Charles University in Prague
Faculty of Social Sciences

Institute of Economic Studies

MASTER THESIS

2010 **Gledis Kazaziová**

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Interest Rate Pass-Through: Does It Change with Financial Distress? The Czech Experience

Author: Gledis Kazaziová

Supervisor: Roman Horváth, Ph.D.

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Prohlášení

Prohlašuji, že jsem diplomovou práci vypracovala samostatně a použila pouze uvedené prameny a literaturu.

Declaration

Hereby I declare that I compiled this diploma thesis independently, using only the listed literature and resources.

Prague, 14th May 2010

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Gledis Kazaziová

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Abstract

The aim of this thesis is to investigate the behavior of the interest rate transmission from money market rates to bank retail rates on the Czech banking market during the period from January 2004 to January 2010, and to detect potential changes occurred as a result of current financial crisis. Using Ordinary Least Squares, Recursive Coefficients estimates and Impulse Response analysis we explore that bank retail rates reflect Pribor rate changes more strongly than changes in Euribor rates. We reveal that interest rate pass-through is rather incomplete and sluggish in the majority of cases and the adjustment level decreases noticeably during the period influenced by the financial crises.

Keywords: interest rate pass-through, monetary policy, money market rates, bank retail rates, financial crisis

Abstrakt

Cílem této práce je analyzovat efektivitu úrokového transmisního mechanismu na českém trhu v období od ledna 2004 do ledna 2010 a ukázat, zda se úroveň transmise z mezibankovních sazeb do sazeb klientských změnila vlivem současné finanční krize. Za použití metody nejmenších čtverců, rekurzivních koeficientů a analýzy reakcí na impulzy zjišťujeme, že klientské sazby reagují podstatně silněji na změny Priboru než na změny Euriboru. Dále jsme objevili, že proces transmise je ve většině případů neúplný a zdlouhavý a míra přizpůsobení se pod vlivem finanční krize zásadním způsobem snižuje.

Klíčová slova: transmisní mechanismus úrokových sazeb, monetární politika, tržní úrokové sazby, klientské sazby, finanční krize

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List of Abbreviations

AM	Agreed Maturity
CZK	Czech Koruna
EMU	European Monetary Union
KPSS	Kwitlowski, Phillips, Schmidt, Shin
LM	Lagrange Multiplier
NP	Notice Period
OLS	Ordinary Least Squares
VAR	Vector Autoregression

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Chapter 1

Introduction

Bank retail rates are a key factor in the transmission of monetary impulses to the real economy. Essential to the effectiveness of monetary policy is how fast and to what degree is the policy rate transmitted to money market rates and consequently, how do lending and deposit rates adjust to these changes. The analysis of the interest pass-through is even more important at present time as there are several signs of potential weakness and increased uncertainty on the financial markets.

This study aims to analyze the long-term relationship of money market rates and bank retail rates and to investigate the development of the transmission over the last six years. As the Czech Republic is an open economy and displays a high participation of foreign banks on the market, an important contribution of this study is that for the first time not only the transmission of domestic Pribor rates, but also the transmission of Euribor rates to bank retail rates are examined. In addition, we try to detect whether the pass-through process changes in presence of financial distress. Several methods are used to obtain utmost information about the investigated data; Ordinary Least Squares (OLS), Recursive Coefficients and finally, the Impulse Response Analysis.

The thesis is organized as follows: In Chapter 2 we introduce very basic facts about monetary policy mechanism and channels it operates through. In the second part of this chapter we present the determinants important for the transmission efficiency and the worldwide findings, based on the existing theoretical and empirical literature. Chapter 3 is dedicated to the Czech market background and its development during the period under review. Moreover, we discuss whether the Czech market accomplishes the assumptions of the transmission determinants. In

Chapter 4 we introduce the investigated dataset and particular methods we use to obtain consistent and trustworthy results. In Chapter 5 we present and discuss in detail the results and compare them with already existing literature. Finally, in Chapter 6 we summarize and conclude our findings and predict the future development of interest rate pass-through.

Chapter 2

Basic Facts and Worldwide Findings

2.1 Monetary Policy Channels

Monetary policy is a set of procedures in a given institutional framework leading to decisions affecting the monetary magnitudes, in order to achieve goals set by monetary authorities. The purpose of central bank strategies is to maximize the economic welfare, which is generally attributed to two main objectives of monetary policy, price stabilization and the stabilization of economic activity.

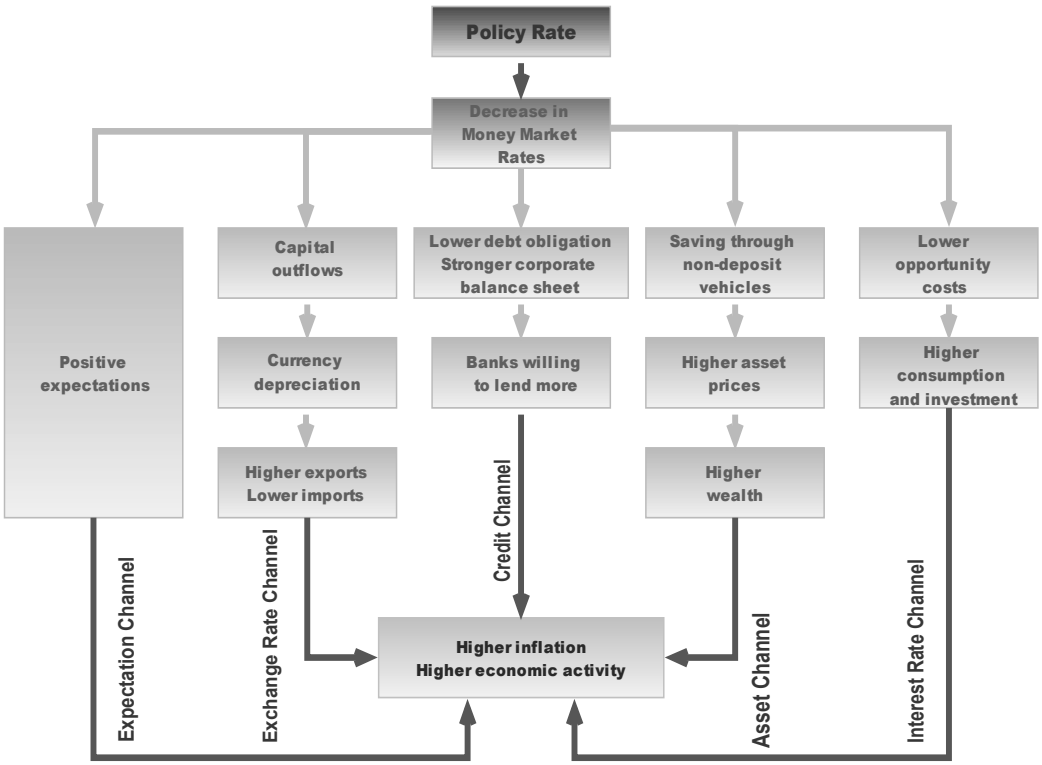
Transmission mechanism of monetary policy leads to desired changes through changes in the setting of monetary policy instruments. At the beginning of the transmission mechanism, there is a change in settings of monetary policy instruments, an initial impulse. This change leads to a movement in behavior of intermediate market influenced directly by monetary policy instruments which in turn affects the price development of the "target" markets, which central banks are willing to change.

Monetary policy is a powerful weapon but in some cases it might bring undesired and unanticipated consequences. In order to achieve required goals and to estimate the effects of monetary policy decisions, the monetary authorities must be accurate in setting the timing and considering aftermaths of their procedures, which necessitates a comprehension of the mechanisms through which monetary policy operations influence the economy development.

Transmission mechanism operates through several parallel channels which are mutually interconnected: the credit channel, the exchange rate channel, the asset

channel, the expectation channel and finally the interest rate channel. In this study we are going to investigate in detail the interest rate pass-through channel. Nevertheless, for better understanding of this process, we should also be acquainted with the functioning of particular channels that are directly driven by changes in policy rates. The basic diagram showing the whole transmission process is presented in *Chart 2.1.*

Chart 2.1: Monetary Policy Channels



Interest Rate Channel

Change in monetary policy interest rates leads first to a movement of interest rates on the interbank market. Changes in money market rates, in turn, cause changes in interest rates announced by banks for lending and taking deposits. Part of these adjustments can be explained through portfolio management of financial institutions in order to maintain competitiveness and generate profit.

Chart 2.2: Interest Rate Transmission

The overall process starts again by a decrease (or increase) of policy rates which is subsequently reflected in money market and retail interest rates. This change induces changes in consumption and investment evoking domestic demand to boost or decrease. It consequently leads to weakening or strengthening of economic activity and inflationary power.

According to Horváth et al. (2004), interest rates intervene in economy through three main channels. The first channel is represented by intensity of substitution effect, i.e. how the changes in relative prices of credit and deposit possibilities influence the behavior of companies and households. The second channel operates through the income effect, which determinates what effect do new interest rates have on costs and incomes of economic agents. Finally, the third indicator is represented by the wealth effect, which displays how do interest rate changes influence the overall value of companies and households through changes in value of their real and financial assets.

The speed and the size of the pass-through of official and market interest rates to retail bank interest rates empower monetary policy transmission and thus streamline price and financial stability. The interest rate channel is regarded as a very importanat player in transmission of money market measures. However, we must bear in mind that it is not enough to only affect the dynamics of market interest rates in the interbank market or the government bond market in order to achieve the proper effect, but to influence the whole spectrum of retail interest rates on client banking business, which is a key condition necessary to change consumer and investment behavior of economic entities.

Expectation Channel

Expectations play very important role in the pass-through process. The impact of monetary policy through this expectation channel is the most insecure of all

channels, as it depends on the public's interpretation of such changes in monetary policy stance. The effect of lower money market rates might be so strong that agents might reconsider their further expectations of permanent nature. While changes viewed as temporary will not affect pricing decisions, those considered as persistent will.

Exchange Rate Channel

Monetary policy is able to bring about changes on the level of the exchange rate and thus to provoke changes in prices, trade volumes and investments (Coricelli et al. 2006). A lower policy rate leads to lower money market rates and retail interest rates overall. Returns on domestic investment decline relative to those from foreign investments causing outflow of capital. This causes currency depreciation and thus distracts foreigners, which stimulates exports and discourages imports. Thereby, aggregate demand increases and leads to higher economic growth.

Credit Channel

Bernanke and Gertler (1995) determine two ways in which the credit channel of monetary policy transmission operates. First, the bank lending channel which affects the supply of loans by depository institutions. Second, the balance sheet channel, through which monetary policy influences income statements and balance sheets of borrowers. Bernanke and Gertler stress that credit channel enhances and intensifies the interest rate channel. Again, decrease in the policy rate causes a decrease in money market rates. Debt obligations decline and thus strengthen borrower's balance sheets. Consequently, banks are more willing to lend as the customer risk is lower. As a result, investments increase magnifying economic growth. And at the same time inflationary pressures rise.

Asset Channel

Monetary policy is also capable of influencing asset prices. A decline in policy rate is transmitted to money market and retail interest rates. Falling interest rates will then increase the attractiveness of equities, fueling equity purchases. People will thus have an incentive to redistribute their savings to non-interest assets (equity, securities etc.), which will in turn raise their prices. Higher prices lead to higher

market value of firms, thus making them advantageous for investment. Finally, higher demand will evoke higher economic growth.

2.2 On the Determinants of the Interest Rate Pass-through

It is crucial to be familiar with the determinants that influence this process in order to study and understand the mechanism and the dynamics of interest rate pass-through from market interest rates to retail bank interest rates. On the following pages we will review the findings of recent economic literature dealing with factors explaining incompleteness and sluggishness in retail rate adjustment. The first part is dedicated to the character of banking industry; the second one analyzes segments of macroeconomic conditions.

2.2.1 Character of Banking Industry

In this section we will introduce parameters of financial structure that induce reactions of bank retail rates to monetary policy shocks. We revise the empirical findings of literature dedicated to influential bank market structure features such as competition and concentration level within the banking system, elasticity of demand for bank loans and deposits, internal characteristics of bank institutions, regulation of the banking sector and the impact of adjustment costs.

Bank Concentration and Competition

There are several disagreements dealing with rapport between competition and concentration. While *the standard approach* assumes that higher market concentration leads to less competitive markets, there are numerous criticisms disagreeing with this statement and assaulting studies where the level of competition is measured by concentration index[1]. Cottarelli and Kourelis (1994) as well as Van Leuvensteijn et al. (2008) claim that this is an inappropriate method since concentration doesn't always erode competition and markets can, in contrast, behave competitively in presence of low market entry barriers. Moreover concentration indexes do not differentiate between large and small countries, where the concentration is generally higher. We will, therefore, take into consideration and distinguish between the impact of bank competition and bank concentration (for

[1] E.g. Onega and Popov (2009) approximate the level of competition by concentration index

those who use concentration indexes as expression of competition level) on the interest rate transmission.

The degree of competition among banks is one of the most examined and most important determinants of interest rate pass-through. It has been proved by several authors that bank competition affects essentially the monetary transmission mechanism. The common finding is that higher competition on the bank market leads to stronger and faster pass-through Cottarelli and Kourelis (1994), Leuvensteijn et al. (2008), Mojon (2000) etc. Insufficient competitive environment evokes lower demand for loans and deposits sensitivity to interest rate (Égert et al., 2006) and thus causes pass-through stickiness.

According to existing literature, the pressure of competition on the pass-through differs across various products of retail bank market. Van Leuvensteijn et al.[2] (2008) have found that competitive environment has higher effects on the loan markets rather than on the deposit markets. Mojon's[3] results (2000) indicate that competition influences positively the speed of the pass-through to deposit rates when money market rate increases, and to credit rates when money market rate decreases, thus reduces the interest rate cycle asymmetry of the pass through. Nevertheless, the results suggest that the interest rate pass-through may vary over the interest rate cycle if the competition level is low.

The effect of bank concentration depends on retail interest rates category as well. Corvoisier and Gropp (2002) discovered that lending rates become more sluggish as concentration increases, while savings deposits don't show such tendency. Wróbel and Pawlowska (2002) obtained the same result concerning lending rates but they found that higher concentration has increased the pass-through for deposit rates. In contrast Cottarelli and Kourelis (1994) did not locate any impact of the degree of market concentration on landing rate stickiness at all. Finally, Sander and Kleimeier (2004) found that lower concentration leads to faster adjustment of retail rates on both loan and deposit markets.

[2] Leuvensteijn, Sorensen, Bikker and van Rixtel (2008) use "Boon indicator" as a measurement of competition based on the impact of efficiency on market shares

[3] Mojon (2000) measures bank competition by Gual cumulative index of bank deregulation

Kok- Sorensen and Werner (2006) made an interesting research applying two different methods on the same data. The first one was using Lerner index as measurement of bank competition, and second one was using Herfindahl index as proxy of concentration level. In this case, the results obtained from each survey predicated that higher competition and lower concentration forces banks to faster interest rate adjustments. They are thereby in line with each other and thus support the *standard approach.*

Although many authors generally take for given that high concentration slows down the transmission process, examples mentioned above do not support this approach.

Elasticity of Demand

Another important determinant causing retail rate stickiness is the *elasticity of demand*. De Bond (2005) considers distinctions in demand elasticity across various products as the main reason explaining asymmetries in money market rate transmission. A low elasticity of demand springs up as a result of low competition, high barriers to entry, high switching costs or asymmetric information. It implies that imperfect elastic demand also evokes a delayed and incomplete adjustment of bank retail rates, since all mentioned factors cause rigidities themselves, as also shown empirically by de Bondt et al. (2002), Coricelli et al. (2006) etc.

Bank Characteristics

It was proved in several studies, e.g. Horváth and Podpiera (2009) that the nature of interest rate pass-through varies across the banks. This might be given by the inherent characteristics of particular banks as discussed below.

It has been inquired by Cottarelli and Kourelis (1994) whether bank *ownership structure* influences retail rates range and the speed of the interest rate pass-through. As pointed out by the authors, lending rates strike is being more rigid in markets where state owned banks prevail. “This finding adverts to inefficiency of public banks or existence of political constraints on interest rate changes”(pp. 613). Égert et al. (2006) also dedicated part of their research to this topic. They have argued that participation of foreigners in the banking sector boosts the interest rate pass-through as the market becomes more competitive and efficient. However, lack of literature

dealing with this subject does not allow us to make a definitive conclusion about the relationship between ownership structure and interest rate pass-through.

The next examined prejudicing parameter is the *size* of the bank. Weth (2002) explores that small banks do not respond to changes in money market to such extend as large banks, because large banks are able to react faster to changes due to better access to the capital markets. Moreover, he also detects positive relation between pass-through stickiness and *volume of non-bank business*. Weth explains that "long-term non-bank deposits which represent a large share of a bank's long-term lending enable the bank to set its lending rates more independently in the first months after a market rate change" (pp.23).

Chmielewski (2003) adverts to another factor important for understanding bank pricing policies, *bank profitability*. His empirical findings denote that higher profitability (due to better competitive position) intensifies and speeds up the incorporation of money market rates changes.

Adjustment Costs

One of adjustment costs enhancing interest rate stickiness are naturally *switching costs*. High switching costs discourage customers to change their bank. They are relatively high when long-term relationships and repeated transactions are substantial to the market. Borio and Fritz (1995) suggest that customer stickiness may appear also due to customer's aversion to variable interest payments. Retail interest rate rigidities might spring from high menu costs, from banks point of view. De Bondt et al. (2005, pp. 7) claim that "menu costs may induce banks to define a target retail rate as a function of long-term rates, as a smooth indicator of future changes in money market rates".

Regulation

The very last important factor influencing interest transmission stickiness is regulation of banking sector. Lower regulation level is generally considered to be a lead to higher transmission level. According to his empirical findings, Mojon (2000) concludes that deregulation has significantly affected the interest rate pass-through process for deposits, but not for loans.

2.2.2 Macroeconomic Conditions and Financial Development

It is intuitive that macroeconomic conditions must significantly influence the interest rate pass-through. Supportive economic conditions create a suitable environment for easier and faster adaptation of deposit and landing rates. Naturally, the pass-though gets stronger as the degree of economy development increases. Nevertheless Cottareli and Kourelis (1994) say that it is not the only explanation of the differences in pass-through level between different countries. Openness of the economy also raises the degree of competition and attracts foreign investors and might thus lead to better pass through. In this section we will discuss empirical findings of works concerning with economic growth and inflation, level of development and volatility of financial markets.

Economic Growth and Inflation

It has been observed that interest rate transmission is more fluent during periods of rapid economic growth (Égert et al. (2004)). Many authors, such as Mojon (2000); Cottarelli and Kourelis (1994); Coricelli et al. (2006); Égert et al. (2004) also declare a positive impact of inflation on interest-rate pass-through. Sander and Kleimeier (2003, 2004, 2006) claim that this finding holds at later stages of pass-through process during approximately six months period. Higher inflation has an opposite effect (slows the pass-through) during the first six months, according to authors. The reason for better reaction is more frequent price adjustment during the high-inflation environment. Considering these findings, we might indicate that low inflation level in developed economies with stable monetary policy conditions slows down the interest rate transmission process.

Development of Financial Markets

As shown by Cottarelli and Kourelis (1994) financial market development enhances the flexibility of retail rates (lending rates in this case). Sander and Kleimeier (2004) also conclude that financial development has a positive impact but only when measured by the share of private credit in GDP[4]. In contrast, Crespo-

[4] No such effect is present when broad money to GDP is used as a measure.

Cuaresma, and Reininger´s (2004) results do not reflect any effect of financial deepening.

Volatility

We might say that interest rate volatility is the key factor regarding the macroeconomic determinants of the pass through. It reflects the uncertainty in macroeconomic conditions and monetary policy regime. Bank retail rates won't follow aimless and temporary movements of money market rates an will wait longer to adjust their retail rates. Thus, as naturally expected and moreover proved by Mojon (2000); Cottarelli and Kourelis (1994); Coricelli et al. (2006); Égert et al. (2004), intense interest rate volatility coincides with sluggish pass-through. As in case of the previous determinant (inflation) Sander and Kleimeier (2004, 2006) confirm this result but in their case this phenomenon holds only after approximately six months.

Transparency of Monetary Policy Changes

Another factor influencing both size and speed of the interest rate transmission is future anticipation. If monetary policy movements are transparent and anticipated, banks should be logically able to react faster. Kleimeier and Sander (2006) attended to this topic and learned indeed that expected monetary policy changes lead up to faster adjustment then unexpected changes for loan markets rates while time deposits seem to have stickier reactions. Predictability, clarity of monetary policy movements and better communication among central banks and markets make transmission process smoother and thus streamline monetary policy implementation.

2.3 Literature Overview

The integrity of the interest rate pass-through reflects the price and financial stability of particular economy and thus also the efficiency and strength of monetary policy interventions. There is a wide range of literature that grapples with this issue. Recent studies dealing with interest rate pass-through differ in terms of the estimation methods and the datasets used and thus reasonably show cross-country differences in the interest rate pass-through findings. Although no clear pattern appears

from those results, in the following part of this study we will try to compare and summarize the findings of the published literature.

2.3.1 Worldwide Findings

A growing literature broadly shows distinctions in transmission of changes on money market according to time. Bank retail rates generally exhibit delay in adjusting to money market changes. A common observation, as found by Cottarelli and Kourelis (1994), Borio and Fritz (1995), Mojon (2000), Sander and Kleimeier (2002, 2004), de Bondt (2005), Kok- Soerensen and Werner (2006), is that the pass-through is sluggish and changes in money market rates are not fully incorporated in the short-run whereas they are (almost) fully reflected in retail rates in the long-run. Some of the authors, such as Cottarelli and Kourelis (1994), Borio and Fritz (1995), de Bondt (2005) find or assume (Mojon, 2000) full completeness in the long-run. Moreover, de Bondt (2005) detects even more than "one-to-one" adjustment. "More than one-to-one adjustment suggests that bank credit was on average not rationed and consistent of relatively risky loans"(pp. 45). On the other hand there are many studies e.g. Sander and Kleimeier (2002, 2004), Burgstaller (2005) etc., that obtained contradicting results. Thereby the completeness of the pass-through in the long-run cannot be confirmed as uniform framework.

The level of sluggishness in respond to money market rate changes varies across different bank products. In general, we can conclude that lending rates have stronger reaction to money market changes then deposit rates, as proved e.g. by Mojon (2000), Sander and Kleimeier (2002, 2004a,b), de Bondt (2005) or Ozdemir (2009) etc. In particular, mainly overnight deposits, current accounts, deposits redeemable at notice and occasionally consumer lending rates are assigned as the stickiest by the majority of authors. On contrary, long-term lending rates seem to exhibit the fastest and most complete adjustment.

In their study, Horváth et al. (2004) compare the transmission regarding target sectors. They find that deposit and loan rates to corporate sector display stronger transmission than the corresponding rates to household sector.

Also the maturity of given rates plays an important role in the size and completeness of adjustment. De Bondt et al. (2005) show that retail bank interest rates adjust not only to changes in short-term but also in long-term interest rates.

According to Mojon (2000), de Bondt (2005), Coricelli et al. (2006) the size and the speed of the pass-through typically increases with the reduced maturity of retail rates. "This implies that the pass-through from the policy rate to retail rates occurs via short-term rather than long-term market rates"(Coricelli et al., pp.6).
Mojon (2000) and De Bondt et al. (2005) stress that the transmission stickiness is caused to large extend by differences between maturities of money market rates and bank retail rates. According to Mojon (2000), banks may try to limit interest rate risk on long-term loans by increasing the maturity of the funding of such loans.
Despite the diversity of approaches, the majority of the studies comes to conclusion that interest rate pass-through varies across different bank retail rates, especially in the short-run. We can observe that interest adjustment is approaching the absolute completeness in most cases in the long run; however, so far no uniform consensus has emerged. We can also see asymmetries across particular bank products. Majority of studies suggests that rates on loans to enterprises and rates on time deposits adjust relatively quickly, while rates on loans to households and rates on overnight and savings deposits are relatively stickier.

Number of empirical literature detects asymmetries in the pass-through processes. That means that particular retail rates do not react similarly to money market rates changes regarding the size and the speed of adjustment. This happens in presence of imperfections in determinants of interest-rate pass-through, especially failures in competition environment. If banks can exert market power over their customers, it is possible that the financial institutions adjust their pricing asymmetrically (Chmielewski, 2003). We can often observe differences in reactions regarding directions of initial change (whether the money market rate raises or falls). When interest rates increase, lending rates respond faster than deposit rates. In reverse, when money market rates are falling, banks adapt their deposit rates more quickly then lending rates (Weth (2002), Mojon (2005). Scholnick (1996) confirms these finding regarding the deposit rates, while Sander and Kleimeier (2000) confirm faster adjustment of lending rates when rates are above equilibrium level. It should be mentioned at the same time, that banks try not to overshoot lending rates increases. Higher lending rates attract low quality borrowers who choose riskier projects and thus cause a decline in creditworthiness of bank's borrowers, which lowers the expected value of repaid amount. Hannan and Berger (1991) argue that

higher stickiness in deposit increases might erode due to collusive pricing behavior of banks. There is a possibility that these arrangements could fall apart in case of change in prices, thus banks count on the cost of potential breakdown before adjusting their prices. The awaited costs are higher for deposit rate augmentation as payments to depositors are higher. This implies that deposit rates are stickier in case of interest rate increase.

To sum it up, we conclude that although the results vary across particular bank products and individual countries, vast majority of empirical evidence records incompleteness and sluggishness of the interest rate pass-through. Moreover, several studies detect also asymmetric adjustment. Differences and imperfections of the transmission are to a large extent in dependence with maturity of given retail rate and shortcomings in transmission determinants.

2.3.2 Impact of the Financial Crisis

One of the hypotheses of this work is whether interest rate pass-through changes with financial distress. In particular, what kind of shock to the transmission mechanism was caused by the crisis afflicting financial markets since summer 2007, i.e. whether the decisions of financial institutions regarding setting their lending and deposit rates have changed since the crisis begun.

Common consensus suggests that financial crises influence the speed and the degree the interest rate pass-through. Using Markov switching VAR model to capture changes in interest rate transmission, Humala (2003) shows that in the presence of high-volatility environment, such as financial crisis, the interest rate pass-through strengthens significantly for all interest rates.

Horváth and Podpiera (2009) compare the coefficients from their whole observation period (January 2004- December 2008) with Czech data from January to December 2008 in order do detect any differences in adjustment mechanism. In summary, they find lower degree and speed of the pass-through for all floating loan rates and fixed household loans, which reflects unwillingness of banks to follow monetary policy decisions in financial crisis.

Jobst and Kwapil (2008) obtained similar results regarding the pass-through of money market rates to retail lending rates for Austrian data. They explored that the transmission to lending rates, in particular loans to non-financial corporations and fixed business and housing loans, has become slightly weaker since the beginning of the financial crisis in summer 2007. The authors explain this phenomenon by banks´ effort to protect their customers from high interest rate volatilities.

There are not many studies investigating the impact of financial crises on interest rate pass-through process yet. Since this area is still under-explored we are not able to make uniform announcement regarding changes in interest rate transmission during turbulences in financial markets. Moreover, as we can see from the results above, findings differ across different countries. This field should be a subject of further research.

Chapter 3

The Czech Market

3.1 Characteristics and Recent Development

The Czech banking industry experienced extensive structural changes during economic transition period. The final aftermath is very similar to other banking sectors in Central European transition countries. In this section, we investigate the behavior of the Czech market with respect to banking industry. We examine whether the characteristics of the market are accomplished requirements of previously discussed pass-through determinants influencing the transmission efficiency. Finally, we inspect potential changes aroused as a result of the financial crisis.

After the transition, the banking sector became dominated by foreign owners. The entry of foreign investors in the Czech banking industry, launching of the privatization of major banks increased considerably since 1999 and nowadays banking sector is entirely owned by private entities. As indicated earlier, according to Égert et al. (2006) and Cottarelli and Kourelis (1994) private ownership and participation of foreigners on the banking sector increase the level of interest rate pass-through and accelerates the process. Thus the transmission should benefit from these characteristics of the Czech market.

However, the arrival of foreign private investors does not seem to favor a strong increase in banking competition. Nevertheless, Podpiera et al. (2007) point out, that the empirical literature on developed economies banking sectors concludes in favor of imperfect competition. Therefore, the strong foreign ownership in Czech banks may have favored a process of convergence of banking performance towards the

normal functioning of a market economy, even if a strong level of banking competition is not observed.

By the end of 2008, two-thirds of bank assets in the Czech market were administered by only four banks, the so-called "Big Four Banks"[5]. These four banks generated a 79% share on net profits, coming from bank charges and commissions, while at the same time 37 banking entities operated on the Czech market: 20 banks and 16 branches of foreign banks. The lower the number of major players in the banking market, the greater is the impact of these banks on the financial system. Higher market concentration and less competition leads to rigidities and sluggishness of interest rate pass-through process, as proved by Cottarelli and Kourelis (1994), Leuvensteijn et al. (2008), Mojon (2000) Corvoisier and Gropp (2002).

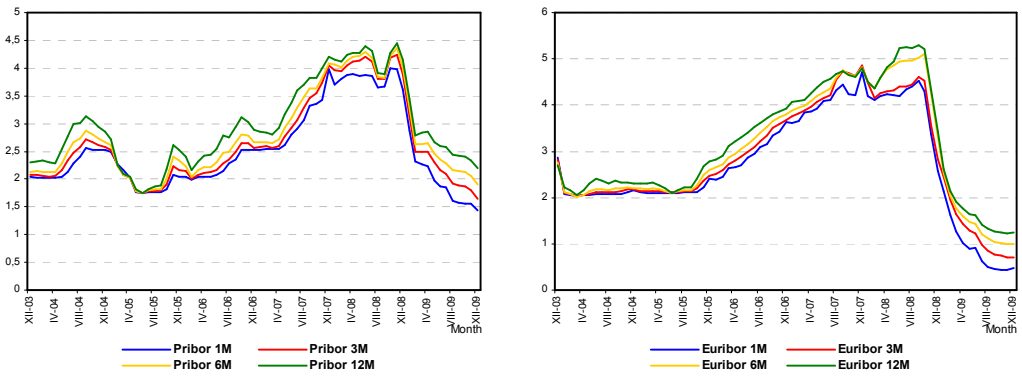
Another characteristic of Czech market leading to transmission rigidity is the method of financing. Geršl and Jakubík (2009) show, that the vast majority of non-financial companies use only one bank as a source of financing. In particular, smaller and young firms and firms in technology and knowledge-intensive industries tend to concentrate their lending needs within one bank, while firms with worse credit rating and firms in cyclical sectors are funded by more than one bank. The strength of established relationship between the bank and the client can lead to substantial switching costs for borrowers, which could consequently reinforce the market power and additionally cause high volatility of macroeconomic variables. The rigidity and sluggishness of the pass-through is inevitable under these circumstances.

There are practically no studies investigating the demand elasticity of bank products. However, Brůna (2007) points out that the elasticity of demand of households and corporations for banking products is relatively low on the Czech market. As we already know from the previous chapter, high elasticity of demand has a positive impact one interest rate transmission. Thereby, an inelastic demand could worsen the transmission efficiency.

[5] ČS, KB, ČSOB, UnicreditBank

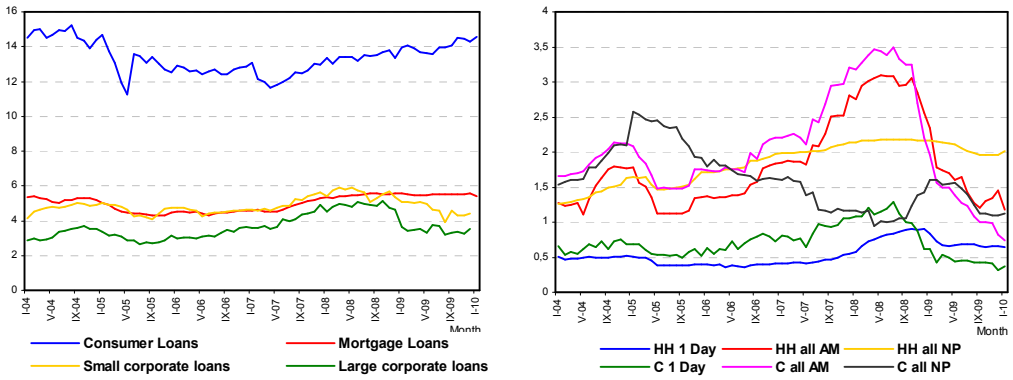
Regarding the volatility of the market, following graphs plot the behavior of Pribor and Euribor rates during 12:2003 and 12:2009. As already mentioned, retail rates won't follow aimless and temporary movements of money market rates and will need more time to adjust their retail rates. We can see that both rates were increasing over time, recording slight fluctuations in case of Pribor. However the tendency was consistent until the crises hit the market. Hence, we do not consider the money market rate volatility to be high to such a degree that it had a negative impact on the interest transmission till 2007. However, as visible on the *Chart 3.1 and 3.2*, both rates drop dramatically in few months as result of monetary intervention of ČNB, where policy rates were pushed downwards in order to maintain liquidity on the market. We hypothesize the volatility on the beginning of the crisis and following uncertainty could have a negative impact on the adjustment level.

Chart 3.1-3.2: Development of Pribor & Euribor rates from 12:2003 to 12:2009



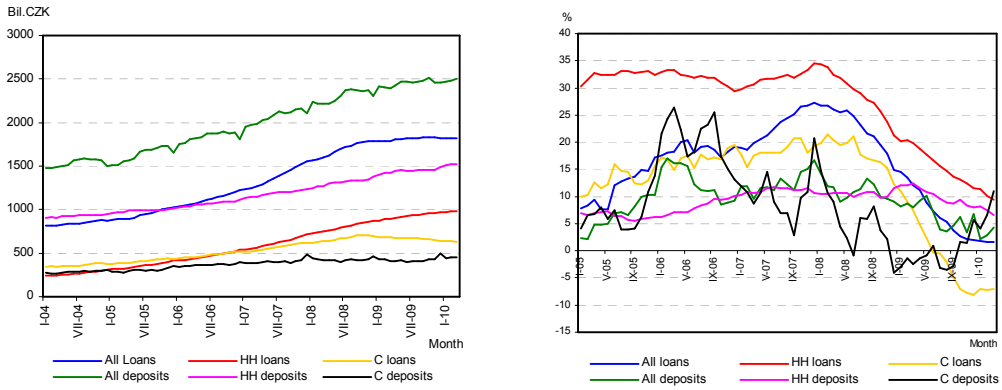
We can see by naked eye that some of the retail rates are following money market trend, such as corporate and household deposits or corporate loans. To prove this relation and to seek other affiliations between money market rates and bank retail rates an econometric model will be applied, see next chapters.

Chart 3.3-3.4: Development of Lending & Deposit Rates from 1:2004 to 1:2010



As demonstrated in the following charts, the volume of deposits as well as the volume of loans in the banking sector is increasing over time. However, we can see a deceleration of this development in both areas as crises entered the Czech market. The annual percentage change is recently on its lowest level since 2005, reaching even negative values in case of corporate loans. The fall occurs mostly within short-term loans due to short maturity and strong linkage to operational financing needs. On the other hand, we can see that household deposits were not substantially touched by the crises. Nevertheless, lower demand in the economy, uncertainty about further developments in the labor market and more cautious approach of banks was reflected in low credit momentum.

Chart 3.5: Volume of Loans Taken and Deposits Granted (in Bil. CZK)
Chart 3.6: Annual % Change of Loans Taken and Deposits Granted

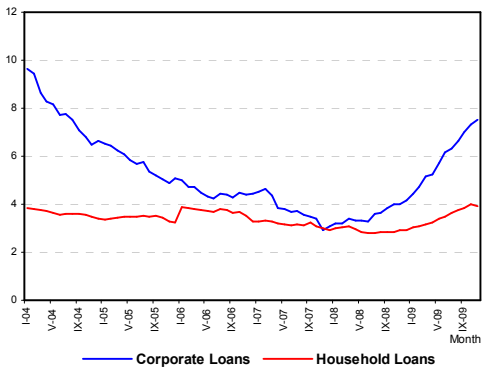


The Czech banking sector is in a long-term characterized by high ratio of deposits taken in relation to loans granted. The ratio of primary customer deposits to loans

exceeds 137%[6]. This feature provides it with sufficient financial resources needed to perform their functions, thus it is not so much dependent on funds from the money market. Independence from the interbank market, especially the foreign market and its financial resources, leads up to a low share of loans granted in foreign currencies. Use of the euro in financial transactions, primarily of non-financial companies, is growing slowly, reflecting the openness of the Czech economy and its involvement in foreign trade. The degree of „eurosation“ is however still at a relatively low level, which is highly reflected in the limited amount of foreign currency loans. These circumstances can influence the interest rate pass-through by causing rigidities and sluggishness in the transmission process. We hypothesize these inflexibilities to appear mainly within Euribor transmission, although a little reflection of Euribor might occur due to its correlation with Pribor changes.

The financial crisis also breeds riskier type of clients, which is visibly reflected by the amount of non-performing loans. As apparent on the *Chart 3.7*, the percentage of bad loans was declining till the beginning of 2008. Since the effect of crisis came to light, it continues to grow at a high rate. Proportion of bad loans increases most significantly in case of non-financial corporations, reaching 7.5%. For households, the share of non-performing mortgages attains 2.5%, while it is 8.4% in case of non-performing consumer loans (CNB issues Inflation Report I/2010). Risky character of loans granted may strongly affect the transmission process; in particular, it can cause transmission rigidities as well as more than one-to-one adjustment, according to de Bondt (2004).

Chart 3.7: Proportion of Non-Performing Loans



[6] Statement from March 2010, ČNB data

Although we may observe several changes in behavior of banking sector during the past three years, the credit portion of the financial crisis of 2007-2010 did not affect the Czech Republic so much in comparison with other economies. According to some, it managed to avoid more distressing consequences due to its stable banking sector which has learned its lessons during a smaller crisis in the late 1990s and became much more cautious. The real impact of the financial crisis and character of the Czech market in interest rate transmission will be explored in following chapters.

3.2 What Do We Already Know About the Czech Interest Rate Pass-through?

There exist few studies investigating, among others, also the Czech data. Horváth and Podpiera (2009) examine the period from January 2004 till December 2008. Their results suggest that there is no cointegration between consumer loans and money market rates. On contrary, retail rates on deposits, corporate loans and other household loans seem to react to changes in money market rates. The strongest, almost one-to-one adjustment can be seen within deposit rates with shorter maturity (up to 2 years) while the lowest reaction appears within fixed loan rates (to non-financial sector). This finding does not go in line with those previously mentioned, where loan rates act as more elastic in comparison with deposit rates.

Crespo-Cuaresma et al. (2004) examine the case Czech Republic in the period from July 1997 to mid 2003 in order to avoid deformations caused by 1997 crisis. They search for both, transmission from key (policy) rates to money market rates, as well as the pass through from money market rates to bank retail rates. Rates of their examination are non-bank loan and deposit rates and with different maturities. The Czech results embody incomplete pass-through for all rates except for the interbank money market rate. Estimates of the long-run elasticity of market rates to the key policy rate show the strongest respond in the case of long term deposit rates (between one and four years) and the lowest respond appears within long term loans. The same authors made another research in 2007, this time they examine the period of December 1995 till December 2005 and they exaggerate the range of rates investigated. They find close to one-to-one adjustment of the non-financial

corporate lending rate (in period 2001-2005) while other rates seem to be very sticky.

3.3 The Future and the Impact of Euro Adoption

Just like many neighboring countries in Central and Eastern Europe, the Czech Republic also intends to go on a journey of monetary integration, as the countries of Western Europe once did. The aim of this trip is the adoption of common currency, euro. The implementation of a common European currency unit in the Czech Republic will significantly interfere with the Czech money market. Besides the adoption of specific legal enactments, the common European currency will also touch a large number of existing laws referring especially to interest rates, which are directly related to the existence of the Czech koruna. As the national currency expires, Czeonia and Pribor will be „replaced“ by Eonia and Euribor, which will as well become the key money market rates to refer to. Thereby, an important question arises. How will the adoption of euro influence the process of interest rate pass-through from money market rates to bank retail rates? Will the level of adjustment change to better or will the rigidities prevail or worsen? How will the reaction period change?

We will have to wait until the process of “euroisation” is completed in order to get answers to these questions. However, there are several studies, which might give us a hint about how will the after-euro interest rate transmission evolve.

All studies devoted to after EMU development show, that the interest rate pass-through is heterogeneous across the euro area countries, see Borio and Fritz (1995), Mojon (2000), Sander and Kleimeier (2002), Angeloni and Ehrman (2003), de Bondt et al. (2005), Sorensen et al. (2008) etc. Regarding the difference before and after the introduction of euro, majority of evidence shows that the degree and the speed of adjustment of interest rates are higher in the after EMU period. This finding suggests a progressing convergence towards an integrated and homogeneous market. However, we have to remind that substantial differences may be found comparing individual countries and also particular bank products. These differences may be attributed to heavy investments in brand names which are country specific, networks of branches and different marketing policies, and

different settings and legal expertise (Chionis and Leon, 2005). For instance, while de Bondt et al. (2005) detect faster adjustment of both lending and deposit rates, Sander and Kleimeier (2003) show that the size and the speed of transmission has changed only in case of lending rates.

Very similar results are obtained also from the research examining the case of Greece. We find it interesting, to discuss these particular results, as a different procedure (to some extent similar to ours, regarding the data period subdivision, see Chapter 5) has been used compared to previous studies. Chionis and Leon (2005) identify two periods of interest rate dynamics: the period prior to EMU, 07:1996–12:2000 and the period 01:2001:01–09:2004, i.e. the period after the accession into EMU. Their findings detect a substantial structural break with the accession into the EMU in 2001. Although the transmission does not reach absolute completeness, the impact multipliers seem to be more active and the speed of adjustment is significantly faster.

On contrary, e.g. Angeloni and Ehrman (2003) find that the size of interest rate pass-through has, on average, increased since 1999 and the transmission became more homogenous across countries, but the speed of convergence to completeness is lower.

As we can see, the overall findings interfere with few disparities across particular studies. We hypothesize these inconsistencies to occur among other also due to possible complications in identifying the exact links regarding the beginning of EMU pressure; i.e. the preparation of transition to a new currency was in process a long time before an actual entrance to EMU, thus it is difficult to recognize the authentic time period, when bank retail rates started to reflect those changes.

Nevertheless, we can conclude, that although we find heterogeneity across different EU countries, in general, the EMU affects positively the interest rate transmission regarding both, its size and speed of adjustment. Therefore, albeit the accession of the Czech Republic to EMU does not seem to occur in the near future, we are optimistic about the transition regarding the efficiency of the pass-through.

Chapter 4

Data and Methodology

4.1 Data

In order to analyze the relationship between money market rates and bank retail rates, average monthly data have been collected from ARAD, Czech National Bank's online time series system. Due to changes in interest rates reporting system[7], only data from January 2004 to January 2010 are used. The sample consists of 73 observations overall. In order to account for structural changes, we divide our dataset into two sub-periods and consequently obtain results for January 2004- December 2006 (36 observations) and January 2007- January 2010 (37 observations). Our series correspond to five retail products: (N1) household mortgages, (N2) consumer loans, (N3) corporate loans, (N4) household deposit rates and (N5) corporate deposit rates.

Mortgage rates (N1) which include rates given to households and non-profit institutions serving households are divided into five specific data sub-samples. First of them covers mortgage rates of all possible maturities, the second one contains floating and fixed rates with maturity up to one year, the third sub-sample covers fixed rates with maturity from one to five years, the forth sample represents fixed rates with maturity from five to ten years and the last consists of fixed mortgage rates with maturity higher then ten years.

[7] Since 2004, the methodology is aligned with the ECB/2001/18 regulation requirements. Reference interest rates are no longer agreed nominal rates, but rates agreed and calculated on an annual basis (compounded interest).
Interest rates on outstanding loans are determined only from „good" loans, i.e. without more than 3 months non-performing loans with penalties, etc. Thus, the statistics of new markets were introduced, also, since January 2005 restructured loans were excluded.

Consumer rates (N2) involve, as well as mortgage rates, rates to households and non-profit institutions serving households and are sectioned into four subsamples. The first group conveys information about all the consumer rates, the second represents floating and fixed rates with maturity up to one year, the third sub-sample fixed rates with maturity from one to five years, and finally the fourth consumer loans above five years.

Within corporate loans (N3) we examine ten sub-series. First of all we investigate data including all rates offered to corporate sector. The second group consists of overdraft rates. In consequence, we create two groups divided by the amount of advanced credit, in particular loans below and above 30 millions CZK. These two groups are consequently staggered into another four groups regarding the credit maturity, similarly as four consumer rates (floating and fixed rates with maturity up to one year, fixed rates with maturity from one to five years, loans above five years).

Household deposits (N4) and corporate deposits (N5) have the same sub-sample structure. First sub-sample comprehends all considered deposit rates. The second one in composed of "one day" deposit rates. Then we split the data according to the deposit character, first representing deposits with agreed maturity and second deposits redeemable at notice. Deposits with agreed maturity are consequently sectioned to rates below one year, from one to two years and above ten years. Deposits with redeemable at notice are subdivided to those up to and above three months.

Regarding the money market rates, we work with monthly average of Pribor 1M, Pribor 3M, Pribor 6M, Pribor 12M, gathered up from Czech National Bank's web pages, as well as monthly average of Euribor 1M, Euribor 3M, Euribor 6M, Euribor 12M gathered up from Eurostat database. It is substantial to mention, that our methodology requires a one month lagged explanatory variable compared to dependent variable, thus money market rates used in the model represent the period from December 2003 to December 2009.

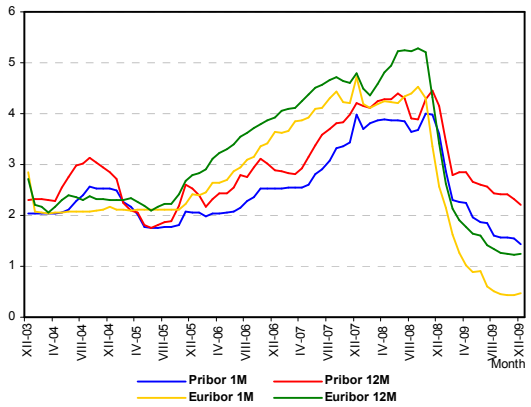
We think it might be interesting to investigate also the potential effect of Euribor rates on bank retail rates, according to substantial concentration of foreign banks in the Czech Republic. Moreover we suppose the integration process into the European Union might have started to be visible also in this area. *Table 4.1* shows

that Pribor and Euribor rates are highly correlated, thus we expect them to move along in time and to have very similar influence on changes in retail rates. *Graph 4.1* proves that both monthly rates tend to move together in the long run.

Table 4.1: Correlation of money market rates

	Pribor 1M	Pribor 3M	Pribor 6M	Pribor 12M	Euribor 1M	Euribor 3M	Euribor 6M	Euribor 12M
Pribor 1M	1	0,992	0,980	0,958	0,810	0,827	0,862	0,852
Pribor 3M		1	0,996	0,982	0,759	0,786	0,829	0,821
Pribor 6M			1	0,994	0,734	0,765	0,811	0,805
Pribor 12M				1	0,714	0,749	0,795	0,792
Euribor 1M					1	0,995	0,983	0,975
Euribor 3M						1	0,991	0,984
Euribor 6M							1	0,998
Euribor 12M								1

Chart 4.1: Development of Pribor 1M, 12M and Euribor 1M, 12M



4.2 Methodology

So that to obtain utmost information about the interest rate pass-through from money market rates to bank retail rates, several different methods are used. Our primary aim was to examine the transmission by Engle-Granger cointegration, but as the time period under review is relatively short and affected by structural breaks, the Ordinary Least Squares (OLS) method is determined as the most appropriate to investigate the pass-through efficiency. The OLS method is moreover used to detect potential asymmetric adjustment to upward or downward changes in individual money market rates. Afterwards, Recursive Coefficient Estimates are employed, in order to analyze how the adjustment level changes over time. Finally, as to appraise the impact of particular shocks to money market rates, an Impulse Response analysis is executed. This method informs us about the time necessary for bank

interest rate to reflect the maximum reached adjustment and the development of the reaction alias whether the affection is permanent or whether it returns to its initial level. We will be provided with all necessary information important for analyzing and evaluating the process of interest rate pass-through in the Czech Republic after all these operations are accomplished.

4.2.1 Ordinary Least Squares (OLS)

After appointing structural breaks we chose an optimal model to estimate the relationship between money market and bank retail rates. At first, a simple Ordinary Least Squares (OLS) model will be used. We consider this procedure to be the most appropriate, due to the relatively short pattern of investigated time series. We should note that banks do not respond to changes in market interest rates immediately but with delay. Following equations can therefore be valid only in the long run. The relation can be described as follows:

$$br_{(t)} = \alpha + \beta * PRIBOR_{(t-1)} + e_{(t)} \quad (1)$$

$$br_{(t)} = \alpha + \beta * EURIBOR_{(t-1)} + e_{(t)} \quad (2)$$

where $br_{(t)}$ stands for particular bank retail rate, Pribor (resp. Euribor) is the money market rate used- lagged by one month, α represents the intercept- a constant mark-up and β determines the level of adjustment to money market changes, which depends on previously mentioned pass-through influencing factors.
In order to search for asymmetric adjustment, a dummy variable was added into previous equations, changing them to following form:

$$br_{(t)} = \alpha + \beta * PRIBOR_{(t-1)} + \gamma * D\_PRIBOR_{(t-1)} + e_{(t)} \quad (3)$$

$$br_{(t)} = \alpha + \beta * EURIBOR_{(t-1)} + \gamma * D\_EURIBOR_{(t-1)} + e_{(t)} \quad (4)$$

where $D\_PRIBOR_{(t-1)}$ (resp. $D\_EURIBOR_{(t-1)}$) stands for the dummy, having value one if $Pribor_{(t)} < Pribor_{(t+1)}$ and value zero if $Pribor_{(t)} \geq Pribor_{(t+1)}$ (resp. Euribor).

In order to examine in detail all possible relationships, each combination of bank retail rates and money market rates will be estimated using OLS model. The aim of this process is to analyze which market rate (Pribor 1M, 3M, 6M, 12M and Euribor 1M, 3M, 6M, 12M) influences the particular retail rate most significantly, to see

whether the key affecting rate remains the most affecting one through the whole surveyed period and, of course, to find out to what extent do retail rates respond to changes in market rates.

4.2.2 OLS Assumptions

We have to make sure that all necessary assumptions are accomplished before we start applying the model on investigated time series

Stacionarity

Stationary time series can be denoted as time series with short memory I(0), nonstationary time series are on the other hand called series of long memory I(1). While in case of series with short memory, the impact shock from the previous period gradually withers away; in series with a long memory the shock has a permanent character. Differences in the nature of these data induce fundamental differences in their generating processes. Our requirement is the investigated time series to be stationary in levels, so that we avoid various stochastic trends between explanatory and dependent variable.

To make sure our data are stationary, we use the Kwitlowski, Phillips, Schmidt, and Shin test (KPSS). KPSS unit root test differs from the other stacionarity tests (e.g. ADF test) regarding the null hypothesis. While the remaining test postulate non-stacionarity under null, the KPSS test assumes time series to be stationary. The regression of KPSS has in general the following form:

$$\mathrm{v}\, x_t = d_t^T \delta + \varepsilon_t \ , \tag{5}$$

where d_t in our case stands for deterministic regressors with constant. LM test statistics has a form:

$$LM = \frac{\sum_t S(t)^2}{T^2 f_0} \ , \tag{6}$$

where S(t) is a cumulative residual function $S(t) = \sum_{r=1}^{t} \hat{u}_r$ based on residuals from the OLS regression $\Delta x_t = \gamma x_{t-1} + d_t^T \delta + \beta_1 \Delta x_{t-1} + \beta_2 \Delta x_{t-2} + ... + \beta_p \Delta x_{t-p} + \varepsilon_t$, $\hat{u}_r = x_t - d_t \hat{\delta}$ and f_0 is an estimator of the residual spectrum at frequency zero.

KPSS test has a relatively low power and might have problems dealing with short time series. Hence, it is necessary to consider the KPSS outcome during the practical assessment and make a confrontation with the expectation based on economic theory.

Autocorrelation and heteroskedasticity

In order to be confident that our results are trustworthy, we have to ensure that the disturbances do not have a varying variance and that they are not correlated. As we know from the theory, OLS provides consistent estimates of parameters despite the presence of heteroskedasticity. However, the standard deviations, which it generates, are not correct in such case. For this reason we run the regression using Newey-West variance estimate, as the use of this method can guarantee obtaining consistent results even in the presence of heteroskedasticity or autocorrelation. Newey and West (1987) suggested a simple heteroskedasticity and autocorrelation-consistent covariance matrix for the OLS estimator without specifying the functional form of the serial correlation. In general, The Newey- West estimator is:

$$\hat{\Sigma}_{NW} = \hat{\Gamma}(0) + \sum_{j=1}^{p}\left(1 - \frac{j}{p+1}\right)\left(\hat{\Gamma}(j) + \hat{\Gamma}^{T}(j)\right), \qquad (7)$$

where $\hat{\Gamma}(j)$ is an autocovariance matrix multiplied by a weight $\left(1 - \frac{j}{p+1}\right)$, that decreases linearly as j increases. The value of p is the maximum order of serial correlation we want to assume. For $j=1$, the weight is $\frac{p}{p+1}$ and it then decreases in successive steps of $\frac{1}{p+1}$ till reaching the value $\frac{1}{p+1}$ for $j=p$. The compatibility of this method relies on p being small in comparison to the number of observations.

4.2.3 Recursive Coefficients

The OLS method comprehends a once-and-for-all calculation. In some cases we are willing to calculate the estimates, subsequently adding new observations for situations where we believe that series might contain a structural break. To meet

this requirement, recursive coefficients are used in order to find whether coefficients of our model are stable over various sub-periods. It should be mentioned that recursive coefficients method is not a statistical test for the parameter stability as such, but it rather presents qualitative information and thus provides with visual impression of how persistent the parameters seem to be.

The coefficients estimate a linear regression equation recursively by the OLS method. We will estimate the equation repetitively, adding additional observations of the sample data at time. Let's assume that we have an intercept α and coefficient β as of above. If there are k estimations, the first estimation of α and β will be generated from the first observation. Then, another observation is added into the data sample so that k+1 observation are employed to determine the second estimate of α and β. This mechanism is repeated until the last observation is implicated and the data sample is complete.

$$br_{(t)} = \alpha' + \beta' * PRIBOR_{(t-1)} + e_{(t)} \quad (8)$$

$$br_{(t)} = \alpha' + \beta' * EURIBOR_{(t-1)} + e_{(t)} \quad (9)$$

To introduce the general formulas for the recursive least squares, we consider a situation based on n observations. We will pursue by including another new observation, defined as $(n+1)$, to our estimation. Let $X_n \to n \times K$, $Y_n \to n \times 1$ and $\hat{\beta}_n = \left(X_n' X_n\right)^{-1} X_n' Y_n$, where X represents *br* and Y represents *Pribor* (resp. *Euribor*). As we add an observation, the new data will have the following form:

$$X_{n+1} = \begin{bmatrix} X_n \\ x_{n+1} \end{bmatrix} \text{ and } Y_{n+1} = \begin{bmatrix} Y_n \\ y_{n+1} \end{bmatrix}$$

where $x_{n+1} \to 1 \times K$, $y_{n+1} \to 1 \times 1$ and non-recursive least square estimator of β is $\hat{\beta}_{n+1} = \left(X_{n+1}' X_{n+1}\right)^{-1} X_{n+1}' Y_{n+1}$. The recursive estimator is then

$$\hat{\beta}_{n+1} = \hat{\beta}_n + \frac{\left(X_n' X_n\right)^{-1} x_{n+1}'}{1 + x_{n+1}\left(X_n' X_n\right)^{-1} x_{n+1}'}\left(y_{n+1} - x_{n+1}\hat{\beta}_n\right), \quad (10)$$

where $\frac{\left(X_n' X_n\right)^{-1} x_{n+1}'}{1 + x_{n+1}\left(X_n' X_n\right)^{-1} x_{n+1}'}\left(y_{n+1} - x_{n+1}\hat{\beta}_n\right)$ is an adjustment factor proportional to

prediction error $\left(y_{n+1} - x_{n+1} \hat{\beta}_n \right)$. The error sum of squares enlarged by the new observation will then be represented by the following formula:

$$SSE_{n+1} = SSE + \frac{\left(y_{n+1} - x_{n+1} \hat{\beta}_n \right)}{1 + x_{n+1} \left(X_n' X_n \right)^{-1} x_{n+1}'} \tag{11}$$

This procedure enables us to trace the development of estimates as the data sample enlarges progressively. We expect the plot to help us distinguish and determine, whether the beginning of the current financial crisis influenced the evolution of the size of the interest rate pass-through in time, and to determine the accurate period when these potential changes started to be noticeable. It must be taken into account that the recursive procedure will behave unsteadily near the start due to low number of observations. However, the question is whether the volatility stabilizes or perseveres through the whole sample. It is very important to mention, that only the last three-quarters (in particular the results from July 2005 to January 2010) of the estimates will be displayed, in order to avoid these initial uncertainties.

4.2.4 Impulse Response Analysis

Impulse response functions represent the mechanisms through which a shock to the money market rates is transmitted to bank retail rates. Our goal is to trace out the time path of this effect on the dependent endogenous variables of the model. Vector Autoregression (VAR) Model levels in which it provides a suitable and powerful framework for monetary policy investigation is applied first, in order to obtain the result from Impulse Response analysis. We have to mention that our data sample is relatively short and contains structural breaks. As VAR needs longer time series to provide credible results, we use the impulse-result method as accompanying instrument generating information about the speed of interest rate adjustment. It is important to note that the results have to be interpreted with caution. Concerning the degree of interest rate transmission, we rely on the results obtained from OLS estimates.

The lowest possible order- of two lags has been chosen for the model, in reference to Akaike and Schwarz criteria, since overestimation of lag orders is considered to

be a larger problem than underestimation (de Bondt, 2005),. The examined VAR model equations are[8]:

$$br_t = \alpha + \sum_{i=1}^{2} \beta_i^1 br_{(t-i)} + \sum_{i=1}^{2} \gamma_i^1 PRIBOR_{(t-i)} + \varepsilon_t^1 \quad (12)$$

$$br_t = \alpha + \sum_{i=1}^{2} \beta_i^1 br_{(t-i)} + \sum_{i=1}^{2} \gamma_i^1 EURIBOR_{(t-i)} + \varepsilon_t^1 \quad (13)$$

$$PRIBOR_t = \alpha + \sum_{i=1}^{2} \beta_i^1 br_{(t-i)} + \sum_{i=1}^{2} \gamma_i^1 PRIBOR_{(t-i)} + \varepsilon_t^1 \quad (14)$$

$$EURIBOR_t = \alpha + \sum_{i=1}^{2} \beta_i^1 br_{(t-i)} + \sum_{i=1}^{2} \gamma_i^1 EURIBOR_{(t-i)} + \varepsilon_t^1 \quad (15)$$

In order to obtain the standard form of VAR, we rewrite the equations in matrix notation as follows:

$$Y_t = \alpha + \sum_{i=1}^{2} B_i Y_{t-i} + \varepsilon_t, \quad (16)$$

Where α is a (2x1) vector of intercepts, B_i is a (2x2) matrix of coefficients, ε_t is the error term vector (2x1), and finally Y_t is a (2x1) vector of variables. In particular:

$$Y_t = \begin{bmatrix} br_t \\ Pribor_{(t-1)} \end{bmatrix} \text{resp. } Y_t = \begin{bmatrix} br_t \\ Euribor_{(t-1)} \end{bmatrix},$$

$$c = \begin{bmatrix} \alpha^1 \\ \alpha^2 \end{bmatrix}, \; B_i = \begin{bmatrix} \beta_i^1 & \gamma_i^1 \\ \beta_i^2 & \gamma_i^2 \end{bmatrix}, \; \varepsilon_t = \begin{bmatrix} \varepsilon_t^1 \\ \varepsilon_t^2 \end{bmatrix}.$$

So as to calculate the impulse response functions, we have to reduce AR(2) representation to AR(1) and then transpose it into MA(∞) representation, where general MA(∞) representation has the following form:

$$Y_t = E_0\left(Y_t\right) + \sum_{i=0}^{\infty} \Phi_i \varepsilon_{t-i}, \quad (17)$$

Where Φ_i represents a (2x2) matrix of lag polynomials depended on B_i coefficients in AR representation. Matrix Φ_i bears information about the impact multipliers used to calculate the impact of the shock to particular variables, i.e. impulse response functions.

[8] The following procedure is adopted from Donnay and Degryse (2001).

For transforming the impulses we use the inverse of Cholesky factor of the residual covariance matrix to orthogonalize the impulses so that to control for correlation between error terms. The purpose is to transform the moving-average construction so as the residuals are uncorrelated, i.e. the residuals are orthogonal to each other. We use degrees of freedom adjustment, which makes small sample degrees of freedom correction when estimating the residual covariance matrix used to derive the Cholesky factor. The Cholesky decomposition on the observed shocks, ε_t, recovering the orthogonal structural shocks η_t is:

$$\eta_t = L^{-1}\varepsilon_t \text{, where } L = \begin{bmatrix} L_{11} & 0 \\ L_{21} & L_{22} \end{bmatrix},$$

L being a lower triangular matrix with $E\left(\varepsilon_t \varepsilon_t^{'}\right) = LL^{'}$ on the diagonal. $E\left(\varepsilon_t \varepsilon_t^{'}\right) = LL^{'}$ represents standard deviations of the structural shocks.

The insight behind this decomposition is that a shock to money market rates will affect the behavior of bank retail rates, while the opposite implication does not hold, thus $L_{12}=0$. The orthogonal impulse response for the shock emerged in the η_{t-i} vector is:

$$Y_t = \sum_{i=0}^{\infty} \Theta_i \eta_{t-i} \,, \tag{18}$$

where $\Theta_i = \Phi_i L$.

Chapter 5

Econometric Results

In this section we present the results coming out from the Ordinary Least Squares, Recursive Estimates and Impulse Response Analysis. First of all, we have to proclaim that the KPSS test results confirmed the stacionarity of examined data, thus we are working with *I(0)* time series. Also the heteroskedasticity and autocorrelation was corrected with use of Newey- West variance estimate.

Concerning further methodology, we have to point out as well, that the OLS estimates devoted to asymmetric adjustment (OLS including dummy variables), Recursive Coefficients and the Impulse Response Analysis were run only when results generated from the original OLS estimates appeared to be significant and when they embodied a fairly high R-squared; moreover investigating only Pribor rates for regarding adjustment asymmetries. Note, that the results from Recursive Coefficient analysis show only the last three quarters of the estimates, in order to avoid initial uncertainties, caused by lack of observations. Although we have stationary data, we use VAR method to obtain results from Impulse Response analysis. Here, we refer to Sims et al. (1990) who demonstrate that VAR results are asymptotically valid despite the stacionarity of given time series.

5.1 Household Lending Rates

It is a common knowledge that the mortgage market was growing very fast in the past years but has suffered considerably since the crisis emerged. Thus, regarding the market conditions, we expect mortgage rates to record considerable changes at the turn of particular sub- periods.

With respect to consumer loans worldwide evidence, such as Mojon (2000), Sander and Klemeier (2004) Coricelli et al. (2006) etc, including Horváth and Podpiera

(2009) who investigate the Czech data, denote consumer rate performance as very rigid and sluggish. In line with these findings we assume the same behavior also for our time series.

Another common finding is that lending rates with shorter maturities are more rigid than those with higher maturity. Next pages will reveal whether this holds also in case of the Czech market.

5.1.1 Mortgage Rates

As mentioned in the previous sector and visible from *Table 5.1*, in order to explore the behavior of all household mortgage rates, five specific data sub-samples regarding the loan maturity where created. The strongest results are displayed in the following tables. The overall findings can be found in the appendix, see *Table A5.1-A5.3*.

Table 5.1: Transmission from Pribor Rates to Mortgage Rates

M	Mortgage Type	Best effect: **PRIBOR**			α			β			R-squared		
		1:2004 -1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 -1:2010	1:2004 - 12:2006	1:2007 - 12:2010
1	All	P12	P1	P12	4,043*	3,250*	4,900*	0,328*	0,698*	0,108	0,29	0,207	0,046
2	≤1 Year	P12	P1	P12	3,250*	3,398*	5,079*	0,601*	0,484**	0,151	0,314	0,059	0,033
3	1-5 Years	P12	P1	P12	3,742*	2,384*	4,998*	0,428*	1,064*	0,1	0,342	0,394	0,028
4	5-10 Years	P12	P1	P12	4,648*	3,695*	4,521*	0,135*	0,632*	0,154*	0,211	0,416	0,327
5	>10 Years	P12	P1	P6	5,116*	4,754*	4,964*	-0,022	0,158	0,014	0,004	0,014	0,006

Note: *, **, *** stands for 1%, 5%, and 10% significance level

The first three columns tell us which Pribor rate is reflected utmost to retail interest rates. As we can see, Pribor with highest influential power changes over examined periods. While during January 2004- December 2006 Pribor 1M seems to have the most significant impact on the mortgage rates, it is Pribor 12M (and Pribor 6M for the last subsample) between January 2007 and January 2010.

As also visible on *Tables A5.1-A5.3*, the results surprisingly explore remarkable differences between adjustment levels to individual Pribor rates during the same period. Such an observation is not expected as particular Pribor rates are highly correlated (see *Table 4.1*). These differences however occur only within the first sub-period[9]. For example, the coefficient relating one-to five year maturity

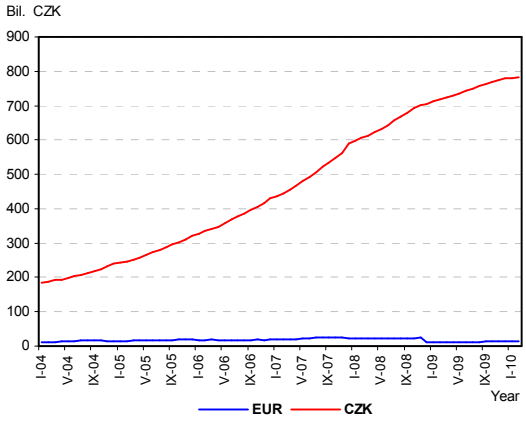
[9] Coefficients from sub-period 01/2004 – 12/2006

mortgage rates and Pribor 1M shows 106% adjustment while coefficient relating the same mortgage rate to Pribor 12M exhibits only 69% adjustment, although the Pribor 1M-Pribor 12M correlation coefficient reaches almost 96%. It is even more surprising as it is Pribor 12M which commercial banks use most frequently for pricing mortgage rates, thus we would expect it to have the strongest affecting power. We hypothesize, that these distinctions arise from changes in expectations which are effected by potential monetary tightening or releasing. When considering the second sub-period or the whole examined time interval, the adjustment behaves consistently across particular money market rates.

Regarding the pass-through efficiency of particular mortgage types, for the first sub-period, we reveal no sensitivity to changes in market rates within fixed mortgages of maturity above ten years, as the coefficients show insignificancy, while the highest reaction appears with fixed mortgage rates of maturity from one to five years, where β exceeds 1, reflecting low default probability of borrowers. Adjustment level of "all" mortgage rates (consisted of all mortgage rates) is almost 70%, which is a relatively high number. However, our results show immense changes between the two periods. We can observe that estimations that are significant during the first sub-period turn up to be insignificant in the sub-period influenced by the presence of the financial crisis. This situation occurred due to a dramatic increase of uncertainty which resulted in money market freezes. As money market rates where not traded in such an extent any longer, retail bank market stopped reacting to particular changes of Pribor.

Considering Euribor rates, we conclude that the Czech mortgage market does not reflect Euribor fluctuations at all, as visible on *Table A5.1-A5.3*. The reason for this phenomena is a fact that loans in the Czech Republic are in an absolute majority being granted in domestic currency (see *Chart 5.1*), thus have no incentive to reflect changes of foreign money market rates.

Chart 5.1: Amount of Mortgages Granted in CZK vs. in EUR (in Bil. CZK)



Our assumption is that since Euribor rates have no influential power, nor will it have the direction of initial changes, thus the OLS model including dummy variables will not be estimated for results which were previously insignificant. For the same reason, also mortgages with maturity higher ten years are excluded from further estimation.

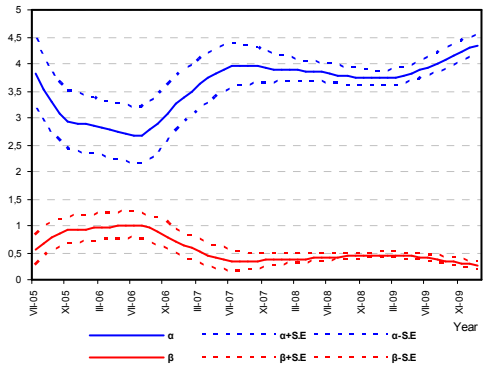
When examining the whole period from January 2004 to January 2010, we find that in case of mortgages with maturity higher than five years, the direction of the change does not play any role, as the coefficients are insignificant. For sub-categories with maturities shorter than five years, a pretty high asymmetric adjustment, of even more than 50%, was detected. These asymmetries might arise due to previously mentioned imperfections in the Czech competition environment. If banks can exert market power over their customers, it is possible that the financial institutions adjust their pricing asymmetrically. Dummy coefficients behave differently during particular sub-periods, showing insignificance for all mortgage types (see *Table A5.4*). Notwithstanding, the insignificancy could be probably caused as a result of short data sample.

Following graphs describe the overall development of the relationship between money market and bank retail rates, generated as a result of recursive estimate. As mentioned at the beginning of this chapter, they display only estimates from July 2005 to January 2010, as the first fourth of data was eliminated in order to avoid initial uncertainties. We can conclude that transmission started to decline during the first six months of 2007. Mortgages with maturity between five to ten years are on

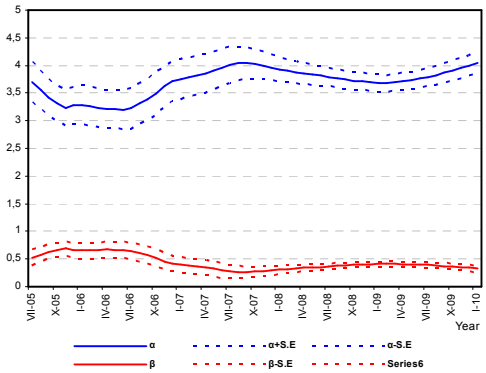
the zero level since then. Although the pass-through slightly increased in case of mortgages shorter than one year during 2008, it is recently on its lowest level for all mortgage types. Also, the risk premium is still increasing while the efficiency of the transmission mechanism goes down, which suggests that the financial crisis keeps influencing the financial market.

Chart 5.2-5.9: Recursive Coeff.- Pribor 1M resp. Pribor 12M/Mortgage Rate

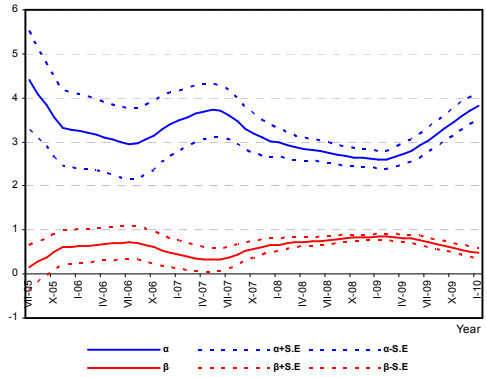
Pribor 1M/ M1



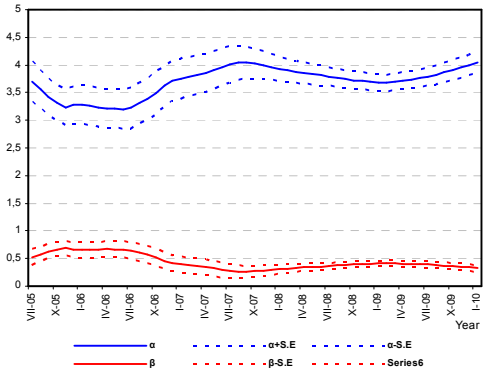
Pribor 12M/ M1



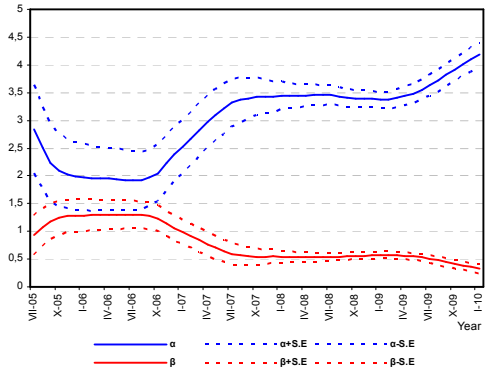
Pribor 1M/ M2



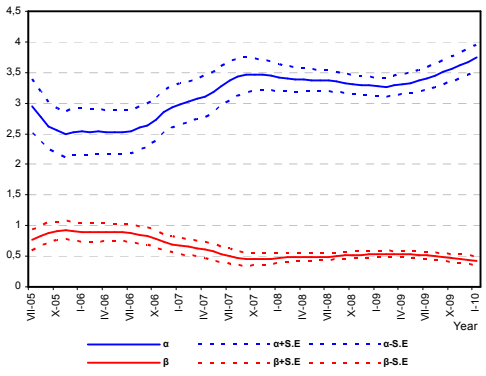
Pribor 12M/ M2



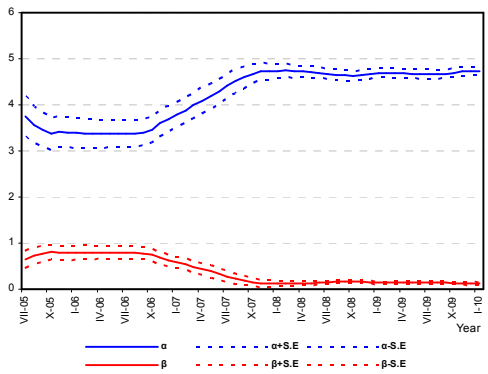
Pribor 1M/ M3



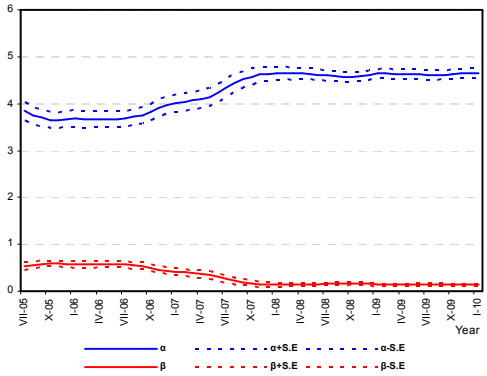
Pribor 12M/ M3



Pribor 1M/ M4



Pribor 12M/ M4



Ultimately, we apply an Impulse Response analysis. As in previous case, only the impact of several interest rate relationships will be investigated, as the OLS results denominate insignificancy in case of mortgages with maturity higher than ten years and all Euribor rates considering the whole data sample reviewed.

On the following graphs we analyze the reaction during 48 consequential months. The vertical line represents the shock. Whereas the shock had value "one" in case of OLS estimation, here it is represented by the standard deviation.

In case of mortgage rates, the results show that shocks to money market rates are not reflected instantaneously. In other words, mortgage rates are sticky in the short-run. Following the positive shock to Pribor rates, they reach their maximum adjustment between 4 months to 15 months, depending on mortgage maturity and Pribor rate maturity. As visible on the charts, the higher is the Pribor maturity, the faster is the maximum adjustment. It is a natural behavior since Pribor 12M is the most widely used money market rate for pricing mortgage rates.

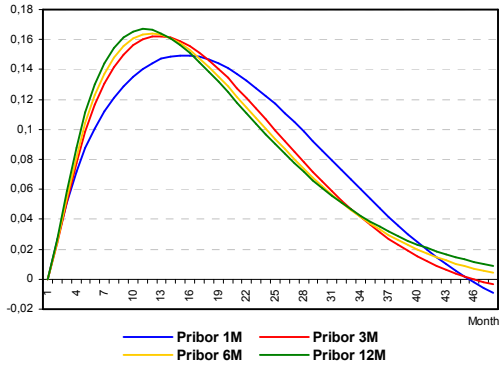
Regarding the transmission according to the mortgage type, the shortest - 4 month reaction appears with mortgages from five to ten years followed by 8 months for mortgages from one to five years (being the same for all four examined Pribor rates). On contrary, mortgages with maturity up to one year reflect changes after 15 months.

We observe that these effects are not persistent. Mortgage rates return to their pre-shock level relatively sharply, after roughly one year in case of mortgages with longest maturity, and after almost four years in case of up to one year maturity. Thus, long-maturity mortgages reflect the shock for a relatively very short period, approximately 8 months while short-maturity rates are influenced for circa three

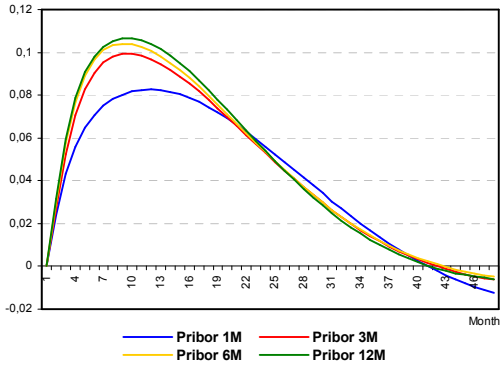
years. Again, this situation occurs because mortgage rate pricing is mostly educed from long-maturity money market rates.

Chart 5.10-5.13: Impulse Response Analysis- Pribor/Mortgage Rate

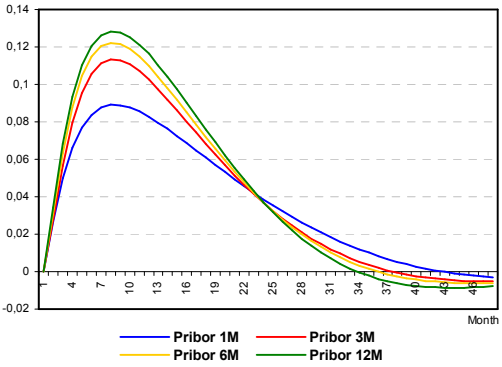
Pribor/ M1



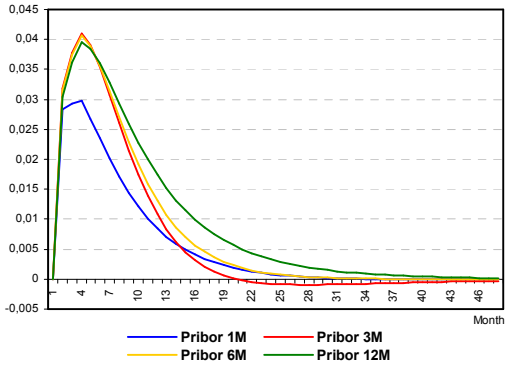
Pribor/ M2



Pribor/ M3



Pribor/ M3



5.1.2 Consumer Lending Rates

Just like mortgage rates, also consumer rates show inconsistency across time regarding the most influencing money market rate, although the differences are almost unrecognizable in contrast to household mortgages (for details see *Table A5.5-A5.7*).

In case of Pribor rates, coefficient β seems promisingly at the first sight, suggesting complete transmission in case of loans above one year[10] and 80% adjustment considering "all" consumer rates in period 2004-2006. The pass-through drops strikingly reaching zero value in the second sub-period. It again suggests that banks stopped reacting to changes in Pribor as the crises started. However, the R-squared is practically zero for all the sub-samples which indicates the regression is not

[10] Specificaly two sub-groups: consumer loans from one to five years and above five years.

appropriate in predicting the values of the dependent variable within the sample. It is also visible that consumer rates display a huge mark-up, which indicates their riskier nature in comparison to previous case. We conclude that consumer rates do not exhibit any relationship with Pribor rates.

Table 5.2: Transmission from Pribor Rates to Consumer Lending Rates

C	Consumer Loan	Best effect: **PRIBOR**			α				β		R-squared		
		1:2004 -1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 -1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010
1	All	P1	P3	P1	13,80*	11,68*	13,98*	-0,166***	0,800***	-0,233***	0,0176	0,0475	0,0631
2	<1 Year	P12	P3	P1	12,69*	11,15*	14,83*	0,141	0,740***	-0,487*	0,0125	0,0763	0,1675
3	1-5 Years	P12	P1	P1	15,54*	12,63*	13,90*	-0,451*	0,996	-0,078	0,071	0,025	0,0198
4	>5 Years	P12	P1	P1	14,40*	10,93*	13,41*	-0,333	1,353***	-0,132	0,0455	0,0718	0,0143

Interpretation: *, **, *** stands for 1%, 5%, and 10% significance level

Higher significance is revealed within Euribor rates. Although the mark-up is even higher then for Pribor rates, we observe a substantial negative effect of Euribor changes on retail rates. For the first sub-period reaching a value "higher" than -2 in case of consumer rates with maturity above one year. The influential power increases within rates with maturity lower than one and on contrary diminishes for those higher than one. Nevertheless, even for Euribor rates the R-squared value is relatively unsatisfying, but yet higher than the Pribor rate findings.

Table 5.3: Transmission from Euribor Rates to Consumer Lending Rates

C	Consumer Loan	Best effect: **EURIBOR**			α				β		R-squared		
		1:2004 -1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 -1:2010	1:2004 - 12:2006	1:2007 - 12:2010
1	All	E3	E1	E3	14,45*	16,09*	14,42*	-0,379*	-1,114*	-0,344*	0,235	0,196	0,421
2	<1 Year	E1	E1	E3	14,08*	13,51*	15,06*	-0,362*	-0,309*	-0,507*	0,208	0,028	0,557
3	1-5 Years	E12	E1	E3	15,80*	20,56*	14,21*	-0,509*	-2,455*	-0,167*	0,235	0,413	0,279
4	>10 Years	E3	E1	E3	14,92*	18,71*	14,10*	-0,527*	-2,067*	-0,330*	0,279	0,456	0,275

Interpretation: *, **, *** stands for 1%, 5%, and 10% significance level

As already mentioned, Pribor rates and bank retail rates show no interaction, thus we assume the initial direction of their change will not influence the adjustment either. Thereby the OLS examining possible asymmetries is applied solely to Euribor rates.

As visible on table (see *Table A5.5-A5.7*) the results are very inconsistent across examined periods. However, if we omit the two sub-periods and if we have a look

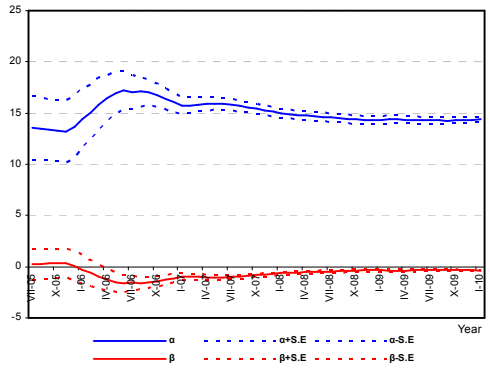
only on the overall results, we can summarize that that asymmetric adjustment is detected in almost all categories (except for Euribor 1M), which is intuitive according to previous OLS results. The dummy coefficients reach values between 35-70%, which is a quite notable number.

Likewise, also recursive coefficients were estimated only for the significant result from the first OLS estimation- the Euribor rates. The results are plotted on the following graphs. We can see that the mark-up is very high during the whole period under review. While it is relatively consistent during the crisis in case of loans with maturity below one year, it tends to fall in case of maturities higher than one year, however, still being on the very high level.

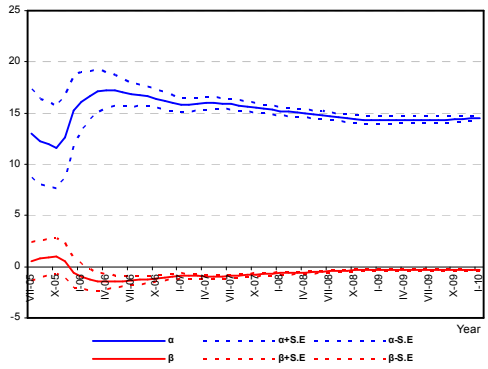
Regarding the β coefficients, Euribor has a strong negative impact in the firs sub-period. Nevertheless, as visible mainly on the graphs with higher maturities, the effect is weakening, approaching zero during the financial crisis.

Chart 5.14-5.21: Recursive Coeff.-Euribor 1M resp.Euribor 12M/Consumer Lending Rate

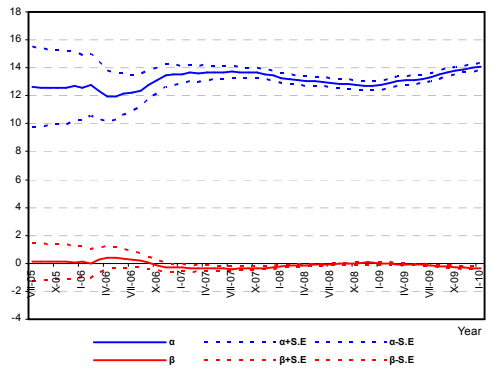
Euribor 1M/ C1



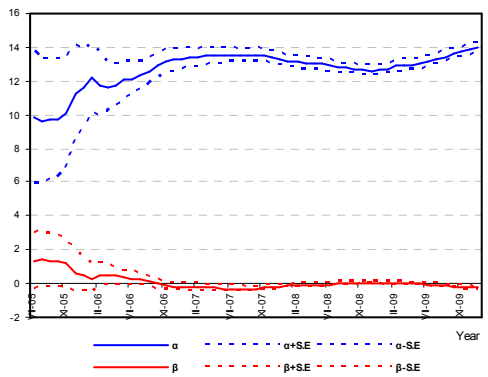
Euribor 12M/ C1



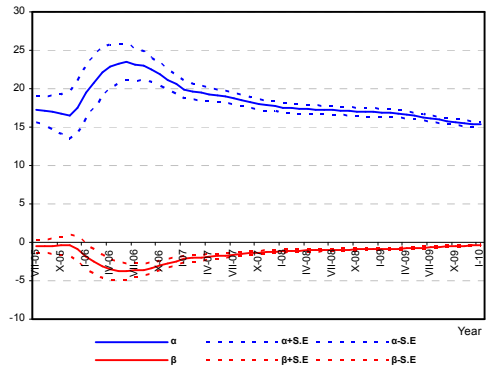
Euribor 1M/ C2



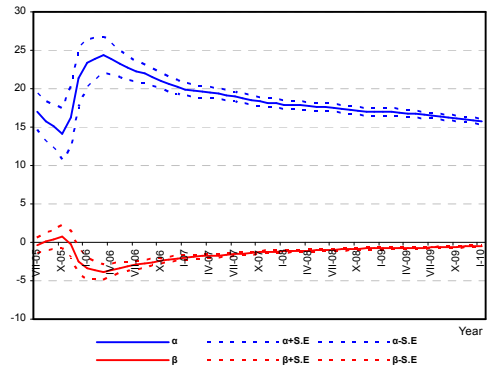
Euribor 12M/ C2



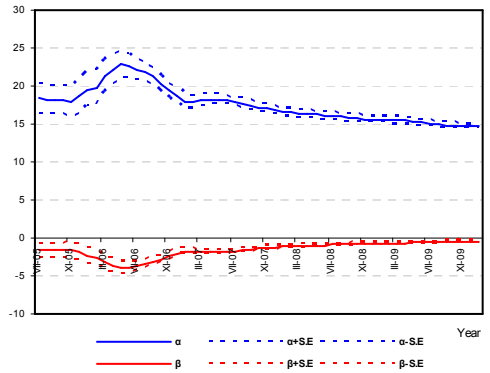
Euribor 1M/ C3



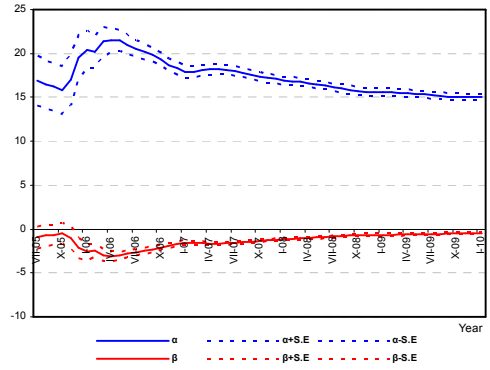
Euribor 12M/ C3



Euribor 1M/ C4



Euribor 12M/ C4



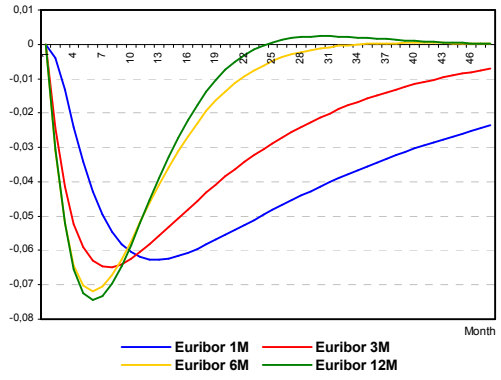
Taking the results generated from the Impulse Response analysis in consideration, we observe that the lower is the maturity of a consumer loans, the faster comes the answer to the money market shock. Thus, consumer loans up to one year reach their maximum adjustment in 5-7 months; it is 19-21 months for loans from one to five years. We can also see that the time of complete adjustment depends on the maturity of Euribor rates. In particular, while it takes 7 months to reflect changes in Euribor 1M, it is only 5 months in case of Euribor 12M. The maturity of Euribor rates influences also the time it takes for retail rates to get back to its pre-shock level. Considering the sub-sample of consumer loans for less than one year, it takes nearly one year to return to the initial level for Euribor 12M and almost four years in case of Euribor 1M. This happens as money market rates with long-term maturities are used for pricing more often than money market rates with shorter maturities.

As we can observe thereinafter, consumer loans with maturity between one and five years react conversely than the other subsamples. A shock to Euribor rates seems to have a positive impact on retail rates. This movement is truly unexpected as OLS

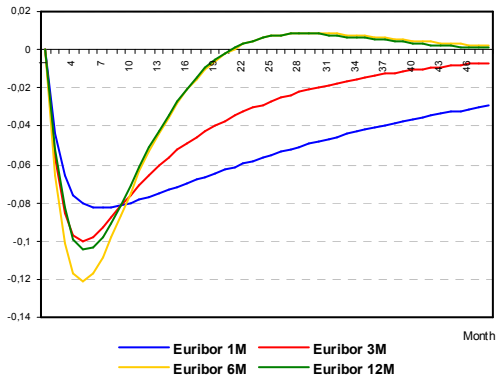
estimates suggest that changes in Euribor rates should influence negatively the retail rates adjustment. However, the results may differ, as the techniques used for estimation (OLS and Impulse Response analysis) are fairly different and OLS method does not consider simultaneous relations.

Chart 5.22-5.25: Impulse response analysis-Euribor/Consumer Lending Rate

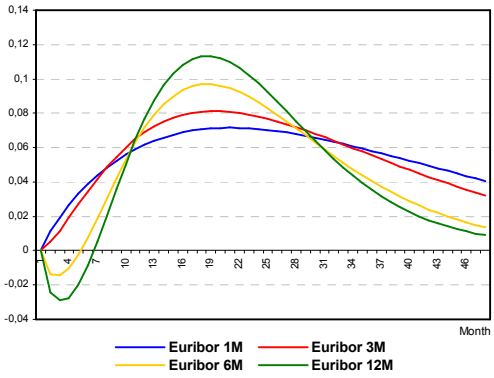
Euribor/ C1



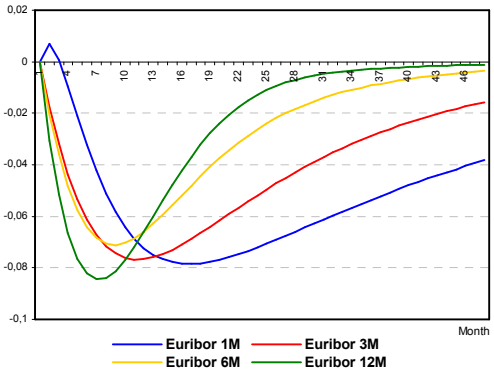
Euribor/ C2



Euribor/ C3



Euribor/ C4



5.2 Corporate Lending Rates

The empirical literature on the interest rate pass-through determines that corporate lending rates are more flexible and that they reflect money market changes much faster than lending rates to households. In addition, lending rates are designated to be also more adaptable than deposit rates, as found by de Bondt (2005), Kok-Soerensen et al. (2006) Horváth et al. (2004) and many others. Following paragraphs will reveal whether our findings are in line with international literature.

Concerning adjustment to particular money market rates, corporate loans behave similarly as mortgage loans. Not only the most influential Pribor (resp. Euribor)

changes over time, but the adjustment spread to particular rates fluctuates likewise. The period from 2004 to 2006 shows again significant differences between particular coefficients. Adjustment of e.g. "all" corporate loans to Pribor 1M comes out to reach 94% while to Pribor 12M comes out to reach only 56%. Let's remind that we suppose the individual money market rates to have comparable effects, as their mutual correlation fluctuates between 95.8% and 99.3%. As mentioned before, the reason for this difference might be changes in future expectations, where commercial banks are not sure about long-run development and thus adjust retail rates to short term indicators. For the other periods and for all the subsamples regarding Euribor, the findings confirm our suppositions, that each money market rate has approximately equal effect on the transmission.

Table 5.4: Transmission from Pribor Rates to Corporate Lending Rates

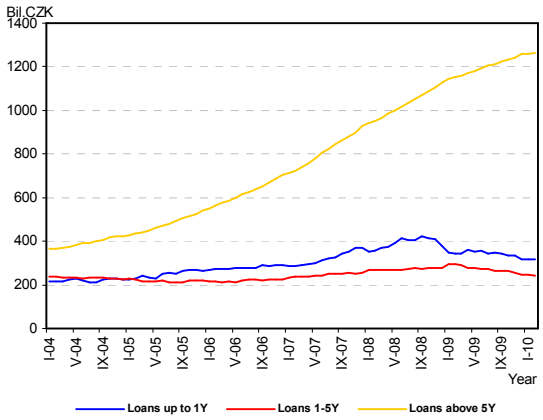
CL	Corporate Loan	Best effect: **PRIBOR**			α			β			R-squared		
		1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007- 12:2010
1	All	P1	P1	P12	2,728*	2,079*	2,534*	0,679*	0,941*	0,659*	0,853	0,805	0,848
2	Overdrafts	P1	P1	P12	3,640*	2,899*	3,167*	0,510*	0,860*	0,569*	0,726	0,476	0,783
	< 30mil.Kč												
3	All	P1	P1	P12	3,434*	3,187*	2,892*	0,561*	0,674*	0,637*	0,786	0,441	0,799
4	≤1 Year	P1	P1	P12	3,236*	3,079*	2,683*	0,617*	0,683*	0,691*	0,792	0,402	0,798
5	1-5 Years	P12	P1	P12	3,703*	3,228*	3,774*	0,458*	0,752*	0,439*	0,547	0,214	0,583
6	>5 Years	P12	P1	P12	4,730*	3,580*	4,841*	0,175*	0,754*	0,134*	0,258	0,367	0,285
7	> 30mil.Kč												
	All	P12	P1	P12	1,064*	0,927*	1,321*	0,868*	1,040*	0,811*	0,883	0,779	0,805
8	≤1 Year	P12	P1	P12	0,948*	0,823*	1,218*	0,891*	1,061*	0,831*	0,883	0,779	0,800
9	1-5 Years	P1	P3	P12	2,327*	3,407*	2,003*	0,723*	0,166	0,741*	0,461	0,007	0,437
10	>5 Years	P12	P1	P12	2,351*	1,223***	2,487*	0,798*	1,456*	0,757*	0,704	0,409	0,701

The table above demonstrates, in line with worldwide findings, that monetary policy is very efficient in influencing the transmission through interest rate channel, regarding corporate loan market. The adjustment level is 70% and higher for all the investigated sub-samples and 94% for "all"-rates including section. Comparing corporate rates according to the amount loaned; we find that larger loans record complete transmission in three out of four sub-samples, reaching even 146% in case of loans with maturity above 5 years. We have to pay attention while interpreting this result since more than one-to-one adjustments might suggest that bank credit was on average not rationed and consistent of relatively risky loans (de Bondt,

2005). Transmission to small loans is also quite high but still at least 25% below full adjustment.

OLS estimates show in general very interesting results in case of corporate loans. The pass through weakens in majority of corporate loans across sub-periods, similarly to mortgage rates. Some of the pass-through measuring coefficients, such as small but relatively also large loans with maturity below one year remain nearly constant over time, signifying that financial crisis does not have any effect on them. We explore a very special situation in case of large loans with maturity from one to five years, when the transmission coefficients behave to the contrary to what we would expect. While the β coefficient was insignificant during the first sub-period, it turns to significant reaching almost 75% during the period affected by the crisis. However, as visible on the *Chart 5.25*, loans with maturity from one to five years have the lowest weight regarding the amount compared to other loans, which might cause confusion in setting the interest rate.

Chart 5.25: Weight of loans according to time to maturity



For the first time we observe also a remarkable reflection of Euribor rates reaching about 40-45%, but only in case of large loans. This appearance can arise due to high correlation between particular Pribor and Euribor rates. As Pribor rates are largely set depending on the global economic development and so are also movements of Euribor rates, it is natural that if corporate lending rates show complete adjustment to Pribor changes, they will also demonstrate positive relation to Euribor changes.

Table 5.5: Transmission from Euribor Rates to Corporate Lending Rates

CL	Corporate Loan	Best effect: **EURIBOR**			α			β			R-squared		
		1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 -1:2010	1:2004 - 12:2006	1:2007- 12:2010
1	All	E12	E1	E12	3,347*	3,838*	3,685*	0,348*	0,107	0,302*	0,613	0,028	0,721
2	Overdrafts	E3	E1	E12	4,178*	5,033*	4,104*	0,262*	-0,124	0,276*	0,495	0,027	0,747
	<30mil.CZK												
3	All	E3	E1	E6	4,103*	5,063*	4,143*	0,262*	-0,183**	0,264*	0,441	0,089	0,579
4	≤1 Year	E3	E1	E6	3,947*	4,858*	4,019*	0,297*	-0,134	0,292*	0,473	0,042	0,601
5	1-5 Years	E6	E6	E12	4,580*	5,268*	4,775*	0,158*	-0,173	0,136*	0,173	0,045	0,228
6	>5 Years	E3	E1	E3	5,163*	5,463*	5,211*	0,029	-0,114	0,027***	0,018	0,023	0,048
7	>30mil.CZK												
	All	E12	E1	E12	2,208*	2,621*	2,735*	0,450*	0,224**	0,372*	0,621	0,098	0,686
8	≤1 Year	E12	E1	E12	2,104*	2,411*	2,653*	0,469*	0,287*	0,386*	0,638	0,156	0,696
9	1-5 Years	E12	E1	E12	3,043*	4,288*	3,278*	0,369*	-0,222	0,345*	0,335	0,033	0,383
10	>5 Years	E12	E1	E12	3,491*	3,478*	3,912*	0,387*	0,363*	0,319*	0,431	0,069	0,502

Interpretation: *, **, *** stands for 1%, 5%, and 10% significance level

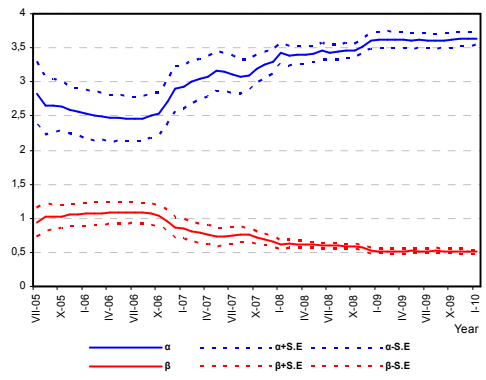
Coefficients that interpret the effect of dummy variable seem to be insignificant considering the whole examined period of January 2004- January 2010 and the second sub-period. That means that the pass-through did not depend on whether there is an initial increase or decrease of Pribor rates. However, it seems that these coefficients are significant for several subsamples during the first sub-period and that they behave differently according to loan size. We find a slightly asymmetric adjustment among 10% to 22% (depending on Pribor rate) in case of small corporate loans with maturity less than one year. On contrary, large loans record a symmetric adjustment of up to 30%. Notwithstanding, we can conclude that the initial direction of shock to money market rate is in general not important to the strength of the pass-through, as the insignificance occurs in majority of our estimates.

The following graphs (*Charts 5.26- 5.33*) plot the development of interest rate pass-through in time. In particular they represent the evolution of corporate overdrafts, small loans of all maturities, large loans of all maturities and finally our special case of one-to- five years large loans, already explored by OLS results. The remaining graphs can be found in the appendix, see *Charts A5.1-A5.12*. We can see that the results of recursive coefficients follow those from OLS. Several diminutive variances might occur as graphs do not consider first quarter of estimates. Since the middle of 2007, the overdraft coefficients dropped while the mark-up increased or remained the same, indicating that the beginning of the financial crisis was reflected

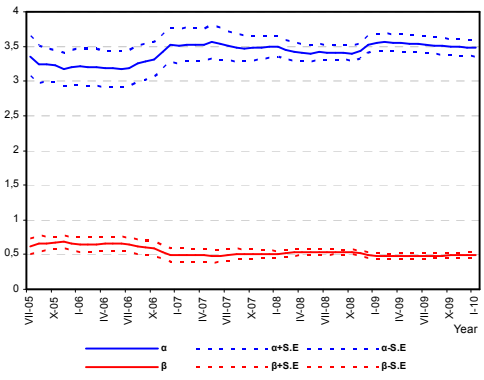
in the behavior of bank policies. Small loans are, as already mentioned, consistent over time. Considering all maturity containing large loans rates relevant to Pribor 1M, we observe a temporary hump in the middle of 2007, probably caused by a confusing situation on the market at that time. On the other hand, graph plotting the relation to Pribor 12M shows improvement in the pass through during the second sub-period, although OLS results indicate the opposite. However this increase is to a large extent influenced by the "special case" revealed form OLS results. As can be seen on *Chart 5.32* and *5.33*, findings incurred from recursive estimates confirm that corporate loans due between one and five years ameliorated their transmission during the crises by almost 60% and lowered the mark-up by the same amount. We should also mention, that the mark-up level is the lowest compared to household rates. This would suggest that corporations bear less risk than households, especially compared to consumer rates, where the mark-up is more than five times higher.

Chart 5.26-5.33: Recursive Coeff.-Pribor 1M resp. Pribor 12M/Corporate Lending Rate

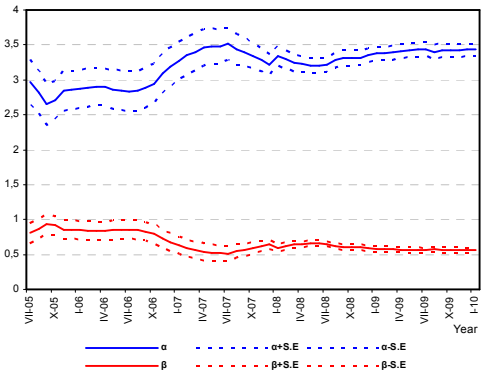
Pribor 1M/ CL2



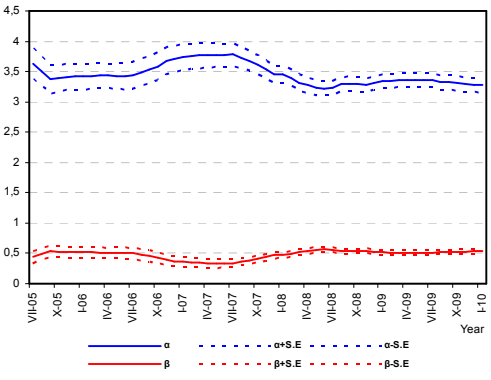
Pribor 12M/ CL2



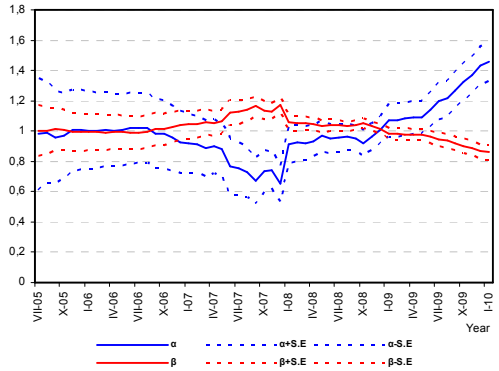
Pribor 1M/ CL3



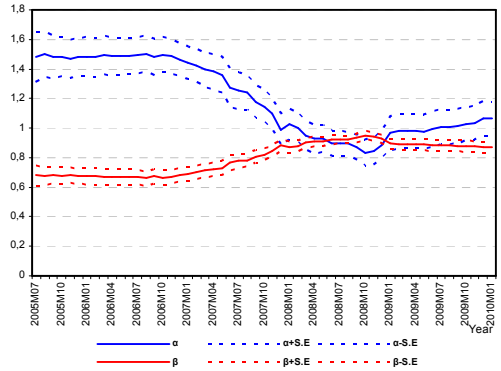
Pribor 12M/ CL3



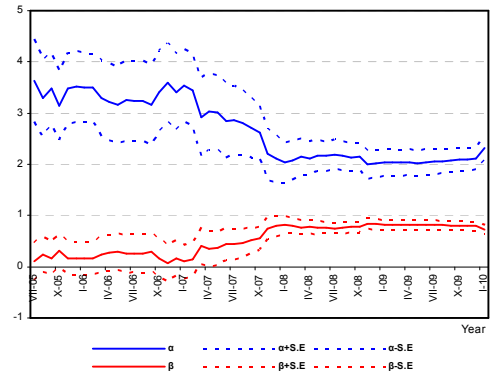
Pribor 1M/ CL7



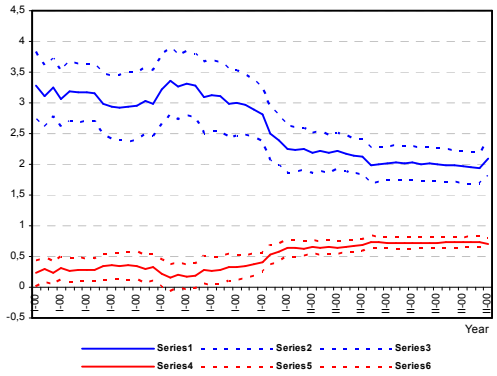
Pribor 12M/ CL7



Pribor 1M/ CL9



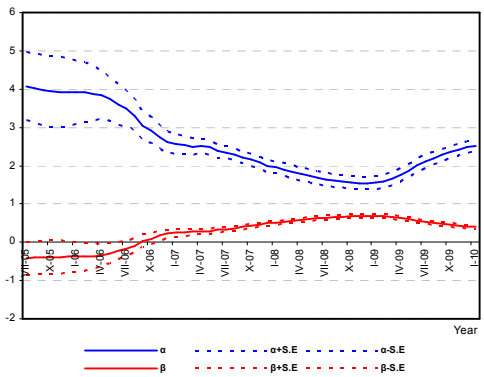
Pribor 12M/ CL9



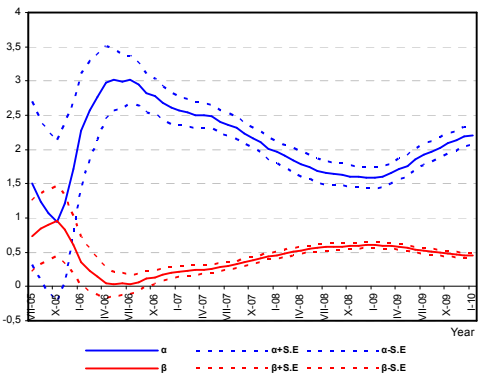
We generate also recursive coefficients comprehending the impact of Euribor rates to "all" large loans (as the OLS results accomplish the assumption of 10% significance level or satisfactory R-squared). As visible thereinafter, the transmission adjustment ameliorates in the presence of financial crises while the mark-up experiences a remarkable decline. We remind repeatedly, that this result could arise due to close linkage of Pribor and Euribor rates.

Chart 5.34-5.35: Recursive Coeff.-Euribor 1M resp.Euribor 12M/Corporate Lending Rate

Euribor 1M/ CL7



Euribor 12M/ CL7



As previously, next charts generated from the impulse response analysis, represent the findings for overdrafts, "all" small and "all" large loans. The results of remaining subsamples are attached in the appendix (*Charts A5.13-A5.25*).

The rule of "the higher money market rate maturity, the shorter reaction time" does not really hold in case of Pribor - corporate loan relation and it is very retiring in case of Euribor rates. Thus, the adjustment periods are relatively consistent for all Pribor types. On the other hand, the time period required for the shock to smooth down is highly depended on the money market rates maturity. For example overdraft reactions are constant for all Pribor rates; they attain the maximum adjustment 4 months after the shock, but the effect is not persistent, corporate rates turn back to zero 23-32 months after the shock emerged, depending on Pribor rate[11].

Considering "all" small corporate loans, the maximum reaction takes effect after approximately 7-8 months. Going over particular sub-samples we find the shortest adjustment of 4 months within loans from one to five years reflecting shocks to Pribor 12M. The longest adjustment appears within loans below one year and above five year, both for Pribor 1M. For all datasets, the effects are only temporary. The time interval it takes them to turn back lowers as Pribor maturity increases, in particular from 19 months to 4 years.

Not too many changes occur in regards to "all" large loans in comparison to "all" small loans. It takes in general from 6-7 months to reflect maximum transmission. Again, the shortest adjustment of 4 months is detected within loans from one to five years, being consistent for all Pribor rates. We discover an interesting occurrence investigating the reaction of less-than-one-year-maturity large loans to Pribor 1M. The result suggests that the maximum adjustment occurs after 19 months, while it takes only 6-7 months to reflect shock to the other Pribor rates. Moreover, the shock seems to be persistent. It did not have a tendency to return back to its initial level during the inspected period of 48 months. . For the other types of loans, the stabilization from the shock comes after the same period of time as in case of small loans.

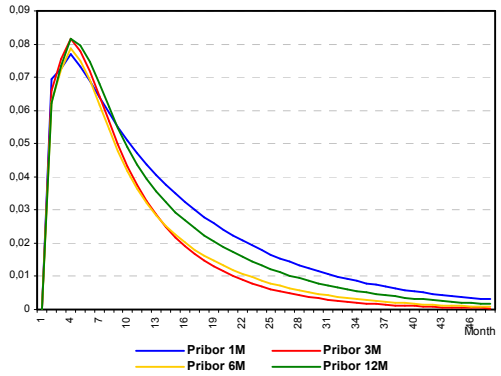
Concerning corporate rates, the impulse response analysis was again accomplished also for Euribor rates. Following the positive shock to Euribor rates, it takes little longer corporate rates to reach their maximum impact, from 8-14 months. In this

[11] 23 months in case of Pribor 3M and 32 in case of Pribor 1M

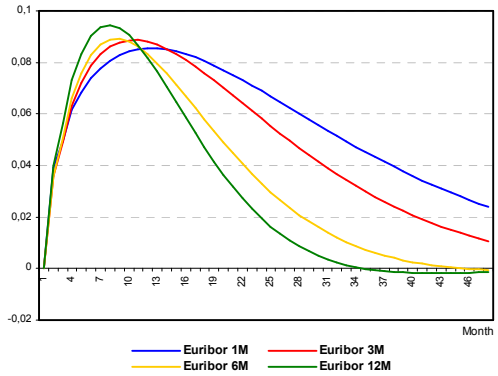
case, it is repeatedly proved that the higher Euribor maturity the less time it is necessary to reach the maximum pass-through and to return back to the pre-shock level. We can conclude that the speed of adjustment is roughly the same for both, small and large loans.

Chart 5.36-5.41: Impulse response analysis-Pribor resp.Euribor/Corporate Lending Rate

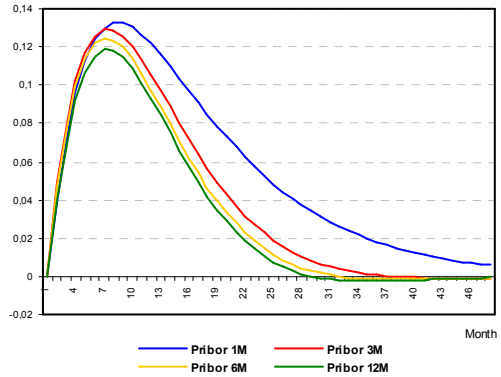
Pribor/ CL2



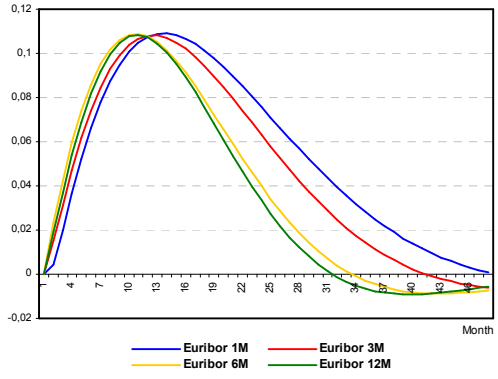
Euribor/ CL2



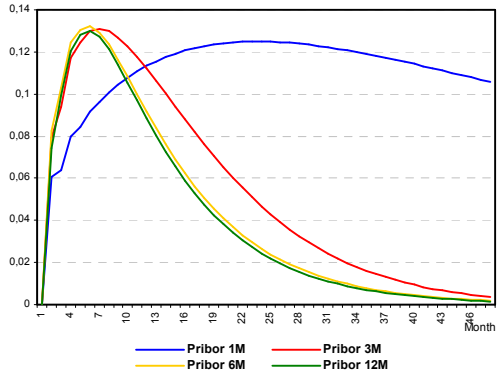
Pribor/ CL3



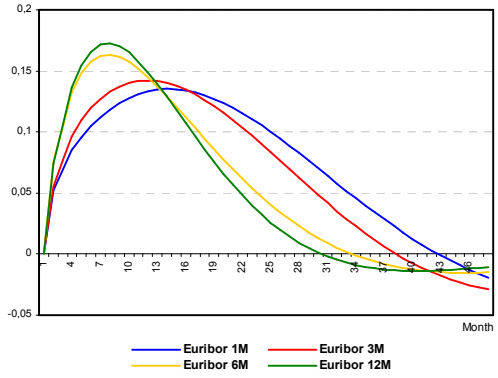
Euribor/ CL3



Pribor/ CL7



Euribor/ CL7



In majority, our results confirm findings of numerous papers dealing with interest rate pass-through. Consumer rates are passive and do not convey any information

regarding changes in Pribor. Mortgage rates showed expected behavior, however we cannot confirm the general observation implicating that long-term loans react more efficiently then short-term loans, as mortgages with maturity above ten years are insignificant across all investigated sub-periods. Consumer rates exhibit, as expected, the highest adjustment level.

5.3 Deposit Rates

Majority of studies investigating Eurozone data define deposit rates, mainly deposits redeemable at notice and current account deposits, as the most sticky and sluggish out of the whole bank product portfolio (including lending rates), e.g. Sander and Kleimeier (2002,2004), de Bondt (2005), Kok-Soerensen et al. (2006), Coricelli et al. (2006). The same findings were also discovered in relation to countries out of Eurozone, such as Hungary (Horváth et al., 2004) or Turkey (Ozdemir, 2009). On the other hand, the Polish data (Chmielewski, 2003) show the complete adjustment solely for deposit rates.
Following pages reveal our findings concerning the interest rate transmission from money market rates to household and corporate deposit rates.

5.3.1 Household Deposits Rates

As in previous cases, most influential Pribor (resp. Euribor) and adjustment spread to particular rates changes over particular sub-periods. The period from 01:2004 to 12:2006 shows again noticeable differences between particular coefficients, e.g. 57% difference in adjusting to Pribor 1M resp. Pribor 12M for deposits with agreed maturity between one and two years. In the other periods and in case of Euribor rates the spreads are almost imperceptible.

One-day deposits do not practically react to fluctuations of money market rates at all, which is intuitive regarding the maturity mismatch. Examining deposit rates based on their character, we can see that deposits with agreed maturity adjust to Pribor changes far more strongly then deposits redeemable at notice. A very high adjustment of more than 85% appears with less-than-one-year-maturity deposits. Deposits from one to two years expose even more than one-to-one adjustment reaching 137%. Deposits with maturity above two years turn out to be insignificant. We assume this rigidity to be caused due to high switching cost involved in long-

term deposits which leads banks not to reflect market rate movements. The pass-through of household deposits redeemable up to three months is also insignificant, those above reflect at maximum 43% adjustment level in the first sub-period under review.

Table 5.6: Transmission from Pribor Rates to Household Deposit Rates

HD	Household deposit	Best effect: **PRIBOR**			α			β			R-squared		
		1:2004 -1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 -1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 -1:2010	1:2004 - 12:2006	1:2007 - 12:2010
1	All	P12	P1	P12	0,344*	0,347*	0,747*	0,233*	0,234*	0,135*	0,659	0,755	0,426
2	1 Day	P12	P1	P12	0,120**	0,174**	0,311*	0,144*	0,122*	0,099*	0,447	0,280	0,202
	HH –AM												
3	All	P1	P1	P12	-0,238*	-0,419*	-0,666*	0,817*	0,865*	0,842*	0,927	0,856	0,904
4	≤1 Year	P1	P1	P12	-0,342*	-0,412*	-0,954*	0,85*	0,861*	0,915*	0,945	0,849	0,904
5	1-2 Years	P12	P1	P12	0,441	-1,230***	2,321*	0,608*	1,372*	0,126	0,347	0,372	0,025
6	>2 Years	P6	P1	P12	1,508*	0,817	1,951*	0,165	0,469	0,049	0,031	0,033	0,003
	HH - NP												
7	All	P12	P1	P12	1,032*	1,016*	1,754*	0,274*	0,271**	0,097*	0,516	0,119	0,729
8	≤3 Months	P12	P1	P12	1,744*	1,813*	2,079*	0,159*	0,121	0,078*	0,358	0,024	0,746
9	>3 Months	P12	P1	P12	0,674*	0,02	0,752*	0,100*	0,427*	0,074*	0,424	0,639	0,436

Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

Regarding Euribor rates there is no outstanding interaction between money market and retail rates. However, deposits with agreed maturity under one year show a noteworthy 46% adjustment to Euribor 12M.

Table 5.7: Transmission from Euribor Rates to Household Deposit Rates

HD	Household deposit	Best effect: **EURIBOR**			α			β			R-squared		
		1:2004 -1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 -1:2010	1:2004 - 12:2006	1:2007 - 12:2010
1	All	E12	E1	E12	0,760*	0,649*	1,114*	0,086*	0,084*	0,026**	0,235	0,264	0,063
2	1 Day	E12	E1	E12	0,437*	0,579*	0,630*	0,034**	-0,061*	0,005	0,064	0,188	0,002
	HH –AM												
3	All	E12	E1	E12	0,459*	0,914*	0,791*	0,434*	0,218**	0,390*	0,716	0,149	0,782
4	≤1 Year	E12	E1	E12	0,352*	0,891*	0,590*	0,462*	0,228**	0,434*	0,763	0,162	0,823
5	1-2 Years	E12	E1	E1	1,862*	1,380**	3,081*	0,119	0,136	-0,109**	0,034	0,01	0,086
6	>2 Years	E1	E1	E3	2,586*	4,209*	2,900*	-0,230*	-1,010*	-0,244*	0,147	0,419	0,231
	HH - NP												
7	All	E12	E1	E12	1,417*	0,748*	1,967*	0,135*	0,357*	0,032*	0,327	0,567	0,321
8	≤3 Months	E12	E1	E3	1,902*	1,466*	2,211*	0,099*	0,257*	0,041*	0,361	0,294	0,868
9	>3 Months	E3	E6	E3	0,851*	0,988*	0,871*	0,042*	-0,021	0,041*	0,182	0,007	0,554

Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

Concerning asymmetric adjustment[12], we do not find any between 2004 and 2006. The direction of initial shock was not important to the size of transmission, as the dummy coefficients are insignificant. So they are in all cases for the other examined sub-periods except for one-day deposits where we detect a modest 18% asymmetric reaction (for Pribor 1M and 3M).

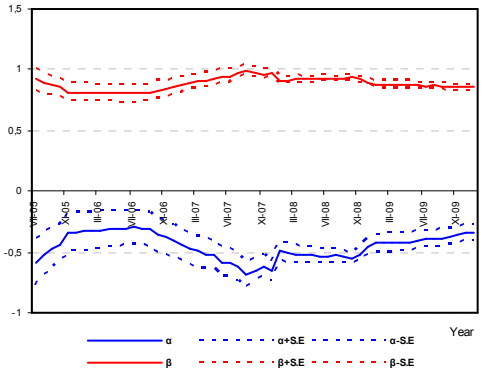
Graphs of recursive coefficients below (*Chart 5.41-5.48*) represent deposit types with strongest adjustment to changes in Pribor 1M and 12M, in particular deposits with agreed maturity less than one year and between one and two years, and deposits with notice period higher three months[13]. The remaining graphs can be found in the appendix (*Chart A5.26-A5.35*).

The results illustrate that except for deposits with agreed maturity under one year, which have consistent or slightly increasing tendency (for Pribor 12M) and almost compete adjustment over surveyed period, all other coefficients cease to react to Pribor fluctuation, some of them becoming insignificant during the period affected by the financial crisis, e.g. the case of one-to two year agreed maturity rates. We can also see how the coefficients of deposits with maturity between one to two years fluctuate during the decline, reflecting uncertain situation on the market. This is for the first time when we observe negative intercept values. It is primarily given by the fact that deposit rates do not bare any risk in comparison to lending rates. Nevertheless, the mark up rises considerably as the transmission decreases, especially in case of deposits with notice period higher than three months.
As the transmission from Euribor to household deposits with agreed maturity below one year exhibits a remarkable adjustment degree, we display also the graph plotting the development of this coefficient. We can see that the strength of the pass-through intensifies under financial crisis, acting conversely than Pribor rates. The same phenomenon was explored within corporate loans. This finding might suggest that bank retail rates change "preferences" in presence of crisis; they stop trusting and reflecting Pribor rates and rely more on Euribor changes.

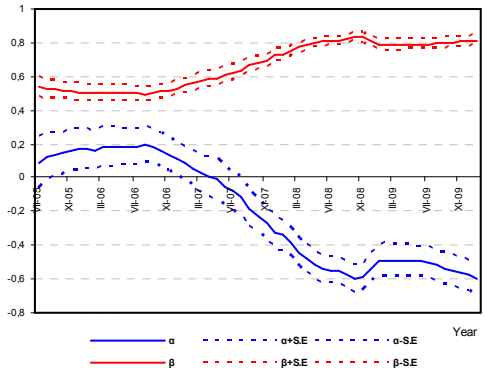
[12] We remind the model identificating asymmetries is run only in case the previous OLS results regarding Pribor rates are significant and have sufficiently high R-squared value.
[13] We do not present the cumulative plots of deposits of "all" agreed maturities and "all" notice period as they can be misleading due to insignificances of some deposit types they include

Chart 5.41-5.46: Recursive Coeff.-Pribor 1M resp.Pribor 12M/Household Deposit Rate

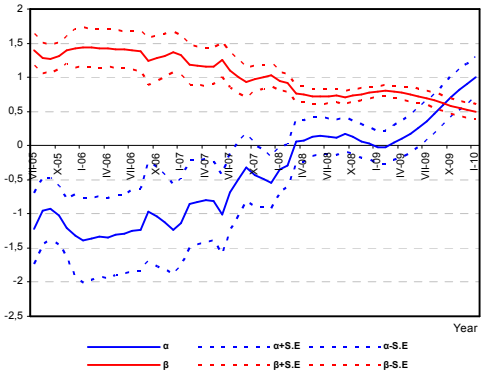
Pribor 1M/ HD4



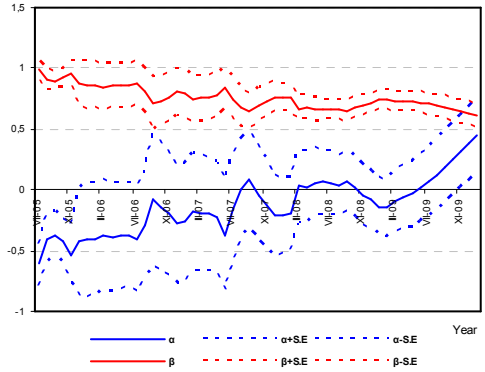
Pribor 12M/ HD4



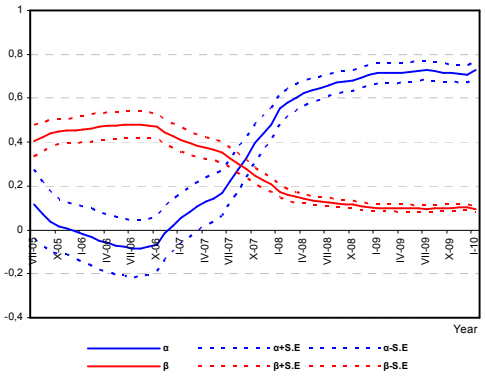
Pribor 1M/ HD5



Pribor 12M/ HD5



Pribor 1M/ HD9



Pribor 12M/ HD9

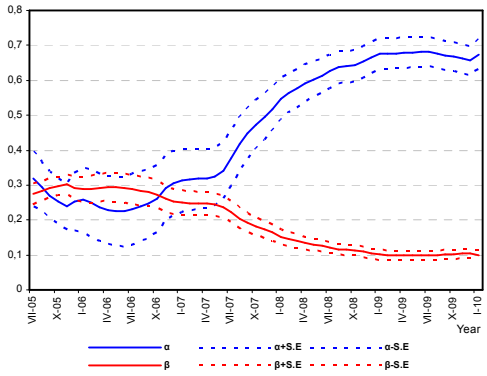
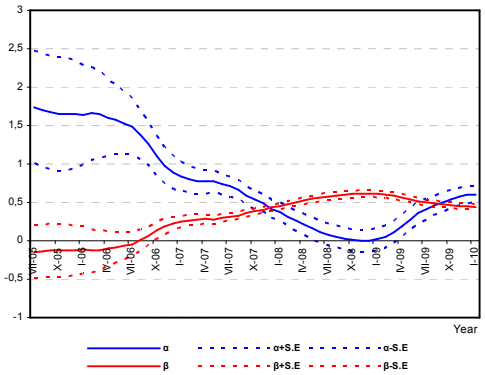
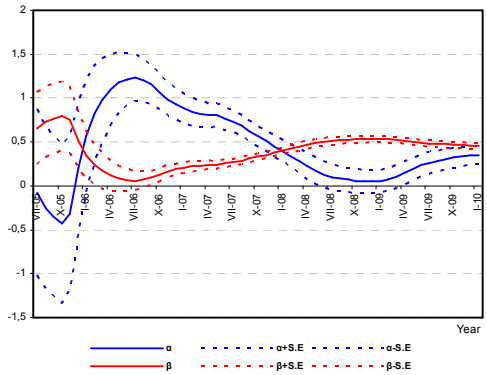


Chart 5.47-5.48: Recursive Coeff.-Euribor 1M resp.Euribor 12M/Household Deposit

Euribor 1M/ HD4



Euribor 12M/ HD4



The impulse response analysis of interest rate combinations showed significant results and higher R-squared in the OLS estimation. The speed of adjustment is relatively consistent across individual Pribor rates except for Pribor 1M, which shows notable adjustment sluggishness compared to others. Regarding Euribor shocks, we find again that the "higher market rate maturity-the faster reaction".

Our findings record quite slow reaction in case of one-day household deposits. The pass-through attains its peak after 12– 15 months depending on Pribor 12M resp. Pribor 1M. The after-shock effects persist for circa 30 months a then return to the initial level. Although as mentioned before, this behavior is intuitive concerning maturity mismatch of one day rate and the examined money market rates.

Considering retail rates with agreed maturity, we discover here the shortest reaction period so far. Although the transmission is not immediate, deposits up to one year reach the maximum adjustment to the Pribor 3M and 6M shocks after three months. Changes in Pribor 1M occur in six months. However it takes at least four years for agreed maturity rates to get back to their initial level, as the "recovery" is very smooth. Retail rates with maturity between one and two years need at least 7 (Pribor 12M) and mostly 11 (Pribor 1M) months to reflect money market changes completely.

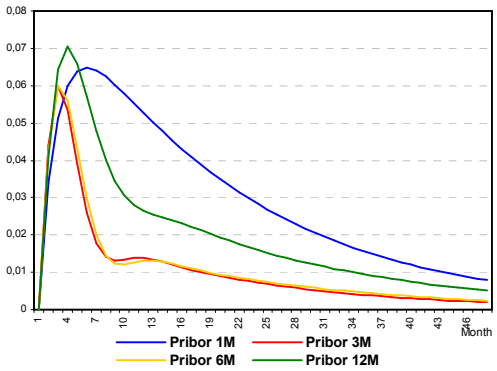
A relatively fast reaction is also found within deposits with notice period over three months, where it takes 4 to 5 months to reflect the changes. The effect holds for only 10 months in case of Pribor 1M, the shortest duration till now, however increasing up to two years for Pribor 24M.

Regarding Euribor rates we estimated recursive coefficients for deposits of "all" agreed maturities and "all" notice periods. The speed of transmission is logically much lower than in case of Pribor rates, since the OLS results showed that the pass-through is not really influenced by Euribor changes. However, also in this case the speed of adjustment decreases as Euribor maturity rises. Deposits with agreed maturity fluctuate from 10 to 16 months; deposits with notice period fluctuate between 15 to 30 months. Deposits with agreed maturity need much less time to return to their initial level in comparison to deposits with notice period, as notice period deposits do not approach zero during reviewed period.

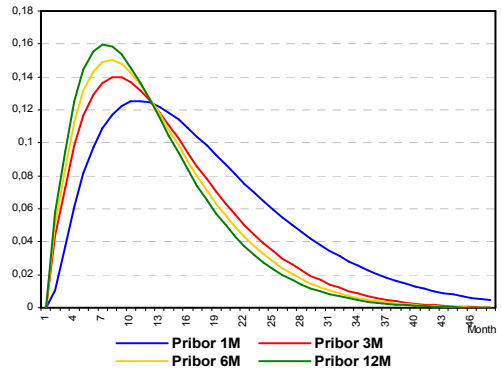
Following graphs represent the results of Impulse Response analysis with most significant reactions to money market changes given the OLS results, for remaining charts see *A5.36-A5.44*.

Chart 5.49-5.53: Impulse response analysis-Pribor resp.Euribor/Household Deposit Rate

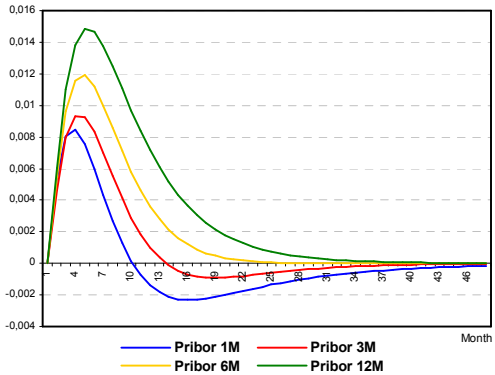
Pribor/ HD4



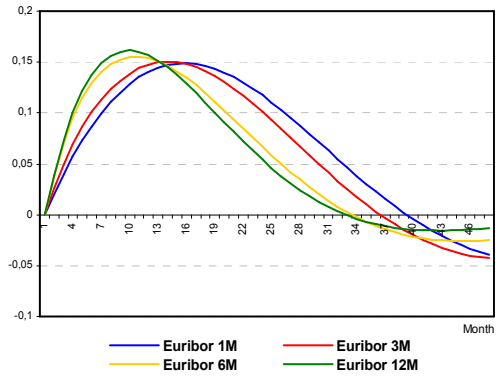
Pribor/HD5



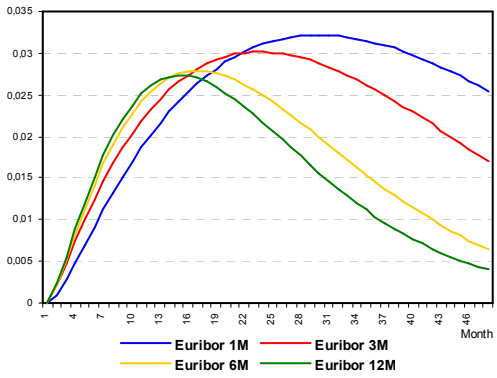
Pribor/ HD9



Euribor/ HD3



Euribor/ HD7



5.3.2 Corporate Deposits

The period from 2004-2006 shows noticeable differences between particular coefficients also in case of corporate deposits. In this case the most remarkable difference appears with deposits with notice period above three months reaching 44%. As previously, for other periods and Euribor rates the spreads are almost imperceptible.

The one-day rates show the lowest adjustment, however a little higher than in case of household deposits.

Considering Pribor rates, for deposits with agreed maturity and deposits redeemable at notice, the information is transmitted very efficiently in the first sub-period, except for rates with agreed maturity higher than two years, where the money market changes are not significant in relation to retail rates alignment. The same situation occurred in case of household deposits. The explication is the same; the switching costs for long term deposits are too high, leading to pass-through rigidities. According to OLS estimates, the pass-through for less than one year deposits turns out to increase, reaching completeness during the second reviewed period, behaving similarly as corporate loans with agreed maturity from one to five years. The crisis does not seem to have negative affect on this market segment. On contrary, all other coefficients fall significantly, at least by 40%. However, if we have a look at the graphs generated from recursive estimation, we can see that the decline of overall coefficient in case of deposit with agreed maturity from one to two years was caused by drop right at the beginning of 2007; therefore it does not probably have much in common with the start of financial crisis. Thus, we may

conclude that crises did not influence the evolution of corporate rates with agreed maturity.

The same situation arises with deposits with notice period. Although OLS results show that β has fallen by 45% in the second sub-period, recursive coefficients reveal that this decrease was caused due to a sharp drop at the end of 2007. However the pass-through coefficient is back on its previous level at this time.

In comparison to household deposits, corporate deposits show a much higher information conveyance for all the retail rates, especially rates redeemable at notice, which are close to zero for the first group.

Table 5.8: Transmission from Pribor Rates to Corporate Deposit Rates

CD	Corporate deposit	Best effect: **PRIBOR**			α			β		R-squared		
		1:2004 -1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 -1:2010	1:2004 - 12:2006	1:2007 - 12:2010
1	All	P1	P1	P12	0,045	0,212*	-0,675*	0,497*	0,443*	0,619*	0,811	0,751	0,752
2	1 Day	P1	P1	P12	0,052	0,1	-0,330*	0,262*	0,252*	0,327*	0,707	0,485	0,672
	C - AM												
3	All	P1	P1	P12	-0,145	0,101*	-1,404*	0,874*	0,798*	1,087*	0,826	0,847	0,770
4	≤1 Year	P1	P1	P12	-0,147	0,099	-1,411*	0,874*	0,798*	1,089*	0,826	0,846	0,771
5	1-2 Years	P12	P3	P12	-0,427	-0,432	1,767*	0,986*	0,980*	0,444*	0,454	0,206	0,129
6	>2 Years	P12	P1	P1	1,551*	0,5183	2,831*	0,16	0,607	-0,21	0,020	0,048	0,036
	C - NP												
7	All	P12	P1	P12	0,1633	-0,410*	0,860*	0,489*	0,786*	0,314*	0,735	0,873	0,509
8	≤3 Months	P12	P1	P12	0,106	-0,359*	0,843*	0,486*	0,727*	0,302*	0,693	0,856	0,418
9	>3 Months	P12	P1	P12	0,281***	-0,335	1,273*	0,668*	0,986*	0,423*	0,727	0,678	0,612

Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

Having a look at reaction to Euribor rates, we see that similarly to households, there appears to be a noticeable answer to these changes within deposits with agreed maturity bellow one year (during second sub-period) and within deposits with agreed maturity from one to two years (considering the whole investigated period). Notwithstanding, as mentioned before, the reflection of Euribor rates is probably arising due to high reflection of Pribor rates, as they are highly correlated.

Table 5.9: Transmission from Euribor Rates to Corporate Deposit Rates

CD	Corporate deposit	Best effect: EURIBOR			α				β		R-squared		
		1:2004 -1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004 - 1:2010	1:2004 - 12:2006	1:2007 - 12:2010	1:2004- 1:2010	1:2004 - 12:2006	1:2007 - 12:2010
1	All	E3	E1	E12	0,404*	0,864*	0,206*	0,314*	0,125*	0,339*	0,835	0,163	0,911
2	1 Day	E3	E1	E12	0,220*	0,324*	0,135*	0,173*	0,133*	0,180*	0,794	0,368	0,818
	C - AM												
3	All	E3	E1	E12	0,500*	1,334*	0,195*	0,547*	0,200**	0,581*	0,835	0,145	0,89
4	≤1 Year	E3	E1	E12	0,498*	1,333*	0,191*	0,548*	0,200**	0,582*	0,835	0,145	0,89
5	1-2 Years	E12	E1	E12	1,156*	0,821	2,662*	0,422*	0,356	0,170*	0,217	0,074	0,077
6	>2 Years	E1	E1	E3	2,623*	2,771*	3,166*	-0,222**	-0,404	-0,290*	0,097	0,057	0,212
	C - NP												
7	All	E12	E1	E12	1,006*	0,875*	1,600*	0,191*	0,167**	0,091*	0,293	0,108	0,173
8	≤3 Months	E12	E1	E12	0,979*	0,848*	1,608*	0,178*	0,147**	0,072**	0,242	0,095	0,097
9	>3 Months	E12	E1	E12	1,393*	1,217*	2,250*	0,273*	0,235**	0,128*	0,316	0,105	0,228

Concerning the asymmetric adjustment, neither bank products, nor corporate deposits rates are dependent on the direction of primary shock to Pribor rate during the period before the financial crisis emerged. Even the dummy coefficients are significant in some cases, mostly reacting to Pribor 1M or Pribor 12M changes. Their value is almost unnoticeable. In contrast to household deposits, corporate deposits show significance for almost all Pribor 1M dummies, except for rates with agreed maturity above one year.

One-day corporate rates and rates with agreed maturity up to one year adjust symmetrically to positive Pribor 1M changes. Interestingly, the other Pribor rates do not play any role for the transmission. All corporate rates with notice periods demonstrate significant asymmetries of 30%, this time in contrary to household rates, where the dummy value is not important for the pass-through.

Following graphs generated from recursive estimates plot the transmission development regarding the relation between Pribor rates and deposits with agreed maturity below one year, between one and two years and "all" deposits redeemable at notice[14], for remaining results see *Chart A5.45-A5.54* in the attached in the appendix. We expose as well coefficients relating Euribor rates with corporate deposits mature within two years, as they record a relatively satisfying adjustment degree.

[14] We do not introduce the graph of „all" deposits with agreed maturity as it contains insignificant data of deposits with maturity higher two years, which might influnce the enfeeble the result.

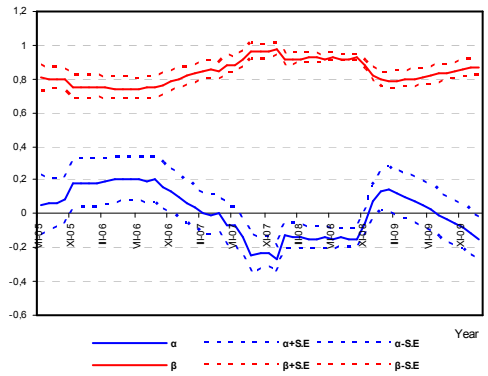
The first graph confirms the original OLS results that the adjustment level of up-to-one-year-maturity deposits increases in time.

As already mentioned deposits with agreed maturity between one and to years recorded a hump which has started at the begging of 2008 and which was probably caused by a confusing situation on a market at that time.

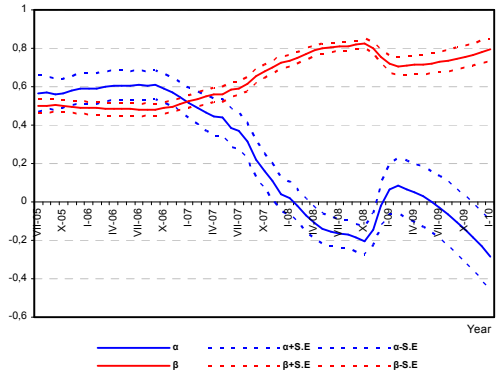
The sample consisted of "all" deposits redeemable at notice shows a remarkable decline in reflecting changes in Pribor 1M during the crisis, however the transmission of Pribor 12M is very confusing displaying extensive fluctuations during the second sub-period.

Chart 5.54-5.59: Recursive Coeff.-Pribor 1M resp.Pribor 12M/Corporate Deposit Rate

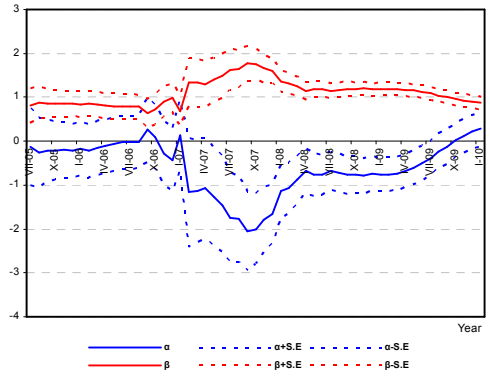
Pribor 1M/ CD4



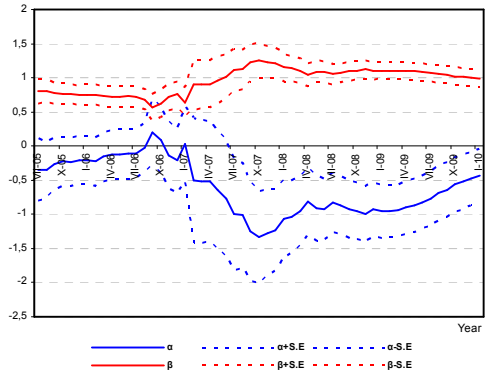
Pribor 12M/ CD4



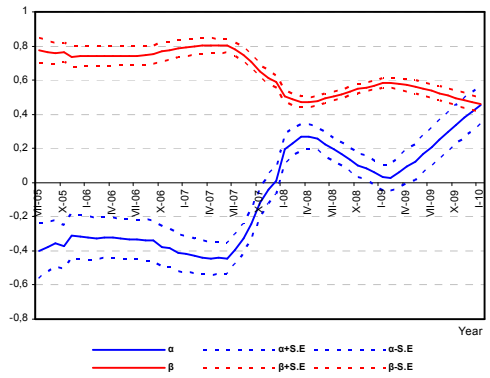
Pribor 1M/ CD5



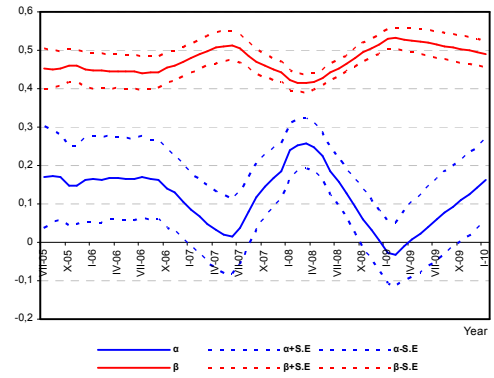
Pribor 12M/ CD5



Pribor 1M/ CD7



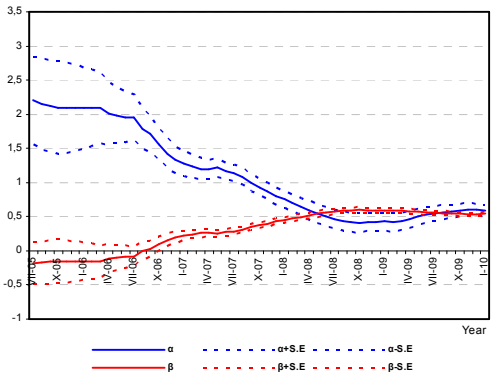
Pribor 12M/ CD7



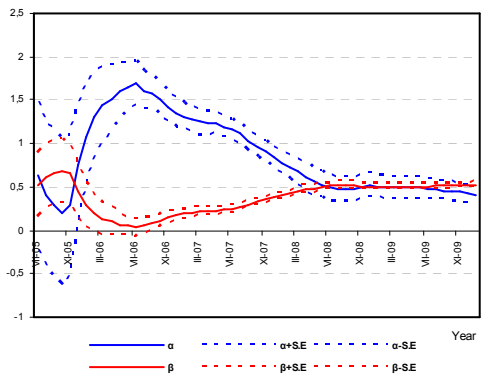
Corporate deposits (with maturity up to one year) show increasing tendency to reflect Euribor changes during the crisis, as corporate loans and household deposits with agreed maturity up to one year also do, as visible on the following graph. As we suggested before, this finding could mean that short and middle-term retail rates believe more in Euribor than in domestic money market rates during the financial distress.

Chart 5.60-5.61: Recursive Coeff.-Euribor 1M resp.Euribor 12M/Corporate Deposit Rate

Euribor 1M/ CD4



Euribor 12M/ CD4



An interesting situation occurs regarding the results from impulse response analysis. While the OLS result displays a very high positive adjustment to Pribor rate changes, the impulse response findings demonstrate a negative shock to retail rates, in particular to one-day corporate rates, to rates with agreed maturity less than one year and as a result also to corporate loans as for a whole sample. This disparity between findings is probably caused as OLS method does not take into account the simultaneous relations and both methods are computed by slightly different techniques. For the other cases (agreed maturity from one to two years and rates with notice period) the reaction turns back to normal.

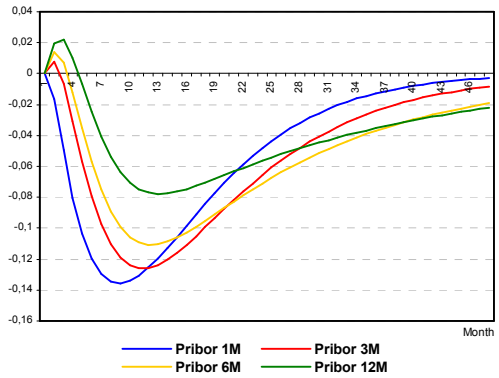
The shortest reaction period appears within 1-2 years agreed maturity rates, being completely transmitted within 6-7 months. For deposit rates redeemable at notice, it takes between 9 to 16 months to reflect the absolute pass-through. While one-day household deposits were more sluggish in comparison to the other rates, in case of corporate deposit they seem to be behaving similarly as the other deposit types. Nevertheless this observation might be misleading given the negative effect. The reaction period again proves to be increasing as the Pribor maturity augments. The shock effect turns back to zero in case of all the rates in the long run, having the shortest impact of circa one year and a half within "all" notice period rates.

Considering Euribor rates, they cause a positive shock to all sub-samples. The transmission period of 7-18 months is in general slightly higher then for Pribor rates. However, e.g. in case of one-day rates the transmission of Euribor rates is faster. Also Euribor rates confirm the rule of "higher money market maturity-lower adjustment period". The shock impact is temporary again and turns back to normal in the long-run.

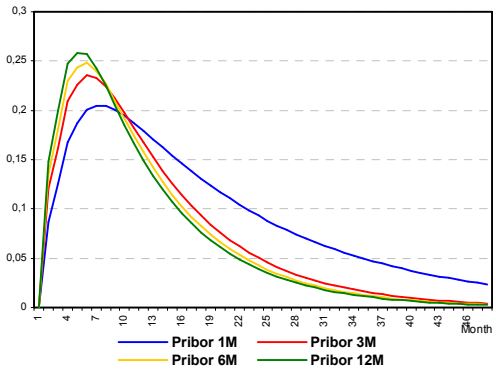
Following charts represent the negative reaction of deposits with maturity less than one year, the positive reaction of rates between one and two years to Pribor changes, as well as the influence of Euribor shocks to "all" agreed maturities and deposits redeemable at notice.

Chart 5.62-5.66: Impulse response analysis-Pribor resp.Euribor/Corporate Deposit Rate

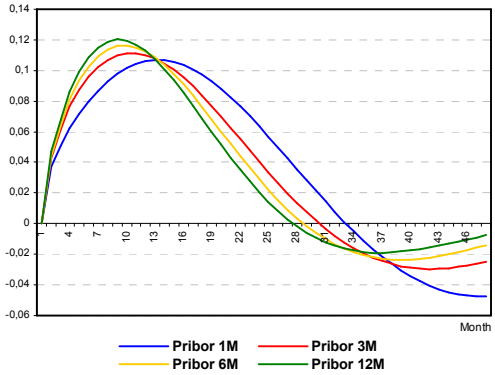
Pribor/ CD4



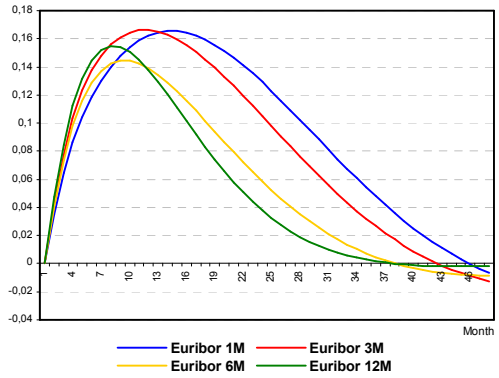
Pribor/ CD5



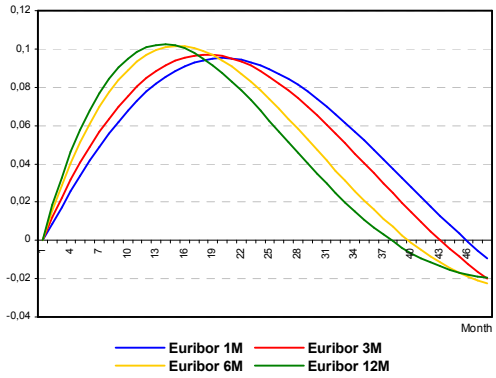
Pribor CD7



Euribor/ CD7



Euribor/ CD9



In this section, we empirically examined the interest pass-through from Pribor and Euribor rates to bank retail rates in the Czech Republic. We applied several different methods to evaluate the volume of transmission, its development in time, or the intensity of reaction to given shocks. Nevertheless, our findings should be interpreted with carefulness as the data sample under review is relatively short and might act uncertainly. The summary of our findings is discussed in the following chapter.

Chapter 6

Summary and Conclusions

Our study focuses its attention on the relationship between money market rates and retail bank interest rates during the period from January 2004 to January 2010. This time path is very specific, as its first part developed under normal circumstances, while the second part was influenced by turbulences of the financial crisis. The aim of this research was to investigate the behavior of the interest rate transmission from money market rates to bank retail rates on the Czech banking market and to detect potential changes which occurred as a result of financial distress.

The first part of the thesis is devoted to very basic introduction of the monetary policy transmission process and to the channels through which it operates. It is important for readers' better understanding of the importance of the issue we are dealing with. In the next section we present the determinants denoted as crucial for transmission efficiency by theoretical and empirical literature. Finally, we summarize the worldwide literature findings regarding the size and the speed of the interest rate pass-through as well as potential abnormalities across particular countries or banking products.

Next chapter is dedicated to the Czech market background and its development during the period under review. First of all we analyze how the Czech market accomplishes the assumptions of the transmission determinants.
We locate several market characteristics that have a positive impact on the money market transmission. We denote that the evolution of money market rates is very stable, thereby the volatility is low. Another optimistic factor is a high percentage of foreign investors in the banking industry, as well as high amount of banks owned by private entities. These features are determined to stimulate the size and the speed of

the transmission. On the other hand, there are also some characteristics which cause pass-through rigidity and sluggishness. As detected, the market suffers from competition imperfections accompanied by high bank concentration. Moreover, majority of non-financial companies use only one bank as a source of financing, which consequently leads to large switching costs and higher volatility. Finally, the market disposes of weaker elasticity of demand.
Regarding the after-crisis development, apart from massive fall in both money market and retail rates, we record also a fall in a growth tendency of amount of loans granted and deposits taken. In addition, the amount of non-performing loans is increasing significantly during the last two years.

Finally, we accomplish the empirical research. In order to examine the strength of adjustment to Pribor and Euribor changes and to detect potential asymmetries, we used the OLS method. After that Recursive Coefficients were estimated, in order to provide us with information about gradual evolution of the pass-through level. At the end, using Impulse Response analysis, we obtained results showing the speed at which the shock to the money market rates is transmitted to bank retail rates. Our results are presented on the following lines.

Considering the results from OLS estimates we learned that the most influential money market rate changes in time. Practically all investigated bank products show higher impact of money market rates with lower maturity (Pribor 1M, Euribor 1M) in the first sub-period and on contrary, stronger effect of money market rates with higher maturity (Pribor 12M, Euribor 12M) in the second sub-period. Moreover, the evidence from the January 2004 to December 2006 period indicates, that the extent to which bank retail rates reflect changes in market rates differs remarkably across particular Pribor rates. Retail rates show by tens of percent higher adjustment to Pribor with low maturity during the first time interval. Our hypothesis is that these distinctions arise from changes in expectations about future, which are effected by potential monetary tightening or releasing.

Concerning the completeness of the pass-through, we have to point out that majority of transmission coefficients are incomplete, which is perfectly in line with worldwide literature. However, completeness is reached within several retail rates, mostly during the first sub-period. Exactly 100% adjustment occurs only within

mortgage rates with maturity from one to five years, large corporate loans due in less than a year, corporate deposits with agreed maturity below two years[15] and corporate deposits with notice period above three months. Some coefficients show a more than one-to-one adjustment, concretely consumer loans with maturity higher than five years, large corporate loans of the same maturity and household deposits from one to two years. A compelling explanation of this phenomenon is given by de Bondt (2005, pp.9): "In banking and finance literature, the subsistence of optimal decisions of banks is attributed to sound risk management practices. Then, the question arises what if banks do not ration credit since their risk management is not strong enough. In this case, interest rate will not be sticky on risky loans and more than one for one adjustment takes place for these riskier loans".

Comparing in general all five retail products regarding the transmission efficiency, we observe that the strongest and most consistent results are provided by corporate deposits, all the corporate loans and household deposits with agreed maturity below two years. Nevertheless, we have to point out, that our findings indicate that both, household and corporate deposit rates, with agreed maturity above two years do not transmit changes in Pribor. Our explanation is that the switching costs for long term deposits are too high and thus bring us to pass-through rigidities. Regarding corporate loans, we conclude that large loans demonstrate slightly higher interest rate transmission than small loans. Household loans tend to behave unstably, showing rather incomplete adjustment during examined period.

Our findings confirm majority of international studies regarding corporate rates; corporate landing rates have the strongest adjustment level in comparison to household lending rates. Moreover, corporate loans show the overall highest pass-through along with deposit rates to corporations. Concerning deposit rates, our results contradict the majority of empirical evidence as they exhibit extremely efficient transmission; especially in case of corporate deposit rates, where all categories show almost complete adjustment, except for one-day aroused due to maturity mismatch[16].

The analyzed data sample was divided into two sub-periods, first containing 36 observations from January 2004 to December 2006, and second sub-period

[15] Deposits with agreed maturity below one year show complete adjustment in the second period.

involving 37 observations from January 2007 to January 2010. The aim of this subdivision was to explore potential differences in adjustment level between the sub-periods, as the first one of them evolved under "natural" economic environment while the second one under pressure of financial crisis.

The OLS results indicate that for absolute majority of given data sub-samples the pass-through decreases noticeably during the period influenced by the financial crises. The coefficients either fall dramatically or they become insignificant, which means they stop reflecting changes in Pribor rates. However, there are some cases that come out to be consistent during both periods such as small corporate loans with maturity less than one year, household deposits with agreed maturity lower than one year and one day corporate deposits. A very interesting result comes out in comparison with the other findings, when the interest rate pass-through reinforces during the second sub-period. This situation arises in case of large corporate loans due after one to five years. However, we learn that loans with maturity from one to five years have the lowest weight regarding the amount compared to other loans, which might consequently cause confusion in setting the interest rate.

Our next intension was to detect potential asymmetric behavior, thus whether it is important for the transmission level, if the initial Pribor change has an upward or downward direction, and how does this factor influences the level of adjustment. OLS estimates where in this case run only for combinations with Pribor rates that exposed significant result with high R-squared value in previous OLS results.

Most of the estimates showed insignificant or hardly remarkable results, especially during 2004-2006. However, we find an exception in case of small corporate loans up to one year which show slightly asymmetric adjustment and also in case of large loans with maturity below one year and above five years, where the dummy has on contrary positive effect. Regarding the second sub-period the most notable asymmetric results are detected within corporate deposits with redeemable at notice option (about -0.3%). We also discover symmetric adjustment within one day corporate deposit (19%) and corporate deposits with agreed maturity up to one year (46%), as well as within large corporate loans due after five years and corporate overdrafts (22-25%). We can conclude that asymmetries are in general observed only during the period of financial crisis and appear solely in case of corporate loans and deposits. Notwithstanding the results are relatively inconsistent and

uncertain over the period under review, therefore they should be interpreted with caution.

The purpose of the next part of our research was to investigate in more detail the overall evolution of the interest rate pass-through coefficients. The results generally follow those coming out from the initial OLS estimates. Coincidental discordances are mostly caused by temporary fluctuations incurred due to primary shocks as the financial crisis emerged.

Our final goal was to discover what time frame is needed for money market rate changes to be reflected at the maximum level. Therefore an Impulse Response analysis was applied. We have to point out that our data sample is relatively short for VAR analysis, thus the following interpretations must be considered with caution.

It holds for majority of the results that the higher is the maturity of the money market rate, the faster is the reflection to bank retail rates. The rest of adjustments are consistent over particular money market types.

Except for the impact of Euribor rates on deposits redeemable at notice and Pribor 1M on large corporate loans, all the observations show that the effects are not persistent and return back to their pre-shock level in maximum during a period of 48 months. The time needed to get back to the initial level also depends on the maturity of particular money market rate; the higher the maturity, the faster is the recovery. The argument explaining this behavior is that money market rates with higher maturity are used more frequently for pricing bank retail rates.

Another, quite intuitive finding (regarding the OLS results) is that shocks to Pribor rates are reflected much faster than those to Euribor rates.

To sum up, we conclude that the shortest reaction to Pribor (resp. Euribor) shocks appears within household deposits with maturity up to one year, reflected in three months (resp. consumer loans with maturity above one year, adjusting in five months). The longest adjustment, of 23 months, occurs in case of large corporate loans (resp. household deposits redeemable at notice, reaching 30 months).

Concerning the future development, we assume the interest rate pass-through to return back to its pre-crisis level after the turbulences caused by the financial

distress completely vanish. However, we have to point out that it can take several years to recover from these aftermaths.

In few years, the Czech Republic is supposed to enter European Monetary Union. This currency transition will certainly change the efficiency of monetary policy, including interest rate channel, as the key influential rates will change. With reference to empirical literature, we suppose the EMU will affect positively the interest rate transmission regarding both, its size and speed of adjustment. Therefore, albeit the accession of the Czech Republic to EMU does not seem to occur in the very near future, we are optimistic about the transition regarding the efficiency of the pass-through.

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Appendix

Table A5.1-A5.3: Transmission from Pribor resp.Euribor Rates to Mortgage Rates

01:2004-01:2010

M	Mortgage Type		Pribor 1M	Pribor 3M	Pribor 6M	Pribor 12M	Euribor 1M	Euribor 3M	Euribor 6M	Euribor 12M
		α	4,35*	4,23*	4,14*	4,04*	5,09*	5,05*	4,98*	4,99*
		β	0,26*	0,24*	0,31*	**0,32***	-0,03	-0,02	0,00	0,00
1	All	R-sq.	0,17	0,24	0,27	0,28	0,00	0,00	0,00	0,00
		α	3,81*	3,59*	4,84*	3,24*	5,08*	4,97*	4,84*	4,84*
		β	0,47*	0,53*	0,05*	**0,60***	-0,0	0,01	0,05	0,05
2	≤1 Year	R-sq.	0,19	0,26	0,29	0,31	0,00	0,00	0,00	0,00
		α	4,17*	4,02*	3,89*	3,74*	5,05*	4,99*	4,90*	4,89*
		β	0,32*	0,36*	0,39*	**0,42***	-0,0	0,00	0,03	0,03
3	1-5 Years	R-sq.	0,19	0,26	0,39	0,34	0,00	0,00	0,00	0,00
		α	4,73*	4,72*	4,69*	4,64*	4,94*	4,94*	4,92*	4,91*
		β	0,12*	0,12*	0,12*	**0,13***	0,03**	0,03***	0,04***	0,04**
4	5-10 Years	R-sq.	0,16	0,17	0,18	0,21	0,04	0,03	0,04	0,05
		α	5,10*	5,09*	5,10*	5,11*	5,23*	5,26*	5,26*	5,28*
		β	-0,02	-0,02	-0,02	-0,02	-0,07*	-0,08*	-0,07*	-0,08*
5	>10 Years	R-sq.	0,00	0,00	0,00	0,00	0,10	0,12	0,11	0,12

01:2004-12:2006

M	Mortgage Type		Pribor 1M	Pribor 3M	Pribor 6M	Pribor 12M	Euribor 1M	Euribor 3M	Euribor 6M	Euribor 12M
		α	3,25*	3,37*	3,56*	3,7*	5,5*	5,5*	5,5*	5,49*
		β	0,69*	0,61*	0,51*	0,41*	-0,32**	-0,31*	-0,30*	-0,28*
1	All	R-sq.	0,20	0,20	0,19	0,19	0,11	0,14	0,16	0,16
		α	3,39*	3,43*	3,53*	3,56*	5,37*	5,38*	5,4*	5,42*
		β	0,48**	0,45**	0,38**	0,35**	-0,39**	-0,39**	-0,38*	-0,37*
2	≤1 Year	R-sq.	0,05	0,06	0,06	0,08	0,10	0,13	0,15	0,17
		α	2,38*	2,51*	2,75*	2,93*	4,71*	4,75*	4,78*	4,77*
		β	1,06*	0,96*	0,82*	0,69*	-0,02	-0,04	-0,05	-0,04
3	1-5 Years	R-sq.	0,39	0,41	0,41	0,43	0,00	0,00	0,00	0,00
		α	3,69*	3,71*	3,84*	3,96*	5,18*	5,17*	5,16*	5,12*
		β	0,63*	0,6*	0,52*	0,43*	-0,06	-0,05	-0,05	-0,03
4	5-10 Years	R-sq.	0,41	0,48	0,49	0,51	0,00	0,01	0,00	0,00
		α	4,75*	4,87*	4,97*	4,98*	5,94*	5,95*	5,96*	5,97*
		β	0,15	0,09	0,05	0,04	-0,36*	-0,35*	-0,35*	-0,33*
5	>10 Years	R-sq.	0,01	0,00	0,00	0,00	0,20	0,24	0,29	0,31

			01:2007-01:2010							
			Pribor				Euribor			
M	Mortgage Type		**1M**	**3M**	**6M**	**12M**	**1M**	**3M**	**6M**	**12M**
		α	5,11*	4,99*	4,93*	4,9*	5,53*	5,55*	5,51*	5,52*
		β	0,05	0,08	0,1	0,1	-0,08*	-0,08*	-0,07*	-0,07*
1	All	**R-sq.**	0,01	0,04	0,05	0,04	0,13	0,12	0,08	0,08
		α	5,41*	5,21*	5,12*	5,07*	6,06*	6,1*	6,05*	6,08*
		β	0,06	0,12	0,14	0,15	-0,15*	-0,15*	-0,13*	-0,13*
2	≤1 Year	**R-sq.**	0	0,02	0,03	0,03	0,16	0,14	0,1	0,1
		α	5,23*	5,09*	5,02*	4,99*	5,68*	5,71*	5,67*	5,7*
		β	0,03	0,07	0,09	0,1	-0,11*	-0,11*	-0,09*	-0,1*
3	1-5 Years	**R-sq.**	0	0,02	0,03	0,02	0,16	0,15	0,11	0,11
		α	4,67*	4,62*	4,57*	4,52*	4,89*	4,88*	4,84*	4,82*
		β	0,12*	0,13*	0,14*	0,15*	0,04**	0,05**	0,05*	0,06*
4	5-10 Years	**R-sq.**	0,3	0,33	0,34	0,32	0,15	0,14	0,19	0,2
		α	5,01*	4,97*	4,96*	4,97*	5,14*	5,16*	5,14*	5,14*
		β	0	0,01	0,01	0,01	-0,04*	-0,04*	-0,03*	-0,03*
5	>10 Years	**R-sq.**	0	0	0	0	0,22	0,21	0,14	0,14

Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

Table A5.4: Asymmetric Adjustment of Mortgage Rates to Pribor Rates

			01:2004-01:2010				01:2004-12:2006				01:2007-01:2010			
M	Mortgage Type		**P 1M**	**P 3M**	**P 6M**	**P 12M**	**P 1M**	**P 3M**	**P 6M**	**P 12M**	**P 1M**	**P 3M**	**P 6M**	**P 12M**
		α	4,32*	4,27*	4,11*	4,04*	3,21*	3,36*	3,45*	3,65*	5,00*	4,92*	4,80*	4,81*
		β1	0,33*	0,34*	0,36*	0,36*	0,73**	0,65**	0,57**	0,45**	0,16***	0,19***	0,19	0,17
		β2	-0,32*	-0,35*	-0,25*	-0,22**	-0,12	-0,16	-0,10	-0,06	-0,38	-0,43	-0,29	-0,25
1	All	**R-sq.**	0,29	0,40	0,36	0,36	0,27	0,30	0,25	0,24	0,25	0,36	0,18	0,15
		α	3,79*	3,67*	3,40*	3,29*	3,39*	3,44*	3,43*	3,51*	5,25*	5,14*	4,97*	5,01*
		β1	0,58*	0,62*	0,66*	0,65*	0,52	0,48	0,45***	0,38***	0,23***	0,27	0,26	0,22
		β2	-0,55**	-0,58	-0,46**	-0,38***	-0,17	-0,18	-0,13	-0,06	-0,65	-0,72	-0,44	-0,35
2	≤1 Year	**R-sq.**	0,30	0,39	0,38	0,37	0,10	0,11	0,09	0,10	0,25	0,35	0,14	0,10
		α	4,14*	4,06*	3,85*	3,74*	2,28*	2,44*	2,62*	2,84*	5,05*	4,96*	4,81*	4,84*
		β1	0,40*	0,43*	0,46*	0,47*	1,11*	1,01*	0,88*	0,72*	0,17***	0,21***	0,22	0,19
		β2	-0,33**	-0,39*	-0,27**	-0,25***	-0,02	-0,08	-0,02	-0,01	-0,46	-0,53	-0,37	-0,31
3	1-5 Years	**R-sq.**	0,29	0,40	0,38	0,41	0,47	0,52	0,51	0,53	0,24	0,36	0,18	0,14
		α	4,73*	4,71*	4,68*	4,63*	3,64*	3,67*	3,81*	3,94*	4,65*	4,58*	4,51*	4,44*
		β1	0,12**	0,13*	0,13*	0,14*	0,64*	0,62*	0,53*	0,44*	0,14***	0,16**	0,18**	0,19*
		β2	0,02	-0,02	0,01	-0,01	0,05	0,02	0,02	0,01	-0,02	-0,08	-0,08	-0,12
4	5-10 Years	**R-sq.**	0,18	0,19	0,20	0,23	0,45	0,52	0,52	0,54	0,31	0,38	0,38	0,40
		α	5,06*	5,08*	5,06*	5,07*	4,72*	4,86*	4,84*	4,90*	4,95*	4,94*	4,88*	4,92
		β1	0,02	0,01	0,01	0,00	0,20	0,14	0,12	0,07	0,05	0,05	0,06	0,05
		β2	-0,15**	-0,15**	-0,09	-0,05	-0,17	-0,18	-0,09	-0,02	-0,17*	-0,17*	-0,16**	-0,14***
5	>10 Years	**R-sq.**	0,10	0,10	0,03	0,01	0,11	0,11	0,03	0,01	0,27	0,24	0,22	0,19

Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

Table A5.5-A5.7: Transmission from Pribor resp.Euribor Rates to Consumer Lending Rates

01:2004-01:2010

C	Consumer Loan		Pribor 1M	Pribor 3M	Pribor 6M	Pribor 12M	Euribor 1M	Euribor 3M	Euribor 6M	Euribor 12M
		α	13,79*	13,65*	13,6*	13,54*	14,36*	14,45*	14,41*	14,49*
		β	**-0,16****	-0,1	-0,08	-0,05	-0,36*	**-0,37***	-0,34*	-0,35*
1	All	R-sq.	0,017	0,007	0,004	0,002	0,226	0,235	0,213	0,221
		α	13,27*	12,99*	12,84*	12,68*	14,08*	14,05*	13,92*	13,93*
		β	-0,06	0,04	0,094	**0,14**	**-0,36***	-0,33*	-0,27*	-0,26*
2	≤1 Year	R-sq.	0,002	0,001	0,005	0,012	0,207	0,172	0,124	0,115
		α	15,16*	15,24*	15,37*	15,53*	15,32*	15,54*	15,65*	15,8*
		β	-0,38*	-0,39*	-0,42*	**-0,45***	-0,41*	-0,46*	-0,48*	**-0,5***
3	1-5 Years	R-sq.	0,047	0,055	0,064	0,07	0,149	0,188	0,214	0,235
		α	14,15*	14,14*	14,22*	14,4*	14,73*	14,91*	14,92*	15,05*
		β	-0,29*	-0,27*	-0,29*	**-0,33***	-0,48*	**-0,52***	-0,49*	-0,52*
4	>5 Years	R-sq.	0,033	0,032	0,035	0,045	0,244	0,278	0,272	0,289

01:2004-12:2006

C	Consumer Loan		Pribor 1M	Pribor 3M	Pribor 6M	Pribor 12M	Euribor 1M	Euribor 3M	Euribor 6M	Euribor 12M
		α	11,8*	11,68*	11,84*	11,87*	16,08*	16,06*	16,02*	16*
		β	0,767	0,79***	0,698	0,63***	-1,11*	-1,07*	-1,02*	-0,96*
1	All	R-sq.	0,034	0,047	0,048	0,061	0,195	0,227	0,253	0,262
		α	11,49*	11,14*	11,09*	11,07*	13,51*	13,43*	13,34*	13,21*
		β	0,601	0,74***	0,73***	0,69**	-0,3	-0,27	-0,22	-0,16
2	≤1 Year	R-sq.	0,039	0,076	0,1	0,134	0,028	0,027	0,022	0,014
		α	12,62*	13,29*	13,96*	14,38*	20,56*	20,43*	20,31*	20,27*
		β	0,996	0,662	0,341	0,148	-2,45*	-2,33*	-2,21*	-2,08*
3	1-5 Years	R-sq.	0,024	0,014	0,005	0,001	0,412	0,465	0,512	0,533
		α	10,93*	11,84*	12,68*	13,52*	18,71*	18,48*	18,31*	18,31*
		β	1,35***	0,893	0,491	0,12	-2,06*	-1,91*	-1,79*	-1,69*
4	>5 Years	R-sq.	0,071	0,04	0,016	0,001	0,456	0,49	0,523	0,552

			01:2007-01:2010							
			Pribor				Euribor			
C	Consumer Loan		1M	3M	6M	12M	1M	3M	6M	12M
		α	13,97*	13,82*	13,82*	13,92*	14,3*	14,41*	14,39*	14,45*
		β	**-0,23*** **	-0,16	-0,16	-0,18	-0,32*	**-0,34***	-0,31*	-0,31*
1	All	R-sq.	0,063	0,032	0,026	0,028	0,425	0,42	0,353	0,35
		α	14,82*	14,69*	14,76*	14,99*	14,88*	15,06*	15,06*	15,15*
		β	**-0,48***	-0,41**	-0,41**	-0,46**	-0,48*	**-0,5***	-0,47*	-0,48*
2	≤1 Year	R-sq.	0,167	0,118	0,107	0,112	0,562	0,557	0,495	0,488
		α	13,89*	13,8*	13,8*	13,83*	14,16*	14,21*	14,2*	14,24*
		β	**-0,07**	-0,04	-0,04	-0,04	-0,16*	**-0,16***	-0,15*	-0,15*
3	1-5 Years	R-sq.	0,019	0,006	0,004	0,005	0,296	0,279	0,242	0,247
		α	13,41*	13,2*	13,14*	13,18*	13,98*	14,1*	14,03*	14,09*
		β	**-0,13**	-0,05	-0,03	-0,04	-0,31*	**-0,33***	-0,28*	-0,29*
4	5-10 Years	R-sq.	0,014	0,002	0	0,001	0,276	0,275	0,214	0,212

Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

Table A5.8: Asymmetric Adjustment of Consumer Lending Rates to Euribor Rates

			01:2004-01:2010				01:2004-12:2006				01:2007-01:2010			
M	Mortgage Type		E 1M	E 3M	E 6M	E 12M	E 1M	E 3M	E 6M	E 12M	E 1M	E 3M	E 6M	E 12M
		α	14,48*	14,49*	14,43*	14,52*	16,33*	16,20*	15,88*	15,85*	14,35*	14,26*	14,31*	14,35*
		β1	-0,34*	-0,30**	-0,24***	-0,27**	-1,19**	-1,11**	-0,88**	-0,86**	-0,30*	-0,20**	-0,22**	-0,21***
		β2	-0,35***	-0,45***	-0,55**	-0,57**	-0,17	-0,12	-0,39	-0,24	-0,30	-0,66	-0,43	-0,61
1	All	R-sq.	0,27	0,29	0,29	0,30	0,25	0,27	0,30	0,28	0,46	0,52	0,40	0,45
		α	14,16*	14,13*	13,96*	13,99*					14,93*	14,90*	14,98*	15,06*
		β1	-0,34**	-0,23***	-0,18	-0,18			Not Estimated		-0,46*	-0,34*	-0,37*	-0,36*
		β2	-0,23	-0,58**	-0,50**	-0,58**					-0,22	-0,71**	-0,50	-0,63***
2	≤1 Year	R-sq.	0,22	0,25	0,18	0,20					0,57	0,63	0,54	0,57
		α	15,44*	15,56*	15,66*	15,81*	20,80*	20,50*	19,7*7	19,85*	14,14*	14,08*	14,14*	14,16*
		β1	-0,38**	-0,42**	-0,35***	-0,42**	-2,36	-2,13	-1,70**	-1,76	-0,08	-0,05	-0,08	-0,07
		β2	-0,39	-0,32	-0,70***	-0,56***	-0,76	-0,85	-1,20***	-0,73	-0,33***	-0,52	-0,33***	-0,47**
3	1-5 Years	R-sq.	0,18	0,21	0,28	0,28	0,52	0,56	0,64	0,58	0,32	0,45	0,32	0,43
		α	14,88*	14,97*	14,96*	15,12*	19,23*	18,40*	17,81*	17,97*	14,05*	13,91*	13,93*	13,96*
		β1	-0,45*	-0,46*	-0,38**	-0,42*	-1,89*	-1,69*	-1,33*	-1,41*	-0,28*	-0,16**	-0,18***	-0,17
		β2	-0,40	-0,41	-0,69**	-0,64**	-0,53	-0,63	-0,98*	-0,63**	-0,41	-0,75**	-0,51	-0,72***
4	>5 Years	R-sq.	0,27	0,30	0,34	0,35	0,49	0,53	0,62	0,59	0,32	0,37	0,26	0,32

Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

Table A5.9-A5.11: Transmission from Pribor resp.Euribor Rates to Corporate Lending Rates

			01:2004-01:2010							
			Pribor				Euribor			
CL	Corporate Loan		**1M**	**3M**	**6M**	**12M**	**1M**	**3M**	**6M**	**12M**
		α	2,72*	2,68*	2,58*	2,43*	3,56*	3,46*	3,4*	3,34*
		β	**0,67***	0,65*	0,66*	0,67*	0,32*	0,34*	0,34*	**0,34***
1	All	**R-sq.**	0,85	0,88*	0,89	0,89	0,51	0,56	0,61	0,61
		α	3,63*	3,64*	3,57*	3,47*	4,22*	4,17*	4,15*	4,11*
		β	**0,5***	0,48*	0,48*	0,49*	0,25*	**0,26***	0,25*	0,25*
2	Overdrafts	**R-sq.**	0,72	0,72	0,71	0,7	0,48	0,49	0,51	0,5
	< 30mil.CZK									
		α	3,43*	3,42*	3,36*	3,27*	4,17*	4,1*	4,06*	4,04*
		β	**0,56***	0,53*	0,53*	0,53*	0,24*	**0,26***	0,26*	0,25*
3	All	**R-sq.**	0,78	0,79	0,78	0,74	0,41	0,44	0,47	0,45
		α	3,23*	3,22*	3,16*	3,06*	4,02*	3,94*	3,9*	3,87*
		β	**0,61***	0,58*	0,58*	0,58*	0,28*	**0,29***	0,29*	0,29*
4	≤1 Year	**R-sq.**	0,79	0,79	0,78	0,74	0,44	0,47	0,5	0,48
		α	3,96*	3,9*	3,82*	3,7*	4,67*	4,63*	4,58*	4,56*
		β	0,43*	0,43*	0,44*	**0,45***	0,13*	0,14*	**0,15***	0,15*
5	1-5 Years	**R-sq.**	0,46	0,5	0,52	0,54	0,12	0,14	0,17	0,16
		α	4,87*	4,83*	4,79	4,73	5,17*	5,16*	5,16*	5,16*
		β	0,14*	0,15*	0,16*	**0,17***	0,02	**0,02**	0,02	0,02
6	>5 Years	**R-sq.**	0,17	0,2	0,23	0,25	0,01	0,01	0,01	0,01
	> 30mil.CZK									
		α	1,45*	1,38*	1,25*	1,06*	2,51*	2,37*	2,28*	2,2*
		β	0,85*	0,84*	0,85*	**0,86***	0,41*	0,43*	0,44*	**0,45***
7	All	**R-sq.**	0,82	0,87	0,88	0,88	0,5	0,55	0,62	0,62
		α	1,35*	1,28*	1,14*	0,94*	2,41*	2,27*	2,18*	2,1*
		β	**0,88***	0,86*	0,87*	**0,89***	0,42*	0,45*	0,46*	**0,46***
8	≤1 Year	**R-sq.**	0,82	0,86	0,88	0,88	0,51	0,56	0,63	0,63
		α	2,32*	2,29*	2,21*	2,09*	3,23*	3,12*	3,04*	2,99*
		β	**0,72***	0,69*	0,69*	0,69*	0,33*	0,36*	**0,36***	**0,36***
9	1-5 Years	**R-sq.**	0,46	0,47	0,46	0,45	0,26	0,29	0,33	0,32
		α	2,75*	2,69*	2,55*	2,35*	3,75*	3,63*	3,55*	3,49*
		β	0,77*	0,75*	0,77*	**0,79***	0,35*	0,37*	0,38*	**0,38***
10	>5 Years	**R-sq.**	0,63	0,66	0,68	0,7	0,34	0,38	0,42	0,43

Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

			01:2004-12:2006							
			Pribor				Euribor			
CL	Corporate Loan		**1M**	**3M**	**6M**	**12M**	**1M**	**3M**	**6M**	**12M**
		α	2,07*	2,23*	2,44*	2,69*	3,83*	3,85*	3,85*	3,81*
		β	**0,94***	0,83*	0,71*	0,56*	**0,10**	0,09	0,09	0,10***
1	All	**R-sq.**	0,80	0,82	0,79	0,75	0,02	0,03	0,03	0,04
		α	2,89*	3,06*	3,28*	3,51*	5,03*	5,01*	4,99*	4,95*
		β	**0,86***	0,75*	0,62*	0,49*	**-0,10**	-0,10	-0,10	0,00
2	Overdrafts	**R-sq.**	0,47	0,47	0,44	0,40	0,02	0,02	0,02	0,02
	< 30mil.CZK									
		α	3,18*	3,32*	3,50*	3,71*	5,06*	4,99*	4,93*	4,86*
		β	**0,67***	0,58*	0,48*	0,36*	**-0,10****	-0,10**	-0,10	0,00
3	All	**R-sq.**	0,44	0,43	0,39	0,34	0,08	0,07	0,05	0,03
		α	3,07*	3,26*	3,44*	3,65*	4,85*	4,80*	4,74*	4,68*
		β	**0,68***	0,57*	0,47*	0,35*	**-0,10**	-0,10	0,00	0,00
4	≤1 Year	**R-sq.**	0,40	0,36	0,33	0,28	0,04	0,03	0,02	0,01
		α	3,22*	3,28*	3,46*	3,60*	5,21*	5,24*	5,26*	5,24*
		β	**0,75***	0,70*	0,59*	0,49*	-0,10	-0,10	**-0,10**	-0,10
5	1-5 Years	**R-sq.**	0,21	0,23	0,23	0,24	0,02	0,03	0,04	0,04
		α	3,58*	3,61*	3,80*	4,01*	5,46*	5,46*	5,45*	5,42*
		β	**0,75***	0,71*	0,60*	0,47*	**-0,10**	-0,10	-0,10	0,00
6	>5 Years	**R-sq.**	0,36	0,42	0,40	0,38	0,02	0,02	0,02	0,02
	> 30mil.CZK									
		α	0,92*	1,00*	1,20*	1,46*	2,62*	2,63*	2,64*	2,60*
		β	**1,04***	0,96*	0,84*	0,68*	**0,22****	0,21**	0,20**	0,20*
7	All	**R-sq.**	0,77	0,86	0,88	0,87	0,09	0,10	0,12	0,14
		α	0,82*	0,89*	1,09*	1,34*	2,41*	2,43*	2,45*	2,43*
		β	**1,06***	0,99*	0,86*	0,70*	**0,28***	0,26*	0,25*	0,24*
8	≤1 Year	**R-sq.**	0,77	0,87	0,89	0,89	0,15	0,16	0,18	0,20
		α	3,40*	3,27*	3,26*	3,25*	4,28*	4,22*	4,18*	4,12*
		β	0,16	**0,22**	0,21	0,20	**-0,20**	-0,10	-0,10	-0,10
9	1-5 Years	**R-sq.**	0,00	0,01	0,01	0,02	0,03	0,03	0,02	0,02
		α	1,22***	1,36**	1,63*	1,92*	3,47*	3,55*	3,58*	3,53*
		β	**1,45***	1,34*	1,17*	0,97*	**0,36****	0,32**	0,29**	0,30**
10	>5 Years	**R-sq.**	0,40	0,44	0,45	0,47	0,06	0,06	0,07	0,08

Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

			01:2007-01:2010							
			Pribor				Euribor			
CL	Corporater Loan		**1M**	**3M**	**6M**	**12M**	**1M**	**3M**	**6M**	**12M**
		α	3,14*	3*	2,81*	2,53*	3,94*	3,83*	3,74*	3,68*
		β	0,56*	0,57*	0,6*	**0,65***	0,27*	0,29*	0,29*	**0,3***
1	All	**R-sq.**	0,84	0,85	0,85	0,84	0,67	0,68	0,73	0,72
		α	3,68*	3,58*	3,42*	3,16*	4,32	4,23*	4,15*	4,1*
		β	0,48*	0,49*	0,52*	**0,56***	0,25*	0,26*	0,27*	**0,27***
2	Overdrafts	**R-sq.**	0,78	0,77	0,77	0,78	0,72	0,72	0,75	0,74
	< 30mil.CZK									
		α	3,48*	3,34*	3,15*	2,89*	4,32*	4,21*	4,14*	4,11*
		β	0,54*	0,55*	0,59*	**0,63***	0,24*	0,25*	**0,26***	**0,26***
3	All	**R-sq.**	0,79	0,8	0,8	0,79	0,53	0,55	0,57	0,54
		α	3,31*	3,16*	2,96*	2,68*	4,21*	4,1*	4,01*	3,98*
		β	0,59*	0,6*	0,64*	**0,69***	0,26*	0,28*	**0,29***	**0,29***
4	≤1 Year	**R-sq.**	0,8	0,81	0,8	0,79	0,55	0,57	0,6	0,56
		α	4,26*	4,12*	3,97*	3,77*	4,92*	4,87*	4,8*	4,77*
		β	0,34*	0,36*	0,39*	**0,43***	0,11*	0,12*	**0,13***	**0,13***
5	1-5 Years	**R-sq.**	0,49	0,54	0,57	0,58	0,17	0,18	0,23	0,22
		α	5*	4,95*	4,9*	4,84*	5,23*	5,21*	5,2*	5,21*
		β	0,1*	0,11*	0,12*	**0,13***	0,02	**0,02*****	0,02***	0,02
6	>5 Years	**R-sq.**	0,21	0,25	0,27	0,28	0,03	0,04	0,04	0,03
	> 30mil.CZK									
		α	2,07*	1,89*	1,65*	1,32*	3,06*	2,93*	2,8*	2,73*
		β	0,69*	0,7*	0,75*	**0,81***	0,33*	0,35*	0,36*	**0,37***
7	All	**R-sq.**	0,8	0,81	0,81	0,8	0,62	0,63	0,69	0,68
		α	1,98*	1,8*	1,56*	1,21*	2,99*	2,85*	2,72*	2,65*
		β	0,71*	0,72*	0,76*	**0,83***	0,34*	0,36*	0,37*	**0,38***
8	≤1 Year	**R-sq.**	0,79	0,81	0,8	0,79	0,63	0,64	0,7	0,69
		α	2,63*	2,5*	2,3*	2*	3,6*	3,47*	3,34*	3,27*
		β	0,65*	0,65*	0,68*	**0,74***	0,3*	0,32*	0,34*	**0,34***
9	1-5 Years	**R-sq.**	0,46	0,45	0,44	0,43	0,33	0,34	0,38	0,38
		α	3,2*	3,03*	2,81*	2,48*	4,2*	4,08*	3,97*	3,91*
		β	0,64*	0,65*	0,69*	**0,75***	0,28*	0,3*	0,31*	**0,31***
10	>5 Years	**R-sq.**	0,68	0,69	0,7	0,7	0,45	0,46	0,5	0,5

Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

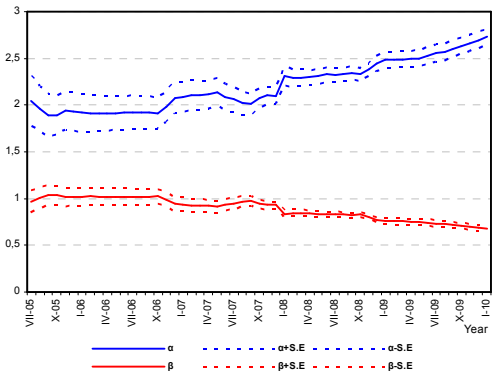
Table A5.12: Signif. Asymmetric Adjustments of Corporate Lending Rates to Pribor Rates

CL	Corporate Loan		01:2004-01:2010				01:2004-12:2006				01:2007-01:2010			
			P 1M	P 3M	P 6M	P 12M	P 1M	P 3M	P 6M	P 12M	P 1M	P 3M	P 6M	P 12M
		α				2,45*	2,04*			2,70*				
		β1				0,69*	0,94*			0,58*				
		β2				-0,08***	0,08			-0,10**				
1	All	R-sq.				0,90	0,83			0,79				
		α									3,76*			
		β1									0,43*			
		β2									0,23**			
2	Overdrafts	R-sq.									0,83			
	< 30mil.CZK													
		α						3,45*	3,53*	3,80*				
		β1						0,57*	0,52*	0,38*				
		β2						-0,12***	-0,17*	-0,18*				
3	All	R-sq.						0,51	0,53	0,49				
		α					3,18*	3,41*	3,47*	3,75*				
		β1					0,67*	0,56*	0,51*	0,37*				
		β2					-0,10***	-0,16**	-0,21*	-0,23*				
4	≤1 Year	R-sq.					0,47	0,48	0,51	0,54				
	> 30mil.CZK													
		α					0,89*	0,98*						
		β1					1,03*	0,96*						
		β2					0,16*	0,10*						
7	All	R-sq.					0,85	0,88						
		α					0,77*	0,85*	1,12*					
		β1					1,05*	0,99*	0,85*					
		β2					0,18*	0,11*	0,05*					
8	≤1 Year	R-sq.					0,87	0,91	0,91					
		α	2,75*	2,67*	2,54*	2,32*	1,05*	1,17*	1,61*					
		β1	0,74*	0,75*	0,76*	0,80*	1,46*	1,36*	1,12*					
		β2	0,20***	0,07*	0,10*	0,01*	0,31***	0,27**	0,27***					
10	>5 Years	R-sq.	0,65	0,67	0,69	0,71	0,49	0,52	0,53					

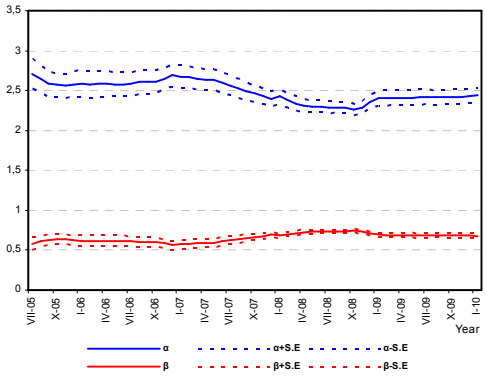
Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

Chart A5.1-A5.12: Recursive Coeff.-Pribor 1M resp. Pribor 12M/Corporate Lending Rate[17]

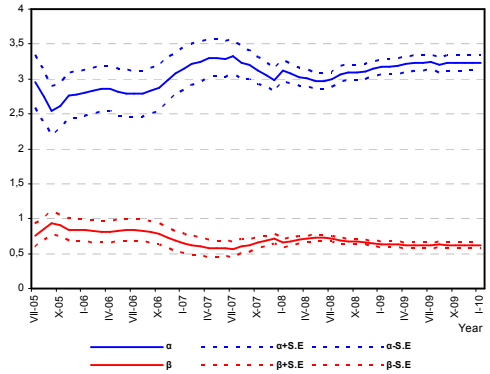
Pribor 1M/ CL 1



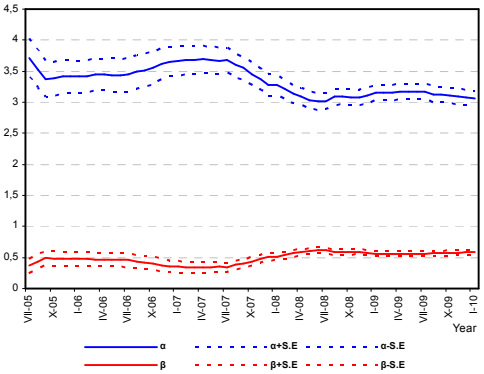
Pribor 12M/ CL 1



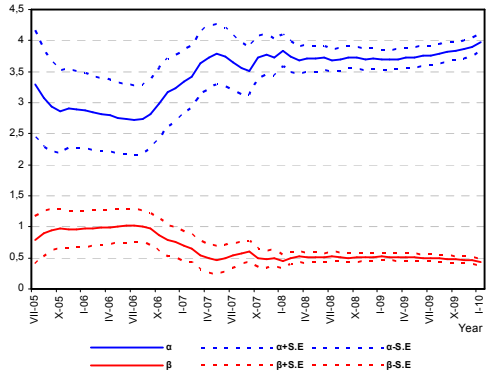
Pribor 1M/ CL 4



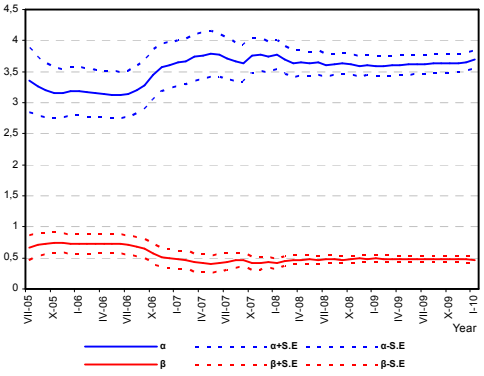
Pribor 12M/ CL 4



Pribor 1M/ CL 5



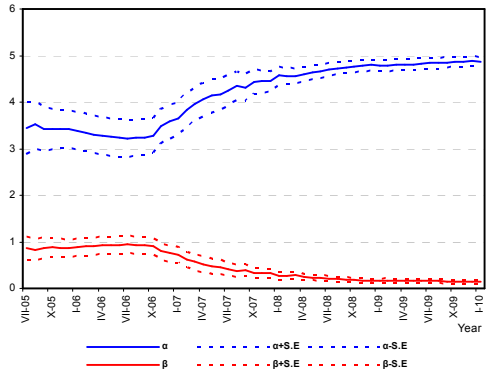
Pribor 12M/ CL 5



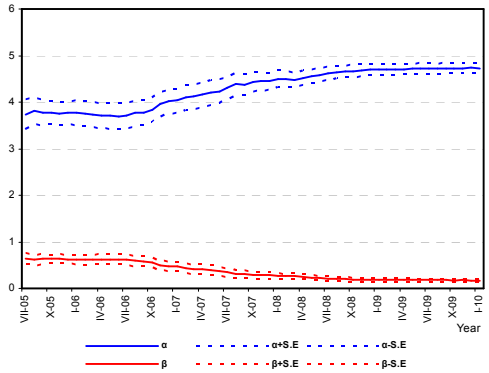
[17] Recursive coefficients- Euribor 1M resp. Euribor 12M/ Corporate Lending Rate – On request

Appendix

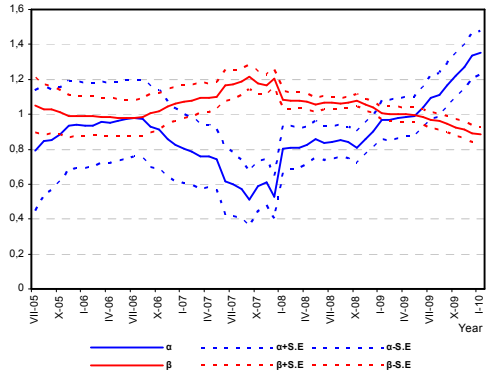
Pribor 1M/ CL 6



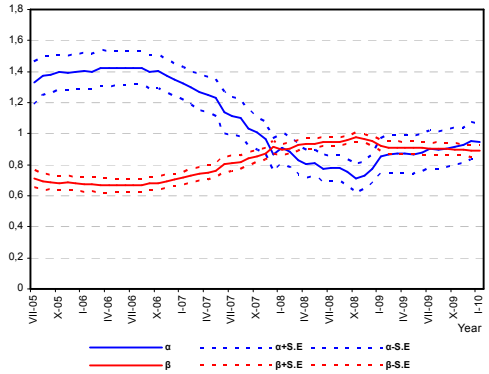
Pribor 12M/ CL 6



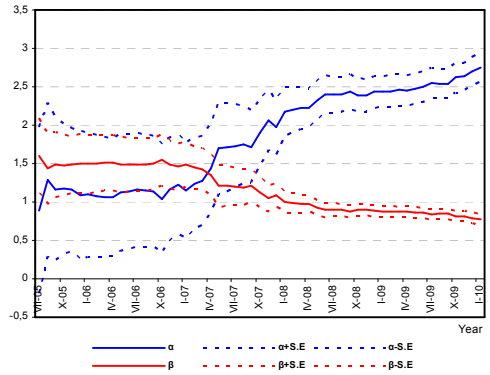
Pribor 1M/ CL 8



Pribor 12M/ CL 8



Pribor 1M/ CL 10



Pribor 12M/ CL 10

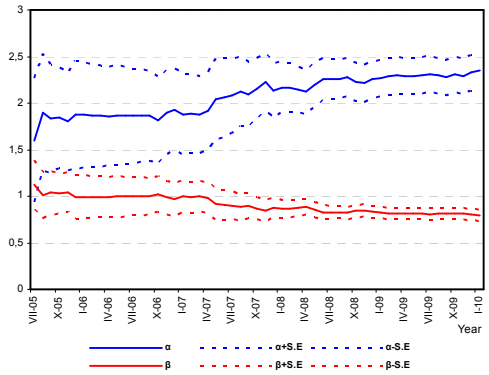
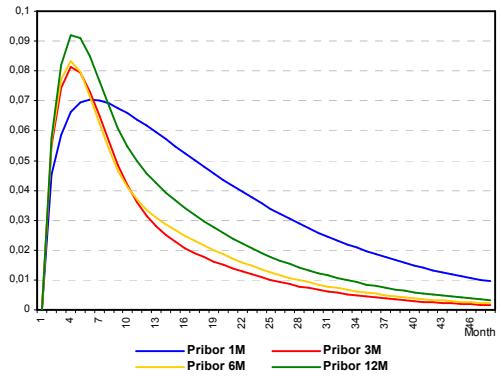
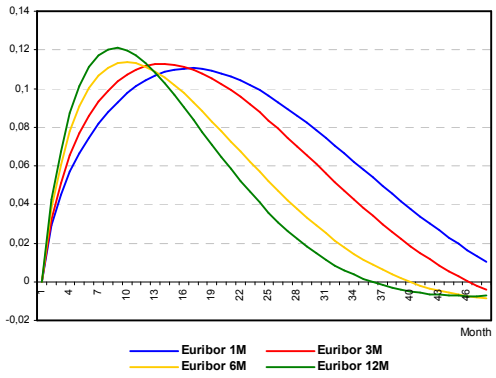


Chart A5.13-A5.25: Impulse response analysis-Pribor resp.Euribor/Corporate Lending Rate

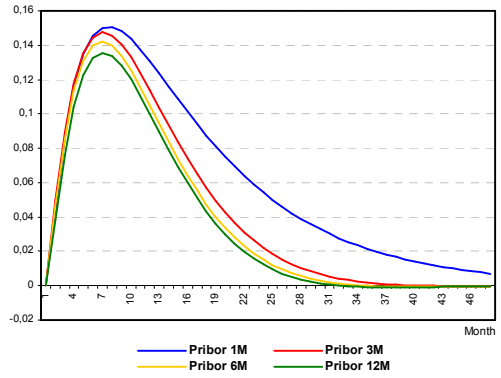
Pribor/ CL 1



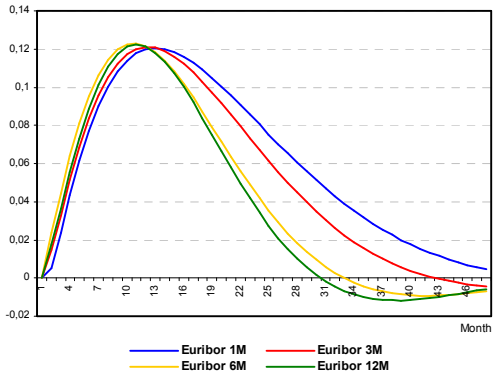
Euribor/ CL 1



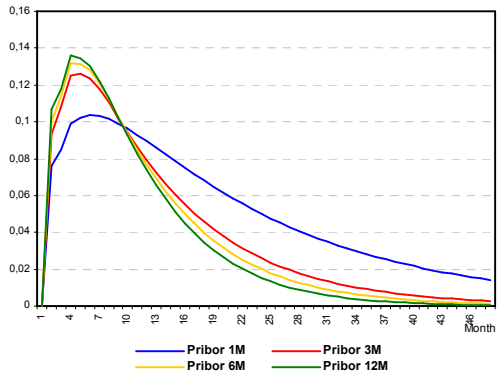
Pribor/ CL 4



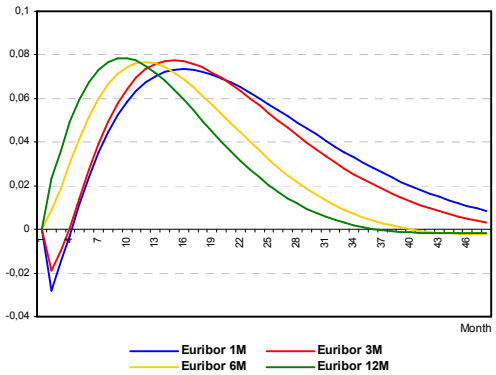
Euribor/ CL 4



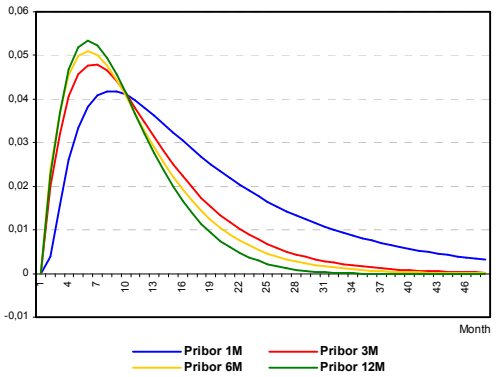
Pribor/ CL 5



Euribor/ CL 5

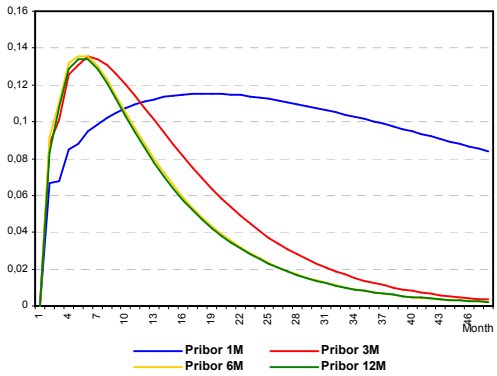


Pribor/ CL 6

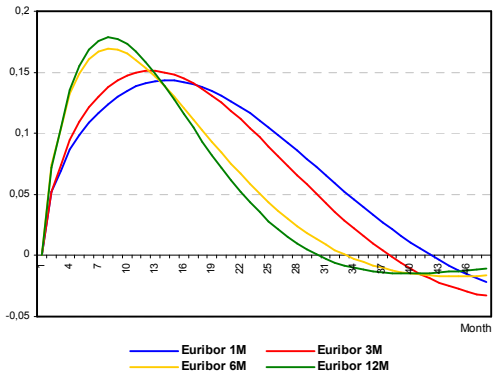


Euribor/ CL 6 - Insignificant

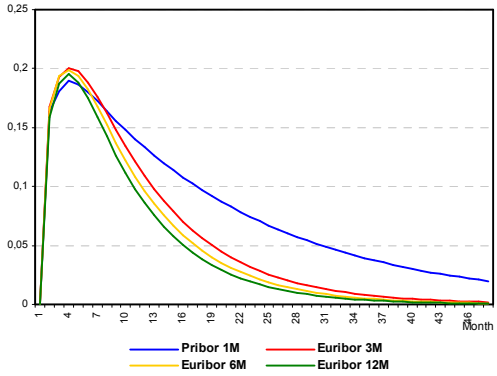
Pribor/ CL 8



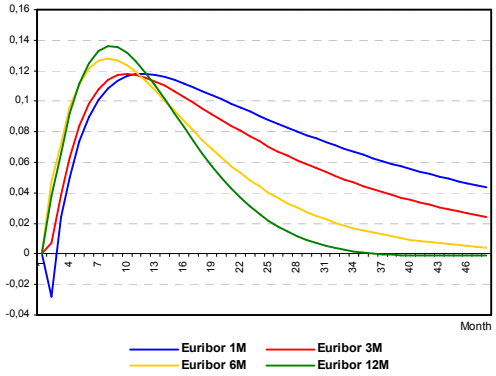
Euribor/ CL 8



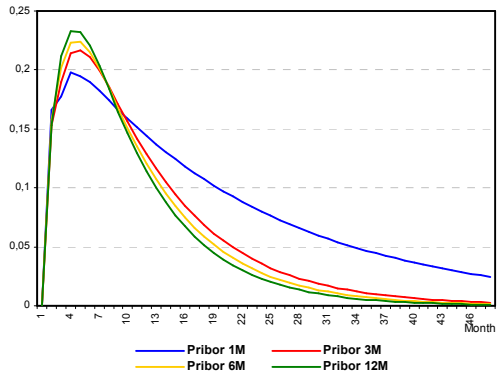
Pribor/ CL 9



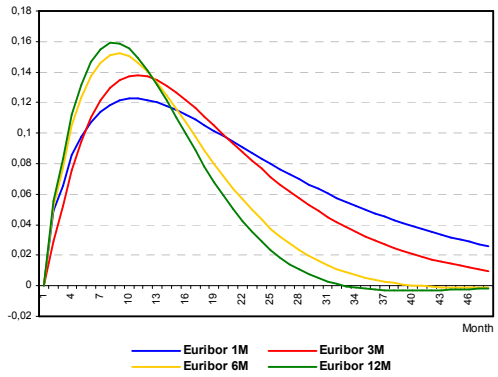
Euribor/ CL 9



Pribor/ CL 10



Euribor/ CL 10



TableA5.13-A5.15: Transmission from Pribor resp.Euribor Rates to Household Deposit Rates

			01:2004-01:2010							
			Pribor				Euribor			
HD	Household Deposits		**1M**	**3M**	**6M**	**12M**	**1M**	**3M**	**6M**	**12M**
		α	0,48*	0,44*	0,39*	0,34*	0,86*	0,82*	0,77*	0,75*
		β	0,21*	0,22*	0,22*	**0,23***	0,06*	0,07*	0,08*	**0,08***
1	All	**R-sq.**	0,53	0,62	0,65	0,65	0,11	0,15	0,22	0,23
		α	0,2*	0,17*	0,14*	0,11**	0,5*	0,48*	0,44*	0,43*
		β	0,13*	0,13*	0,14*	**0,14***	0,01	0,02	0,03**	**0,03****
2	1 Day	**R-sq.**	0,36	0,44	0,46	0,44	0,01	0,02	0,06	0,06
	HH- AM									
		α	-0,2*	-0,2*	-0,3*	-0,5*	0,71*	0,6*	0,52*	0,45*
		β	**0,81***	0,78*	0,79*	0,79*	0,4*	0,42*	0,43*	**0,43***
3	All	**R-sq.**	0,92	0,94	0,94	0,92	0,61	0,65	0,72	0,71
		α	-0,3*	-0,3*	-0,4*	-0,5*	0,6*	0,49*	0,41*	0,35*
		β	**0,85***	0,81*	0,81*	0,81*	0,44*	0,46*	0,46*	**0,46***
4	≤1 Year	**R-sq.**	0,94	0,94	0,93	0,9	0,67	0,71	0,77	0,76
		α	0,99*	0,8*	0,63**	0,44	2,13*	1,99*	1,88*	1,86*
		β	0,48*	0,53*	0,57*	**0,6***	0,03	0,08	0,11	**0,11**
5	1-2 Years	**R-sq.**	0,21	0,28	0,32	0,34	0	0,01	0,03	0,03
		α	1,71*	1,56*	1,5*	1,49*	2,58*	2,6*	2,51*	2,56*
		β	0,09	0,15	**0,16**	0,15	**-0,2***	-0,2*	-0,1*	-0,1*
6	>2 Years	**R-sq.**	0,01	0,02	0,03	0,02	0,14	0,13	0,09	0,1
	HH- NP									
		α	1,22*	1,17*	1,1*	1,03*	1,56*	1,49*	1,44*	1,41*
		β	0,24*	0,25*	0,26*	**0,27***	0,1*	0,12*	0,13*	**0,13***
7	All	**R-sq.**	0,38	0,45	0,49	0,51	0,17	0,24	0,31	0,32
		α	1,83*	1,8*	1,77*	1,74*	1,99*	1,94*	1,92*	1,9*
		β	0,15*	0,15*	0,15*	**0,15***	0,08*	0,09*	0,09*	**0,09***
8	≤3 Months	**R-sq.**	0,31	0,34	0,36	0,35	0,23	0,29	0,34	0,36
		α	0,73*	0,72*	0,7*	0,67*	0,85*	0,85*	0,84*	0,84*
		β	0,09*	0,09*	0,09*	**0,1***	0,04*	**0,04***	0,04*	0,03*
9	>3 Months	**R-sq.**	0,36	0,36	0,38	0,42	0,17	0,18	0,18	0,17

Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

			01:2004-12:2006							
			Pribor				Euribor			
HD	Household Deposits		**1M**	**3M**	**6M**	**12M**	**1M**	**3M**	**6M**	**12M**
		α	0,35*	0,39*	0,44*	0,50*	0,65*	0,66*	0,66*	0,66*
		β	0,23*	0,21*	0,18*	0,14*	0,08*	0,08*	0,07*	0,07*
1	All	**R-sq.**	0,75	0,76	0,74	0,69	0,26	0,29	0,30	0,33
		α	0,17**	0,21*	0,25*	0,28*	0,58*	0,58*	0,57*	0,57*
		β	0,12*	0,10*	0,08*	0,06*	-0,06*	-0,06*	-0,05*	-0,05*
2	1 Day	**R-sq.**	0,28	0,25	0,22	0,19	0,19	0,21	0,23	0,23
	HH- AM									
		α	-0,42*	-0,30*	-0,12	0,11	0,91*	0,94*	0,96*	0,95*
		β	0,87*	0,79*	0,67*	0,53*	0,22**	0,20**	0,19**	0,18*
3	All	**R-sq.**	0,86	0,90	0,90	0,85	0,15	0,16	0,17	0,19
		α	-0,41*	-0,30*	-0,12*	0,11	0,89*	0,92*	0,94*	0,93*
		β	0,86*	0,78*	0,67*	0,53*	0,23**	0,21**	0,20*	0,19*
4	≤1 Year	**R-sq.**	0,85	0,90	0,89	0,85	0,16	0,17	0,18	0,20
		α	-1,23***	-0,99*	-0,63**	-0,28	1,38**	1,42**	1,46*	1,44*
		β	1,37*	1,22*	1,01*	0,80*	0,14	0,12	0,09	0,10
5	1-2 Years	**R-sq.**	0,37	0,37	0,35	0,33	0,01	0,01	0,01	0,01
		α	0,82	0,95	1,20	1,45**	4,21*	4,10*	4,00*	3,94*
		β	0,47	0,39	0,27	0,15	-1,01*	-0,94*	-0,87*	-0,80*
6	>2 Years	**R-sq.**	0,03	0,03	0,02	0,01	0,42	0,45	0,47	0,47
	HH- NP									
		α	1,02*	1,04*	1,06*	1,13*	0,75*	0,77*	0,80*	0,80*
		β	0,27**	0,25**	0,23*	0,19*	0,36*	0,34*	0,32*	0,30*
7	All	**R-sq.**	0,12	0,13	0,15	0,15	0,57	0,63	0,69	0,72
		α	1,81*	1,84*	1,86*	1,93*	1,47*	1,47*	1,48*	1,48*
		β	0,12	0,10	0,09	0,06	0,26*	0,25*	0,24*	0,22*
8	≤3 Months	**R-sq.**	0,02	0,02	0,02	0,02	0,29	0,34	0,38	0,40
		α	0,02	0,09	0,20*	0,31*	0,98*	0,98*	0,99*	0,98*
		β	0,43*	0,38*	0,32*	0,25*	-0,02	-0,02	-0,02	-0,02
9	>3 Months	**R-sq.**	0,64	0,65	0,61	0,59	0,00	0,01	0,01	0,00

Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

			01:2007-01:2010							
			Pribor				Euribor			
HD	Household Deposits		**1M**	**3M**	**6M**	**12M**	**1M**	**3M***	**6M**	**12M**
		α	0,89*	0,84*	0,79*	0,75*	1,16*	1,15*	1,12*	1,11*
		β	0,11*	0,12*	0,13*	**0,14***	0,02	0,02	0,03**	**0,03****
1	All	**R-sq.**	0,38	0,45	0,45	0,43	0,02	0,03	0,06	0,06
		α	0,43*	0,37*	0,34*	0,31*	0,67*	0,67*	0,64*	0,63*
		β	0,08*	0,09*	0,10*	**0,10***	-0,01	-0,01	0,00	**0,00**
2	1 Day	**R-sq.**	0,16	0,21	0,22	0,20	0,00	0,01	0,00	0,00
	HH- AM									
		α	0,08	-0,08	-0,32	-0,67*	1,13*	0,99*	0,86*	0,79*
		β	0,73*	0,74*	0,78*	**0,84***	0,35*	0,37*	0,38*	**0,39***
3	All	**R-sq.**	0,93	0,92	0,92	0,90	0,73	0,73	0,79	0,78
		α	-0,16***	-0,32*	-0,57*	-0,95*	0,96*	0,81*	0,67*	0,59*
		β	0,80*	0,80*	0,85*	**0,92***	0,40*	0,42*	0,43*	**0,43***
4	≤1 Year	**R-sq.**	0,94	0,93	0,91	0,90	0,78	0,78	0,83	0,82
		α	2,58*	2,42*	2,36*	2,32*	3,08*	3,08*	3,05*	3,08*
		β	0,06	0,11	0,12	**0,13**	**-0,11***	-0,10*	-0,08***	-0,09**
5	1-2 Years	**R-sq.**	0,01	0,02	0,03	0,03	0,09	0,07	0,05	0,05
		α	2,23*	2,02*	1,95*	1,97*	2,82*	2,90*	2,83*	2,88*
		β	-0,04	0,03	**0,05**	0,04	-0,24*	**-0,24***	-0,21*	-0,21*
6	>2 Years	**R-sq.**	0,00	0,00	0,00	0,00	0,24	0,23	0,17	0,17
	HH- NP									
		α	1,85*	1,82*	1,79*	1,75*	2,00*	1,99*	1,97*	1,97*
		β	0,08*	0,09*	0,09*	**0,10***	0,03*	0,03*	0,03*	**0,03***
7	All	**R-sq.**	0,71	0,76	0,75	0,73	0,27	0,28	0,33	0,32
		α	2,14*	2,13*	2,11*	2,08*	2,23*	2,21*	2,20*	2,20*
		β	0,07*	0,07*	0,07*	**0,08***	0,04*	**0,04***	0,04*	0,04*
8	≤3 Months	**R-sq.**	0,81	0,77	0,75	0,75	0,86	0,87	0,86	0,84
		α	0,81*	0,80*	0,78*	0,75*	0,89*	0,87*	0,86*	0,86*
		β	0,07*	0,07*	0,07*	**0,07***	0,04*	**0,04***	0,04*	0,04*
9	>3 Months	**R-sq.**	0,49	0,45	0,44	0,44	0,55	0,55	0,54	0,53

Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

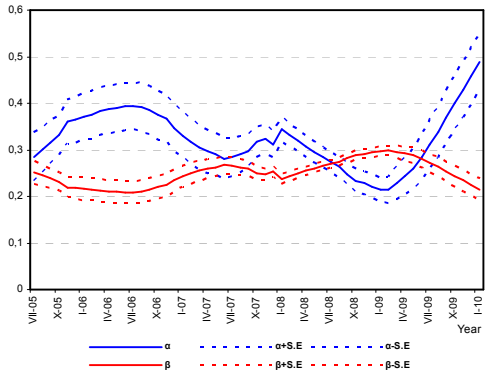
Table A5.16: Signif. Asymmetric Adjustments of Household Deposit Rates to Pribor Rates

HD	Household Deposits		01:2004-01:2010				01:2004-12:2006				01:2007-01:2010			
			P 1M	P 3M	P 6M	P 12M	P 1M	P 3M	P 6M	P 12M	P 1M	P 3M	P 6M	P 12M
		α	0,49*	0,47*	0,40*	0,37*							0,74*	0,71*
		β1	0,23*	0,23*	0,25*	0,24*							0,16*	0,16*
		β2	-0,11**	-0,11*	-0,11*	-0,11*							-0,13**	-0,11**
1	All	R-sq.	0,59	0,69	0,72	0,72							0,58	0,54
		α	0,20**	0,19**	0,14***	0,13							0,28*	0,26*
		β1	0,16*	0,16*	0,16*	0,16*							0,14*	0,13*
		β2	-0,12*	-0,12*	-0,10*	-0,10*							-0,15**	-0,14**
2	1 Day	R-sq.	0,48	0,57	0,56	0,54							0,39	0,37
	HH- AM													
		α												
		β1												
		β2												
3	All	R-sq.												
		α	-0,33*											
		β1	0,83*											
		β2	0,09***											
4	≤1 Year	R-sq.	0,95											
		α	1,01**	0,88***										
		β1	0,56*	0,58*										
		β2	-0,41**	-0,34***										
5	1-2 Years	R-sq.	0,27	0,33										
		α	1,70*	1,63*	1,48*	1,54*								
		β1	0,20	0,22***	0,24**	0,20***								
		β2	-0,54**	-0,48**	-0,40***	-0,33***								
6	>2 Years	R-sq.	0,14	0,13	0,10	0,08								
	HH- NP													
		α				1,07*								
		β1				0,28*								
		β2				-0,10***								
7	All	R-sq.				0,55								
		α										2,13*		
		β1										0,06*		
		β2										0,02***		
8	≤ 3 Months	R-sq.										0,80		
		α									0,82*	0,81*	0,80*	0,76*
		β1									0,06*	0,06*	0,06*	0,07*
		β2									0,03**	0,04**	0,04***	0,03***
9	>3 Months	R-sq.									0,52	0,50	0,48	0,47

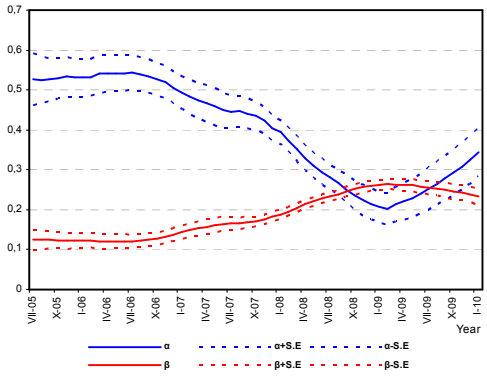
Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

Chart A5.26-A5.35: Recursive Coeff.-Pribor 1M resp. Pribor 12M/Household Deposit Rate[18]

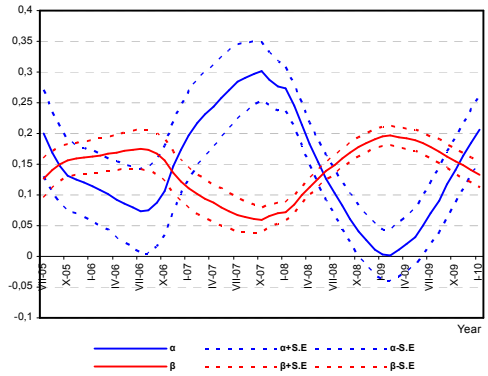
Pribor 1M/ HD 1



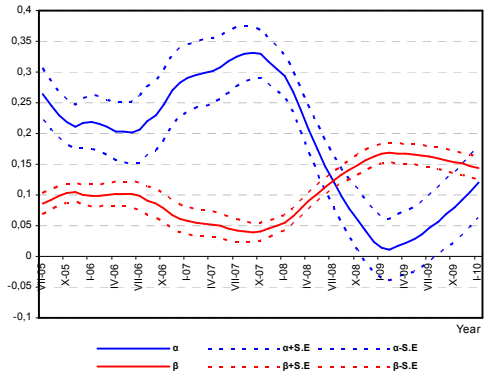
Pribor 12M/ HD 1



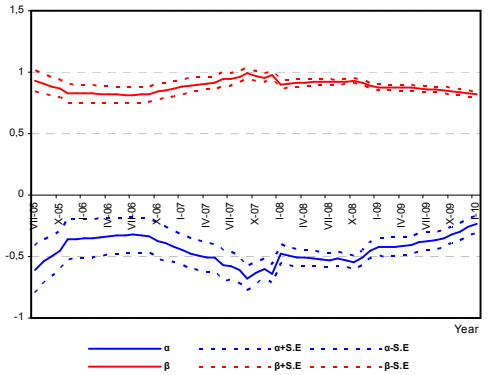
Pribor 1M/ HD 2



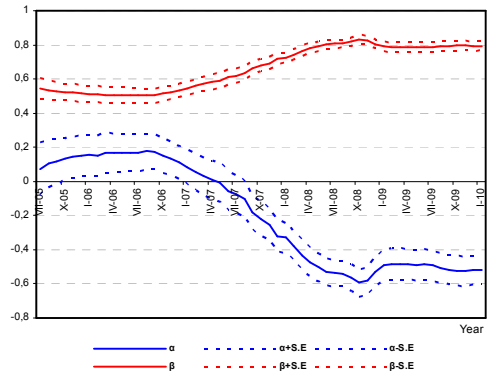
Pribor 12M/ HD 2



Pribor 1M/ HD 3

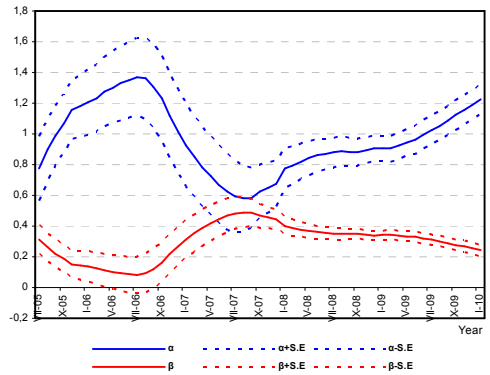


Pribor 12M/ HD 3

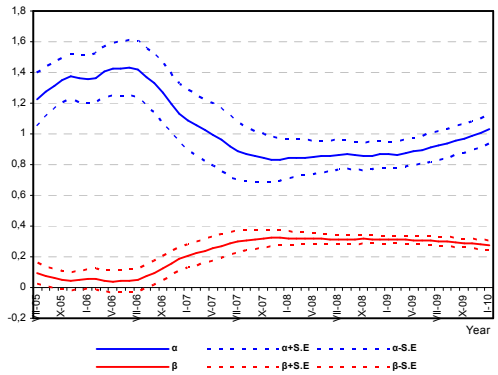


[18] Recursive coefficients- Euribor 1M resp. Euribor 12M/ Household Deposit Rate – On Request

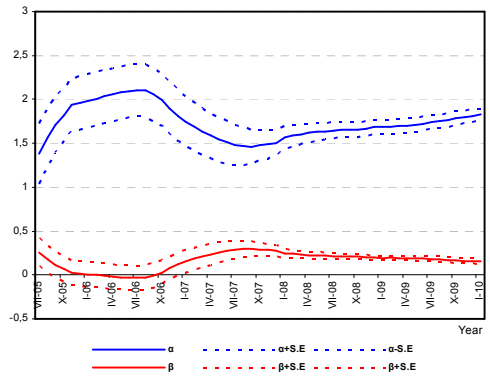
Pribor 1M/ HD 7



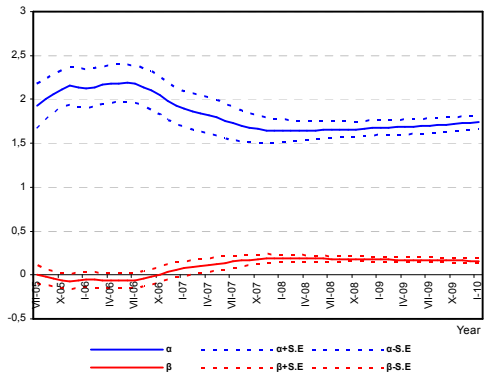
Pribor 12M/ HD 7



Pribor 1M/ HD 8



Pribor 12M/ HD 8

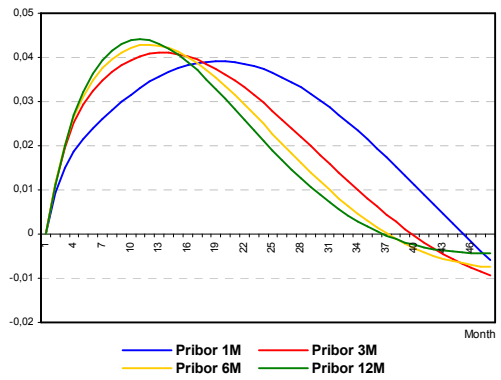


Pribor 1M/ HD 8 - Insignificant

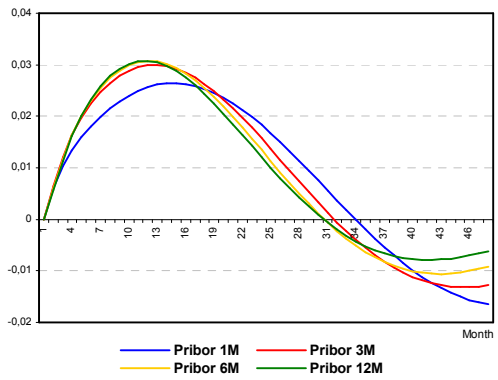
Pribor 12M/ HD 8 – Insignificant

Chart A5.36-A5.44: Impulse Response Analysis-Pribor resp.Euribor/Corporate Lending Rate

Pribor/ HD 1



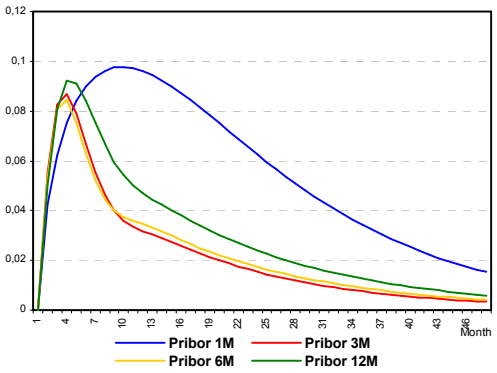
Pribor/ HD 2



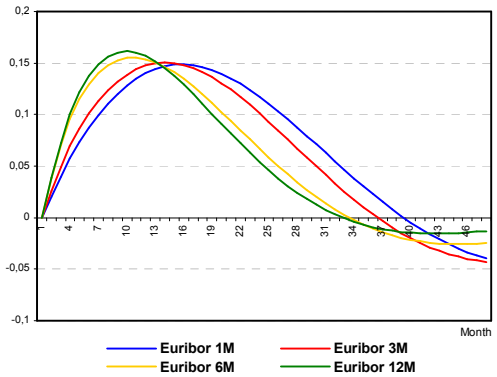
Euribor/ HD 1 - Insignificant

Euribor/ HD 2 - Insignificant

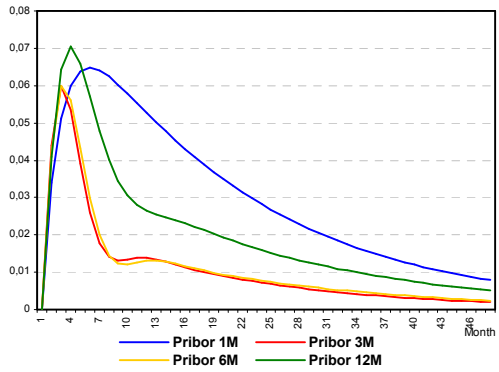
Pribor/ HD 3



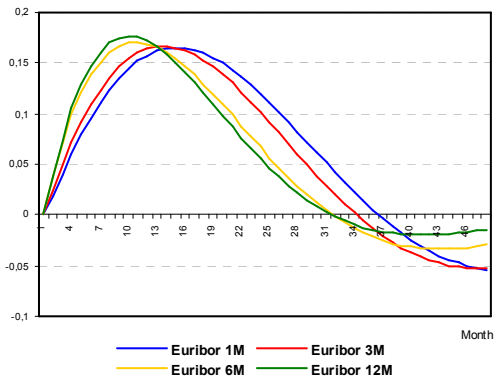
Euribor/ HD 3



Pribor/ HD 4



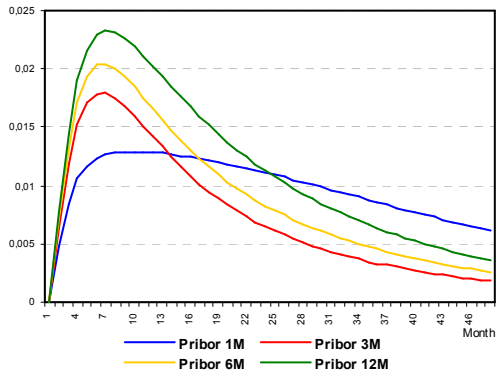
Euribor/ HD 4



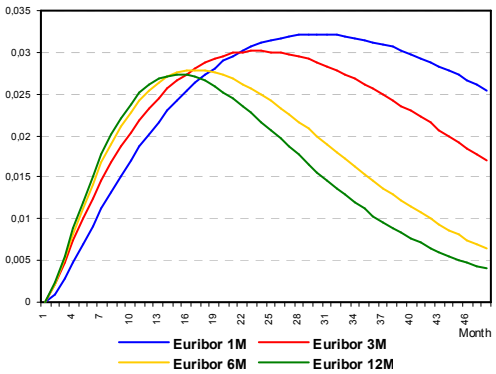
Euibor/ HD 5 - Insignificant

Pribor/ HD 6 - Insignificant

Pribor/ HD 7

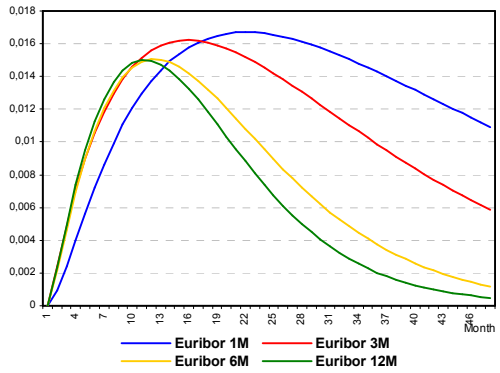


Euribor/ HD 7



Pribor/ HD 8 - Insignificant

Euribor/ HD 8



Euribor/ HD9 - Insignificant

Table A5.17-A5.19: Transmission from Pribor resp.Euribor Rates to Corporate Deposit Rates

			01:2004-01:2010							
			Pribor				Euribor			
CD	Corporate Deposit		**1M**	**3M**	**6M**	**12M**	**1M**	**3M**	**6M**	**12M**
		α	0,05	0,08	0,05	-0,02	0,46*	0,40*	0,38*	0,34*
		β	**0,50***	0,46*	0,45*	0,45*	0,31*	**0,31***	0,30*	0,31*
1	All	**R-sq.**	0,81	0,76	0,73	0,69	0,84	0,83	0,85	0,84
		α	0,05	0,07	0,05	0,00	0,25*	0,22*	0,21*	0,19*
		β	**0,26***	0,24*	0,24*	0,24*	0,17*	**0,17***	0,17*	0,17*
2	1 Day	**R-sq.**	0,71	0,67	0,65	0,63	0,79	0,79	0,80	0,79
	HH- AM									
		α	-0,15	-0,09	-0,15	-0,28	0,60*	0,50*	0,47*	0,40*
		β	**0,87***	0,81*	0,80*	0,79*	0,54*	**0,55***	0,53*	0,53*
3	All	**R-sq.**	0,83	0,78	0,75	0,71	0,83	0,83	0,84	0,83
		α	-0,15	-0,09	-0,15	-0,28	0,60*	0,50*	0,47*	0,40*
		β	**0,87***	0,81*	0,80*	0,79*	0,54*	**0,55***	0,53*	0,53*
4	≤1 Year	**R-sq.**	0,83	0,78	0,75	0,71	0,83	0,83	0,84	0,83
		α	0,28	0,08	-0,14	-0,43	1,60*	1,40*	1,24*	1,16*
		β	0,87*	0,90*	0,95*	**0,99***	0,33*	0,38*	0,41*	**0,42***
5	1-2 Years	**R-sq.**	0,34	0,40	0,43	0,45	0,12	0,17	0,21	0,22
		α	1,93*	1,73*	1,65*	1,55*	2,62*	2,60*	2,53*	2,56*
		β	0,04	0,11	0,14	**0,16**	**-0,22****	-0,20**	-0,17**	-0,17**
6	>2 Years	**R-sq.**	0,00	0,01	0,02	0,02	0,10	0,08	0,06	0,06
	HH- NP									
		α	0,45*	0,37*	0,28*	0,16	1,22*	1,14*	1,05*	1,01*
		β	0,46*	0,46*	0,48*	**0,49***	0,14*	0,17*	0,19*	**0,19***
7	All	**R-sq.**	0,61	0,70	0,73	0,74	0,16	0,21	0,28	0,29
		α	0,40*	0,32*	0,22**	0,11	1,19*	1,11*	1,02*	0,98*
		β	0,45*	0,46*	0,47*	**0,49***	0,13*	0,15*	0,17*	**0,18***
8	≤3 Months	**R-sq.**	0,56	0,65	0,69	0,69	0,12	0,16	0,23	0,24
		α	0,66*	0,55*	0,43*	0,28***	1,68*	1,56*	1,45*	1,39*
		β	0,63*	0,64*	0,66*	**0,67***	0,21*	0,24*	0,27*	**0,27***
9	>3 Months	**R-sq.**	0,62	0,70	0,73	0,73	0,18	0,23	0,31	0,32

			01:2004-12:2006							
			Pribor				Euribor			
CD	Corporate Deposits		**1M**	**3M**	**6M**	**12M**	**1M**	**3M**	**6M**	**12M**
		α	0,21*	0,26*	0,34*	0,44*	0,86*	0,88*	0,89*	0,87*
		β	**0,44***	0,41*	0,36*	0,29*	**0,12***	0,12*	0,11*	0,11*
1	All	**R-sq.**	0,75	0,81	0,83	0,84	0,16	0,17	0,19	0,22
		α	0,10	0,12***	0,15*	0,20*	0,32*	0,35*	0,37*	0,36*
		β	**0,25***	0,24*	0,21*	0,18*	**0,13***	0,12*	0,11*	0,10*
2	1 Day	**R-sq.**	0,49	0,54	0,59	0,63	0,37	0,37	0,38	0,40
	HH- AM									
		α	0,10*	0,19**	0,35*	0,55*	1,33*	1,36*	1,37*	1,36*
		β	**0,80***	0,73*	0,63*	0,51*	**0,20****	0,19*	0,17*	0,17*
3	All	**R-sq.**	0,85	0,91	0,92	0,90	0,14	0,15	0,16	0,18
		α	0,10	0,19**	0,35*	0,54*	1,33*	1,36*	1,37*	1,36*
		β	**0,80***	0,73*	0,63*	0,51*	**0,20****	0,19*	0,17*	0,17*
4	≤1 Year	**R-sq.**	0,85	0,91	0,92	0,90	0,15	0,16	0,17	0,19
		α	-0,43	-0,53	-0,38	-0,21	0,82	0,88	0,94	0,93
		β	**0,98***	**0,99***	0,89*	0,76*	**0,36**	0,32	0,29	0,28
5	1-2 Years	**R-sq.**	0,21	0,27	0,29	0,32	0,07	0,08	0,07	0,08
		α	0,52	0,59	0,76	0,81	2,77*	2,77*	2,77*	2,73*
		β	**0,61**	0,55	0,46	0,41	**-0,40**	-0,39	-0,38***	-0,35***
6	>2 Years	**R-sq.**	0,05	0,05	0,05	0,06	0,06	0,07	0,08	0,08
	HH- NP									
		α	-0,41*	-0,29*	-0,11	0,10	0,88*	0,90*	0,91*	0,91*
		β	**0,79***	0,71*	0,60*	0,47*	**0,17****	0,15**	0,14**	0,14**
7	All	**R-sq.**	0,87	0,90	0,88	0,82	0,11	0,11	0,12	0,13
		α	-0,36*	-0,26*	-0,10	0,09	0,85*	0,87*	0,89*	0,88*
		β	**0,73***	0,66*	0,56*	0,44*	**0,15****	0,13**	0,12**	0,12**
8	≤3 Months	**R-sq.**	0,86	0,90	0,88	0,84	0,10	0,10	0,10	0,11
		α	-0,34	-0,14	0,11	0,43**	1,22*	1,23*	1,24*	1,21*
		β	**0,99***	0,86*	0,72*	0,54*	**0,23****	0,22*	0,21*	0,21*
9	>3 Months	**R-sq.**	0,68	0,67	0,63	0,53	0,10	0,12	0,13	0,15

Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

			01:2007-01:2010							
			Pribor				Euribor			
CD	Corporate Deposits		**1M**	**3M**	**6M**	**12M**	**1M**	**3M**	**6M**	**12M**
		α	-0,17***	-0,25***	-0,41**	-0,68*	0,48*	0,36*	0,28*	0,21*
		β	0,56*	0,55*	0,57*	**0,62***	0,31*	0,33*	0,33*	**0,34***
1	All	**R-sq.**	0,82	0,77	0,76	0,75	0,89	0,88	0,91	0,91
		α	-0,05	-0,10	-0,18***	-0,33*	0,27*	0,21*	0,17*	0,13*
		β	0,29*	0,29*	0,30*	**0,33***	0,17*	0,18*	0,18*	**0,18***
2	1 Day	**R-sq.**	0,71	0,68	0,67	0,67	0,82	0,82	0,83	0,82
	HH- AM									
		α	-0,50*	-0,65*	-0,94*	-1,40*	0,65*	0,44*	0,31*	0,20*
		β	0,97*	0,95*	1,00*	**1,09***	0,54*	0,57*	0,57*	**0,58***
3	All	**R-sq.**	0,82	0,79	0,77	0,77	0,88	0,88	0,90	0,89
		α	-0,50*	-0,66*	-0,94*	-1,41*	0,65*	0,44*	0,30*	0,19*
		β	0,97*	0,95*	1,00*	**1,09***	0,55*	0,57*	0,57*	**0,58***
4	≤1 Year	**R-sq.**	0,82	0,79	0,77	0,77	0,88	0,88	0,90	0,89
		α	2,24*	2,10*	1,96*	1,77*	2,88*	2,80*	2,71*	2,66*
		β	0,36*	0,38*	0,41*	**0,44***	0,13**	0,15**	0,16*	**0,17***
5	1-2 Years	**R-sq.**	0,12	0,13	0,13	0,13	0,05	0,06	0,07	0,08
		α	2,83*	2,64*	2,63*	2,70*	3,09*	3,17*	3,16*	3,23*
		β	**-0,21**	-0,13	-0,13	-0,14	-0,29*	**-0,29***	-0,27*	-0,28*
6	>2 Years	**R-sq.**	0,04	0,01	0,01	0,01	0,23	0,21	0,19	0,19
	HH- NP									
		α	1,16*	1,06*	0,97*	0,86*	1,73*	1,71*	1,62*	1,60*
		β	0,26*	0,28*	0,30*	**0,31***	0,07**	0,07**	0,09*	**0,09***
7	All	**R-sq.**	0,49	0,54	0,54	0,51	0,10	0,10	0,17	0,17
		α	1,15*	1,03*	0,95*	0,84*	1,73*	1,71*	1,63*	1,61*
		β	0,25*	0,27*	0,29*	**0,30***	0,05***	0,05***	0,07**	**0,07****
8	≤3 Months	**R-sq.**	0,39	0,45	0,44	0,42	0,04	0,05	0,09	0,10
		α	1,69*	1,55*	1,42*	1,27*	2,41*	2,37*	2,28*	2,25*
		β	0,36*	0,38*	0,40*	**0,42***	0,10*	0,11*	0,13*	**0,13***
9	>3 Months	**R-sq.**	0,58	0,65	0,64	0,61	0,16	0,16	0,23	0,23

Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

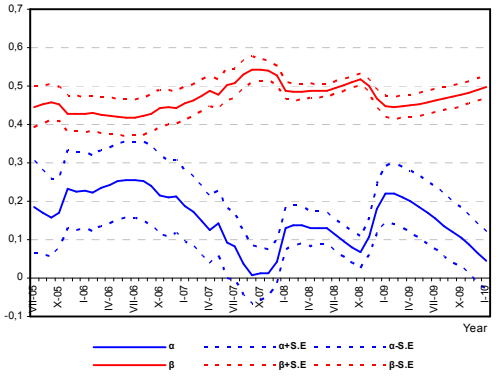
Table A5.20: Signif. Asymmetric Adjustments of Corporate Deposit Rates to Pribor Rates

CD	Corporate Deposit		01:2004-01:2010				01:2004-12:2006				01:2007-01:2010			
			P 1M	P 3M	P 6M	P 12M	P 1M	P 3M	P 6M	P 12M	P 1M	P 3M	P 6M	P 12M
		α	0,05	0,06			0,19*	0,24*			-0,09			
		β1	0,47*	0,44*			0,44*	**0,41***			0,49			
		β2	0,16**	0,11***			0,06*	**0,04***			0,26***			
1	All	**R-sq.**	0,85	0,78			0,81	0,84			0,87			
		α	0,05	0,05	0,04		0,07*	0,08*			0,01			
		β1	0,24*	0,23*	0,23*		0,25*	**0,24***			0,24			
		β2	0,12*	0,09*	0,07***		0,05***	**0,05****			0,19**			
2	1 Day	**R-sq.**	0,77	0,71	0,67		0,57	0,64			0,80			
	HH- AM													
		α	-0,14	-0,13			0,08*	0,18*		0,56*	-0,35*			
		β1	0,82*	0,78*			0,79*	0,73*		0,51*	0,84*			
		β2	0,28*	0,20**			0,08	0,04***		-0,04***	0,47**			
3	All	**R-sq.**	0,86	0,80			0,88	0,92		0,91	0,88			
		α	-0,14	-0,13			0,08*	0,18*		0,56*	-0,36*			
		β1	0,82*	0,78*			0,79*	0,73*		0,51*	0,84*			
		β2	0,28*	0,20**			0,08	0,04***		-0,04***	0,47**			
4	≤1 Year	**R-sq.**	0,86	0,80			0,88	0,92		0,91	0,88			
		α								-0,31*				
		β1								**0,74***				
		β2								**0,25*****				
5	1-2 Years	**R-sq.**								0,39				
		α												
		β1												
		β2												
6	>2 Years	**R-sq.**												
	HH- NP													
		α	0,46**	0,41**	0,28***	0,20	-0,43*			0,13*	1,07*	1,02*	0,87*	
		β1	0,49*	0,48*	0,51*	0,51*	0,78*			**0,48***	0,35*	0,33*	0,36*	
		β2	-0,18**	-0,18**	-0,18*	-0,19*	0,07*			**-0,08****	-0,31*	-0,23*	-0,21**	
7	All	**R-sq.**	0,65	0,73	0,77	0,78	0,90			0,85	0,67	0,65	0,61	
		α	0,41***	0,36***	0,22	0,15	-0,38*			0,11*	1,03*	0,99*	0,83*	0,77*
		β1	0,49*	0,48*	0,51*	0,50*	0,72*			0,45*	0,35*	0,33*	0,36*	**0,35***
		β2	-0,21**	-0,20**	-0,20*	-0,19*	0,06**			-0,06***	-0,37*	-0,28*	-0,25*	**-0,20*****
8	≤1 3 Months	**R-sq.**	0,62	0,70	0,73	0,74	0,88			0,86	0,62	0,59	0,54	0,48
		α	0,68**	0,62**	0,45**	0,36***				0,50*	1,61*	1,51*	1,34*	
		β1	0,66*	0,66*	0,69*	0,69*				0,55*	0,43*	0,44*	0,46*	
		β2	-0,19***	-0,23**	-0,24*	-0,28*				-0,17**	-0,30*	-0,27*	-0,22***	
9	>3 Months	**R-sq.**	0,64	0,74	0,77	0,78				0,63	0,71	0,75	0,71	

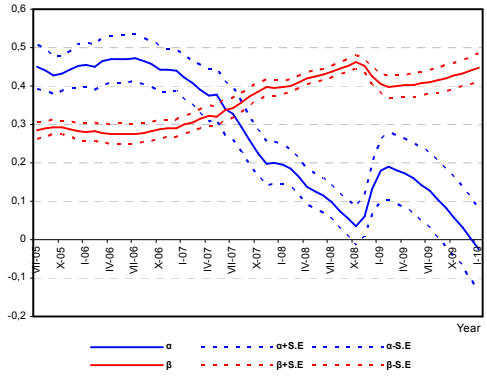
Interpretation: *, **, *** stands for 1%, 5%, 10% significance level

Chart A5.45-A5.54: Recursive Coeff.-Pribor 1M resp. Pribor 12M/Corporate Deposit Rate[19]

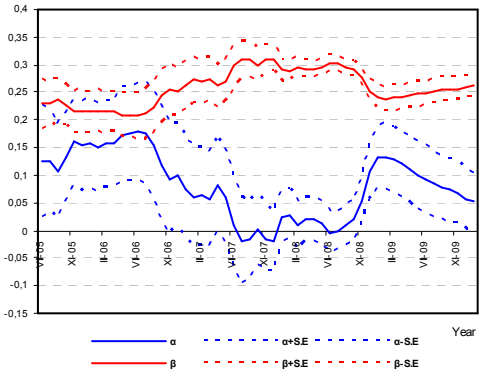
Pribor 1M/ CD 1



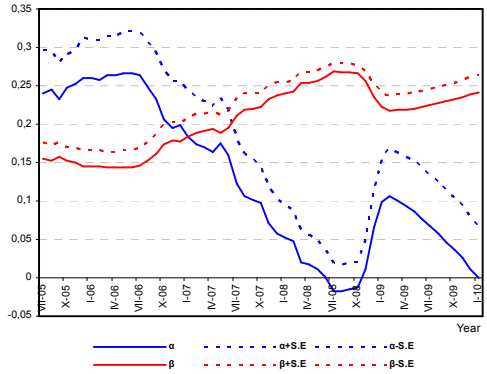
Pribor 12M/ CD 1



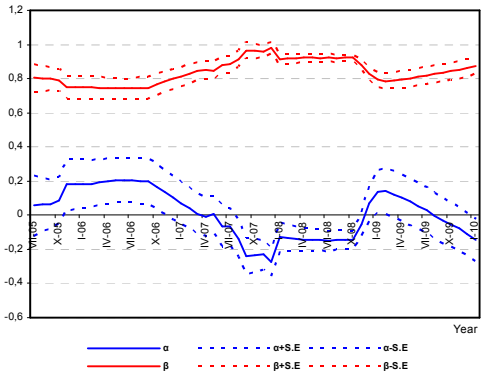
Pribor 1M/ CD 2



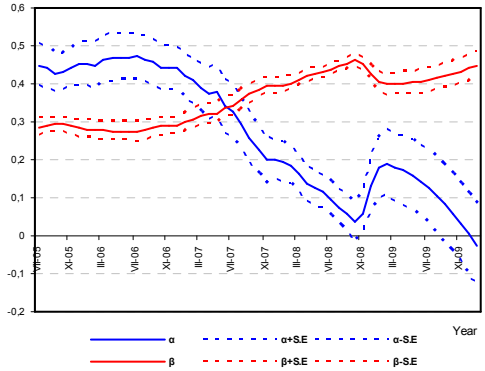
Pribor 12M/ CD 2



Pribor 1M/ CD 3



Pribor 12M/ CD 3

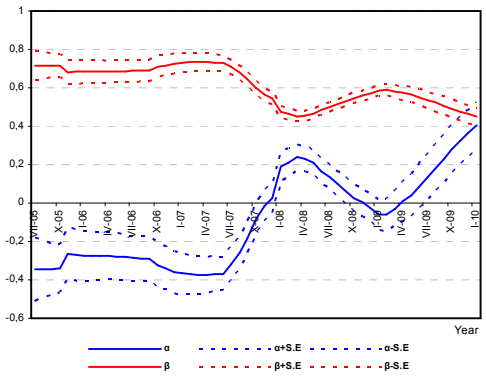


Pribor 1M/ CD 6 - Insignificant

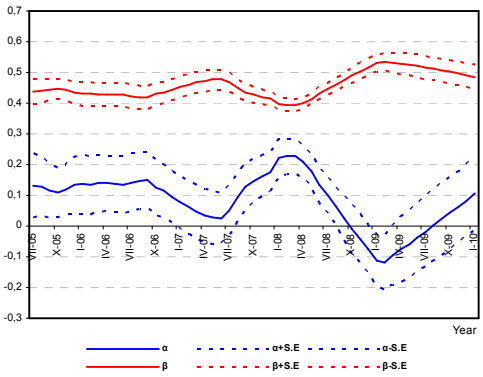
Pribor 12M/ CD 1 - Insignificant

[19] Recursive coefficients- Euribor 1M resp. Euribor 12M/ Corporate Deposit Rate – On Request

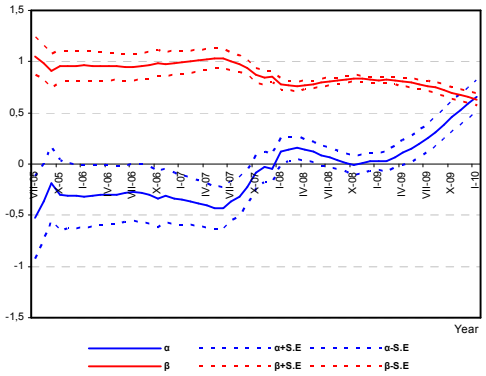
Pribor 1M/ CD 8



Pribor 12M/ CD 8



Pribor 1M/ CD 9



Pribor 12M/ CD 9

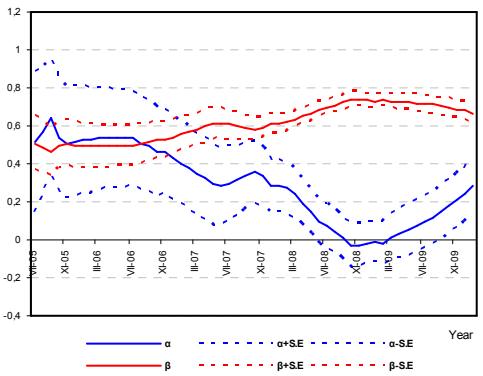
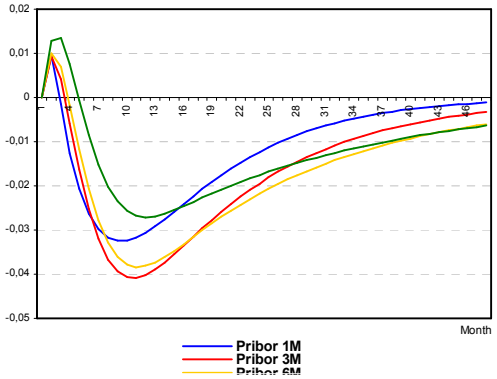
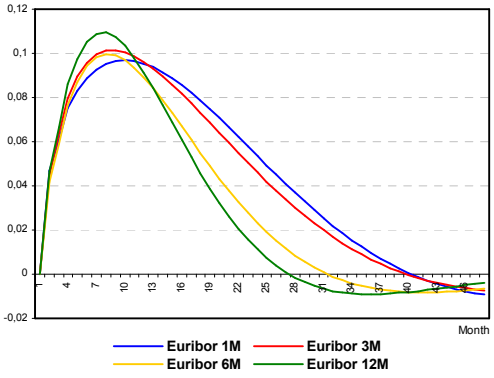


Chart A5.55-A5.68: Impulse response analysis-Pribor resp.Euribor/Corporate Lending Rate

Pribor/ CD 1

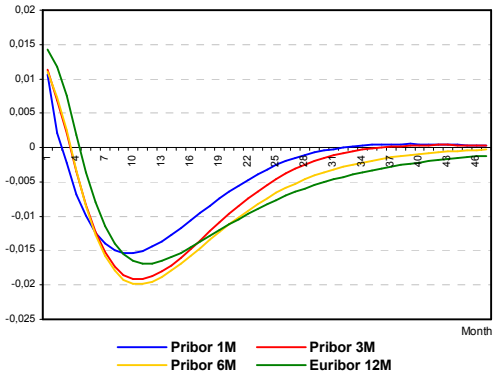


Euribor/ CD 1

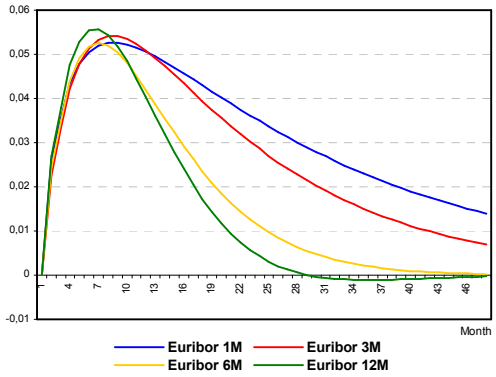


Pribor/ CD 2

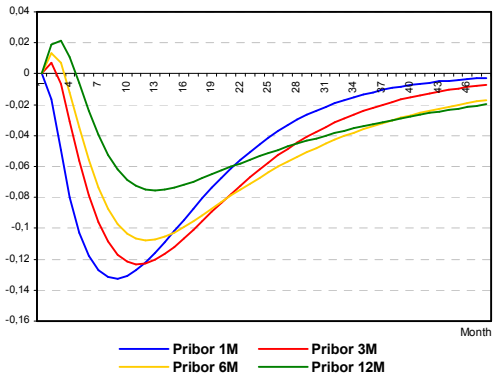
Euribor/ CD 2



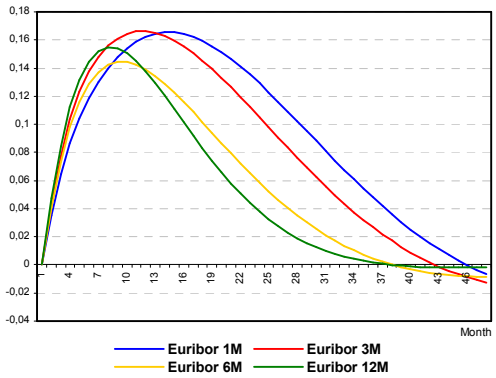
Pribor/ CD 3



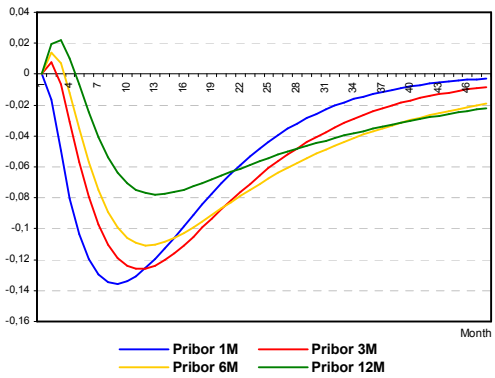
Euribor/ CD 3



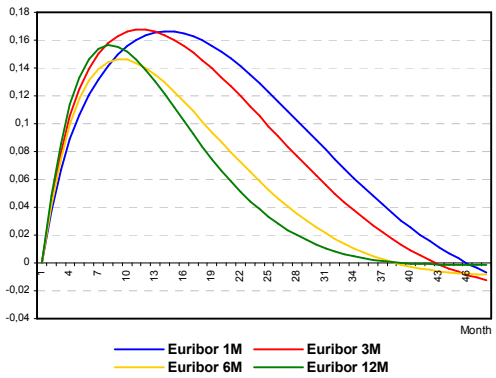
Pribor/ CD 4



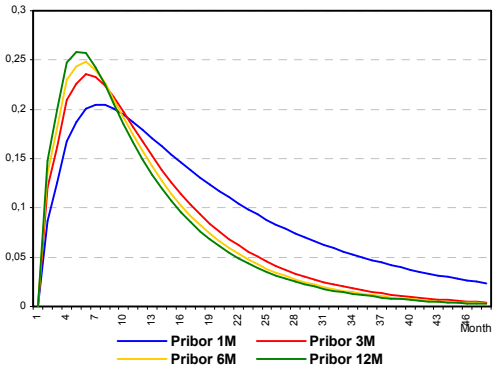
Euribor/ CD 4



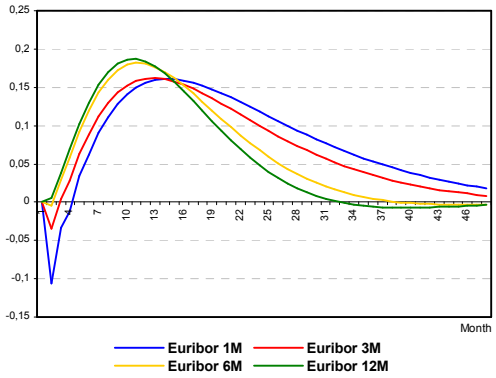
Pribor/ CD 5



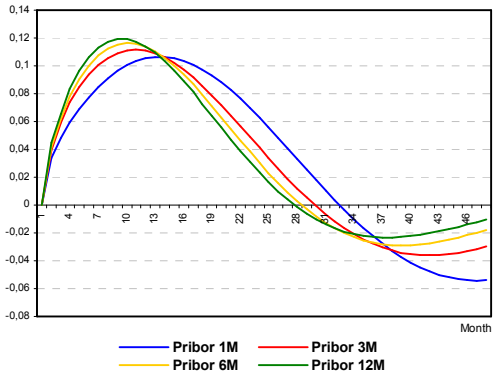
Euribor/ CD 5



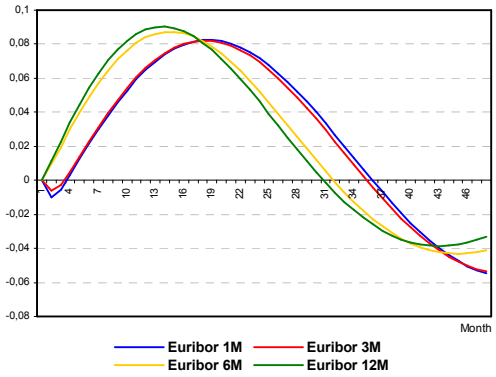
Pribor/ CD 8



Euribor/ CD 8



Pribor/ CD 9



Euribor/ CD 9