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Financial integration in the European Union — the impact of the crisis on the bond market

Abstract

Research background: In our paper we have analyzed the influence of the crisis on the financial integration in the European Monetary Union. We have analyzed EMU capital market to show the impact of the crisis, with the focus on the bonds market. The determinants of the research are yields and standard deviations on medium-term and long-term triple-A bond markets, as well as CDS medium-term premiums.

Purpose of the article: The aim of this paper is to show the volatility of researched determinants in periods of crisis in EMU zones.

Methods: As a model we used a modified theoretical CAL portfolio model. In the last fifteen years Europe has been faced with two major crises: the world economic crisis and sovereign debt crisis.

Findings & Value added: We believe that the sovereign crisis hit EMU more, leaving the deeper implications on the financial integration. Our analysis has showed that the crisis had

a major impact on the financial integration. Yields and standard deviations increased multiply in periods of crisis and left the impact of volatility on the capital market. However, the degree of convergence of euro area bond markets largely stabilized in last two years.

Introduction

Before the outbreak of the European debt crisis, the EU (European Union) wholesale banking business, such as interbank lending, investment banking, government bonds and various financial derivatives markets, had reached a high degree of integration. The yields on the money market and government bonds almost entirely converged; corporate bond yields were basically immune to the environment of their respective nations, but were more affected by various types of common factors (Hu, 2015). However, every crisis in the EU has an impact on the decline in the financial integration (Grubisic *et al.*, 2011). One of the biggest crises in the EU was sovereign crisis. The "Eurozone crisis" began as a sovereign (or public) debt crisis in 2009–2010. Until late 2012, the process of integration in the Eurozone abated, but in 2013 market confidence became more positive and the situation stabilized in most Eurozone countries. The crisis has shown that in addition to the clear benefits, financial integration also carries financial stability risks in the absence of a strong institutional framework. The crisis has confirmed the importance of interdependencies among economies in real sphere which influence to transition of shocks in the case of all aspects of socio-economic life (Pietrzak *et al.*, 2017).

Why financial integration is so significant for the EU? According to Guiso *et al*. (2004), the financial integration is bound to accelerate the development of the most backward financial markets and to allow companies and households from these countries to access the credit and security markets of the more advanced countries of the Union. The same author claims that the recent theoretical and empirical literature demonstrates that financial development is associated with higher economic growth, and economists and policy makers expect financial integration to have a "growth dividend" in Europe (Vyklyuk *et al.*, 2013). Financial integration is fundamental for Europe: it ensures that its economy remains internationally competitive and continues to prosper, which in turn is essential for maintaining the EU's political legitimacy (Grossman & Leblond, 2011). Creating a single capital market has been a central European goal for several decades. According to Zinecker *et al.* (2016) and Faldzinski *et al.* (2016), there are growing interrelations among capital markets in the EU. Nineteen of the EU's twenty-eight member states use a common single currency, the euro, and are often collectively referred to as "the Eurozone." The gradual

introduction of the euro began in January 1999, when eleven EU member states became the first to adopt it, and banks and many businesses started using the euro as a unit of account. The single currency has had a visible impact on the European financial markets. The most radical change is the swift integration of the euro-area bond market after the introduction of the single currency: yield differentials across member countries fell sharply, the volume of private bond issues grew rapidly, save for the important exceptions of the clearing and settlement systems and the market microstructure converged to a common area-wide system (Lane, 2006). The level of competition among financial intermediaries for underwriting and trading activities increased significantly, leading to a reduction in transactions costs, increased market access for higher-risk issuers and greater financial innovation (Pagano & von Thadden, 2004). The euro contributed to financial integration through a variety of channels.

Recent decades showed that financial integrations in the European Union (EU) gave excellent results. Grossman and Leblond (2011) argue that the recent history of financial integration in Europe can generally be considered a success story. Grahl and Teague (2005) claim that the financial integration policies launched by the EU are a remarkable success. According to McCreevy (2006), Europe has made "real progress" on financial integration. It is obvious that the agreement at Maastricht (which refers to creation a single currency for Europe) and especially Lisbon agenda (which aimed to make the EU the most productive economic region in the world) strongly influenced the process of integrating European financial markets.

However, the crisis that hit the European Union had an impact on reducing integration. As one of the main features of the crisis was the volatility on the bond market. The aim of our paper is to show the impact of the crisis on the financial integration of the European Monetary Union (EMU). In the last fifteen years, Europe has been faced with two major crises: The world economic crisis (2007–2009) and Sovereign debt crisis (2010–2012). Both crises had an impact on the financial integration of EMU members, but sovereign crisis left a much deeper impact. We shall analyze EMU capital market to show the impact of the crisis, with the focus on mid-term and long-term instruments (five-year and ten-year maturity bonds, as also mid-term CDS). With the analysis of yields and standard deviations in certain periods, it is possible to make conclusions about the impact of the crisis.

Research methodology

In our research we have used the modified portfolio theory model — Capital allocation line (see more Bodie *et al.*, 2013). Basically, this model shows the relationship of risk-free and risky assets for a given level of standard deviation as a measure of risk. As risk-free assets, we indicate money market instruments (r_f). All the money market instruments are virtually immune to interest rate risk (unexpected fluctuations in the price of a bond due to changes in market interest rates) because of their short maturities and all are fairly safe in terms of default or credit risk (Bodie *et al.*, 2013). In our modified model, all money market instruments have been included. As risky assets, we analyze only government medium-term and long-term bonds issued in the EMU zone. This is a modification compared to the original model of portfolio allocation of assets. Therefore, the line that shows the allocation of assets is not a CAL (Capital allocation line) as in the original model. Our line of allocation is AL_b — bonds allocation line. The difference between risk-free and risky assets is expected risk premium on government bonds ($E(r_{pb})$). We can say that the expected risk premium is the potential reward or expected yield for the risk taken above risk-free rate. Standard deviation for the risk premium asset is denoted as (σ_{pb}) (Figure 1).

The model does not consider the investor's strategy, because it includes only government bonds (unless investors are buying only treasury notes and bonds). The purpose of this modified hypothetical model is to show the relationship between risks and yields, and the impact of the crisis on variables. Bearing in mind the nature of the relationship between risk and yields (return) (growth of risk affects the increase of return), we indicate two different situations in relationship as also influence on financial integration.

Position P1 shows a situation in which there are no shocks caused by the crisis. The standard deviation in this scenario is less or equal than standard deviation for the risk premium asset. Bearing this in mind, we present the following relations:

$$\sigma_f \geq \sigma_{p1} \geq \sigma_{pb} \text{, for } \sigma_f > 0 \qquad (1)$$

$$E(r_{pb}) \text{ is max for } \sigma_{p1} \qquad (2)$$

Considering the impact of the crisis on the financial integration (which will be shown in the next chapter), we can assume that integrations are possible if the risks are presented as (σ_{p1}). In the square above the RPL (risk premium line) — not shaded part, expected risk premium is maximum

for reasonable risks (σ_{p1}). Standard deviation for the risk-free assets is greater then zero ($\sigma_f > 0$). This situation is paradoxical in the money market, which is characterized by risk-free assets and requires more precise explanation. If the standard deviation is greater than zero, it means that assets are risky in some way. Moreover, some experiences have shown that the standard deviation increases during the period. That's exactly what happened with the sovereign debt crisis: "*In the wake of the euro crisis as well as the credit downgrade of the United States in the summer of 2011, one clearly needs to consider whether (or when) sovereign debt can be treated as risk-free. Governments that issue debt in their home currency can in principle always repay that debt, if need be by printing more money in that currency. This strategy, however, can lead to runaway inflation, so the real return on that debt would hardly be risk-free*" (Bodie *et al*., 2013, p. 134). However, corporate bonds, medium-term and long-term securities are riskier, and therefore money market is called risk-free (although there is certain risk, for $\sigma_f > 0$). Standard deviation is a measure of volatility of istruments from the mean. It is the appropriate measure of risk for a portfolio of assets with normally distributed returns. In this case, no other statistic can improve the risk assessment conveyed by the standard deviation of a portfolio. On the Figure 2 is shown distribution of returns and standard devations. The probabilities are highest for outcomes near the mean and are significantly lower for outcomes far from the mean.

Position P_2 shows a situation with shocks caused by the crisis (shaded part, Figure 1). The standard deviation in this scenario is equal or bigger than standard deviation for the risk premium asset. Relations are the following:

$$\sigma_{pb} \leq \sigma_{p2} \tag{3}$$

$$E(r_{pb}) \text{ is lower for } \sigma_{p2} \tag{4}$$

In a situation with a crisis (sovereign bonds), it is possible that the risks will increase more than the expected premiums. These are all positions below AL_b line in the shaded square (Figure 1), which is the largest part of P_2. This means that the crisis affects the standard deviation goes over (σ_{p2}) and put investors in a less favorable position. In such a scenario, some countries (for example, certain members of EMU) will have more problems then others. As collateral, the integration will certainly be smaller. In the next chapter, we will show the impact of the crisis on the integration.

Results and discussion

The impact of the crisis

According to ALB model yields on medium-term and long-term bonds have increased in periods of crisis. We have analyzed the yields from nominal AAA government bonds, five and ten years maturity, provided by ECB (European Central Bank). On the Figure 3 one can notice that the yields increased in periods 2007–2009 and 2010–2012. After this period, the trend shows a sharp decline in yields.

For our analysis we chose triple A (AAA) bonds, because they have the highest rating. The reason for this is that triple A bonds will have fewer fluctuations in relation to lower rating bonds. Changes in yields of bonds with the highest rating over a longer period (for example, more than a year) are a reliable indicator of the crisis. The crisis did not impact all triple A bonds to the same extent. The impact of the crisis was different in relation to their years to maturity.

Figure 4 shows that long-term maturity bonds had the highest growth (first twenty-years maturity, after ten-years maturity bonds), after midle-term (five-years maturity) and the last short-term (one-year maturity) AAA bonds. The situation is completely expected bearing in mind the relationship between risk (time) and returns (yields). The situation is the same with the triple A ten-years maturity bonds (Figure 5). The trend is the same, except that in periods of crisis the yields are slightly higher comparing to the triple A five-years maturity bonds.

However, one of the best indicators of the impact of the crisis on the EU capital market is CDS premia. A Credit Default Swap (CDS) is the most common form of credit derivative (based on bonds). It is a particular type of swap designed to transfer the credit exposure of fixed income products between two or more parties. Given that are derivatives, whose basis is originated from bonds (price-based bonds), crisis have a great impact on their premiums.

Figure 6 shows that premiums had a stable flow until impact of the world economic crisis. In the period 2008–2010 premiums increased several times, but from 2011, this increase has continued to grow multiply. Based on this figure, we cannot say whether the world economic crisis had a strong influence on incresing premiums in 2011, but it is obvious that the premiums have grown exponentially during the sovereign crisis. Moreover, CDS premiums have not even returned to their previous level before all crisis. The reason is that the debt crisis is not finished in all EMU countries (for example, in Greece — at this moment the country requires a fourth

loan from the ECB or it will declare bankruptcy).

EU integration

According to the data from Table 1, countries that have been affected by sovereign crisis still have higher yields on the secondary capital market. For example, in last year, Greece, Portugal, Cyprus, Spain and Italy had higher government bonds yields with maturity of ten years comparing to other EU monetary zone countries (along Malta, Lithuania and Slovenia). This means that the risks (of these securities) are higher than in other EU monetary members, which is mainly caused by fiscal problems. Here in the forefront there is Greece, with around 8% per annum, which is still in a deep debt crisis.

When we talk about the financial integration in the EU and the impact of the crisis (sovereign crisis), the following graph shows this relationship. Until 1999 and the introduction of the euro and Monetary Union, yields on government bonds with maturity of ten-years were quite different in EU countries. Again, we can say that Greece had the highest yield in this period (it did not even meet all Maastricht criteria), along with Ireland, Portugal and Spain (which did). More precisely, the expected fiscal problems could be anticipated for these countries. However, with the introduction of the euro, the situation was immediately stabilized. Harmonization at the level of yields on government bonds with medium and long-term maturity after 1999 is a good indicator of financial integration of the monetary zone.

Figure 7 clearly shows that any country that has entered the EMU had a decrease of yields on government bonds before sovereign crisis. Even the Global economic crisis did not have a greater impact on the growth of government bonds yields in EMU members states. The situation changed after the sovereign debt crisis. As we can see, after 2009 the yields were significantly increased until the end of 2013. Pronounced divergence in yields emerged when market participants began to perceive a tangible credit risk for some euro area sovereigns. The biggest rise in yields was observed in Portugal, Ireland and Italy, which contributed to the significant growth of the EU average. These yields became additionally influenced by self-reinforcing premia related to market fragmentation and perceived risks of redenomination. After the announcement of Outright Monetary Transactions programme in 2012, the size of these self-reinforcing premia and the related divergence in government bond yields declined remarkably.

Figure 8 shows Proportion of explained variance of governments bond as a indicator of financial integration. After introducing euro, variance tended equalizing in all EMU states. The variance is a measure of the risk

of securities (as the square of the standard deviation) and depending on the needs of statistics is shown instead of the standard deviation (Figure 9).

Conclusions

Financial integration has made good progress in the EU, and particularly in the Euro area has brought with it substantial benefits. With the introduction of the euro, the integration process within the European Economic and Monetary Union has seen rapid development in terms of both breadth and depth. However, it has been severely affected by the crisis. Our analysis showed that the crisis had a major impact on the financial integration. However, it was the sovereign crisis that had the biggest influence. Yields and standard deviations increased multiply in the periods of crisis and left the mark of volatility on the capital market (especially on bonds market). After the crisis, the volatility of financial instruments remained increased and did not return to the level before the crisis. The same goes for the yields which have proved to be excellent indicators of crisis (in our research). On the other hand, the degree of convergence of the euro area bond markets largely stabilized around its 2014 levels. Specifically, price-based indicators showed a continued dispersion of yields of euro area sovereign, non-financial corporate and bank bonds, although considerably below its intensity during the global financial crisis and the euro area sovereign debt crisis (ECB, 2016). The overall improvement in financial integration is expected to continue also as a consequence of the monetary policy actions taken by the ECB to restore the bank intermediation channel, as well as of the effective implementation of the Banking Union.

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Acknowledgments

Table 1. Long-term interest rate statistics - EU Member States (percentages per annum; period averages; secondary market yields of government bonds with maturities of close to ten years)

Countries	Dec. 15	Jan. 16	Feb. 16	Mar. 16	Apr. 16	May 16	June 16	July 16	Aug. 16	Sep. 16	Oct. 16	Nov. 16	Dec. 16
Belgium	0.89	0.86	0.72	0.62	0.55	0.55	0.43	0.20	0.15	0.18	0.27	0.57	0.61
Germany	0.55	0.43	0.17	0.17	0.13	0.13	-0.02	-0.15	-0.13	-0.09	0.00	0.19	0.25
Estonia	-	-	-	-	-	-	-	-	-	-	-	-	-
Ireland	1.11	1.05	0.99	0.85	0.86	0.84	0.76	0.47	0.40	0.42	0.50	0.85	0.84
Greece	8.21	9.08	10.41	9.12	9.03	7.64	7.92	7.99	8.19	8.34	8.33	7.33	6.94
Spain	1.69	1.72	1.72	1.54	1.53	1.57	1.48	1.17	1.01	1.04	1.07	1.43	1.44
France	0.93	0.84	0.59	0.51	0.51	0.51	0.39	0.17	0.15	0.18	0.33	0.67	0.75
Italy	1.58	1.53	1.56	1.38	1.44	1.53	1.45	1.23	1.18	1.27	1.45	1.94	1.89
Cyprus	3.87	3.82	4.00	4.01	3.99	3.89	3.82	3.87	3.84	3.62	3.39	3.47	3.55
Latvia	1.08	1.05	0.88	0.71	0.61	0.51	0.48	0.30	0.12	0.10	0.19	0.56	0.90
Lithuania	1.49	1.47	1.42	1.42	1.31	0.86	0.86	0.86	0.86	0.79	0.31	0.31	0.31
Luxembourg	0.27	0.72	0.43	0.42	0.34	0.33	0.17	-0.00	-0.05	-0.03	0.07	0.28	0.39
Malta	1.29	1.25	1.16	1.03	1.00	1.02	0.95	0.76	0.61	0.60	0.59	0.84	0.82
Netherlands	0.75	0.65	0.37	0.32	0.40	0.38	0.25	0.06	0.03	0.06	0.16	0.39	0.44
Austria	0.86	0.77	0.53	0.46	0.38	0.37	0.33	0.16	0.11	0.15	0.24	0.49	0.53
Portugal	2.49	2.71	3.23	2.84	3.13	3.15	3.20	3.06	2.91	3.26	3.33	3.51	3.74
Slovenia	1.61	1.61	1.59	1.48	1.37	1.41	1.36	0.95	0.80	0.75	0.62	0.89	0.96
Slovakia	0.72	0.71	0.56	0.43	0.38	0.41	0.77	0.49	0.30	0.32	0.42	0.72	1.01
Finland	0.86	0.78	0.53	0.53	0.46	0.45	0.33	0.12	0.06	0.08	0.17	0.41	0.46

Source: ECB (2017).

Figure 1. AL_b - bonds allocation line model
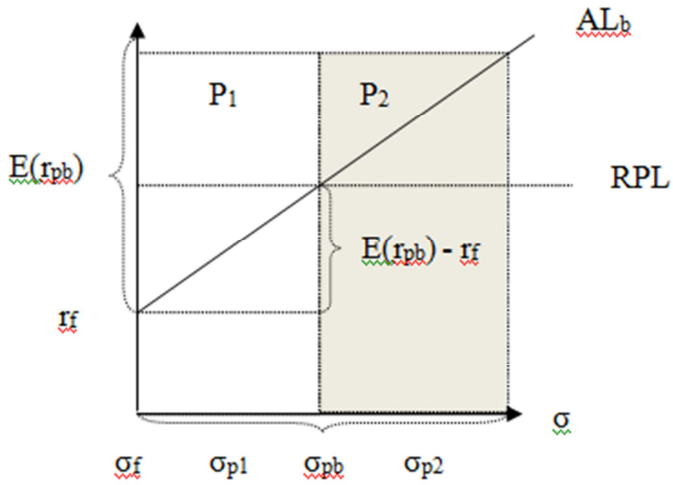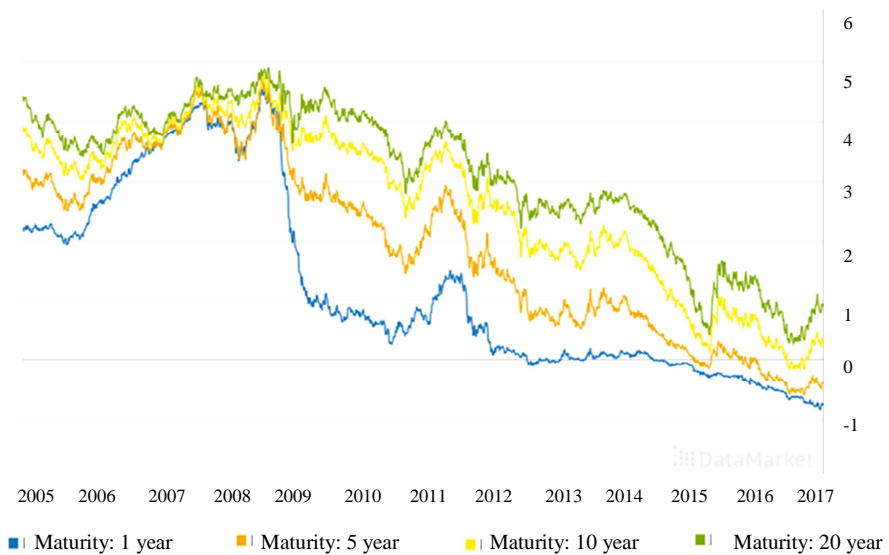

Figure 2. Returns and risks
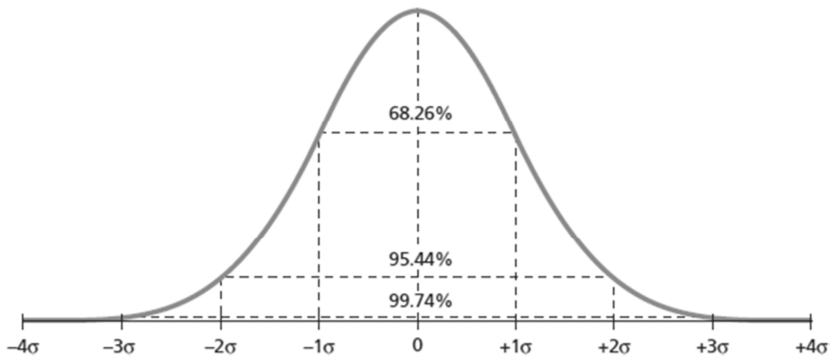
Source: Bodie *et al*. (2013).

Figure 3. AAA five-years government bonds yields, EMU zone

Source: Authors calculations based on data retrieved from ECB (2017).

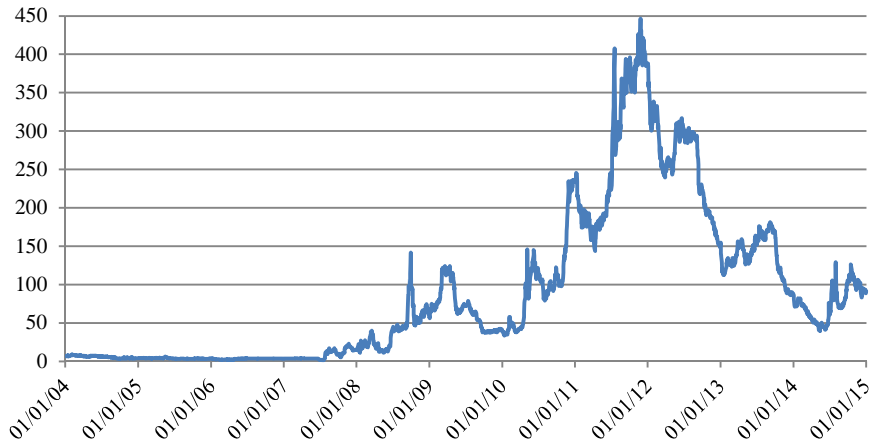**Figure 4.** Euro yield curves - AAA euro area central governments bonds

■ Maturity: 1 year   ■ Maturity: 5 year   ■ Maturity: 10 year   ■ Maturity: 20 year

Source: ECB (2017).

Figure 5. AAA ten-years government bonds yields, EMU zone

Source: Authors based on data retrieved from ECB (2017).

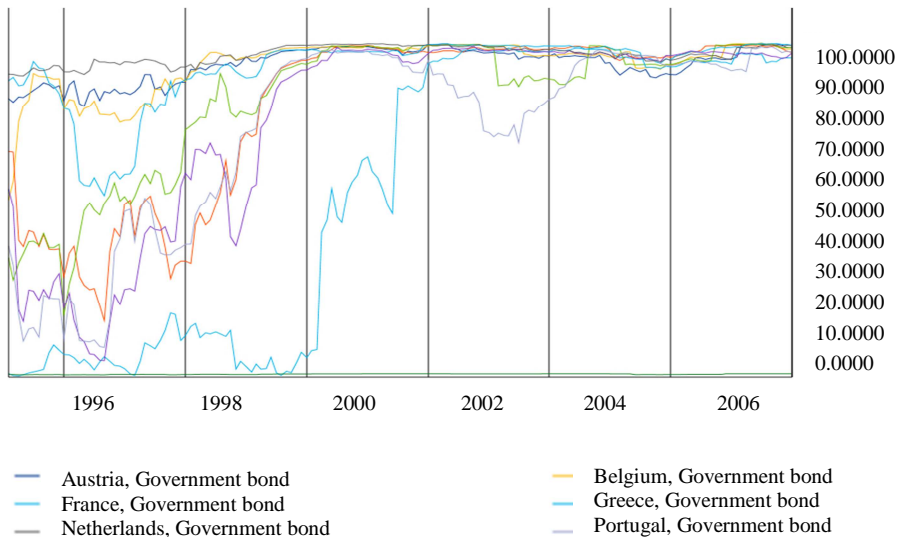**Figure 6.** Dispersion in the five-year CDS premia across the Euro area

Source: Authors, based on data retrieved from ECB (2017).

Figure 7. Long-term yields statistics - EU Member States
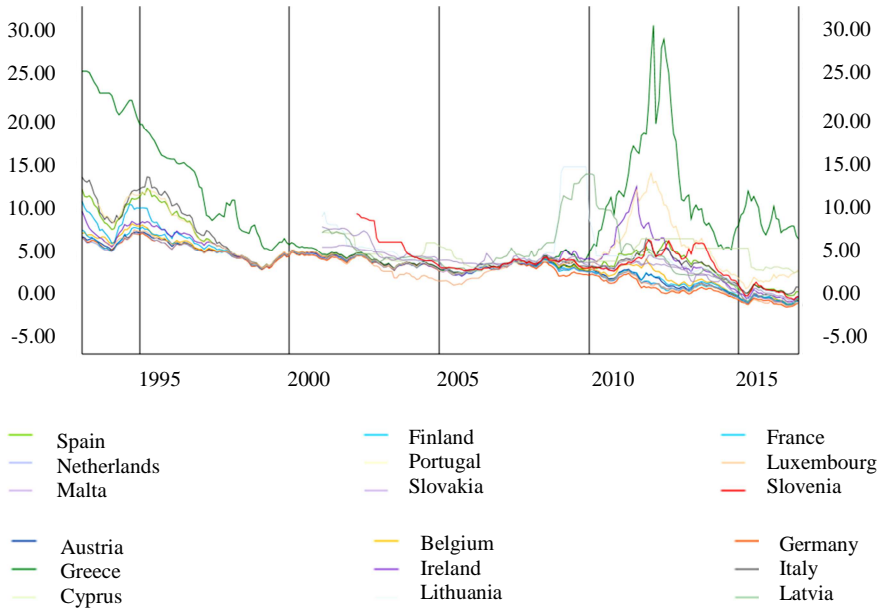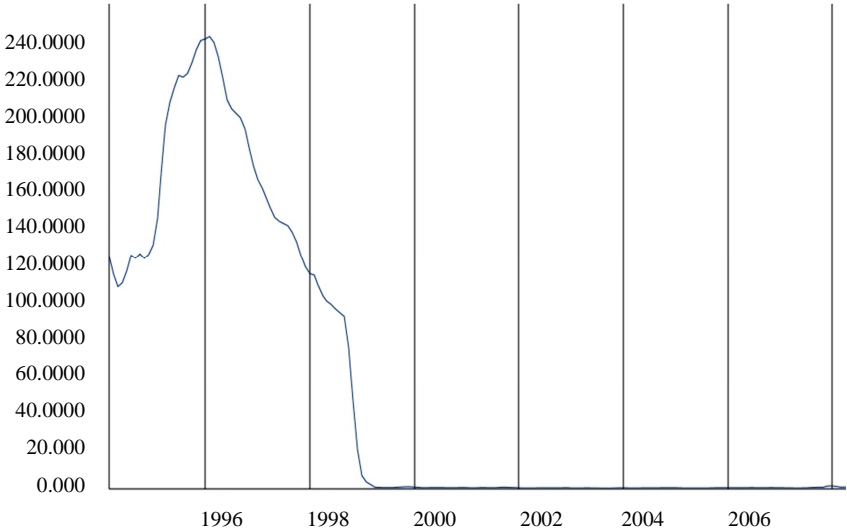

Source: Adopted Figure based on ECB (2017).

Figure 8. Proportion of explained variance

Source: Adopted Figure based on ECB (2017).

Figure 9. Standard deviation (IFI input-output data: EURIBOR rate) of money markets of EMU members

Source: Adopted Figure based on ECB (2017).