FOREIGN EXCHANGE RESERVE MANAGEMENT IN THE EUROZONE AND THE GLOBAL INTEREST RATES

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Abstract

Global interest rates and their term structure depend on the relation of the time structure of demand and supply of capital. With the monetary integration in Europe one can observe substantial realignments in the mentioned variables. The scientific problem of this paper is the change in the term structure of the global interest rate over the period of the last 25 years – 1987 – 2011. The aim is to recognize any actual anomalies in the yield curve of the global interest rate that may be associated with the creation of the Eurozone and its further expansion. The first step in this quest is presentation of the theoretical background for the foreign exchange reserve management at a central bank. Then, the institutional solutions are presented to give insights into the actual operating procedures that have potential of affecting the term structure of demand and supply of liquid funds in foreign exchange markets. In the next step, a rationale for a substantial realignment of large foreign assets' portfolios in a monetary union is presented in detail. One may list here several cost-related arguments and efficiency in maximizing rate of return, without endangering the international liquidity of a country and a monetary union as a whole. It is argued that the institutional solutions together with the rational behavior of central banks result in permanent departure from the once well-established balance in the global economy. It could be also argued that monetary integration in Europe is responsible for moving toward a new equilibrium at the global financial market. These claims are later supported in the empirical part by the time series analysis of the term structure of global interest rates. Differentiating between interest rates of different maturities delivers three years over the period 1987-2011 when the yield curve inverted. These years were 1998, 2001 and 2007. All three cases of unusual yield curve behavior may be associated with: onset, expansion and further expansion of the Eurozone. In each case, adding to the common pool of the foreign exchange reserves created an impulse for demand-supply interplay, concerning the term structure of capital offered and demanded at the global financial market. Another supporting argument flows from the recognized strong and significant relationship between foreign exchange reserves management and the term structure of global interest rates. Correlation exercise delivered interesting results, showing not only uniqueness of the mentioned years (1998, 2001, and 2007) but also some differences between these years in the manner of the yield curve shape and form of adjustment. In some cases changes leading to the inverted yield curve were only in long-term interest rates (down), but sometimes interest rates of all maturities were changing (short term up& long-term down). Also the form of latter adjustment, when yield curve returned to the normal shape differed for the studied anomalies.

Keywords: foreign exchange reserves, global interest rates, yield curve, monetary policy, ECB.

Introduction

Foreign exchange management is an issue that despite its importance has not been a subject of detailed analysis in the literature. It has been a result of the actual design of the global financial system. Historically, foreign exchange management has been focused on the main aim that has been maintaining international liquidity [Młodkowski 2002]. Mercantilism perceived foreign exchange reserves as a value for itself, claiming that the higher the level of reserve assets (monetary gold) the better. Until the second half of the 90s in XXth century, research on driving forces for demand for foreign exchange reserves was sporadically. It is possible to list here works of Bryant [1980], Edwards [1983], or Ben-Bassat and Gottlieb [1992] and Scott [1993]. This situation started to change with the onset of monetary integration in Europe.

At the turn of XXth and XXIst century, interest in this topic rose, among economists and economic policymakers. The reason was the creation of a new international currency backed by the biggest economies in Europe [Chinn and Frankel, 2005, p. 3]. Aside from this fact, the other reason was departure from maintaining foreign exchange reserves in a form of monetary gold (due to high costs) at the end of

XXth century. This tendency, however, was revered after the world turmoil caused by the 11/9 terrorists attacks. Unstable political situation resulted in fueling demand for gold. Foreign exchange reserves and their management became interesting also because of significant changes in the global pattern of trade and liberalization of the balance of payments accounts. Review of literature in this regard for 1997-1999 period can be found in Eichengreen and Mathieson [2000]. The fact of further increase in interest for this topic can be concluded from the reference list found in Aizenman and Lee [2005], or Chinn and Frankel [2005]. However, all of the mentioned authors studied the foreign exchange reserves issues from the point of view of only one country [Młodkowski 2006]. The topic of monetary union reserve assets management was still not present in the literature. The reason was in the absence of a formal currency union of a significant share in the global economy. There were already four successful monetary unions prior to the 1999 [Młodkowski 2008]. All of them centralized their foreign exchange reserves for the purpose of an effective monetary policy in stabilizing member economies [Młodkowski 2007]. Only after creation of the European Monetary union (EMU) centralization of the reserve assets became an important factor for the global monetary system.

The paper presents introductory empirical results of an analysis of foreign exchange reserves management on the global interest rates. The research methodology is a simple correlation analysis of time series for global interest rates' yield curve.

Institutional design of foreign exchange reserves management in the Eurozone

When one describes the centralization and management of foreign exchange reserves in the Eurozone, it is necessary to start from the exchange rate system regulations. The European Treaty assigns the responsibility for the decision on the exchange rate regime to the European Council [European Treaty Art.111, p.1]. In case of the lack of the decision on a particular exchange rate regime, the European Council (by a qualified majority of votes) may formulate the general directions for the exchange rate policy [European Treaty, Art.111, p.2]. A priority goal in both formal ways of defining the exchange rate policy in the EMU is maintaining stability of the general level of prices. Therefore, all decisions in this regard require recommendation from the European Central Bank or from the European Commission that is often consulting them with the ECB. So far none of the aforementioned procedures were initiated. During the summit of the European Council on 13th of December in 1997 in Luxembourg stressed that the exchange rate of the Euro should be a result of an interplay between economic factors and economic policies and the exchange rate it self should not be a separate and an independent aim. It was concluded that some general directives for the exchange rate policy will be formulated only in extraordinary circumstances. However, all these potential directives must consider the independence of the European System of Central Banks and the ultimate goal, which is the stable general level of prices.

The lack of the institutional exchange rate regime solutions together with no exchange rate target for the ECB caused only two actual interventions in the foreign exchange market by the ECB over the first five years of operations [Scheller, 2004, p.92]. Both interventions took place in 2000 (in September and November). These were conducted with a cooperation of central banks of the USA, Japan, the UK and Canada. The reason for the interventions was the stable depreciation trend of Euro, which was in contradiction with the macroeconomic situation of the Eurozone. In order to conduct such foreign exchange market interventions, a central bank needs to hold some foreign exchange. The European Central Bank maintains the necessary resources because it is a custodian of the pool of the common foreign exchange reserves. The charter of the central bank defines, among its basic functions, conducting foreign exchange transactions and maintaining the foreign exchange reserves of the member states [ECB Statute, Art.3.1]. The common pool of foreign exchange reserves at the ECB is maintained and managed mainly for the purpose of foreign exchange market interventions. The ECB is allowed to conduct transactions (spot and forward) and make deposits together with engaging in credit operations [ECB Statute, Art.23].

The national central banks of the Eurosystem are obligated to transfer their foreign exchange reserves to the ECB. Initially, the total amount of the foreign exchange reserves was set at 50 billion of ECU [ECB Statute, Art.30.1]. However, as new countries join the Eurozone, it results in increasing the equity of the ECB and in increasing the common pool of the foreign exchange reserves. Since the 1st of May 2004 the initial limit rose to 55,6 billion of Euro. The ECB is not obligated to return some of the foreign exchange to member countries that decreased their share in the total equity.

In January 1999 the national central banks transferred to the ECB the foreign exchange reserves with total value of 39,46 billion Euro. It was the upper limit resulting directly from the ECB Statute, decreased by the share in the ECB equity of the EU countries that did not join the EMU. Then, on 1st of January in 2001, when Greece joined the Eurozone, the central bank of Greece transferred 1,28 billion worth of foreign exchange reserves. The total amount of all contributions so far reached 40,74 billion of Euro. The structure of the transfer was as follows: 15% gold and 85% jointly the US dollar– and Japanese yen–denominated assets.

The initial value of the common pool of foreign exchange reserves at the European Central Bank fluctuated due to exchange rates movements and FX market interventions. In January 2008 it amounted at 43,2 billion Euro [ECB 2008, p.18], while in January 2011 it was 56.3 billion Euro [ECB 2011, p.16].

The Statute of the ECB allows the central bank to call for transferring more of foreign exchange from the national central banks, above the initial limit. The reason for such a call would be a necessity to replenish depleted foreign exchange reserves, but not to increase their total amount at the ECB disposal.

Goals of foreign exchange management at the European Central Bank

The European Central Bank has one general goal in its foreign exchange reserves management. The goal is to have enough of the most liquid foreign assets to conduct any necessary intervention at the foreign exchange market. This leads to emphasizing two principles: liquidity and safety when decisions about the chosen instruments are made. Complying with these two principles, the total value of foreign assets portfolio is maximized. It can be argued that such an approach is in line with the modem trends in this regard.

The foreign exchange reserves in the European Monetary Union are managed by national central banks according to an investing strategy formulated at the European Central Bank. In reality this solution means that the following parameters are imposed:

1. currency structure of foreign assets portfolio,
2. ratio of acceptable risk to the expected rate of return,
3. credit risk,
4. liquidity requirement for instruments used.

The currency structure of the foreign assets portfolio is decided by the Managing Board at the ECB. It considers the expected needs resulting from potential interventions and it is subject to frequent change. The ECB is not conducting an active foreign assets portfolio management to avoid the indirect interference with the common monetary policy.

The actual decisions of the ECB concerning the foreign exchange reserves management at the national central banks are communicated in a from of investment benchmarks and limits, which ought to be achieved and maintained. The national central banks announce the actions undertaken as a

consequence of centralized decisions. This allows all foreign partners at financial markets to distinguish transactions conducted on behalf of the ECB from independent ones.

The ECB defined four key parameters for investing its foreign exchange reserves [Scheller 2004, p.95]:

I. two-level investment benchmarks for each currency (strategic and tactic ones),

II. allowed deviations from the benchmarks,

III. a list of allowed instruments and operations,

IV. credit risk exposure limits.

Details of these parameters are classified to avoid an undesired influence on financial markets. These benchmarks are defined for two levels of managements: a strategic one and a tactic one. The strategic benchmark for each of currencies present in the foreign assets portfolio, reflects the long–term requirements of the policy of the Managing Board together with the preferences of the ECB in regard to risk and the rate of return. The tactic benchmark is formulated by the governors of the ECB. It must be maintained within the predefined deviations from the strategic benchmark. It is supposed to reflect the short–term and the mid–term preferences of the ECB in regard to the rate of return and the risk, concerning the current market conditions. As can be seen, the national central banks, when conducting their everyday management of foreign assets portfolios have some autonomy based on the allowed deviations from the pre-defined limits. The aim in this regard is to achieve higher efficiency.

The ECB maintains also some foreign exchange reserves in the from of gold, at 750 tons. This part of its portfolio is not however subject to an active management, as in other monetary unions [Młodkowski 2007, p. 213]. This is a result of the fact that the ECB is a member of the Gold Agreement of Central Banks, signed in 1999 by 15 central banks that belong to the Eurosystem. In 2004 this agreement was extended by another 5 years. Then it was then extended in 2009 for another 5 years until the 26th of September 2014. The foreign exchange reserves that were not transferred to the common pool and are still maintained and managed by the national central banks amounted in 2008 at 374,6 billion Euros [ECB 2008, p.18], while at the beginning of 2011 (January) the amount of these reserve assets reached 562.3 billion Euros [ECB 2011, p.16]. The right to call for additional foreign exchange by the ECB means that the common central bank has a tremendous power to conduct interventions at foreign exchange markets and to shape the exchange rate even in the long run. The foreign assets at the national central banks are almost ten times the value of the common pool today.

Benefits of a lower demand for foreign exchange reserves in the Eurozone

Before creation of the EMU a discussion developed on the foreign exchange reserves and their surplus that was represented by amounts outstanding after creation of the common pool at 50 billion of Euros. The recognized benefits resulted from lowering the costs of maintaining foreign assets and from increasing the rate of return on foreign assets portfolios. The surplus of the foreign exchange reserves could no longer be maintained in gold and could be exchanged into instruments generating a much higher rate of return at a much lower liquidity. Up to that moment, the diversification of foreign assets portfolios was significantly restricted.

Both, the IMF and independent economists underestimated the surplus of the foreign exchange reserves in the EMU. The IMF estimated the surplus at 50 to 230 billion of the USD [IMF 1998, p.143]. Masson and Turtelboom [1997, p.17] estimated the total value of the surplus at 105 billion of the USD. Among many estimations of the surplus of the foreign exchange reserves in the EMU the most accurate was the one by the European Commission. According to the EC, the surplus was supposed to be about 300 billions of Euro, above the statutory 50 billions in the common pool.

Currently, in the 2011, the surplus in the foreign exchange reserves amounts at 562 billion Euro, after 374 billions in 2008 [ECB 2011, p.16]. The available rate of return from 5% to 10% suggests potentially significant benefits from it. In the first years of the third phase of the EMU it was not expected to witness any effects of the monetary integration on foreign assets portfolios. Is was caused by the decision of the ECB forbidding the sale of foreign assets. In case of quick liquidation, appreciation of Euro would follow. This in turn would be detrimental to competitiveness of European exports. The IMF contradicted this view, and claimed that the potential appreciation would be very small. The reason is because the foreign exchange reserves of the Eurosystem represent a small part of all of the USA foreign liabilities. However, the appreciation trend of Euro against the US dollar may be attributed partly to realignments in foreign assets portfolios.

Rationale for the postulated realignment in foreign assets portfolio in the Eurozone

Foreign exchange reserves management became important because of excessive costs associated with maintaining large portfolios of foreign assets. With the primary aim to maintain international liquidity of a country, cost optimization begun. The new objectives (to minimize costs & to maximize rate of return) added to the previous ones (liquidity & safety) generated the need for realignments in the structure of reserve assets. There were several main reasons why such transition in the approach occurred. First, there was a significant increase in the stability of the global financial system. The last decade of the XXth century witnessed not only decreasing prices of natural resources but also low and stable inflation. In the same time, many central banks introduced two systemic solutions (1) inflation targeting and (2) free float, as the exchange rate regime. The latter one decreased demand for liquid foreign assets even further. With the general and broad macroeconomic stability and market-based exchange rates, demand for international liquidity systematically decreased. However, it was still not enough to cause large-scale realignments in the foreign assets' portfolios, due to precautionary considerations in each and every country that was managing its foreign exchange reserves on its own. Only after monetary integration affected countries that represent a substantial share in the global GDP and in international trade, time structure began to change.

In a monetary union, demand for foreign exchange reserves is significantly lower due to the fact of executing substantial part of all current and financial transactions in a common currency. All intra-union export-import transactions are denominated in the common currency. In addition, direct and portfolio and other investment within the union is also denominated in the common currency and do not call for any

foreign exchange to settle an intra-union transaction.

There are additional reasons why excessive foreign exchange reserves accumulate when countries operate as a monetary union. In case of the Eurozone, common sectoral and monetary policies resulted in a temporary increase in the productivity of capital within the member states. This, in turn, attracted capital from the rest of the world, adding to the total amount of foreign assets in the international investment position of the European Monetary Union countries. Higher productivity of capital was also generated due to financial markets integration and lowering transaction costs. Inflow of foreign capital was not discouraged by the relatively low interest rates for instruments denominated in the Euro.

To conclude, it can be said that due to general trends in the global economy and because of regional developments, demand for international liquidity decreased significantly. In the same time, excessive surpluses in foreign assets portfolios accumulated for the EMU countries. The question remained: What to do with the amounts denominated in foreign currencies that, on one hand, were generating continuous costs of maintaining them, and on the other hand, were kept in highly liquid securities that were offering low rate of return. With the 'price stability', as the main objective of the common monetary policy of the European Central Bank, expanding money supply in the Eurozone was not an option. Therefore, despite the recognized excess of foreign reserve assets, above what was necessary to grant international liquidity, the accumulated stock was not released in any other form. With the nominal total value, a different change occurred, a change in the maturity structure.

Departure from holdings of short-term, highly liquid assets disturbed the yield curve of the global interest rate. The suggested effect could be described as follows. The latter members of the System of National Central Banks of the Eurozone were custodians and managers of nations' foreign assets. Despite the actual currency composition was always and everywhere classified, it can be said that aside monetary gold, foreign exchange reserves were maintained in the most liquid financial assets of the shortest available maturities. When the ECB was created, and the EMU member states transferred the required amounts of reserves to the common pool, the remaining foreign assets at their disposal were still substantial. Analyzing behavior of exchange rates of major reserve currencies at that time, it can be said that the postulated realignment in the excessive amounts of foreign reserve assets were not affecting the currency pattern. The only other dimension that potentially could be the subject to change was the maturity structure of instruments, in which reserves were maintained.

Therefore, a hypothesis is posed about the rational response of the System of National Central Banks in the Eurozone. These agents redesigned their foreign assets portfolios at the onset of the EMU, moving from the short-term securities to the longer-term securities. Such realignment resulted in substantial alterations, for the time of this process, in the interplay of demand and supply of capital at different maturities. Statistical exercise based on interest rates from 1987 to 2011 offers some hints about the actual timing of these postulated realignments.

Empirical investigation of disturbance in the yield curve for the global interest rate

Testing for unusual developments in the global interest rates is based on the LIBOR interest rates for the main reserve currency – the USD. Time series for the empirical study come from an on-line database (www.global-rates.com) provided by Triami Media BV in cooperation with HomeFinance.

The study considers the annual average interest rates for each maturity, from 1-month to 12-month, as the best proxy for the market situation in any given year. A methodology for recognizing disturbances at global financial markets is very simple. Since the yield curve is supposed to be of a normal shape in normal circumstances, then an unusual situation may be recognized when the yield curve inverts. Using the annual averages of interest rate for different maturities makes the study informative and removes all small, short-time disturbances. By this approach only significant and persistent changes are pronounced and observed.

The first step of the empirical analysis utilizes the original time series of the LIBOR interest rates of maturities (1M⇒12M). According to the theory of finance, the risk premium for maturity period should make interest rates for longer maturities higher than for the shorter maturities. As a consequence, the difference between interest rates for the longest maturity and any interest rate for a shorter maturity should be positive. Testing for this rule required calculation of the postulated differences. These are presented graphically in Figure 1.
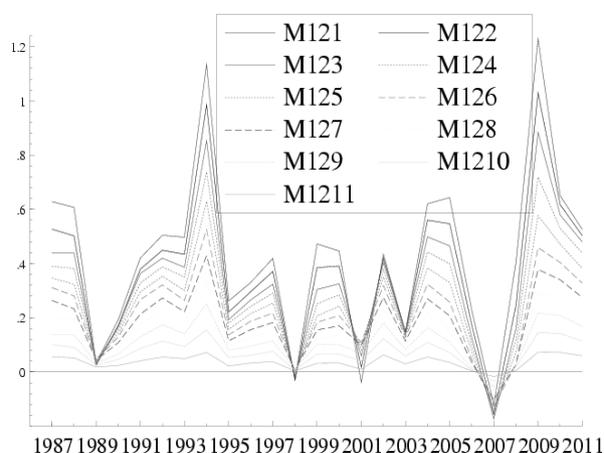
Figure 1. Differences between 12-month interest rate and interest rates for maturities from 1-month to 11-months – 1987 – 2011.
Source: Author.

As can be observed in Figure 1, for most of the years covered by the analysis, the standard relationship between longer and shorter maturities was present. However, there are three years, for which this rule does not hold. The years of unusual behavior of interest rates' differentials are: 1998, 2001 and 2007. The 2007 changes in financial markets can be interpreted as signs of the global crisis approaching. Financial institutions were looking for more liquidity and they realigned their portfolios from longer to shorter maturities, creating additional demand for short-term money market

instruments and excessive supply of longer-term ones. This in turn, influenced the interest rates of financial instruments of different maturities. Relatively increased demand for longer maturities of financial instruments pushed up their prices. As a consequence, the interest rates for these maturities decreased.

The reversed yield curves for selected years (presented in Figure 2 and in Figure 3) offer another opportunity to confirm the interpretation of the situation at the global financial markets. In all the years that precede yield curve reversal, the situation is normal. The pattern of interest rates for different maturities exhibits the postulated relationship in 1997, 2000 and 2006. Then, in the years of the actual reversal, interest rates for longer maturities experience a significant decline. It should be noted that the relative change in short-term interest rates is relatively small in comparison with the change in the level of interest rates of longer maturities.
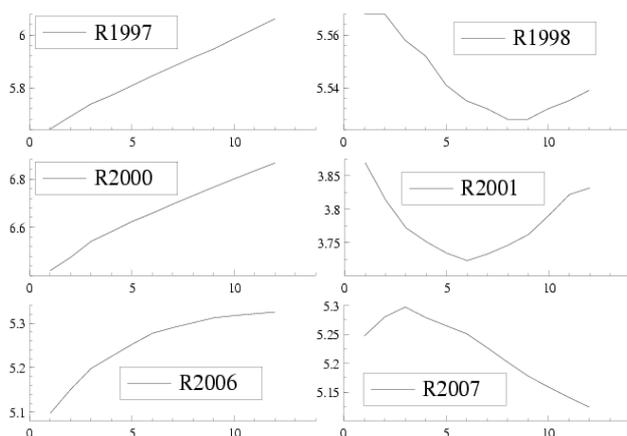
Figure 2. Yield curves for the global interest rate (from 1M to 12M) in pairs of years when curves reversed.
Source: Author.

After the years of the observed reversals in the yield curve (1998, 2001, 2007), the relationship between interest rates of different maturities return to the normal state. This is presented in Figure 3, with upward sloping curves in the second column of charts. The same shape, of persistently upward sloping yield curves is recognized for all other years covered by this study, from 1987 to 2011. The only years of temporary reversals in the pattern of interest rates at different maturities are 1998, 2001 and 2007. It is argued that the reasons for the observed behavior in 1998 and in 2001 were realignments in the foreign exchange reserves portfolios of central banks. These institutional agents in the Eurozone found themselves in a situation of excessive foreign assets and started to optimize foreign exchange reserves management. Minimizing costs of maintaining foreign assets in a form of monetary gold resulted in systematic decline in gold prices at global market for this asset. The other kind of realignment was the move from short-term financial assets to longer-term securities that offer lower liquidity, but much higher rates of return.
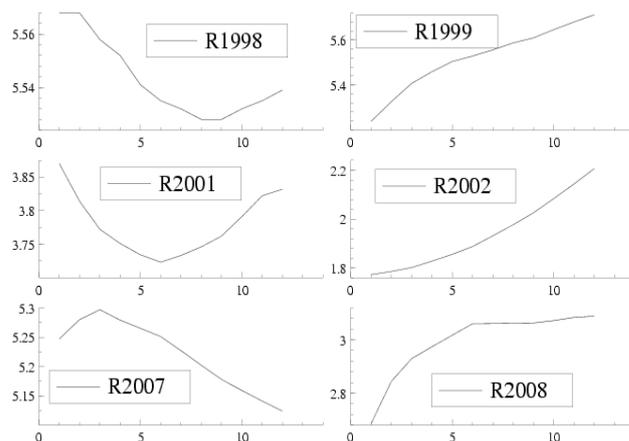
Figure 3. Yield curves for the global interest rate (from 1M to 12M) in pair of years when curves reversed again.
Source: Author.

Information included in Table 1 represents a proof for significance and clear difference between yield curves for several more years than covered by Figures 1 and 2. Correlation coefficients of interest rates for different maturities in the period from 1997 to 2007 leave no doubt that 1998, 2001 and 2007 exhibited a very different pattern than all other years covered by this study.

Table 1. Correlation coefficients for yield curves of the global interest rate for maturities from 1M to 12M over the period from 1997 to 2007.

	98	99	00	01	02	03	04	05	06
97	-0.82								
98	1.00								
99	-0.88	1.00							
00	-0.86	0.99	1.00						
01	0.52	-0.23	-0.13	1.00					
02	-0.70	0.92	0.96	0.17	1.00				
03	-0.57	0.86	0.90	0.31	0.99	1.00			
04	-0.83	0.98	1.00	-0.05	0.98	0.93	1.00		
05	-0.89	0.99	1.00	-0.18	0.94	0.87	0.99	1.00	
06	-0.94	0.98	0.96	-0.39	0.84	0.75	0.94	0.98	1.00
07	0.63	-0.81	-0.88	-0.32	-0.96	-0.96	-0.91	-0.86	-0.73

Source: Author.

The observed negative correlation coefficients for 1998, 2001 and for 2007 indicate that in these three years the situation at the financial markets was opposite to that in all of the other years. In particular, it is necessary to stress the fact that for most cases the value of correlation coefficient is statistically significant and it is close to minus one.

There is one more statistical analysis exercise that is able to offer some more information about the nature of the observed changes. To answer a question: what is actually changing in order to deliver an inversed yield curve? Is the short term increasing? Or is the long-term decreasing? To answer these questions and provide a deeper insight into the nature of the

observed developments, changes on the year-to-year basis are presented in Figure 4. The new time series are calculated as follows: interest rate in the year preceding a change in the yield curve MINUS interest rate in the year of the yield curve inversion. Variable D9798 represent a difference in interest rates between 1997 and 1998. Variable D9899 represents a difference in interest rates between 1998 and 1999. The other charts are based on the same pattern of calculating year-to-year differences in interest rates.
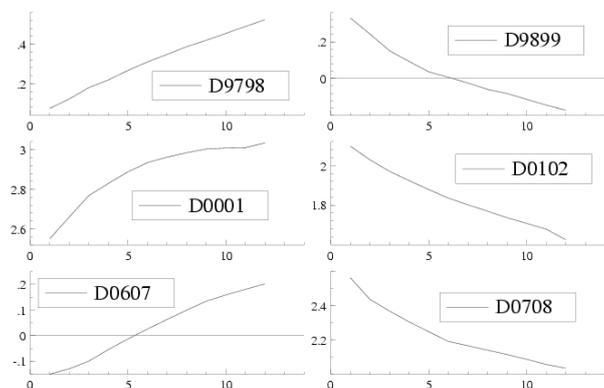
Figure 4. Year-to-year changes of interest rates (from 1M to 12M) for years when yield curves inverted and returned to normal shape again.
Source: Author.

As can be seen in the first column of charts in Figure 4, each and every yield curve reversal was associated with much greater change in long-term interest rates than the change in interest rates for the shortests maturities. In case of year 2007, the change in short-term interests rates was even deeper, resulting in a negative change that indicates an increase (2006 minus 2007). It could be concluded that in 1998 and in 2001 short interest rates did not change in a significant way. The observed yield curve invertion should be attributed solely to the adjustment of long-term interest rates that decreased relatively to the short-term ones.

The following changes that returned all yield curves to the normal shape are in 1998/1999 case different from the later two cases (2001 & 2007). From the second column of charts in Figure 4 it can be recognized that in 1999 the average interest rates for short maturites declined and these for longer maturities increased. This is a seesaw effect and it was quite symmetric. For the other two years (2002 and 2008) the adjustment that resulted in returning the yield curve to the normal shape was of different kind. Long term interest rates experienced a change statistically not different from ZERO. These are the short-term interest rates that were responsible for reshaping the yield curve by a relatively substantial decline.

Conclusions

Monetary integration in the European Union covers more and more of the EU countries. The economic and demographic potential of the Eurozone is still growing and in 2011 exceeds the potential of the USA. It was expected that the creation of a common currency backed by high developed countries that represent a substantial share in the global GDP and in the international trade will have a significant influence on the global economic and financial system. However, issues associated with reserve assets management and consequences of accumulation of excessive amounts of foreign assets at a disposal of the European Central Bank and the European System of (national) Central Banks were not subject to earlier studies.

As was presented in the empirical part of the paper, behavior of global interest rates from the moment the ECB was created exhibited several times a clear divergence from a situation that is typical. The analyzed yield curves for the global interest rate for financial instruments denominated in the leading reserve currency (the USD) reversed in 1998, 2001 and 2007. The first case could be associated with the creation of the ECB and pooling the foreign exchange reserves, according to the statutory requirements. After creation of the common pool of foreign assets at the disposal of the ECB, the national central banks of the Eurozone started to optimize their portfolios by moving from short-term maturities to longer-term maturities. As a consequence, an inversed yield curve for average interest rates in 1998 was observed. Another inversion took place in 2001, when there was expansion of the EMU and the directive of the ECB prohibiting national central banks to sell their foreign assets was no longer binding. In 2001 the ECB and all other institutional and private agents recognized that the common monetary policy and the new currency were successful. The stable macroeconomic position allowed for further realignments in foreign assets' portfolios and demand for instruments with longer-term maturities increased again.

The last case of the yield curve reversal, despite it co-occurred with another EMU expansion, it is difficult to associate this change solely with European developments. It is possible that in the year that precedes directly the outbreak of the global financial crisis there were already some changes in confidence of financial markets. Therefore this particular inversion of the yield curve is left without a specific Euro-related interpretation. Since this issue remains still unclear, it calls for further theoretical, institutional and empirical studies.

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