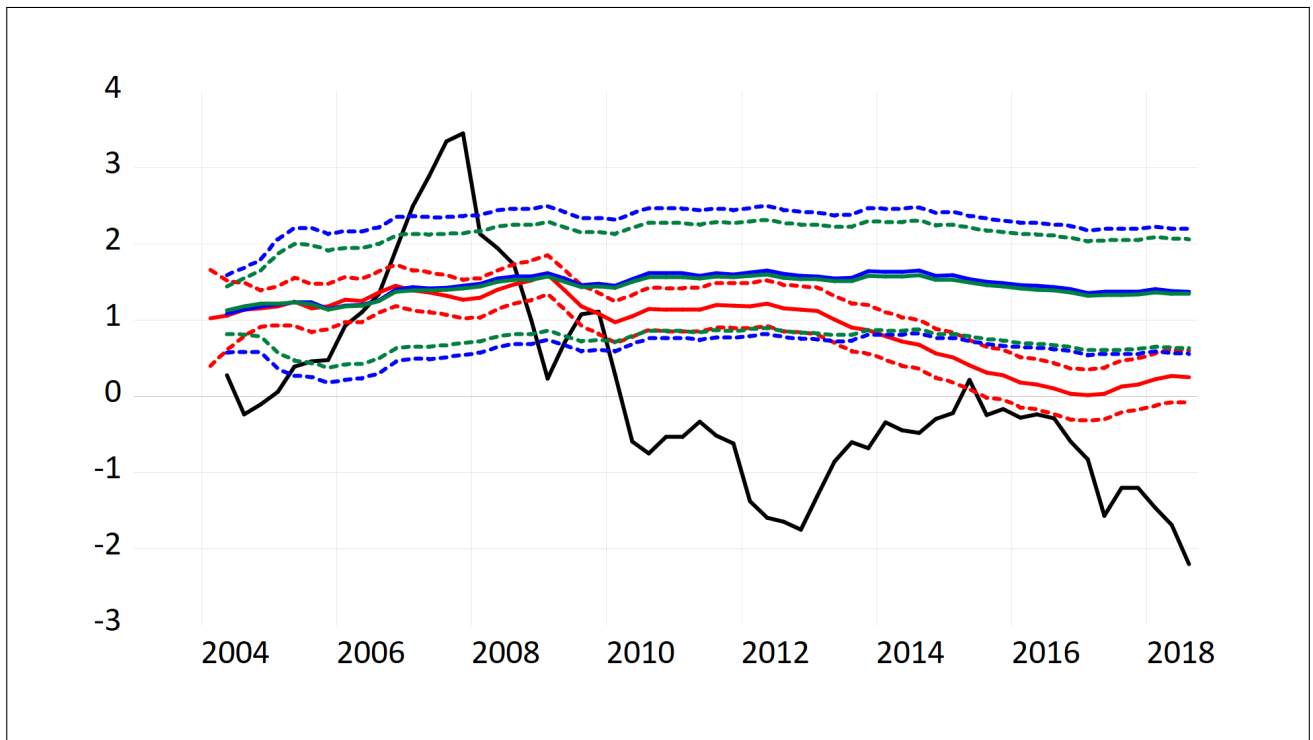

Figure 27: Real and Natural Interest Rates Belgium; black line = ex-ante real interest rate, red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows, dashed lines +/- one standard deviation.
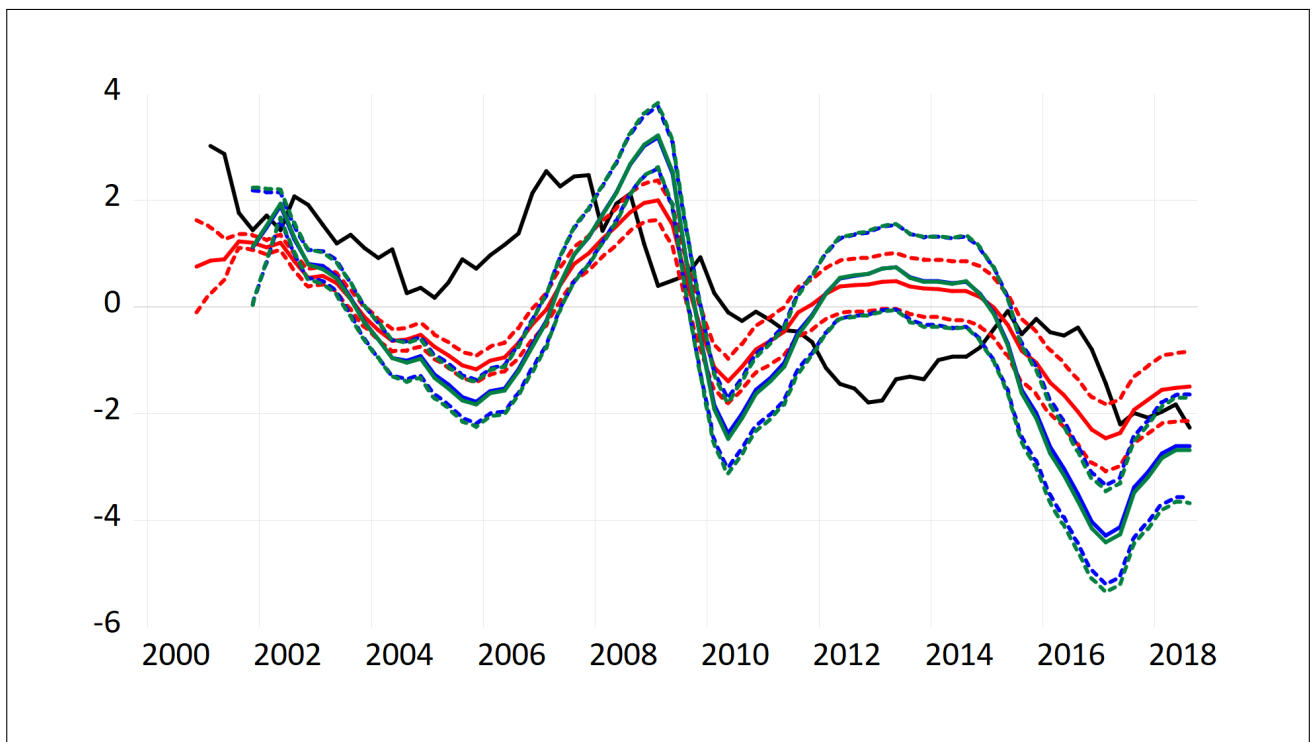
Figure 28: Real and Natural Interest Rates Germany; black line = ex-ante real interest rate, red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows, dashed lines +/- one standard deviation.
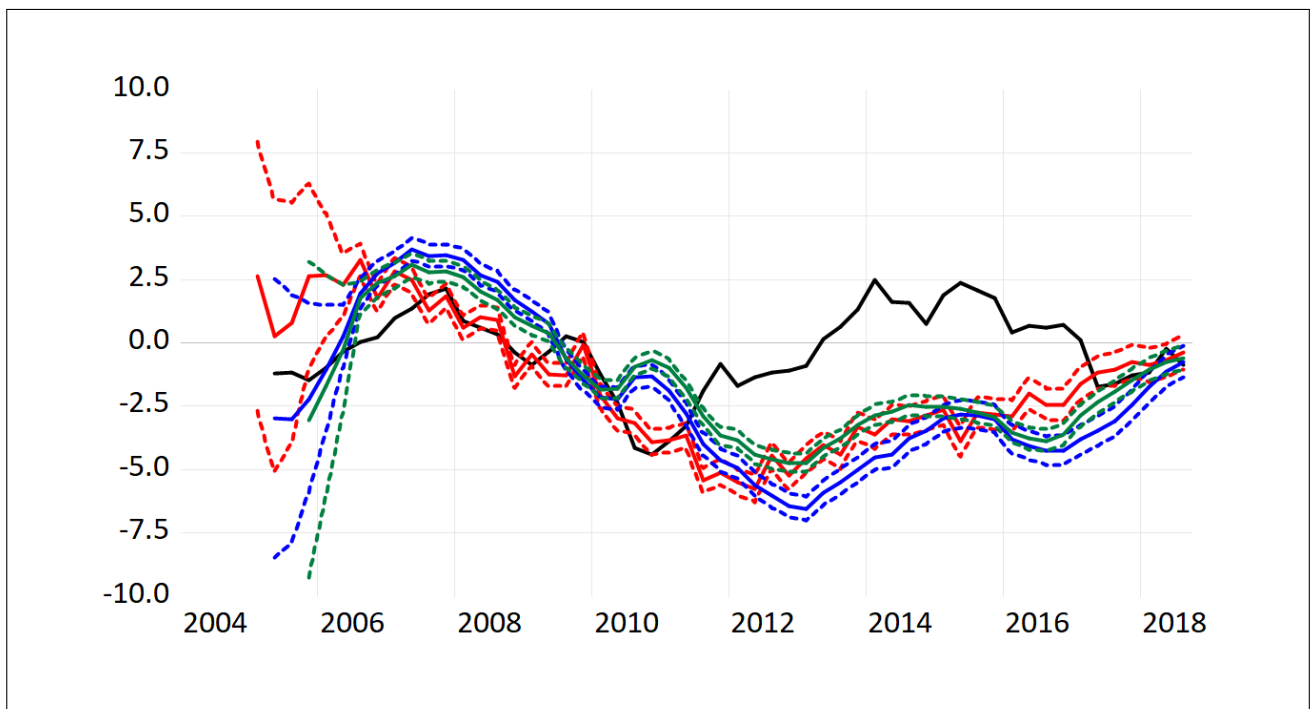

Figure 29: Real and Natural Interest Rates Spain; black line = ex-ante real interest rate, red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows, dashed lines +/- one standard deviation.

Figure 30: Real and Natural Interest Rates Finland; black line = ex-ante real interest rate, red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows, dashed lines +/- one standard deviation.
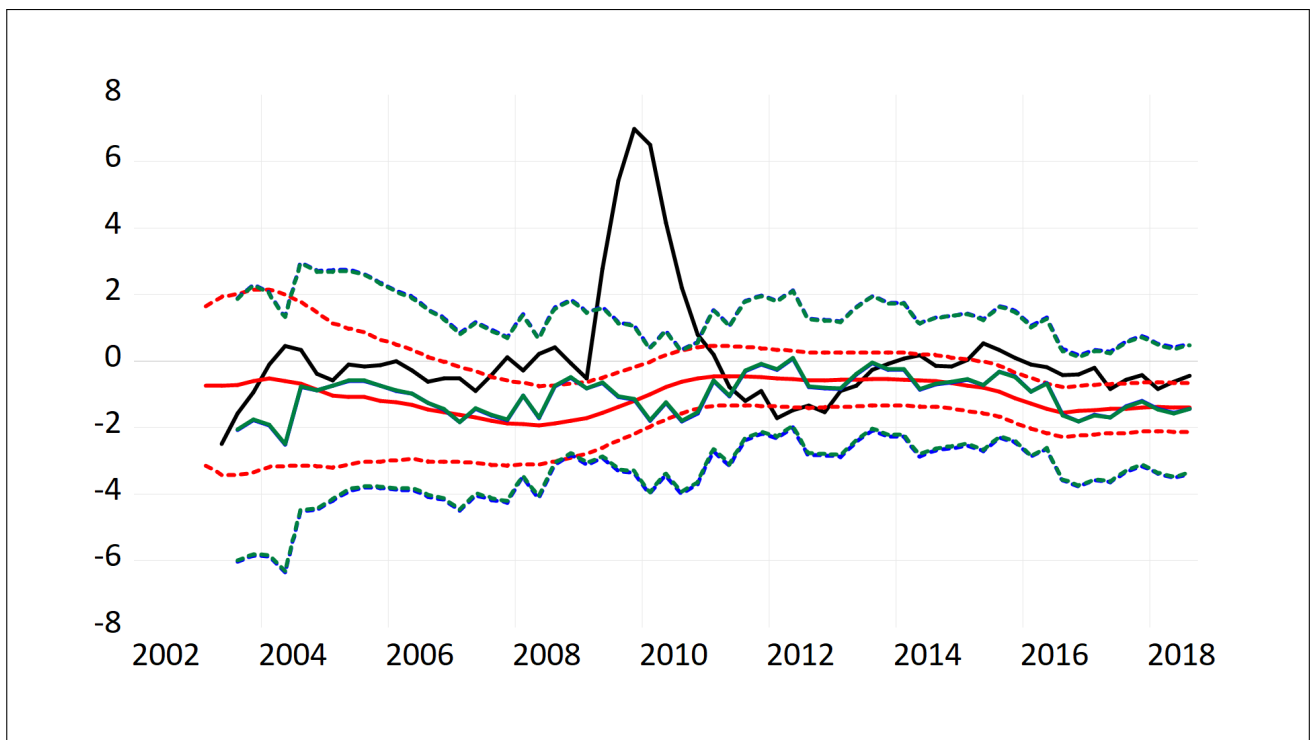

Figure 31: Real and Natural Interest Rates France; black line = ex-ante real interest rate, red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows, dashed lines +/- one standard deviation.
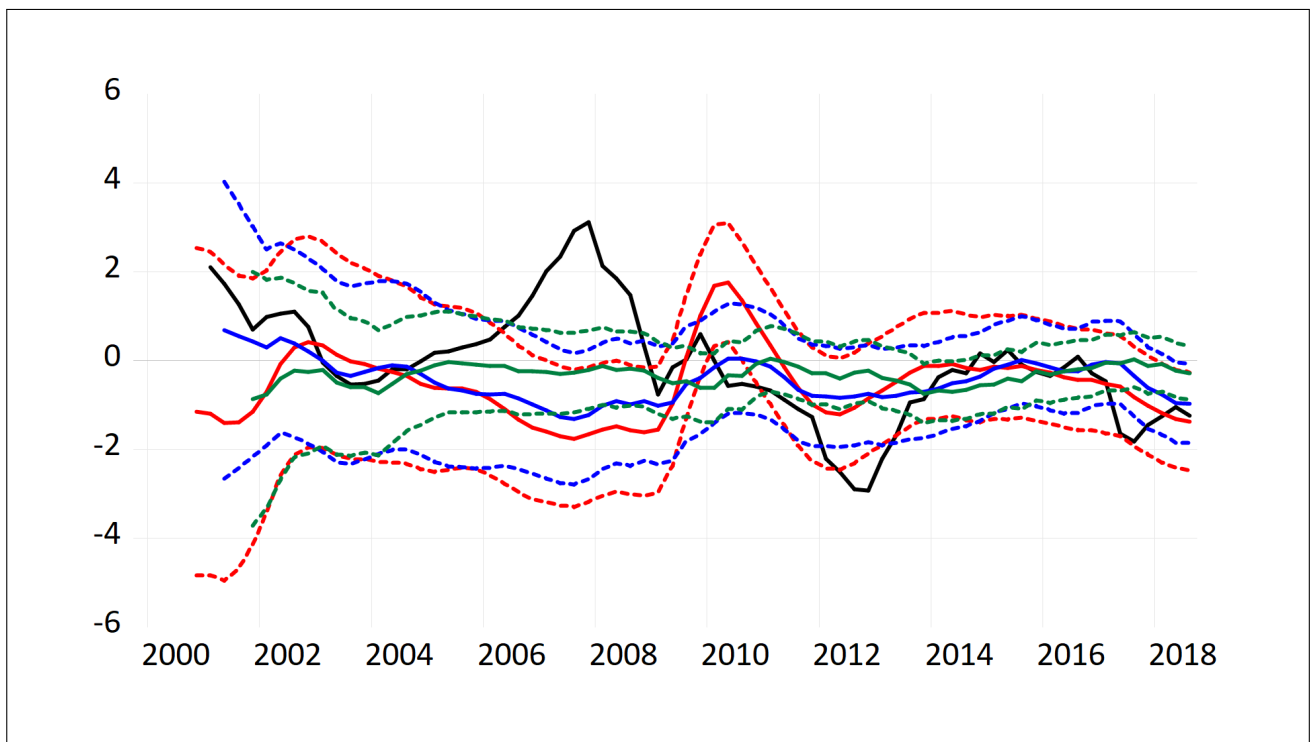
Figure 32: Real and Natural Interest Rates Greece; black line = ex-ante real interest rate, red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows, dashed lines +/- one standard deviation.

Figure 33: Real and Natural Interest Rates Ireland; black line = ex-ante real interest rate, red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows, dashed lines +/- one standard deviation.

Figure 34: Real and Natural Interest Rates Italy; black line = ex-ante real interest rate, red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows, dashed lines +/- one standard deviation.
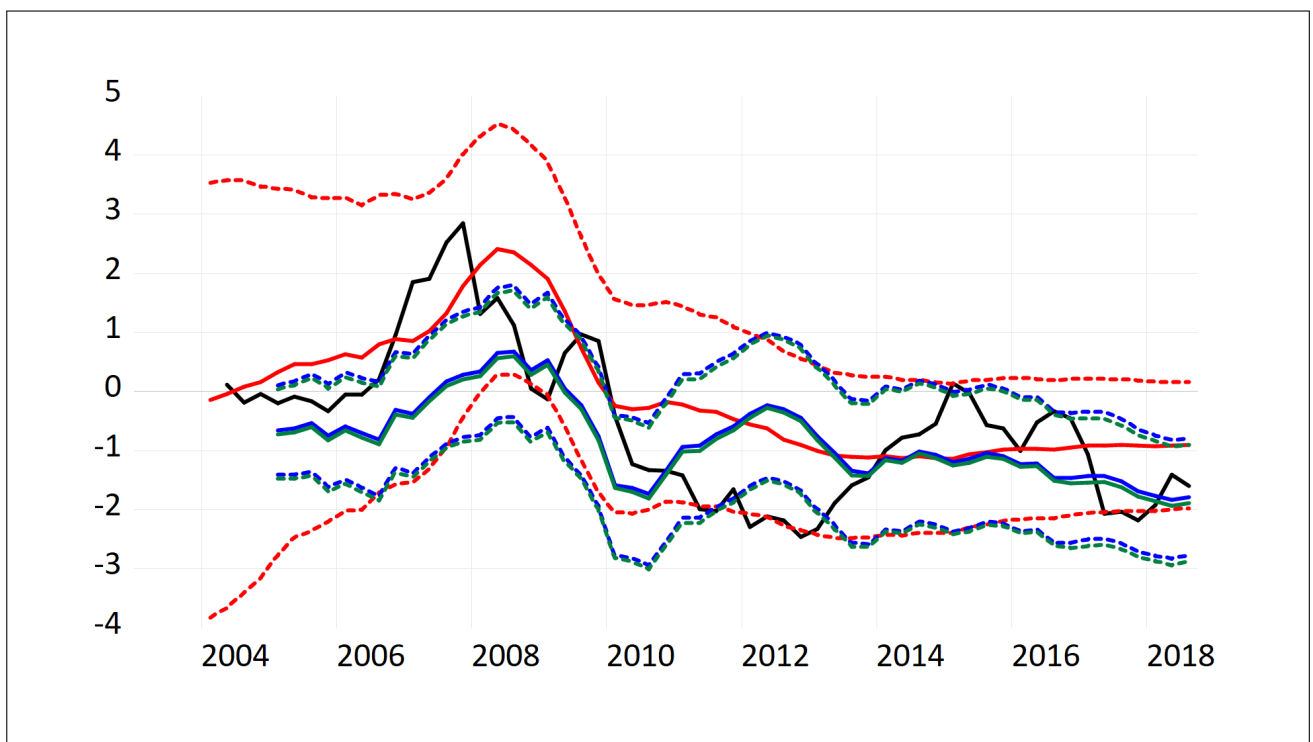

Figure 35: Real and Natural Interest Rates Luxembourg; black line = ex-ante real interest rate, red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows, dashed lines +/- one standard deviation.
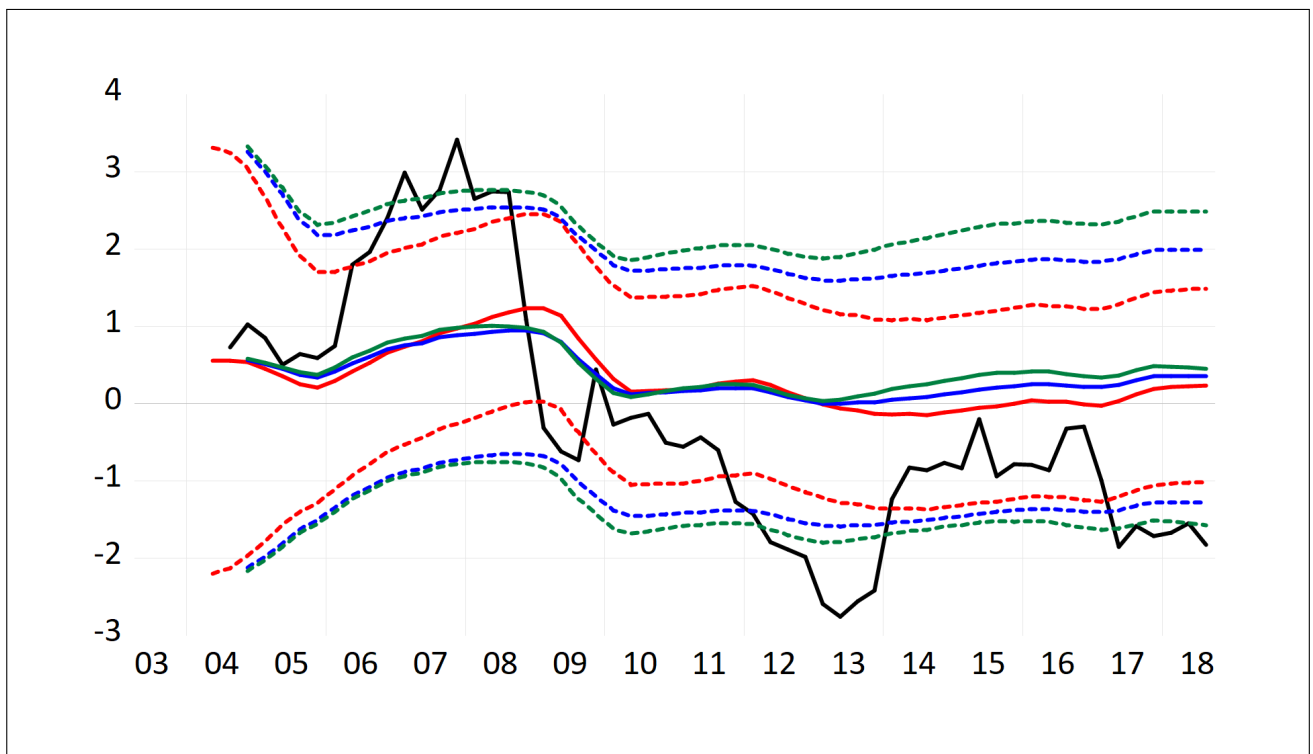
Figure 36: Real and Natural Interest Rates Netherlands; black line = ex-ante real interest rate, red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows, dashed lines +/- one standard deviation.
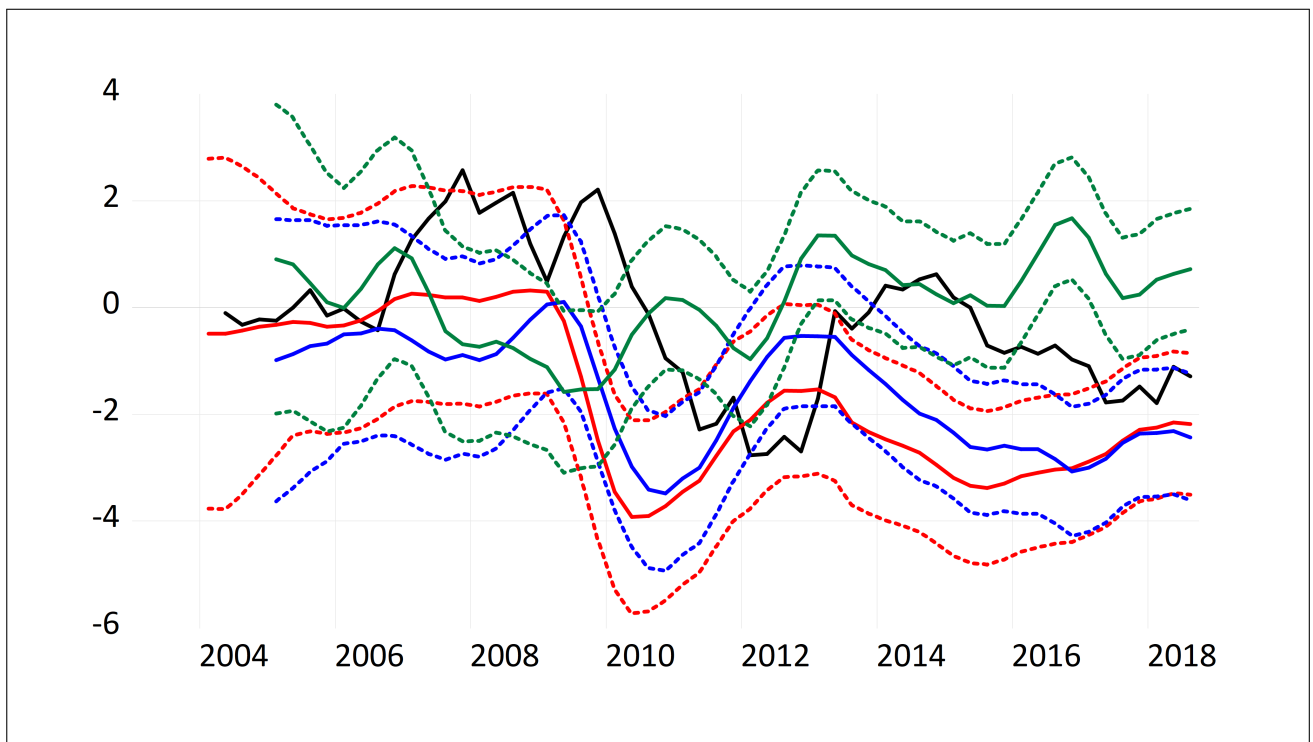

Figure 37: Real and Natural Interest Rates Portugal; black line = ex-ante real interest rate, red line = standard model, blue line = model including safe haven flows, green line = model including private safe haven flows, dashed lines +/- one standard deviation.