Shock asymmetries and distance to the Euro Area

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Summary:

Since January 2008, the Euro Area has enlarged for the third time to Cyprus and Malta. As Slovakia is now planned to join in 2009, these waves of new entries revive the debate around greater asymmetries which may threaten the stability of the whole monetary union.

This paper extends Bayoumi and Eichengreen's (1992) centre-periphery approach. We show how a suitable decomposition of the correlations between supply and demand disturbances enables to get two new indices to give a more intuitive assessment of the distance to the Euro area and the origin of shock asymmetries. Using monthly data over 1995-2008 on 21 countries, asymmetries are measured by correlations among the structural shocks from a VAR process. We then translate these correlations estimates into two synthetic indices. One can be interpreted as the relative distance of the candidate country to a fully symmetric currency area. The other reveals the relative magnitude of shock asymmetries. Our very first results show that most of the countries under study are closer to the seminal Euro area rather than to Germany. New comers remain at the periphery of the Euro area with pronounced shock asymmetries than either the founder members or the three *Opt-Outs*.

JEL Classification: E3, E42, C02, C32.

Keywords: shock asymmetries, distance, Euro area enlargement.

Introduction

Since January 2008, the Euro Area has enlarged for the third time to Cyprus and Malta. As Slovakia is now planned to join in 2009, these waves of new entries revive the debate around greater asymmetries which may threaten the stability of the whole monetary union. While little attention has been paid to the adhesion of the Drachma, the perspective of a widening to the currencies of the Central and Eastern European Countries has revived the debate around the participation in a monetary union. Many and fast accessions could jeopardize the stability of the enlarged union as well as the definition and the exercise of stabilization policies. It would be the case if the eligible countries add to the heterogeneity of the whole system opening the way to new asymmetries or reinforcing the existing ones.

Indeed, it is common now to make the following assessment: if national economies in the Euro area diverge considerably, the common monetary policy will not be optimal for all countries concerned. A large literature is interested in the asymmetries either of business cycles or shocks of countries in the EMU (see Huchet-Bourdon and Pentecôte (2008) for a survey).

The current financial turmoil has also revived the debate about the instability associated to either explicit or implicit Euro targeting as exchange rate policies followed by many EU countries. Reconsidering their attitude towards the Euro requires that States must be able to assess their own eligibility for a soon entry into the single currency area. The current Euro members may also worry about the capacity of the union itself to withstand new entries in the near future.

Recent works have stressed the predominant role of shock asymmetries in the dynamics and in the welfare cost of forming a monetary union (Jondeau and Sahuc, 2007). As also questioned by Plasmans and al (2006), the enlargement of a monetary always induces welfare losses when the accession country is hit by asymmetric price shocks. Any transfer mechanism is then unable to compensate losers for the implied negative spillovers.

The pessimistic view is reinforced by the fact that EMU insiders would suffer, on average, from next enlargements. Further, either full or partial fiscal coalitions jointly with the ECB's monetary policy appear to be instable in the absence of a well-design institutional setting. In this view, our

paper extends Bayoumi and Eichengreen's (1992) core-periphery approach. Their work has been widely used to assess empirically the eligibility of a given country to join a currency union. Their method relies on the identification of the so-called "structural" supply and demand shocks using Vector Auto-Regressive (VAR) models before estimating correlations between common and idiosyncratic disturbances or between the dynamic responses of representative aggregates (economic activity and prices) to them.

The aim of this paper is to show how a suitable decomposition of the correlations between supply and demand disturbances enables to get two new indices to give a more intuitive assessment of the distance to the Euro area and the origin of shock asymmetries: one index in terms of distance of the candidate country to a fully symmetric currency area, and the other in terms of the relative magnitude of shock asymmetries.

The paper is organized as follows: The next section provides technical details on the measure of the two indexes. Section 2 describes data and presents the results. The final section concludes.

1. Size and side of shock asymmetries: two new indexes

1.1. Shock correlations and distance from a currency area

By construction, correlation coefficients between either supply (ρ_s) or demand shocks (ρ_d) take their values in the [-1,1] interval. Graphically, these correlations lie somewhere in the square box delimited by the dashed line as depicted on Figure 1 below.

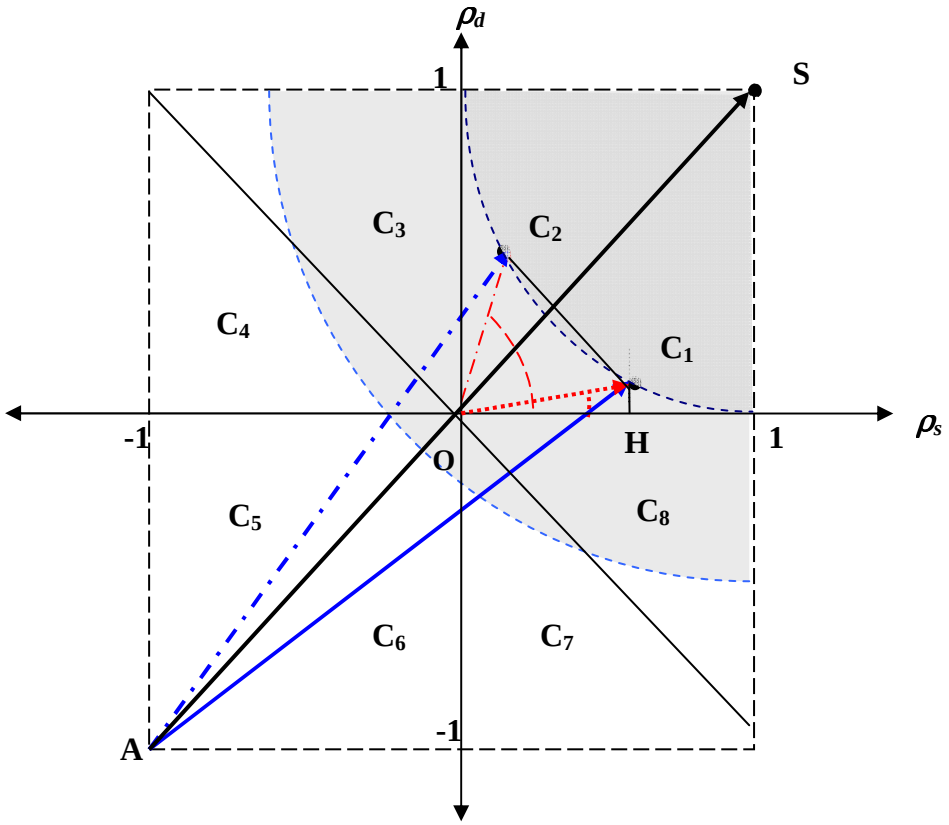


Fig. 1: Vector representation of shock correlations and asymmetries indices

Point S at the upper right corner corresponds to the full symmetric case between any candidate member and the reference area or country. At the opposite, the lower left point A reflects complete asymmetric shocks, in terms of demand as well as in term of supply. Following Bayoumi and Eichengreen's approach, the closer the candidate country to point S is, the lower is the cost of joining the European currency union. From this perspective, it would be interesting to translate these correlations into a more intuitive measure of distance to EMU.

As illustrated on the above Figure 1, this leads us to build two new indices which derive from basic trigonometric calculus according to a vector representation in the correlations space of aggregate supply and demand disturbances (ρ_s, ρ_d). These two complementary indicators indeed receive an intuitive appealing when one wishes to gauge the eligibility of a State to a given monetary union.

The first one can be interpreted as a measure of the relative distance of the candidate country (C_1 on fig. 1) from the "fully symmetric" case (S). This index derives from the ratio of the norms of two

vectors with the "complete asymmetric" case (A) as their common starting point (see figure 1): the first one relates (A) to the accession country (C_1), while the second one links the "worst" to the "best" situations which can be observed in terms of stochastic asymmetries. More precisely, we define the distance index I_D:

$$I_D = 1 - \frac{\left\|\overrightarrow{AC_1}\right\|}{\left\|\overrightarrow{AS}\right\|}. \qquad (1)$$

By construction, the distance index I_D varies in the [0,1] range such that the closer to one the index is, the more is the candidate country subject to common (symmetric) shocks. In this sense the candidate country would be more synchronized with the currency area if I_D increases.

What matters for the moment is only the relative magnitude of asymmetries irrespective of the nature of the shocks. To illustrate this point let us consider another accession country whose asymmetries are reflected by point C_2 such that: $\rho_s^{C_2} = \rho_d^{C_1}$ and $\rho_d^{C_2} = \rho_s^{C_1}$. C_1 and C_2 are thus equidistant to the first "secant" and the vector $\overrightarrow{C_1C_2}$ is orthogonal to $\overrightarrow{AS}$. In this circumstance both countries will be characterized by the same "distance" index, namely: $I_D^{C_2} = I_D^{C_1}$ since $\left\|\overrightarrow{AC_2}\right\| = \left\|\overrightarrow{AC_1}\right\|$.

The cost of asymmetries in the wake of an adhesion to a monetary union may differ according to the origin of shocks. It is often acknowledged that supply shocks have a permanent effect on output whereas demand shocks are assumed to be neutral on real macro-variables in the long run (see Fidrmuc and Korhonen, 2006, for a survey).

But this traditional view has recently been challenged. Given the debate on this issue it is interesting to build a second index to reveal the relative intensity of shock asymmetries.

1.2. The side of shock asymmetries

For this purpose, let us define the angulus $\theta_{C_1} = ang\left(\overrightarrow{OH}, \overrightarrow{OC_1}\right)$ together with the complex number $z_{C_1} = \rho_s^{C_1} + i\rho_d^{C_1}$. We know that: $\theta_{C_1} = \arg\left(z_{C_1}\right)$. It appears from the above figure 1 that the

argument of the complex number associated to the vector $\overrightarrow{OC_1}$ will take the magnitude as well as the sign of each correlation coefficient into account.

Since point *S* lies on the first "secant", we can build the asymmetry index I_A as:

$$I_A = \frac{\arg(z_{C_1})}{\arg(z_S)} \qquad (2)$$

Since arg(z_{C_1}) varies within the [-π,π] range, the discussion involves three cases:

a) when $I_A^C \in]-3,1[$ the candidate country experiences greater asymmetry from the demand side than from the supply side. In this case we verify that either $\cos(\theta_C) > \cos(\theta_S)$ or $\sin(\theta_C) < \sin(\theta_S)$. This is precisely the case of the accession state (C_1) on figure 1: it records relatively more asymmetries in terms of demand disturbances (thereby relatively less on the supply side): $\arg\left(\vec{OC_1}\right) < \arg\left(\vec{OS}\right)$. The same conclusion could be drawn for candidates C_6, C_7, and C_8 which lie in the]-1,0[,]-2,-1[, and]-3,-2[intervals respectively. Unlike C_1, the three others exhibit negative correlations between demand shocks. Furthermore, C_8 is characterized by even stronger supply shock discrepancies.

b) when $I_A^C \in]-4,-3[\cup]1,4[$ supply shocks to the accession country are more asymmetric or less synchronized relative to the currency area than demand shocks are. This means that we verify either $\cos(\theta_{C_1}) < \cos(\theta_S)$ or $\sin(\theta_{C_1}) > \sin(\theta_S)$. Such situations are depicted by countries like C_2 , C_3, C_4, and C_5 on the above graphic: the asymmetry side index takes then its values in the corresponding] 1,2[,]2,3[,]3,4[, and]-4,-3[range.

c) when $I_A^C = 1 \, or \, -3$, the correlation between supply shocks is equivalent to its demand counterpart. Point C would then lie somewhere along the [AS] segment.

While the candidate States C_1 and C_2 were found to be equally eligible to the monetary union on the basis of the distance index, this is no longer true if we focus now on the extent to which there is

asymmetry among shock asymmetries. To decide whether an entry into a currency union is suitable or not it also matters having an idea about the induced costs given the nature of shock idiosyncrasies. One may furthermore wonder about the weights to be assigned to each of these sources of costs in some representative social loss function. Unfortunately, little is known about how to link these stochastic asymmetries to the cost of adhesion to a currency area (see although Hughes-Hallett and Jensen (2004) for a tentative assessment).

As shown on figure 1, the two new indices based on shock correlations can be used to identify countries belonging to the core or to the periphery of a given currency area (which is referred to here by point S). However, as pointed out by Artis (2003), there is no well-established theoretical foundation about the related trigger distance levels in terms of stochastic asymmetries. Assuming equal weights of the welfare effects induced by a lack of synchronization of macroeconomic shocks on either the demand or the supply side would lead to the depicted circular zoning. It depends on distance which separates the candidate country C_i to the perfect symmetric monetary union (S). Instead, unequal weights would produce rather different (elliptic) zones.

To sum up the above discussion, table 1 below shows how the correlations of structural shocks vary with the values taken by our distance and asymmetric indices.

Table 1: Shock correlations and the distance/asymmetry indices

		Distance Index I_A	
		[0 , 0.5]	[0.5 , 1]
Asymmetry Index I_D	]-4 , -3[	Very strong to moderate asymmetries, Supply-dominated asymmetries $\rho_d^C < 0, \quad \rho_s^C < 0$ and $\left\|\rho_d^C\right\| < \left\|\rho_s^C\right\|$	
	-3	Very strong to moderate asymmetries $\rho_d^C < 0, \quad \rho_s^C < 0$ and $\left\|\rho_d^C\right\| = \left\|\rho_s^C\right\|$	
	]-3 , 2[	Very strong to moderate asymmetries Demand-dominated asymmetries $\rho_d^C < 0, \quad \rho_s^C < 0$ and $\left\|\rho_d^C\right\| > \left\|\rho_s^C\right\|$	
	[-2 , 0[	Moderate to low asymmetries Demand-dominated asymmetries $\rho_d^C < 0, \quad \rho_s^C \geq 0$ and $\rho_d^C < \rho_s^C$	
	]0 , 1[		Moderate to low asymmetries Demand-dominated asymmetries $\rho_d^C > 0, \quad \rho_s^C > 0$ and $\left\|\rho_d^C\right\| < \left\|\rho_s^C\right\|$
	1		Moderate to low asymmetries $\rho_d^C \geq 0, \quad \rho_s^C \geq 0$ and $\rho_d^C = \rho_s^C$
	]1 , 2]		Moderate to low asymmetries Supply-dominated asymmetries $\rho_d^C > 0, \quad \rho_s^C \geq 0$ and $\rho_d^C > \rho_s^C$
	]2 , 4]		Very strong to moderate asymmetries Supply-dominated asymmetries $\rho_d^C \geq 0, \quad \rho_s^C < 0$ and $\rho_d^C > \rho_s^C$

2. Results

2.1. Data

The data include price and output time series. As a proxy for output we consider the industrial production index in volume. Both the consumer price index (CPI) and the harmonised CPI are also used according to the countries. Data are taken from the Eurostat database on a monthly basis over the period 1995:01-2008:04. Twenty-one countries are included in the sample: the eleven founders, countries which joined the EMU after 1999 (Greece in 2001, Slovenia in 2007, Cyprus in 2008[1]), the "*Outs*" (United Kingdom, Sweden and Denmark), future EU countries candidates to the EMU (Estonia, Lithuania, Latvia, and Slovakia).

A related issue is how to specify the reference area: several studies discuss this point (see Huchet-Bourdon and Pentecôte (2008) for a survey). We can indeed take one country as reference; in this case, the choice often bears on Germany. But we can also make our comparisons with the Euro area as a whole. This raises further questions since the Euro did not exist before 1999, and also because the number of countries participating to the EMU has grown over/through time. This requires a weighted average of several European economies. Both cases are first adopted (German and EMU-11) but in a second step only the aggregated series are kept[2].

We also need aggregated series corresponding to the EMU with 11 countries. Which aggregated data can we consider for the Euro area still remains a great question.

The answer is not obvious for several reasons. First, we need long historical data series but the Euro area did not exist before 1999. We have consequently to build the aggregated series with the national data for the period pre-1999 at least. Second, the Euro area has been enlarged several times so which countries do we consider in the aggregated series. Do we consider aggregated series corresponding to 11, 12, 13 and 15 countries between 1999 and 2008? Third we have to determine

[1] Malta is not included in our sample due to the unavailability of monthly data on the studied period.

[2] Mink, Jacobs and De Haan (2007) select the cycle that lies the closest to all individual countries' cycles in the region in terms of synchronicity and co-movement.

the weights of the different countries of the Euro area. The common approach is to aggregate across these countries using a constant pre-specified set of weights[3].

In this study Eurostat data are used for the following reasons. First, Eurostat data are available over our sample: from 1995 to 2008. Second, it takes the various enlargements into account. Third, HCPI series are built by Eurostat. Fourth, we need to make these aggregations for two series, industrial production and prices.

Average data for the EMU-11 about IPI, CPI and HCPI are collected from Eurostat Database. The HCPI series for the EMU with 11 countries is only available until 2000 (before the first enlargement). Hence, we rebuilt the series by initially transforming by retropolation Euro-12 in Euro-11 over the period before 2001, and then by extrapolating the principle of calculation of the weights to supplement EMU-11 after 2001.

2.2. Estimated results

The first step has been to estimate structural VARs in order to measure correlations among the structural shocks. These estimations are not reported here for mainly two reasons. Firstly, this is not the main object of this paper[4], and secondly because of the size of the sample (21 countries, and two kinds of shocks, supply and demand).

On the other hand these estimations enable to then compute two synthetic indices. One corresponds to the relative distance of the candidate country to a fully currency area, and the other measures the relative magnitude of shock asymmetries. Both indices are computed for each country of the sample at each date between 1995 and 2008.

To ease the interpretation of so many results, we looked for judicious graphic representations.

We **first** represent each index over the period 1998-2008 for each country relative to Germany and the Euro area with the 11 founder countries. Graphs are represented in Annex. Our first objective here is to see whether the choice of the reference zone is important when we make our comparisons.

[3] Anderson, Dungey, and Osborn (2007) discuss the various approaches that have been used for constructing Euro area data.

[4] See Huchet-Bourdon and Pentecôte (2008) for details on correlations asymmetries.

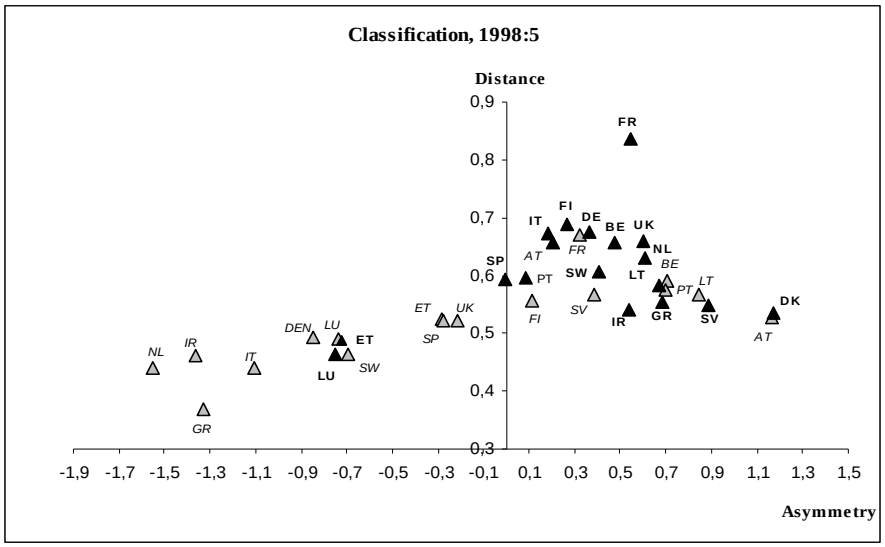
According to the figures, it seems that the shape of the evolution of both indices is not so many different if computations are made either with Germany as the reference zone or with the EMU-11. Nevertheless, this first look do not must occult the fact that there are substantially differences in the size of the relative strength of asymmetries: the value is generally higher and positive if we are interested in comparisons with the EMU-11 whereas it is rather negative when we take Germany as the reference zone.

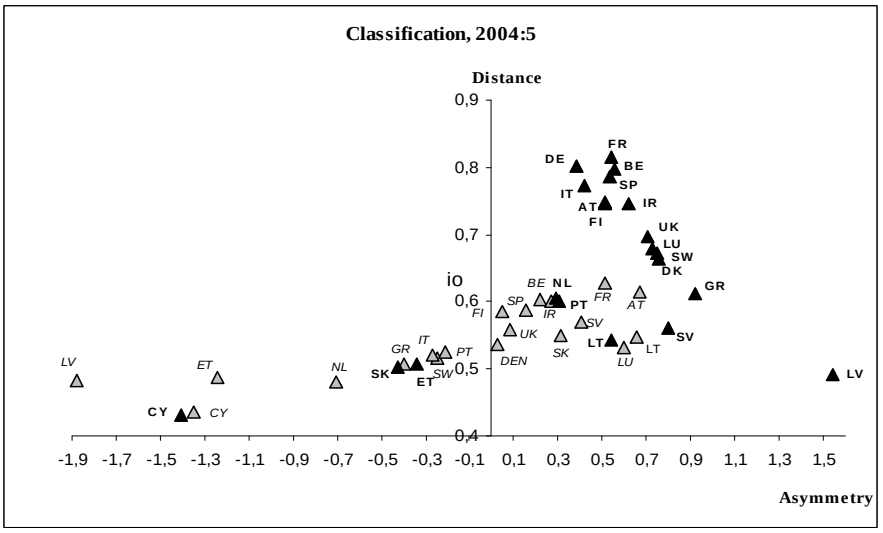
However, the figures show how it is difficult to study the impacts of such measures for all countries and on the whole period.

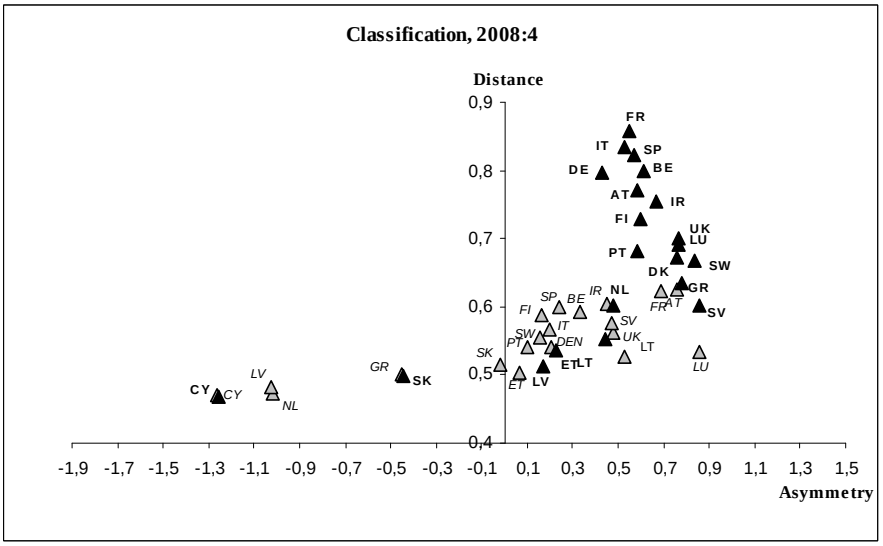
So, in a **second** step, we represent on the same graph both indices, measured either compared to Germany or to the Euro area with 11 countries, for three key dates: 1998:5 which corresponds to the announcement of the eleven founders countries of the EMU, 2004:5 because of the huge enlargement of the EU, and 2008:4 that is the last available data whatever the country.

A black triangle symbolises the measures relative to the EMU-11, and a grey one means that Germany is the target country for computations.

Figure 2: Countries' eligibility to EMU from size and side of shock asymmetry (▲ comparisons with Euro-11, △ with Germany)







Note : AT: Austria, BE: Belgium, CY : Cyprus, DK: Denmark, DE: Germany, ET: Estonia, FI: Finland, FR: France, GR: Greece, IR: Ireland, IT: Italy, LT: Lithuania, LU: Luxembourg, LV: Latvia, NL: Netherlands, PT: Portugal, SK: Slovakia, SP: Spain, SV: Slovenia, SW: Sweden, UK: United Kingdom.

When comparisons are made with the aggregated EMU with 11 countries, figure 2 reveals that both indices are higher than those corresponding to the comparisons with Germany, whatever the chosen date. Besides, both indices reflect a decrease in the asymmetries through the period under study. The last part of the graph shows that new comers (now in the EMU or still applicant countries) like Cyprus, Greece, Slovakia, and Latvia, remain at the periphery of the Euro area with more pronounced shock asymmetries than either the founder members or the three "Opt-Outs".

Third, it should be very interesting to investigate more precisely our results according to the origin of the asymmetries (supply or demand side) as well as the level of distance of the country to the Euro area (either the band is changing or the values are those of May 1998). We make this exercise for two reference zones again: Germany or EMU-11.

Table 2a: Asymmetries and distance (Euro-11 as the reference zone)

		Distance to the Euro Area *(time-varying u_l and u_u)*		
		Far [0 , d_l [	**Medium** [d_l , d_u [	**Close** [d_u , 1]
Asymmetries mainly from the **Demand** side	] -2 , 0]	**SP ET IR LU** **CY GR SK**	**DE FI** **DE FI IR**	
Asymmetries mainly from the **Demand** side	[0 , 1 [	**SV** **DK SV ET LT LV NL PT**	**AT BE GR IT LT NL PT SW SV UK** **AT BE SP LU SW UK**	**FR** **FR IT**
Asymmetries mainly from the **Supply** side	] 1 , 2]	**DK** **-**		

Note : First row (red): May 1998; Second row (blue): April 2008

Table 2b: Asymmetries and distance (Euro-11 as the reference zone)

		Distance to the Euro Area (u_l and u_u in May 1998)		
		Far [0 , 0.547 [	**Medium** [0.547 , 0.728 [	**Close** [0.728 , 1]
Asymmetries mainly from the **Demand** side	] -2 , 0]	**SP ET IR LU** **CY SK**	**DE DK FI** *GR*	**-** *DE FI IR*
Asymmetries mainly from the **Demand** side	[0 , 1 [	**SV** **ET LV**	**AT BE GR IT LT NL PT SW SV UK** *DK LT* **LU** *NL PT* **SW** *SV* **UK**	**FR** *AT BE SP* **FR IT**
Asymmetries mainly from the **Supply** side	] 1 , 2]	**DK** **-**		

The country classification according to their distance (by columns) and their relative asymmetry (by rows) indices is reported on tables 2a and 2b. Columns refer to the distance to each country from the Euro area given the lower (d_l) and upper (d_u) distance bounds, computed as the sample mean minus or plus one standard deviation. We adopt two approaches: limits fluctuate with the current distribution of the distance indices in table 2a, while these bounds are kept fixed at their 1998 levels in table 2b. The latter case enables to show how the classification between countries would have changed if the initial distribution of distances was maintained.

By construction, the trigger values for the relative asymmetry index remain the same. From our results, asymmetries are always in the [-2,2] range. This implies that the estimated correlations of supply shocks are always positive (or nil), while those on demand side may change sign.

Major differences from table 2a to table 2b are stressed in italic case because they correspond to a switch of one country from one group to another. A striking feature is the general movement of the founder members to get closer to the Euro area through time. If we had maintained the distance bounds of 1998, six other economies (Austria, Belgium, Spain, Germany, Finland and Ireland), belong now to what can be defined as the core, in addition to France and (more recently) Italy. The remaining three founders have moved towards the core but still lie at the (first) periphery: Portugal and, more surprisingly, the Luxemburg and the Netherlands. Since the latter were often viewed as members of the former D-Mark currency union, this may signal that Germany is no longer the sole centre of gravity of the EMU.

Conclusion

Using monthly data over 1995-2008 on 21 countries, asymmetries are measured by correlations among the structural shocks from a VAR process. We then translate these correlations estimates into two synthetic indices. One can be interpreted as the relative distance of the candidate country to a fully symmetric currency area. The other reveals the relative magnitude of shock asymmetries.

These indices enable to know on which side are dominated shock asymmetries given the country's distance to the Euro area.

Our very first results show that most of the countries under study are closer to the seminal Euro area rather than to Germany. New comers remain at the periphery of the Euro area with pronounced shock asymmetries than either the founder members or the three *Opt-Outs*. Our results demonstrate also a general movement of the founder members to get closer to the Euro area through time. Finally, we find that three founders have moved towards the core but still lie at the (first) periphery: Portugal and, more surprisingly, the Luxemburg and the Netherlands. Since the latter were often viewed as members of the former D-Mark currency union, this may signal that Germany is no longer the sole centre of gravity of the EMU.

We have to complete this work by looking for the link between the asymmetries and the cost of adhesion to a currency area: the idea is to consider a loss function (see Hughes-Hallett and Jensen (2004)). It would enable us to answer to the following questions: What does imply the enlargement process on the cost of (next) entry and on the cost of membership for its current members? What is the overall cost of the growing EMU? Is there a boundary to enlargement?

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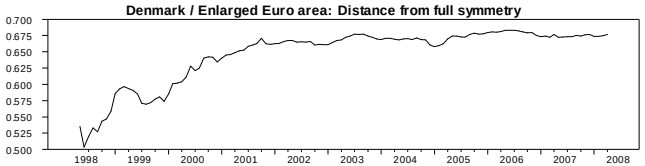
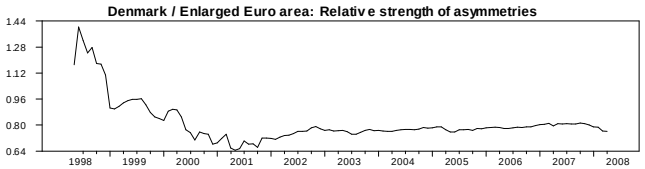
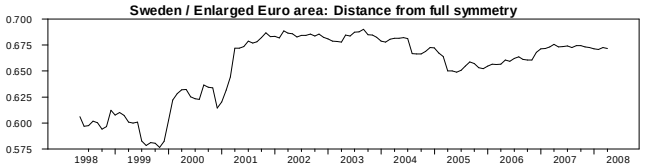
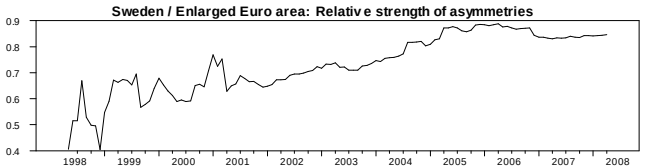
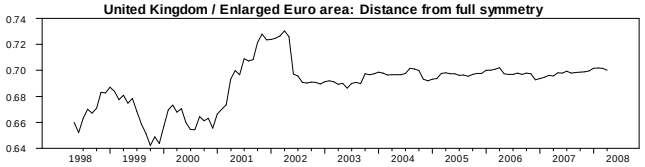
Annex

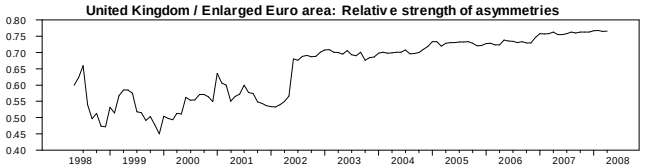

Denmark / Enlarged Euro area: Distance from full symmetry
0.700
0.675
0.650
0.625
0.600
0.575
0.550
0.525
0.500
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

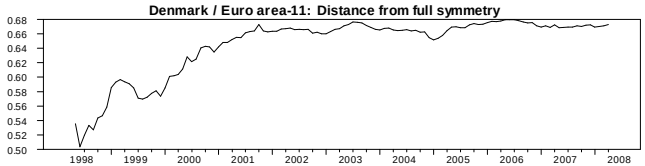

Denmark / Enlarged Euro area: Relative strength of asymmetries
1.44
1.28
1.12
0.96
0.80
0.64
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

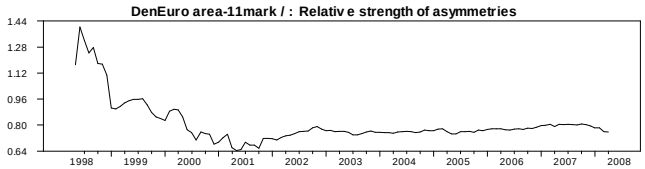

Sweden / Enlarged Euro area: Distance from full symmetry
0.700
0.675
0.650
0.625
0.600
0.575
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

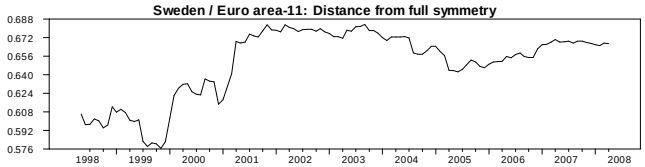

Sweden / Enlarged Euro area: Relative strength of asymmetries
0.9
0.8
0.7
0.6
0.5
0.4
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

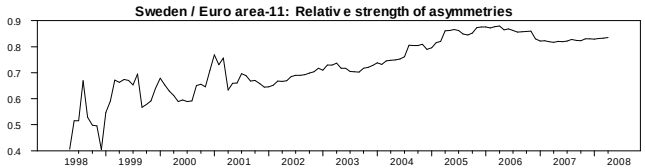

United Kingdom / Enlarged Euro area: Distance from full symmetry
0.74
0.72
0.70
0.68
0.66
0.64
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

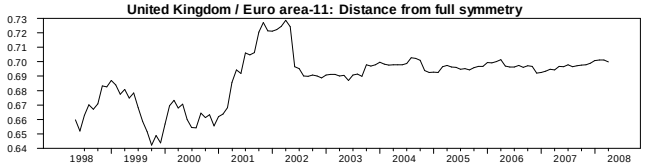

United Kingdom / Enlarged Euro area: Relative strength of asymmetries
0.80
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

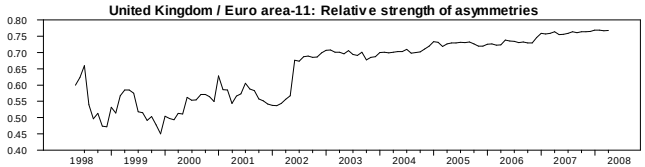

Denmark / Euro area-11: Distance from full symmetry
0.68
0.66
0.64
0.62
0.60
0.58
0.56
0.54
0.52
0.50
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

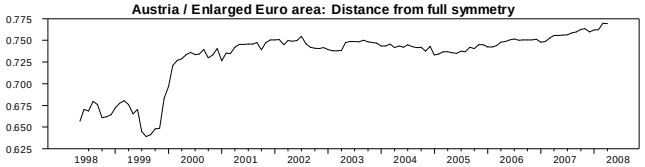

DenEuro area-11mark / : Relative strength of asymmetries
1.44
1.28
1.12
0.96
0.80
0.64
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

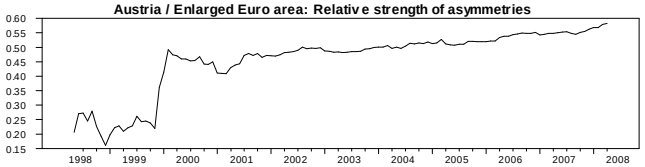

Sweden / Euro area-11: Distance from full symmetry
0.688
0.672
0.656
0.640
0.624
0.608
0.592
0.576
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

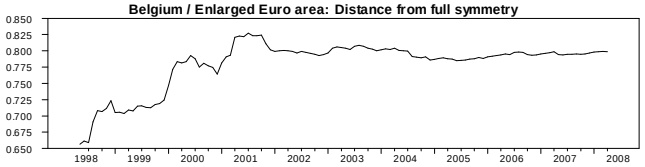

Sweden / Euro area-11: Relative strength of asymmetries
0.9
0.8
0.7
0.6
0.5
0.4
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

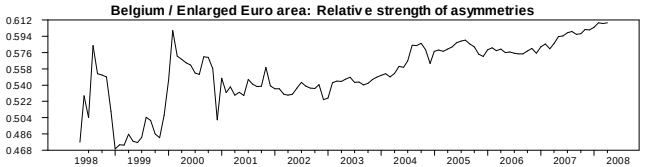

United Kingdom / Euro area-11: Distance from full symmetry
0.73
0.72
0.71
0.70
0.69
0.68
0.67
0.66
0.65
0.64
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

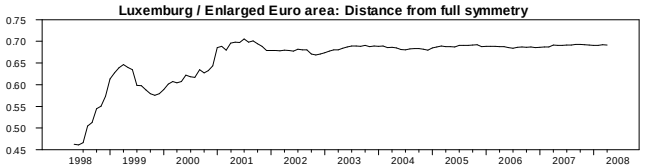

United Kingdom / Euro area-11: Relative strength of asymmetries
0.80
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

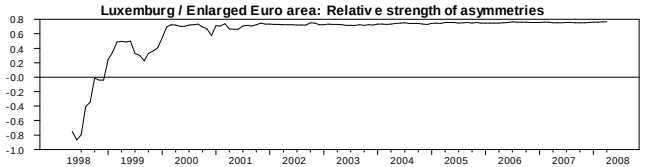

Austria / Enlarged Euro area: Distance from full symmetry

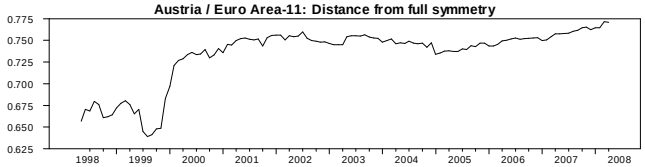

Austria / Enlarged Euro area: Relative strength of asymmetries

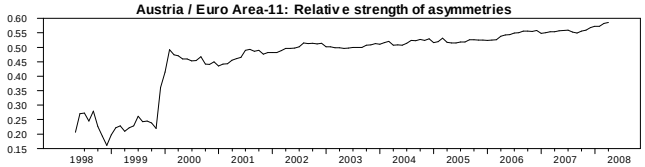

Belgium / Enlarged Euro area: Distance from full symmetry

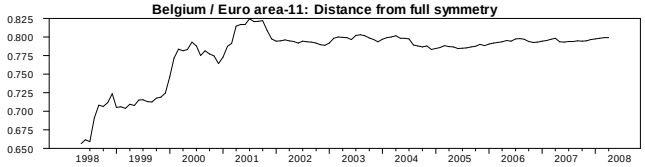

Belgium / Enlarged Euro area: Relative strength of asymmetries

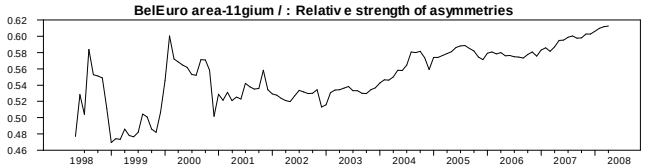

Luxemburg / Enlarged Euro area: Distance from full symmetry

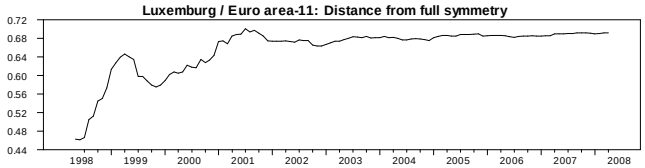

Luxemburg / Enlarged Euro area: Relative strength of asymmetries

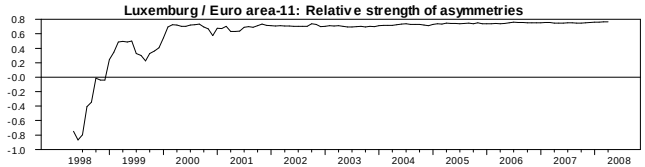

Austria / Euro Area-11: Distance from full symmetry

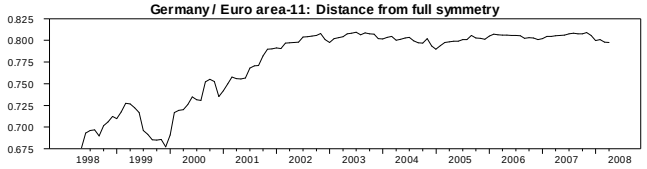

Austria / Euro Area-11: Relative strength of asymmetries

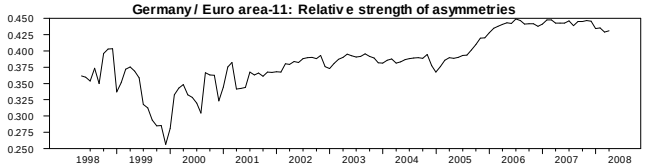

Belgium / Euro area-11: Distance from full symmetry

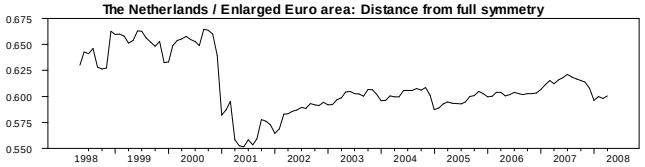

BelEuro area-11gium / : Relative strength of asymmetries

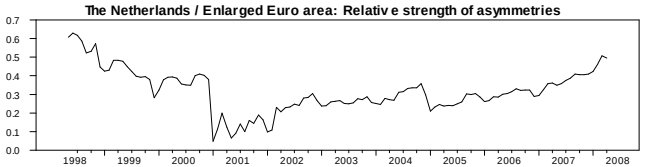

Luxemburg / Euro area-11: Distance from full symmetry

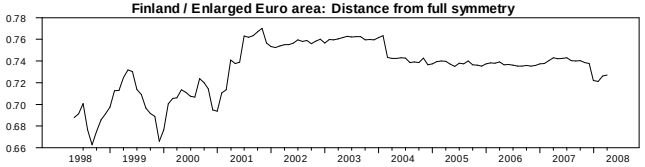

Luxemburg / Euro area-11: Relative strength of asymmetries

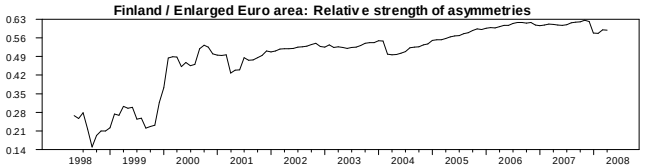

Germany / Euro area-11: Distance from full symmetry
0.825
0.800
0.775
0.750
0.725
0.700
0.675
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

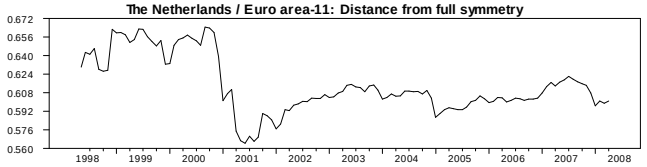

Germany / Euro area-11: Relative strength of asymmetries
0.450
0.425
0.400
0.375
0.350
0.325
0.300
0.275
0.250
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

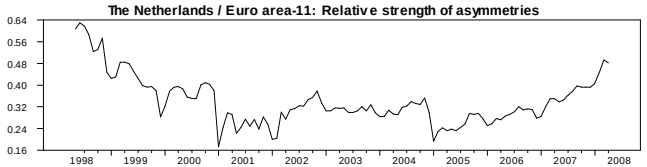

The Netherlands / Enlarged Euro area: Distance from full symmetry
0.675
0.650
0.625
0.600
0.575
0.550
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

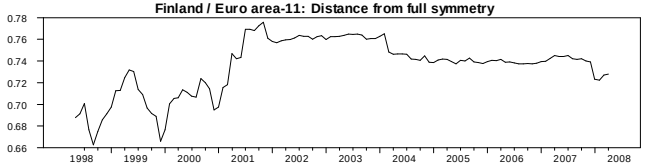

The Netherlands / Enlarged Euro area: Relative strength of asymmetries
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

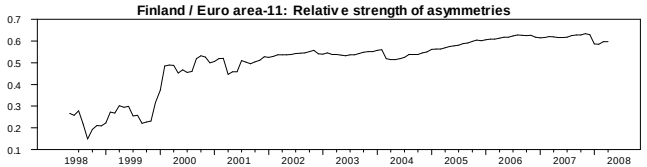

Finland / Enlarged Euro area: Distance from full symmetry
0.78
0.76
0.74
0.72
0.70
0.68
0.66
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

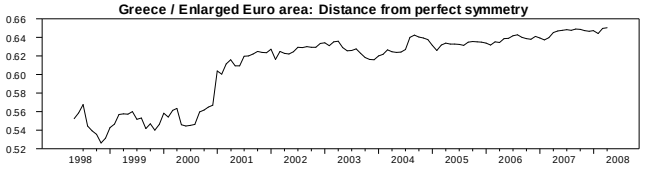

Finland / Enlarged Euro area: Relative strength of asymmetries
0.63
0.56
0.49
0.42
0.35
0.28
0.21
0.14
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

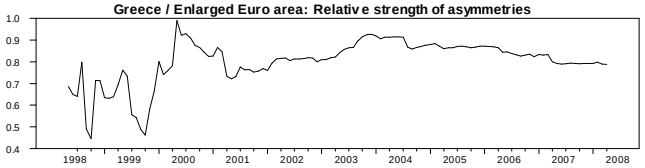

The Netherlands / Euro area-11: Distance from full symmetry
0.672
0.656
0.640
0.624
0.608
0.592
0.576
0.560
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

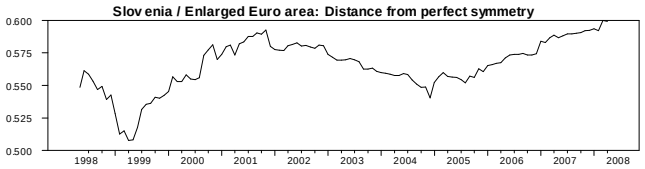

The Netherlands / Euro area-11: Relative strength of asymmetries
0.64
0.56
0.48
0.40
0.32
0.24
0.16
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

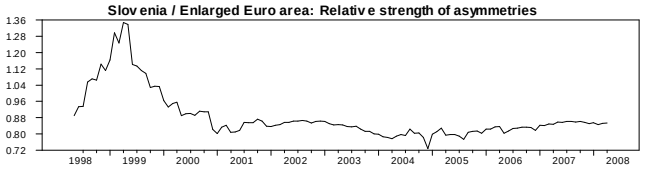

Finland / Euro area-11: Distance from full symmetry
0.78
0.76
0.74
0.72
0.70
0.68
0.66
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

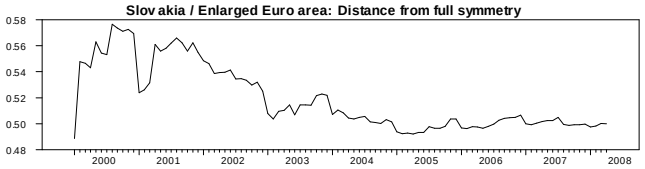

Finland / Euro area-11: Relative strength of asymmetries
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

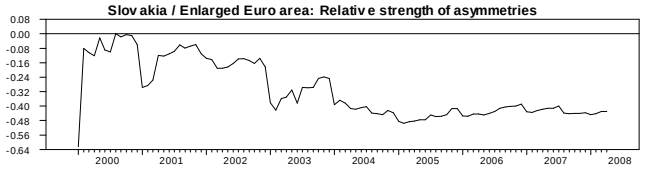

Greece / Enlarged Euro area: Distance from perfect symmetry

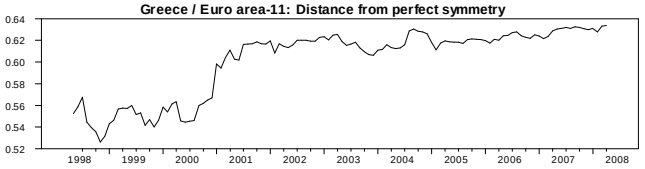

Greece / Enlarged Euro area: Relative strength of asymmetries

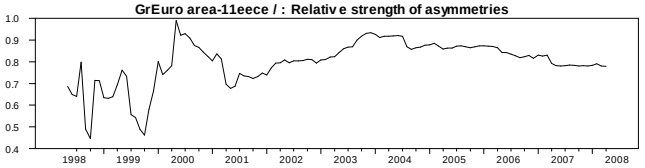

Slovenia / Enlarged Euro area: Distance from perfect symmetry

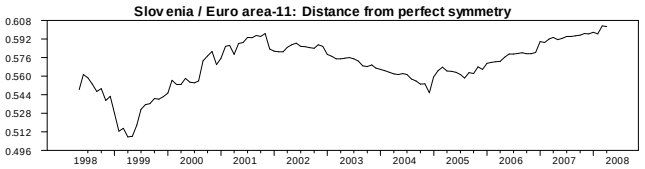

Slovenia / Enlarged Euro area: Relative strength of asymmetries

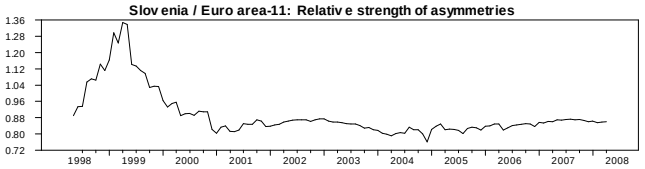

Slovakia / Enlarged Euro area: Distance from full symmetry

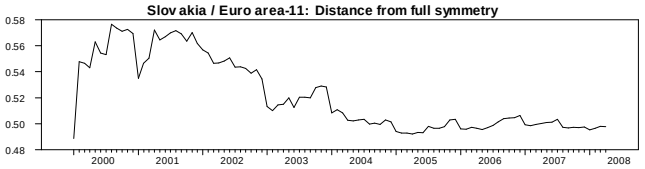

Slovakia / Enlarged Euro area: Relative strength of asymmetries

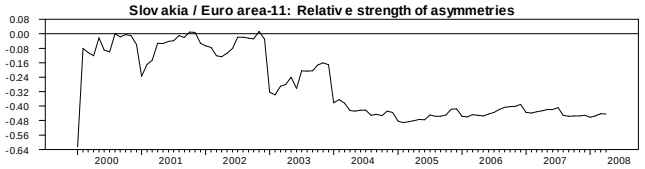

Greece / Euro area-11: Distance from perfect symmetry

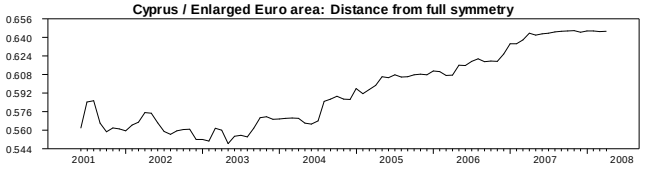

GrEuro area-11eece / : Relative strength of asymmetries

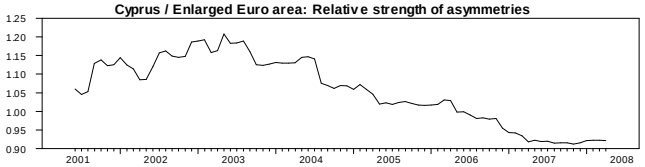

Slovenia / Euro area-11: Distance from perfect symmetry

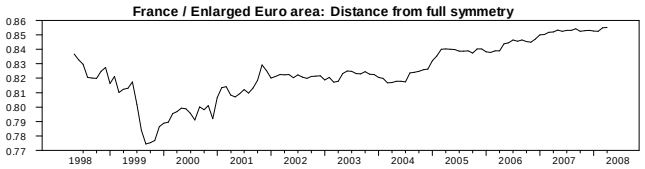

Slovenia / Euro area-11: Relative strength of asymmetries

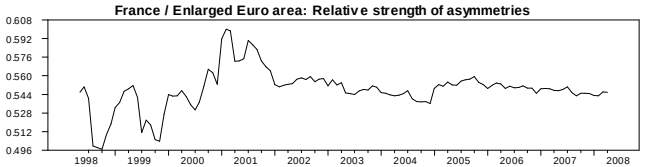

Slovakia / Euro area-11: Distance from full symmetry

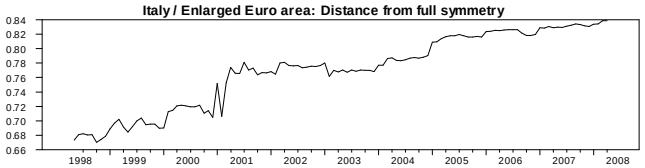

Slovakia / Euro area-11: Relative strength of asymmetries

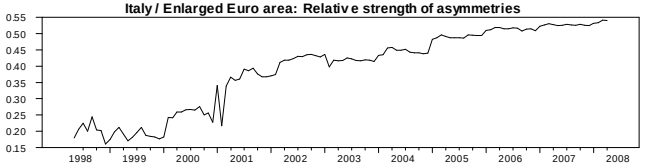

Cyprus / Enlarged Euro area: Distance from full symmetry
0.656
0.640
0.624
0.608
0.592
0.576
0.560
0.544
2001
2002
2003
2004
2005
2006
2007
2008

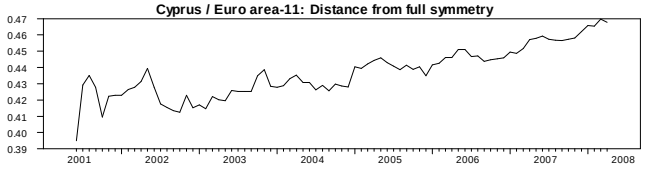

Cyprus / Enlarged Euro area: Relative strength of asymmetries
1.25
1.20
1.15
1.10
1.05
1.00
0.95
0.90
2001
2002
2003
2004
2005
2006
2007
2008

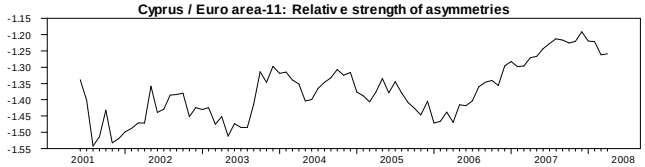

France / Enlarged Euro area: Distance from full symmetry
0.86
0.85
0.84
0.83
0.82
0.81
0.80
0.79
0.78
0.77
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008

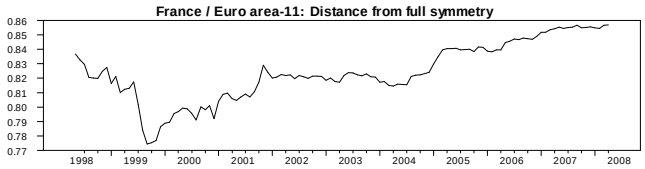

France / Enlarged Euro area: Relative strength of asymmetries
0.608
0.592
0.576
0.560
0.544
0.528
0.512
0.496
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008

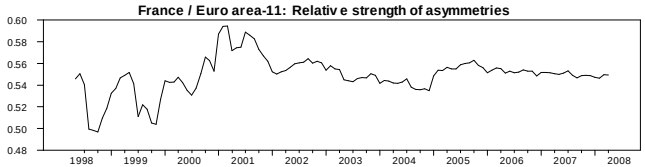

Italy / Enlarged Euro area: Distance from full symmetry
0.84
0.82
0.80
0.78
0.76
0.74
0.72
0.70
0.68
0.66
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008

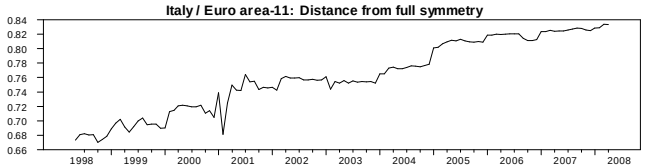

Italy / Enlarged Euro area: Relative strength of asymmetries
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008

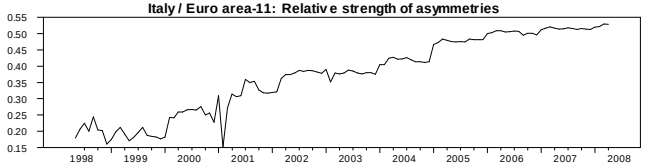

Cyprus / Euro area-11: Distance from full symmetry
0.47
0.46
0.45
0.44
0.43
0.42
0.41
0.40
0.39
2001
2002
2003
2004
2005
2006
2007
2008


Cyprus / Euro area-11: Relative strength of asymmetries
-1.15
-1.20
-1.25
-1.30
-1.35
-1.40
-1.45
-1.50
-1.55
2001
2002
2003
2004
2005
2006
2007
2008


France / Euro area-11: Distance from full symmetry
0.86
0.85
0.84
0.83
0.82
0.81
0.80
0.79
0.78
0.77
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008


France / Euro area-11: Relative strength of asymmetries
0.60
0.58
0.56
0.54
0.52
0.50
0.48
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008


Italy / Euro area-11: Distance from full symmetry
0.84
0.82
0.80
0.78
0.76
0.74
0.72
0.70
0.68
0.66
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008


Italy / Euro area-11: Relative strength of asymmetries
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
1998
1999
2000
2001
2002
2003
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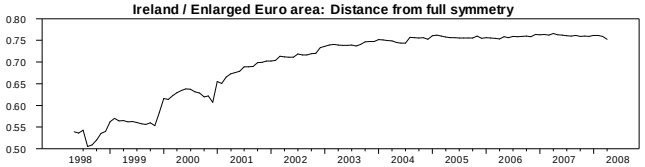
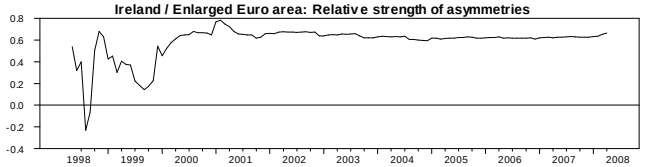
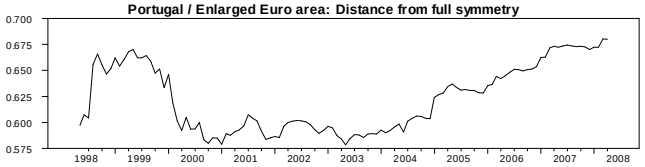
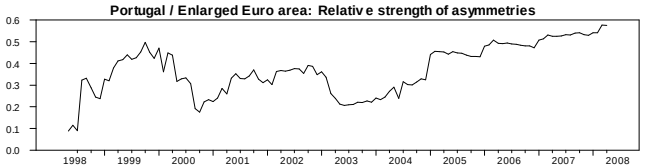
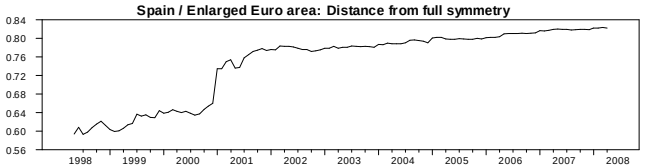
2008

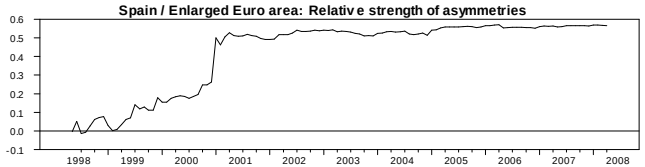

Ireland / Enlarged Euro area: Distance from full symmetry

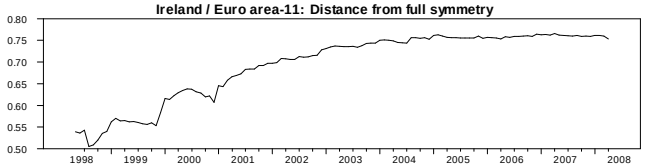

Ireland / Enlarged Euro area: Relative strength of asymmetries

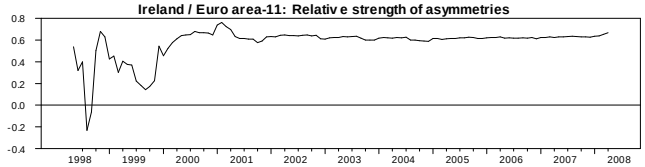

Portugal / Enlarged Euro area: Distance from full symmetry

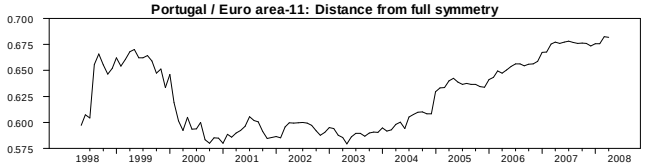

Portugal / Enlarged Euro area: Relative strength of asymmetries

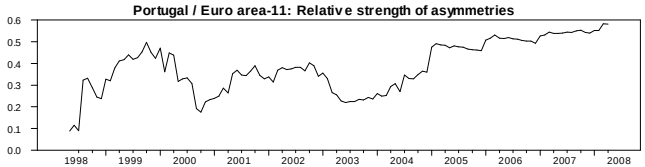

Spain / Enlarged Euro area: Distance from full symmetry

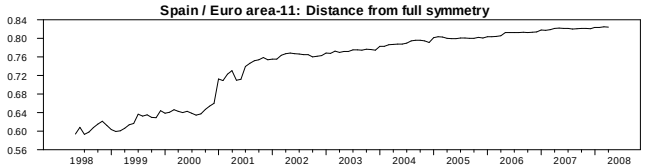

Spain / Enlarged Euro area: Relative strength of asymmetries

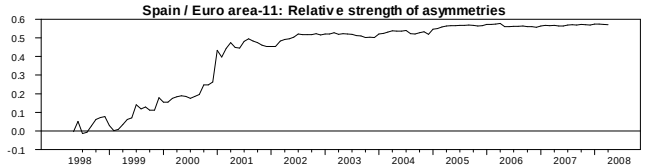

Ireland / Euro area-11: Distance from full symmetry

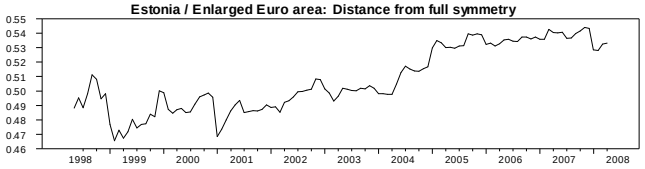

Ireland / Euro area-11: Relative strength of asymmetries

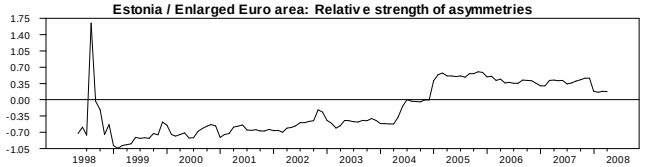

Portugal / Euro area-11: Distance from full symmetry

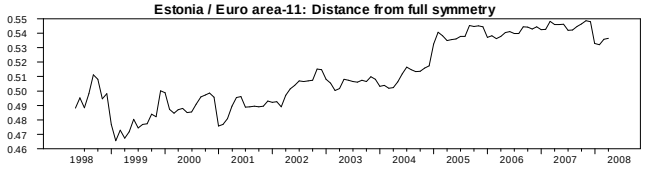

Portugal / Euro area-11: Relative strength of asymmetries

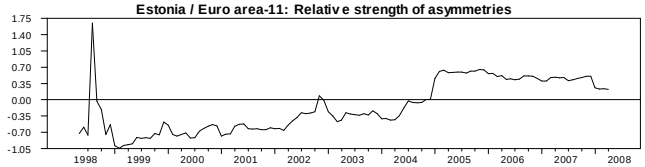

Spain / Euro area-11: Distance from full symmetry

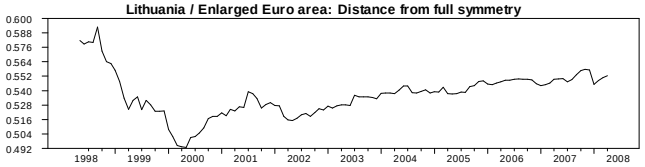

Spain / Euro area-11: Relative strength of asymmetries

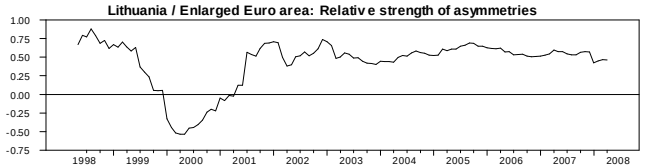

Estonia / Enlarged Euro area: Distance from full symmetry

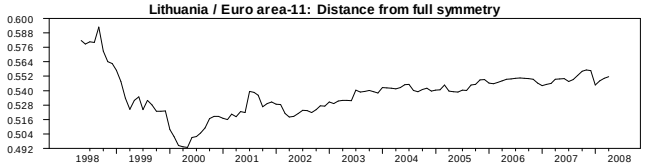

Estonia / Enlarged Euro area: Relative strength of asymmetries

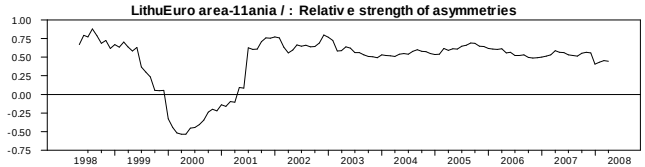

Estonia / Euro area-11: Distance from full symmetry

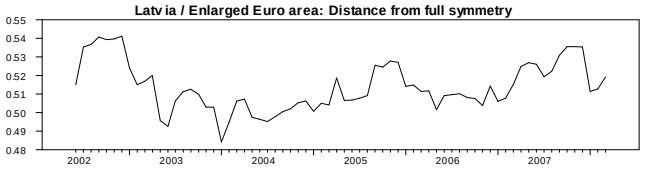

Estonia / Euro area-11: Relative strength of asymmetries

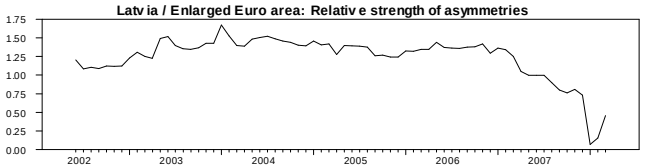

Lithuania / Enlarged Euro area: Distance from full symmetry

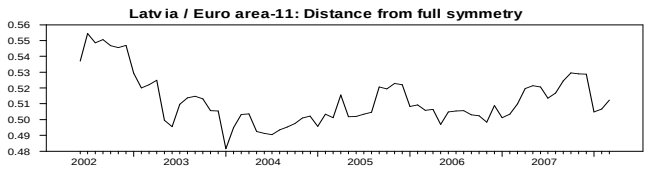

Lithuania / Enlarged Euro area: Relative strength of asymmetries

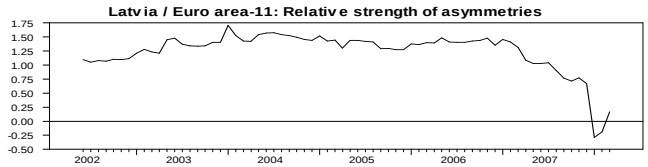

Lithuania / Euro area-11: Distance from full symmetry


LithuEuro area-11ania / : Relative strength of asymmetries


Latvia / Enlarged Euro area: Distance from full symmetry


Latvia / Enlarged Euro area: Relative strength of asymmetries


Latvia / Euro area-11: Distance from full symmetry


Latvia / Euro area-11: Relative strength of asymmetries