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FACULTY OF ECONOMICS

MASTER'S THESIS

**DETERMINANTS OF LOAN GROWTH IN BOOM-BUST-RECOVERY  
REGIME: THE CASE OF FORMER YUGOSLAV COUNTRIES**

Ljubljana, September 2013

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## **AUTHORSHIP STATEMENT**

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## INTRODUCTION

The global financial and economic crisis of 2007-2009, as determined by Williamson (in Miller & Stiglitz, 2010, p. 1), raised a notable question: how seemingly minor effects can have major consequences for a particular economy? These events have led to an interest in revising the existing models to account for financial market imperfections. An attempt to include transmission channels between financial and real sector into the existing macroeconomic framework has been made.

An extensive literature has studied the interactions between the financial and real sector. A recent review of the literature, conducted in the interest of the Bank for International Settlements, identified three transmission channels between financial and real sector: borrower balance sheet channel, bank balance sheet channel, often referred to as financial accelerator channels, and liquidity channel (Basel Committee on Banking Supervision, 2011). Beside financial market imperfections as a basic premise, one of the commonalities is a direct or indirect relation to bank lending and thus its relevance to the topic discussed.

Initially, the mechanisms of transmission focus on monetary policy actions, but they can be to some extent generalized to any shocks affecting financial institutions' balance sheets or non-financial institutions' balance sheets. Through the balance sheets, shocks influence bank lending (financial sector) and consequently investments and consumption (real sector). Especially the borrower balance sheet amplification mechanism is the subject of an extensive literature and is often the first reference during financial crises (Krishnamurthy, 2010). The latter is also particularly relevant, when explaining the importance of our research from the point of view of interactions between financial and real sector in different regimes. By the term "regimes", we refer to the studied boom period (2007-2008), bust period (2009-2010) and recovery period (2011-2012).

Throughout the studied period, banks are anticipated to have an important role in the amplification and propagation of external shocks. In a boom period, increasing asset prices drive up net worth of a borrower. This causes an increase in borrower's propensity to invest and partially his indebtedness, as a borrower is viewed as more creditworthy in the eyes of a bank. Access to external finance is eased, bank lending is aggressively expanded but often with compromised credit quality (Borio, Furfine, & Lowe, 2001; Huang & Ratnovski, 2010).

In a bust period, the access to external finance is constrained or at least costs more, due to the deterioration in borrowers' balance sheets. Simultaneously, with reductions in informational capital and an increased risk perception, banks tighten credit standards and collateral requirements. Via contraction in bank lending, the shocks are amplified and propagated, especially in an economy where non-financial sector is highly dependent on bank lending. The presence of financial market imperfections contributes additionally to excessively constrained or excessively eased access to external finance in different regimes (Bernanke, Gertler, & Gilchrist, 1999).

Based on the background presented above, it is crucial to understand determinants of bank lending behaviour in boom-bust-recovery regimes, its variations, and drivers behind them. Insight into bank lending behaviour is critical (useful) for practitioners, to reduce and manage risks and for supervisors and regulators, to set appropriate regulatory standards. As a result, procyclical behaviour of bank lending could be minimized and negative effects on real sector during economic downturns that originate from unstable financial sector mitigated.

The aim of the thesis is to identify determinants of bank lending in the boom period (2007-2008), bust period (2009-2010) and recovery period (2011-2012). We are further interested in changes of the direction and magnitude of a particular determinant in the studied regimes. When taking into consideration bank balance sheet, we focus on the liability-side, i.e. capital, retail deposits, interbank liabilities and longterm (wholesale) funds, and add into the equation other factors based on empirical considerations. In particular, we test whether quality of assets, size of banks, foreign ownership, participation in Vienna Initiative 1.0 and country-specific factors have a significant influence on bank lending. Under country-specific factors, structural characteristics of banking systems and institutional setting are considered.

When selecting the countries that might be interesting for the analysis, one of the decisive factors is a high dependency of non-financial sector on bank lending. Banking sectors of the countries under investigation indeed represent the most important financial sub-sector in Bosnia and Herzegovina, Croatia, FYR Macedonia (hereinafter: Macedonia), Serbia and Slovenia. Montenegro and Kosovo, part of former Yugoslavia, are eliminated due to the limited data availability.

To summarize, in the master's thesis we want to answer the following research questions:

**Q1:** Which are the determinants of bank lending behaviour in the boom period (2007-2008), bust period (2009-2010) and recovery period (2011-2012)?

**Q2:** How are the direction and magnitude of influence of a particular determinant changing in the boom period (2007-2008), bust period (2009-2010) and recovery period (2011-2012)?

**Q3:** Do country-specific structural characteristics have a significant impact on bank lending?

The master's thesis consists of three main sections. In the first section, theoretical and empirical literature on determinants of bank lending is reviewed. In the second section, the main characteristics of the banking systems of studied countries are presented and compared. The third part is devoted to the empirical research.

The empirical research is conducted on the unbalanced panel, which consists of 112 banks located in Bosnia and Herzegovina, Croatia, Macedonia, Serbia, and Slovenia. Bank lending behaviour is studied within the period of 2007-2012. The main source of bank financial accounts, i.e. balance sheets and income statements, is Bankscope database. For the analysis of the obtained data, we use software package GRET. In line with literature review, the

basic equation which allows studying the development of loans relative to selected bank balance sheet items is formed and estimated by the instrumentalized two-stage least squares method for each year separately.

Limitations of the research are mainly associated with data availability. First, we eliminated Montenegro and Kosovo from the analysis because we were not able to gather adequate data from banks' balance sheets and income statements. In order to overcome the same problem in the case of other countries, the database is improved by gathering the data directly from banks' annual reports, auditors' reports etc.

Second, when investigating bank lending behaviour, not only supply-side factors but also demand-side factors are considered. In case of demand constraints, a decrease in bank lending might be a reflection of lack of investment opportunities or weak economic performance and consequential deterioration of potential borrowers' creditworthiness. In case of supply constraints, a decrease in bank lending is a reflection of bank-related factors, e.g. lack of available funds or depletion of capital (Blaes, 2011). As data from financial accounts reflect both demand and supply, the statements on the factors that underlie bank lending are to a certain extent limited. In addition, evidence is found that macroeconomic factors significantly influence bank lending behaviour. De Haas and van Lelyveld (2006) show that characteristic of home and host countries (in case of a subsidiary) influence loan growth in a host country. The limitations that arise from excluding these variables from the model are accounted for (to some extent) in the way the model is estimated.

## **1 LITERATURE REVIEW**

In the following section, literature on the determinants of bank lending is reviewed; in particular, we focus on bank-related factors. First, liability-side determinants of bank lending are identified; retail deposits, interbank liabilities, long-term funding and capital as the sources of funds. We continue with other determinants of bank lending, asset-side of a bank's balance sheet and quality of assets, and determinants that are specific to the countries studied. Second, the relationship between bank lending and each determinant, which we identified, is established within a single section, and the hypotheses are set.

### **1.1 Liability-side determinants of bank lending**

#### **1.1.1 Retail deposits**

We start with retail deposits, which represent the most important source of bank funding. In contrast to non-financial sector, which is far more dependent on retained earnings, banks finance only around 4% of total assets with cash flows. When studying more than 1500 subsidiaries throughout US, Jayaratne and Morgan (2000) find that around three-quarters of total assets are financed by retail deposits. In the euro area, deposits from the non-financial

sector constitute around one-third of total liabilities (Cappiello, Kadareja, Sørensen, & Protopapa, 2010).

Cappiello et al. (2010) attribute a special status in the liability structure of a bank's balance sheet to non-interbank deposits. It derives from imperfect substitutability of deposits with other sources of bank funding, which is reflected in constrained bank lending. As imperfect substitutability has its roots in informational asymmetries and principal-agent problems, the early research, in attempting to assess the dependence of bank lending on retail deposits, use the analogy to the empirical literature on financial accelerator mechanism.

In line with the latter, positive correlation between cash flows and investments can be interpreted as evidence of budget constraints (controlling for investment opportunities). Applying the underlying logic on the financial sector, investments are replaced by loans and cash flows by insured deposits. The following basic regression equation arises (Jayaratne & Morgan, 2000):

$$L_i = \beta_0 + \beta_1 D_i + \beta_2 C_i + \varepsilon_i \quad (1)$$

where  $L_i$  denotes loan growth for a bank  $i$ ,  $D_i$  denotes deposit growth for a bank  $i$ ,  $C_i$  denotes level of bank capitalization for a bank  $i$ ,  $\varepsilon$  denotes the error term.

Under the assumption of perfect capital markets, i.e. without informational asymmetries or incentive distortions, the reduction in insured deposits should not cause the loans to decline. Banks are assumed to be able to compensate for the reduction in insured deposits by raising uninsured liabilities as an alternative source of funds. In line with this assumption,  $\beta_1$  is zero.

In contrast,  $\beta_1$  is greater than zero under the assumption that capital market frictions exist. It follows that a reduction in insured deposits causes a reduction in bank lending. Through capital market imperfections, the accessibility to external funds is limited or at least more costly. The empirical literature on bank lending channel, namely, regards insured deposits as internal funds because of the government insurance on these deposits. The external finance premium, the difference between internally and externally raised funds, is thus equal to zero. We expect positive correlation between retail deposits and bank lending. To our knowledge, empirical research does not provide evidence against positive correlation. Furthermore, it is predicted that other sources of funding move in the same direction as retail deposits.

The above statement complies also with Stein (1998). He concludes that banks are reluctant to issue uninsured liabilities that are of higher costs as the amount of insured deposits decreases and compensate for the reduction by a contraction in bank lending. In theory, banks could maintain their lending after a loss of reserves by issuing large certificates of deposits or other notes that do not require reserves (Romer & Romer, 1990). It is indeed the case that banks increasingly supplement retail deposits for wholesale funds, usually short-term and on a



rollover basis (Feldman & Schmidt, 2001). On the contrary, empirical research indicates that the reductions in retail deposits are not fully compensated for.

**Hypothesis 1:** Retail deposits have a positive influence on the amount of loans provided by a bank in all regimes (in boom, bust and recovery period).

**1.a)** The influence of retail deposits on the amount of loans provided by a bank is smaller in the bust period than in the boom period.

**1.b)** The influence of retail deposits on the amount of loans provided by a bank is smaller in the bust period than in the recovery period.

**1.c)** The influence of retail deposits on the amount of loans provided by a bank is larger in the boom period than in the recovery period.

**Hypothesis 2:** Retail deposits move in the same direction as interbank liabilities and long-term funding in all regimes (in boom, bust, and recovery period).

Owing to the perception of retail depositors as “sluggish” and rather uninformed we expect the influence of retail deposits on bank lending to be relatively stable during boom, bust and recovery regime. Individual depositors do not have strong incentives to monitor the bank or to provide market discipline, and consequently the funds remain relatively stable over time (or at least react less to changes compared to other forms of financing) (Huang & Ratnovski, 2010). The strong reaction in the form of withdrawal of deposits might arise when there is a negative public information available (crisis) which also reaches otherwise uninformed depositors. This might be seen in the late 2008, when Croatia and Serbia faced massive deposit withdrawals because public information, e.g. rumours, affected the reputation of some systemic banks (Bokan, Grguric, Krznar, & Lang, 2009; National Bank of Serbia, 2009).

In a recent study, Marinč (2012) presents evidence that speaks in favour of demand deposits as more stable source of funds. Demand deposits, even insured, are found to restrain excessive bank lending through a constant threat of withdrawals. However, it should be noted that the threat of withdrawal is linked to liquidity needs and not directly to threat of a bank run. Choudhry (2011) also points out that customer deposits are generally more stable when compared to wholesale funds. It follows that the risk of withdrawal is lower than the risk of withdrawal of wholesale funds in the bust period. The volatility of deposits as a determinant of bank lending is thus believed to be smaller compared to other sources of funds.

**Hypothesis 3:** The volatility of retail deposits is expected to be lower than the volatility of other uninsured liabilities (less informed).

### **1.1.2 Interbank liabilities**

Beside by retail deposits, a bank finances its investments (loans) by other uninsured liabilities. The latter include short-term funds raised on an interbank market: deposits, loans and repos from banks. As mentioned, Feldman and Schmidt (2001) find evidence that banks increasingly supplement retail deposits for wholesale funds. It is believed that wholesale funding is especially beneficial, as banks are not constrained by the availability of retail deposits to finance their investment opportunities. Besides, the so-called sophisticated wholesale financiers provide market discipline through monitoring (Calomiris, 1999) and access to funds in case of retail deposit withdrawals (Goodfriend & King, 1988).

Nevertheless, the source of the external finance, a parent bank or another bank involved in interbank intermediation for example, plays an important role when bank lending is regarded. In the case of a parent bank's support to a subsidiary, interbank borrowing is seen as having a positive influence on lending. De Haas and van Lelyveld (2010) argue that being a part of a bank-holding company, foreign subsidiaries are not completely autonomous organizations. Their operations, including credit supply, are influenced by a parent bank, which may have a stabilizing role. A parent bank may act as a lender of last resort during the crisis and make a subsidiary less vulnerable to a host country's shocks. Through its internal capital market, a parent bank may also provide liquidity and assure more stable credit supply in a host market.

When liabilities to banks are not limited to the relationship parent-subsidiary, correlation found is negative. Kořak et al. (2011) studied the association between loan growth and structure of banks' liabilities, namely funding. It is shown that interbank liabilities and retail deposits have an effect on bank lending. A significant and negative correlation between interbank liabilities and gross loan growth is found. However, when the authors accounted for ownership effect, there was an indication that interbank liabilities have positive effect on loan growth in case of parent-subsidiary transactions. Furthermore, they find that banks with strong base of insured deposits reduce lending less during the crisis. The findings of Ivashina and Scharfstein (2010) are similar. In the study of bank lending during the crisis of 2008, banks with a better access to deposit financing are observed to cut their lending less. In addition, these banks are found not to rely on short-term debt.

Credit and deposit activities of foreign bank subsidiaries are also characterized as potential channels of financial shock transmission during the global financial crisis. There is a variation expected in bank lending behaviour, due to the funding of the foreign banks. Allen, Hryckiewicz, Kowalewski and Tümer-Alkan (2012) define the ability to borrow in the interbank market to be one of the main determinants of lending during the crisis. It is assumed that some subsidiaries operate without financial support from parent banks, while others are dependent on their parents and interbank markets to finance loans. Authors show that the reduction in lending is stronger for those subsidiaries that are dependent on the interbank market, including their parents. The higher the dependence on interbank markets, the stronger

the reduction in lending during the crisis is. This is also in compliance with previous research of Peek and Roesengren (1997), Popov and Udell (2012). The same authors study market discipline as a reason for contraction in bank lending. Taking into consideration emerging markets, market discipline is found not to play a significant role.

In their study on the international contagion in Eastern Europe, Ongena, Peydró, & Horen (2012) illustrate that domestically operating banks cut lending less during the recent financial crisis. In contrast, banks that borrowed funds internationally and foreign banks reduced lending more on average. An even greater impact on lending is documented when the level of retail deposits (obtained through domestic markets) is low.

We assume positive influence on the bank lending of uninsured liabilities, for the most part interbank intermediation, prevails, as banks can supplement retail deposits. In such a manner, their investment opportunities are not constrained. However, when we account for monitoring of the borrowers in an interbank market, it is believed that the size of the coefficient would be significantly lower in the bust period.

**Hypothesis 4:** Interbank intermediation has a positive influence on the amount of loans provided by a bank in all regimes (in boom, bust and recovery period).

**4.a)** The influence of interbank intermediation on the amount of loans provided by a bank is larger in the boom period than in the bust period.

**4.b)** The influence of interbank intermediation on the amount of loans provided by a bank is larger in the boom period than in the recovery period.

**4.c)** The influence of interbank intermediation on the amount of loans provided by a bank is smaller in the bust period than in the recovery period.

### **1.1.3 Long-term funding**

In order to be able to study the impact of long-term funding an accurate definition is needed. According to Bankscope database (2013), long-term funding comprises subordinated borrowing (subordinated loans and debt including any dated hybrid instruments), senior debt maturing after one year (loans from banks, debt securities in issue, the liability component of convertible bonds, and other borrowed funds), and other funding (capital markets funding not otherwise categorized). We are again dealing with sophisticated wholesale investors but, in contrast to the previously considered short-term interbank liabilities, the funds are long-term.

According to Choudhry (2011), long-term funding is seen as the most appropriate source of funding in addition to or to supplement retail deposits. In the first place, banks are able to reduce their risks consequence of a better maturity and liquidity alignment. We thus assume long-term funding to have a greater impact on bank lending when compared to short-term funding, for example, interbank liabilities.

**Hypothesis 5:** The influence of long-term funding on the amount of loans provided by a bank is larger than the influence of interbank intermediation.

Based on the composition of long-term funding, it can be noticed that subordinated debt, which represents (usually) the largest share of Tier 2 capital, is categorized under long-term funding. Barrell, Davis, Fic and Karim (2011) shows that an increase in proportion of Tier 2 capital and the capital adequacy held constant, increases risk measures e.g. loss provisions and charge-offs. This might be translated to deterioration of loan portfolio, due to the extension of loans to lower-quality borrowers. Furthermore, it is in contrast to the belief that subordinated debt, the main part of Tier 2 capital, provides an additional benefit of market discipline through monitoring of the riskiness of the bank by its holders.

In line with Barrell et al. (2011), Huang and Ratnovski (2010) find that wholesale investors do not always opt for monitoring banks and thereby imposing market discipline. When costless public information is available, and retail deposits suffice to absorb wholesale investors' withdrawal, the possibility of inefficient liquidations of wholesale funds increases (Huang & Ratnovski, 2010). This is especially the case for senior debtors. Though the principle described is in the first place valid for short term funds, we assume that it is also valid for long-term funding, as the authors analyse the behaviour of the banks and wholesale investors in 2 consecutive periods. A necessary condition for a source of funds to be classified as long-term is, on the other hand, more than one year. Due to the fact that in general more accurate public information is available in a bust period, we expect long-term funding to influence loan growth in a bust period less than in a boom and recovery period.

**Hypothesis 6:** Long-term funding has a positive influence on the amount of loans provided by a bank in all regimes (boom, bust and recovery period).

**6.a)** The influence of long-term funding on the amount of loans provided by a bank is larger in the boom period than in the bust period.

**6.b)** The influence of long-term funding on the amount of loans provided by a bank is larger in the recovery period than in the bust period.

**6.c)** The influence of long-term funding on the amount of loans provided by a bank is larger in the boom period than in the recovery period.

#### **1.1.4 Capital**

Lastly, the association between the level of capital, its composition and bank lending behaviour is examined. The purpose of bank capital, which is one of the most important items of a bank's balance sheet, is to protect a bank against the risk of insolvency and failure. Acting as a buffer, it enables a bank to absorb unexpected losses (expected losses are absorbed by provisions) and to continue with operations in times of economic distress, when a bank net

worth declines (Barrell et al., 2011; Borio et al., 2001). The amount of required capital depends on the assets that a bank holds and their riskiness; the riskier the asset, the higher the required level of capital (European Parliament, 2013).

The quality of the capital is determined by the structure of the capital. In compliance with Basel II, which is relevant for the observed period, there is a distinction between Tier 1 or core capital and Tier 2 or supplementary capital. Tier 1 capital comprises shareholder funds plus perpetual noncumulative preference shares, and Tier 2 capital comprises subordinated debt, hybrid capital, loan loss reserves and the valuation reserves. Tier 1 capital is perceived as the highest quality capital, as it is not obliged to be repaid and has a loss absorption capacity. Tier 2 is considered of lower quality as it is not loss absorbing and repayable (Choudhry, 2011). Under the Basel rules, the Tier 1 ratio should be at least 4% and the total capital adequacy ratio should be at least 8%.

Barrell et al. (2011) finds evidence that capital adequacy and composition are relevant to risk taking behaviour of banks. Results suggest that an increase in total capital adequacy ratio reduces the riskiness of bank behaviour, including excessive lending. Considering the role of Tier 2 capital in risk taking and lending, there is no consensus in the literature.

An extensive literature also focuses on the so-called bank lending channel of monetary policy transmission. In their seminal work, Bernanke and Gertler (1995) identify a set of factors that amplify and propagate conventional interest rate effects. The balance sheet channel, which is explained in more details in the following section, and the bank lending channel transmit monetary policy actions to real economy. The bank lending channel that is in a modified form relevant for the analysis under this section focuses on how monetary policy actions shape the supply of loans by commercial banks.

The basic premise of credit channel is the existence of the external finance premium, a positive difference between the cost of external and internal funds. It stems from credit market imperfection, e.g. asymmetric information or costly enforcement of contracts. It also reflects the cost of monitoring and evaluation, the cost of risk of undesired deviation in the borrower's behaviour (Bernanke & Gertler, 1995; Basel Committee on Banking Supervision, 2011).

Meh (2011) recently examines how the balance sheets of banks constrain the supply of credit through the bank capital channel. It is defined as the endogenous response of bank capital to economic developments and resembles financial accelerator mechanism, a mechanism of amplification and propagation of shocks in output, investment, bank lending, and inflation.

Through the bank capital channel monetary policy actions or other shocks, e.g. shocks to aggregate supply and demand, as well as development of real estate markets, influence bank lending. If adverse shocks (loan losses) are not buffered by profits, the level of capital depletes and when it depletes to the minimum level that still fulfils regulatory requirements the upper bound on bank assets and thereby on bank lending is placed. The underlying

assumption here is that capital markets are imperfect and thus raising capital is costly for banks. In an attempt to meet regulatory requirements, banks deleverage by reducing bank lending through tightening the credit standards, increasing interest rate spread and collateralization (Van den Heuvel, 2002).

The severity of the shock depends on the banking system capitalization; the less capitalized the banking system is, the more bank lending responds to shocks. For example, a bank with high capital adequacy is in a position to reduce the level of capital for more, when adverse shocks arise, and is able to deleverage less. Since the pressure to reduce assets is less pronounced, contraction in credit is expected to be less pronounced as well.

In addition, dependence of enterprises on bank funding and difficulties of raising capital, faced by banks, contribute to the strength of this channel. Disruptions in supply of bank loans impose sizeable difficulties and costs for the borrowers that are highly dependent on bank loans (Bernanke & Gertler, 1995). It is concluded that weaker bank balance sheets make an economy more vulnerable to adverse shocks and that effective counter-cyclical capital regulation will increase the resilience of the banking sector to economic shocks (Meh, 2011).

The results of Gambacorta and Mistrulli (2004) are consistent with bank lending channel hypothesis, namely, well-capitalized banks need to adjust lending less compared to poorly capitalized banks. Being faced with an adverse shock (contractionary monetary policy in the research mentioned) the former are able to raise uninsured non-deposit funds more easily and thereby their supply of loans is less procyclical. It is concluded that bank capital is a relevant balance-sheet item for the propagation of shocks to lending.

Jayaratne and Morgan (2000) also use logic of the financial accelerator mechanism in a firm to investigate the relationship between loan growth and insured deposits. The latter implies that agency problems are decreasing as bank capital is increasing. On average, well-capitalized banks are less dependent on insured funds and more on uninsured funds. It follows that fluctuations in insured deposits have greater impact on loan growth of less-capitalized banks.

Košak et al. (2011) finds that level of capital, acting as a buffer to absorb losses and help to overcome distress, positively affects the growth of gross loans in banking sectors of Central and Eastern Europe (CEE) and other analysed countries. In particular, Tier 1 as well as Tier 2 capital has positive effect on lending in normal times, whereas in crisis times Tier 2 capital has a negative effect on lending.

Based on the distinction between Tier 1 and Tier 2 capital, it is expected of a capital composition to have an effect on bank risk taking behaviour and thereby bank lending behaviour. The association between bank lending and capitalisation can be summarized as follows: the lower the total capital adequacy ratio, the riskier the bank is perceived to be. The less favourable the capital structure, (Tier 1 capital close to minimal level and more Tier 2

capital) the riskier the bank is perceived to be. Since risk perception influences interest rates at which the bank can raise funds, the cost of funding increases and/or the supply of loans is limited. Based on the above findings, bank capital is also expected to have a more pronounced influence on bank lending in the time of economic downturn as it propagates shocks.

**Hypothesis 7:** Tier 1 capital (alternatively Equity) has a positive influence on the amount of loans provided by a bank in all regimes (in boom, bust and recovery period).

**7.a)** The influence of Tier 1 (alternatively Equity) on the amount of loans provided by a bank is larger in the bust period than in the boom period.

## **1.2 Other determinants of bank lending**

### **1.2.1 Quality of assets**

Shifting from the liability side, the next key determinant of banks' performance, thereby lending, is the quality of assets (Podlesnik, 2000). This has a long-lasting influence on banks' profitability through non-performing loans and provisions for non-performing loans. Furthermore, deterioration in the quality of assets has a direct negative effect on lending growth, on account of increased risk perception. It might be connected to weaker economic performance of a particular firm or even of a particular economy (Borio et al., 2001). With a decreasing informational capital, deterioration in asset quality can lead to tighter lending standards, which in turn reduce loan growth and exacerbate a recession.

When asset quality and its association to bank lending are considered, borrower balance sheet mechanism is relevant in presenting the consequences of distressed firms in a bust period on a bank's balance sheet. As we mentioned, there is a consensus in the literature that negative shocks that affect the banks' balance sheets also affect costs and availability of loans. Feedback effect of credit tightening is also important as banks are in a position to trigger an "endless vicious spiral" (Hou & Dickinson, 2007).

The prerequisite of this mechanism to work are highly indebted non-financial institutions and households. Prior to the financial and economic crisis of 2008-2009, the countries analysed indeed accumulated excessive levels of debt and remained highly leveraged, when the crisis arose. The overall economic performance of the studied countries was improving and, according to Četković (2011), the rapid increase in credit to private sector, associated with the entry of foreign banks and financial deepening, was the main driver of this growth. The period mentioned was also noted for booming real estate markets as well as for exceptional stock performance.

In compliance with the financial accelerator mechanism, market imperfections in a form of information asymmetries, institutional shortcomings, or perverse incentives, drive the behaviour of lenders and borrowers. Financial accelerator operates through a balance sheet of

borrowers; under borrowers, enterprises and households are understood (Bernanke & Gertler, 1995).

In a boom period, asset prices tend to increase simultaneously with profits and drive up the net worth of potential borrowers. New lending is facilitated as assets are worth more, also the value of collateral assets is inflated, and balance sheets are strengthened. The capacity to borrow increases and this might lead to excessive growth of credit to private sector. Through the mechanism described, the leverage increases, taking into consideration enterprises, and the monitoring is more difficult, taking into consideration banks. Related to the insufficient monitoring, projects with low or negative net present value are financed. With expansion of lending, the quality of asset portfolio deteriorates, risk exposure increases and a bank becomes more vulnerable to adverse shocks (Gourinchas, Valdes, & Landerretche, 2001; Sa, 2006).

In a bust period, the mechanism is reversed; adverse (external) macroeconomic shocks are propagated and amplified, vulnerabilities in the banking and real sector are revealed. Attributable to deteriorating economic performance, excessively leveraged enterprises become budget constrained as soon as their profits and thereby their net worth decreases. On the one hand, investment collapses together with asset prices because borrowers are reluctant to invest and on the other, borrowers might even be faced with problems on debt repayment. Banks, lending to an over-indebted non-financial sector, can thus expect a sharp increase in non-performing loans as a bubble bursts. Calling in collateral at firesale prices, banks further drive down the asset prices and cause their balance sheet to shrink further. Bank lending is restrained (Gourinchas et al., 2001; Sa, 2006; Bock & Demyanets, 2012).

The literature also suggests the reversed causality. Namely, Bock and Demyanets (2012) find that in the sample period of 1996-2003, strong credit growth itself is associated with asset quality problems. A slowdown in economic growth and rapid credit growth are also independently associated with higher level of non-performing loans (Gourinchas et al., 2001).

Beside non-performing loans, loan loss provisions also reflect the quality of assets. Their association to non-performing loans could be easily established by presenting the Bank for International Settlements (BIS) standard loan classification. Non-performing loans comprise the loans in the latter three categories out of five according to classification presented below. For the categories mentioned banks are obliged to put aside loan loss provisions. The five-tier system defines loans as follows (Hou & Dickinson, 2007; Bankscope database, 2013):

- **Passed:** Solvent loans;
- **Special Mention:** Loans to enterprises which may pose some collection difficulties, for instance, because of continuing business losses;
- **Substandard:** Loans whose interest or principal payments are longer than three months in arrears of lending conditions are eased. The banks make 10% provision for the unsecured portion of the loans classified as substandard;



- **Doubtful:** Full liquidation of outstanding debts appears doubtful and the accounts suggest that there will be a loss, the exact amount of which cannot be determined as yet. Banks make 50% provision for doubtful loans;
- **Virtual Loss and Loss (Unrecoverable):** Outstanding debts are regarded as not collectable, usually loans to firms which applied for legal resolution and protection under bankruptcy laws. Banks make 100% provision for loss loans.

Bank provisions are strongly procyclical, being highly negatively correlated with the business cycle (Bock & Demyanets, 2012). Provisions for the most part increase when the economic growth is clearly decelerated, but often not until economy is in recession. The behaviour of provisions translates into a clear procyclical pattern in bank profitability, which further encourages procyclical lending practices. In compliance with this perspective, an increase in non-performing loans or provisions is expected to have an influence on bank lending. A negative correlation is anticipated and stronger correlation is anticipated in the bust period.

**Hypothesis 8:** Loan loss provisions have a negative influence on the amount of loans provided by a bank.

**8.a)** The negative influence of loan loss provisions on the amount of loans provided by a bank is larger in the bust period than in the boom period.

### 1.2.2 Size of Banks

Bank lending behaviour is also studied in relation to the size of a bank; in particular researchers are interested in distinctions between smaller and larger banks. It is hard to consider size of a bank as the variable that has a direct influence on bank lending. However, it is easier to be seen as a reflection of a set of characteristics associated with the size. It can be seen (to some extent) as a proxy.

The association between the size and loan growth is mainly established through the access to the uninsured liabilities, as a substitute for insured deposit funding. The correlation found is usually positive. In contrast, principles of relationship banking and use of soft information indicate negative correlation between the size and loan growth.

According to Jayaratne and Morgan (2000), the contractionary monetary policy influences only bank lending of smaller banks. Thus, also bank lending channel was found relevant only to small banks, especially those with low capitalization. Larger banks seem to be unconstrained by monetary policy actions that influence balance sheets of banks in a similar manner, i.e. decrease in supply of insured deposits.

Kashyap and Stein (1995) and Kashyap, Rajan and Stein (2002) demonstrate that loan growth of smaller banks is more sensitive to monetary policy tightening than loan growth of larger banks. In another study, there is an indication that smaller banks, which hold less liquid

assets, are more sensitive to negative shocks in insured deposits. Their access to uninsured liabilities is more limited.

In contrast, empirical research has shown that larger banks have more difficulties in exploiting the soft information data. Due to more complex organizational structure large banks focus on hard information that can be verified, in contrast to smaller decentralized banks, being able to use soft information better. That is especially important taking into consideration financing of SMEs and financing of firms in crisis periods (Boot, 2007).

Based on the considerations above, contraction in bank lending in crisis periods is less pronounced for smaller banks than larger banks. However, as it is supposed that influence of constrained access to funds prevails, the correlation between size of a bank and loan growth is expected to be positive. Loan growth is expected to increase simultaneously with increase in total assets as a measure of bank size.

**Hypothesis 9:** Size has an influence on the amount of loans provided by a bank.

### **1.2.3 Ownership**

One of the transmission channels of the crisis to Central and Eastern European countries is said to be the banking system. The global financial crisis of 2007-09 emanated from home markets of banking groups based in European Union to host markets, including the countries of our interest. Due to reduced interbank liquidity, parent banks started to deleverage and the crisis was transmitted to the analysed countries through local subsidiaries (De Haas, Korniyenko, Loukoianova, & Pivovarsky, 2012). It is also believed that financial crisis only exposed imbalances in the structure of banking sectors dominated by foreign banks (Bartlett & Monastiriotis, 2010).

The ownership is thus relevant subject for the analysis and is anticipated to have a significant effect on bank lending. In the literature there is a lively debate on the consequences of foreign bank entry on the banking systems of a host country and its stability. The evidence shows that foreign banks increase effectiveness of a banking system, improve corporate governance practices and institutional setting. In addition, foreign bank entry is associated with credit growth and the reduced likelihood of crises (Beck et al., 2009). In contrast, some authors suggest that foreign entry can also have destabilizing effects on the banking system of a host country. Bank subsidiaries in relation to the parent bank represent only a small fraction of its assets but for the host country, a bank might be crucial for the system.

De Haas and Van Lelyveld (2006) document that bank lending growth is determined by characteristics of a bank, by characteristics of a parent bank (in case of a subsidiary) as well as by host and home country variables. In particular, authors investigated the differences in reaction of foreign and domestic banks in CEE countries to business cycles and banking crises. Within the period of 1993-2000 local crises and reactions of more than 250 banks,

differentiated based on bank ownership and mode of entry, are studied. Their findings show that domestic banks contracted their lending, whereas greenfield foreign banks stayed more stable lenders during the crisis periods. It is worth mentioning that bank lending behaviour is compared in relative terms, e.g. a "stable" lender means "more stable" than other lenders. Moreover loan growth of foreign subsidiaries is affected by economic performance of a home country. Increase in output of a home country has a negative influence on loan growth of a subsidiary.

De Haas and Van Lelyveld (2010) further document the existence of internal capital markets exploited by multinational banks to manage lending of their subsidiaries. The main influence on the bank lending of a subsidiary is again through the balance sheet of a parent bank. A foreign-owned subsidiary supported by a strong parent is able to expand its lending in the host country faster during the crisis when compared to domestic banks. In line with this findings, Dinger (2011) shows for emerging Europe that the presence of multinational bank subsidiaries eases aggregate liquidity shortages.

When a bank is part of a multi-bank holding company, its access as a subsidiary to external funds is eased compared to similar stand-alone banks. Attributable to limited disruptions in access to external funds, even in the case of an adverse shock as monetary contraction, affiliated banks are believed to be able not to reduce lending whereas other banks are forced to slow loan growth and decrease liquid assets (Ashcraft, 2003).

Considering the global financial crisis of 2007-09, it is demonstrated that multinational bank subsidiaries limit credit more aggressively than domestic banks. Domestic banks, which relied more on local deposits to fund credit, were better positioned to continue to lend (De Haas & Van Lelyveld, 2010). This might be attributable not only to the ownership structure but also to the structure of funding as banks with higher level of non-bank deposits are seen as more stable lenders. In Boot (2007), the position of domestic banks against foreign banks is compared. Domestic banks are believed to be privileged, due to better knowledge of domestic market and deeper relationships with borrowers. They have been in a better position as they are present on the market for a longer period of time.

Popov and Udell (2012) find evidence that negative shocks were transmitted from parent banks to subsidiaries in emerging Europe in the onset of the crises 2007-2008. In particular, loan rejection rates were higher for subsidiaries of parent banks with deteriorating balance sheets. Namely, enterprises reported higher credit constraints. Furthermore, foreign banks reduced lending to a greater extent compared to domestic banks.

Allen et al. (2012) studied how liquidity and capital shocks are transmitted from multinational bank-holding companies to subsidiaries. Fifty-one multinational banks and their subsidiaries are included in the sample. Their findings are consistent with Popov and Udell (2012) and show that the financial distress of a parent bank, reflected in the higher loan loss provisions, has a negative impact on the lending of a subsidiary.

**Hypothesis 10:** Foreign ownership has an influence on the amount of loans provided by a bank.

#### **1.2.4 Vienna Initiative 1.0**

Banking sectors of former Yugoslav republics had undergone a deep transformation process in the late 1990s and early 2000s. Banks were privatized and consolidated for the most part with the participation of foreign strategic investors (Bonin, 2004). As a result, banking sectors are dominated by foreign-owned banks, except in Slovenia. In 2011, the share of foreign-owned banks in total banking system assets was 92.0%, 90.6%, 92.4%, and 74.5% in Bosnia and Herzegovina, Croatia, Macedonia, and Serbia, respectively (Raiffeisen Bank International AG, 2012; European Bank for Reconstruction and Development, 2013). Through foreign ownership banking sectors have become dependent on the funds of parent banks located for the most part in the European Union.

The analysed countries experienced excessive growth of credit to private sector prior to the financial and economic crisis of 2007-2009. The outcome was a leveraged private sector and an increased vulnerability of banking sector. Involvement in an expansion of riskier loans in the boom period, financed mainly by foreign capital, led to an increase in non-performing loans and constrained supply in the bust period (Ćetković, 2011; European Investment Bank, 2013).

As a result of deteriorating economic environment and high dependence of subsidiaries on their parents, a sharp reduction in foreign financing would have led to a sharp reduction in bank lending and severe macroeconomic destabilization. To ensure a continued commitment of parent banks to their subsidiaries and financial support for banks operating in the region, Vienna Initiative 1.0 was created in November 2008. All the key stakeholders, multinational European banks, their supervisors, fiscal authorities, the IMF and development institutions active in emerging Europe were joined “to support banking sector stability and lending to the real economy in crisis-hit CEE” (Vienna Initiative 1.0, 2013).

In addition to Hungary, Latvia, and Romania, Bosnia and Herzegovina, and Serbia were included in Vienna Initiative 1.0. In Table 1, we list parent banks, which participated in Vienna Initiative 1.0. 17 parent banks with their subsidiaries in Bosnia and Herzegovina and Serbia issued assurances to maintain their exposures and to recapitalize subsidiaries if, and when needed (De Haas et al., 2012). Commitment letters were signed on 22<sup>nd</sup> June 2009 for safeguarding exposures of parent banks in Bosnia and Herzegovina and on 27<sup>th</sup> March 2009 for Serbia. Multinational parent banks reaffirmed their commitments on 26<sup>th</sup> February 2010 for Serbia.

Table 1. Participant parent banks in Vienna Initiative 1.0.

<b>Bosnia and Herzegovina</b> Signed June 22, 2009	Raiffeisen International	Raiffeisen Bank
	Hypo Alpe-Adria	Hypo Alpe-Adria Bank
	UniCredit Group	UniCredit Bank
	Volksbank International	Volksbank Bosnia
	Intesa SanPaolo	Intesa SanPaolo Bank
	NLB Group	NLB Bank
		ZepterKomerceBank BanjaLuka
<b>Serbia</b> Signed March 27, 2009 Reaffirmed February 26, 2010	Eurobank EFG	Eurobank EFG
	Intesa SanPaolo	Bank Intesa
	Raiffeisen International	Raiffeisen Bank
	Hypo Alpe-Adria	Hypo Alpe-Adria Bank
	National Bank of Greece	Vojvodjanska Bank
	UniCredit Group	UniCredit Bank Serbia
	Société Générale	Société Générale Bank
	Alpha Bank	Alpha Bank Beograd
	Volksbank International	Volksbank Beograd
	Piraeus Bank	Piraeus Bank Beograd

Source: De Haas et al., *Foreign banks and the Vienna Initiative: turning sinners into saints*, 2012, pp. 38.

De Haas et al. (2012) shows that contraction in credit to private sector was characteristic of both domestic and foreign banks in CEE countries during the crisis. Foreign banks that participated in Vienna Initiative 1.0 were found to be more or less stable lenders in 2008-09. This also holds for state-owned domestic banks.

Using the panel regression that included data for 29 emerging European countries for the period of 2000-2010, Mileva (2013) studied the influence of Vienna Initiative 1.0 on international bank lending. The results are consistent with De Haas et al. (2012), countries that participated in the Vienna Initiative 1.0 did not experience the decline in foreign private loans associated with IMF programs.

As Vienna Initiative is believed to have an effect on bank lending behaviour, it is included in the model. It is expected to have a positive effect on bank lending or at least to decelerate the contraction of bank lending of the banks that participated in Vienna Initiative 1.0. Although Vienna Initiative 1.0 was signed in 2009, it is of an interest to test whether banks that were a part of Vienna Initiative 1.0 maintain their exposures towards the analysed countries in the years after the crisis.

**Hypothesis 11:** Participation in Vienna Initiative 1.0. has an influence on the amount of loans provided by a bank.

## **2 BANKING SYSTEMS AND INSTITUTIONAL SETTING**

In the section that follows, we characterize banking systems of Bosnia and Herzegovina, Croatia, Macedonia, Serbia and Slovenia and their development up to the studied period and during the studied period of 2007-2012. As banking systems of the studied countries pursued rather different paths of development, the historical background is crucial for understanding country-specific structural characteristics. Under the latter, we place the initiation of the transition process and its pace, advancement of privatization, bank rehabilitation, previous banking crises and their consequences, etc. These characteristics, it could be said persistent legacies, might be seen as having an important role in the severity of the global financial crisis.

After a survey of the past, we continue by describing banking sectors in the studied period of 2007-2012. We focus on determinants of banking systems and differences among studied countries that might play a significant role in mitigating or amplifying the impacts of global financial crisis. Indeed, the instabilities arising from the crisis differed in the studied countries. Furthermore, within the period of 2006-2012 we debate boom (2007-2008), bust (2009-2010) and recovery (2011-2012) period.

### **2.1 A brief review of history of the banking systems**

Unlike in other socialist economies, mono-banking system was abolished in SFR Yugoslavia in the mid 1960s. Operations of the commercial banks had been separated from the operations of the central bank, but the former remained exposed to social and political influences. In the late 1960s, an interbank market has been established and a capital market in the late 1980s. At the beginning of the transition process, the existing two-tier banking system needed to be re-established, and market practices introduced (Šević, 2000; Jovančević, 2000).

During the 1990s, the banking systems were confronted with several inherited problems. Gaining monetary independence, bank claims on the National Bank of Yugoslavia became impossible to collect. The so-called frozen foreign currency deposits resulted in the gaps in balance sheets of the commercial banks and caused them to become insolvent. The majority of the governments assumed responsibility and issued bonds as a counter value to the frozen deposits (Muller-Jentsch, 2007).

Furthermore, an unhealthy cross-ownership was institutionalized in the majority of the studied countries. In compliance to the principles of Yugoslavian self-management, banks were not state-owned, but were rather socially-owned at the beginning of the transition (Bonin, 2004). Revamping the socialist system in 1989-90, ownership of the banks was allocated to the real sector enterprises, for the most part the founders and the main debtors of the bank at the same time (Šević, 2000).

## **2.1.1 Croatian banking system**

### **2.1.1.1 Early foreign bank entry and bank rehabilitation**

In the years that followed the liberalization of bank licensing in 1993, the number of banks increased significantly. An attempt to promote competition and reduce concentration resulted in the Croatian banking system being overbanked with 60 banks in 1997. In the same year, more than 60% of total banking assets has been privately-owned as a result of passive privatization through privatization of enterprises (Reininger & Walko, 2005; Kraft, Hofler, & Payne, 2002). However, attributable to unstable political situation and high inflation, entry of foreign bank was deterred in the first years of independence. It improved after the Dayton Accord when six foreign banks entered the market.

### **2.1.1.2 Bank rehabilitation and banking crisis of 1998-1999**

The process of bank rehabilitation started in 1995-1996 in four out of five large banks (Slavonska, Splitska, Riječka, and Privredna Banka Zagreb). Zagrebačka Banka, the fifth large bank, had the capabilities to restructure itself without government assistance and remained a privately-owned domestic bank. In total, the government recapitalized 13 large banks (Bonin, 2004; Jovančević, 2000).

The period of bank rehabilitation was also the period of bank speculations, high profits and uncontrolled lending associated to typical market and regulation failures. In 1996, the banks had to shift their focus to lending to enterprises and households. Troubles of banks influenced negatively the banking market in 1994-1996. Absence of risk assessment, extremely high interest rates, inexperience in mergers, acquisition, bankruptcies and insolvency and bad credit policies (personal contacts remained crucial for lending) led to the systemic banking crisis in 1998-1999 (Šonje & Vujčić, 1999). The confidence in the banking system was shaken, and a decrease in total assets and stagnation of savings were recorded (Jovančević, 2000).

After the crisis in 1998, the banking sector underwent a deep transformational process. Fourteen bankruptcies were registered and rehabilitated banks (state-owned) were privatized with the participation of foreign strategic investors (Bonin, 2004). Foreign investors gained dominant market share with 84.1% in 2000, 89.3% in 2001 and 90.2% in 2002 (European Bank for Reconstruction and Development, 2013). After 2002, the competition has been increasing, strengthening the position of small and medium-sized banks as well as foreign bank entries.

## **2.1.2 Bosnian banking system**

### **2.1.2.1 Dayton peace accord and two entities**

The independence of Bosnia and Herzegovina was followed by a devastating civil war of 1992-1995. After the Dayton Agreement was signed, the war ended but resulted in a constitutional division of Bosnia and Herzegovina into two entities. In terms of economic policies and regulation, the role of central government is limited to macroeconomic policies, whereas the Federation of Bosnia and Herzegovina and Republika Srpska represent the fundamental authorities and regulators. Accompanied with political antagonism, unfavourable division delayed the implementation of economic and banking sector reforms during the 1990s (Tesche, 2000).

In line with the division mentioned, two largely independent and rather small financial markets emerged. The majority of multinational banks are present with two subsidiaries up to this time. The Banking Agency of the Federation of Bosnia and Herzegovina, established in 1996, and the Banking Agency of the Republic of Srpska represent supervisory and regulatory authorities in Bosnia and Herzegovina, i.e. the Central Bank of Bosnia and Herzegovina is not accountable to regulate commercial banks (Banking Agency of the Federation of Bosnia and Herzegovina, 2013). Interestingly, until the establishment of the Banking Agency of the Republic of Srpska in mid-1998, the National Bank of Serbia was responsible for banking regulation (Tesche, 2000; Pehar, 2008).

### **2.1.2.2 Accelerated reforms and foreign bank entry**

A more stable political environment, entry of foreign banks and support of international institutions had encouraged reforms in all parts of the financial system in the early 2000s. Besides, Law on Bank from 1998 has undergone significant changes. As a result of the banking system reform, foreign banks entered the market, and intensified the consolidation process, which resulted in a decrease of banks from 61 in 1999 to 32 in 2006 (Pehar, 2008).

In conjunction with foreign entry, also rapid expansion of financial intermediation was initiated at the beginning of the decade. There was an increase in lending activity as well as an increase in deposit collection, which was for the most part the outcome of introduction of the euro (Cottarelli, Ariccia, & Vladkova-Hollar, 2005). According to Pehar (2008) and Četković (2011), Bosnia and Herzegovina experienced a credit boom in the precrisis period. In particular, domestic credit provided by the banking sector increased from 23.4% of GDP in 2001 to 67.2% of GDP in 2008 (The World Bank, 2013c). This occurred despite the tightening of reserve requirements and rules for foreign currency exposure, aimed at putting a lid on credit growth (Muller-Jentsch, 2007).



## **2.1.3 Macedonian banking system**

### **2.1.3.1 A series of external shocks**

After Macedonia gained its monetary independence in April 1992, it experienced a difficult transition on account of a series of external and internal shocks during the 1990s and early 2000s: the war on the former Yugoslav territories in 1992-1995, United Nations economic and political sanctions in 1993-1994, the Greek trade embargo in 1994-1995, the Kosovo crisis, and the ethnic conflict with Albanian minority in 2001 (Nenovski & Smilkovski, 2012; Domadenik et al. 2012). High political risks and unfavourable environment hindered the inflow of foreign capital, delayed the robust output growth until 2004-2005 and also the restructuring of the banking system (Petkovski & Bishev, 2004).

### **2.1.3.2 Financial sector reforms and passive privatization**

The stabilization process, which was supported and to a great extent led by the International Monetary Fund, was initiated in 1994. The central bank undertook the role of banking supervisor, gained complete control over money and credit, and implemented exchange rate targeting as its monetary target; exchange rate of denar has been fixed against deutsche mark, later against euro. Deriving from the role of banks (at least the perceived role) to subsidize enterprises and influential interest groups that sought soft loans, the financial sector reform started only in 1995. It is worth mentioning, that before 1995 numerous small banks entered the banking sector since standards for entering (licensing) were low. The main goal of newly-established banks remained similar to the goal of the old banks, namely, to attract funds to finance business of the owners. To be exact, non-financial enterprises established a bank to attract funds and become at the same time its owners and main debtors. The rehabilitation was extremely costly, reaching 42.3% of GDP with 12.2% referring to the costs of non-performing loans (Petkovski & Bishev, 2004).

The passive privatization of the banking sector, as a side effect of the enterprise privatization, was even more pronounced in Macedonia than in Croatia. The share of state-owned banks in total assets equalled to zero in 1996 (European Bank for Reconstruction and Development, 2013). Unlike in the other studied countries, several banks were sold to managers, employees, and domestic investors. Insider privatization in particular is characteristic, which in comparison to privatization with participation of foreign strategic investors resulted in less comprehensive restructuring, less pronounced improvements in corporate governance and lower levels of efficiency (Petkovski & Bishev, 2004). The first foreign bank with a good reputation entered in 2000, the year of the economic revival in Macedonia. In the same year, the largest bank was sold to foreign investors after the government restructured it again. Foreign investments in financial intermediation had been on the rise with an evident increase in 2008, when the share of domestically owned-banks decreased to 5% (National Bank of the Republic Macedonia, 2013a; European Bank for Reconstruction and Development, 2013).

### **2.1.3.3 Underdeveloped financial system**

Macedonia has an underdeveloped and shallow financial system dominated by commercial banks. The integration of banks in the global financial markets is relatively limited, owing to restrictive clauses of the EU Stabilization and Association Agreement from 2001. Also the spillover of the global financial crisis was limited in Macedonia, and the financial system remained stable, well-capitalized and with a small amount of non-performing loans (Nenovski & Smilkovski, 2012). The latter represented only 6.7% of gross loans in 2008, 8.9% in 2009 and 9.7% in 2012. Compared to other studied countries, non-performing loans correspond to lower share of total gross loans of Macedonian banking system (The World Bank, 2013b).

### **2.1.4 Serbian banking system**

#### **2.1.4.1 A lost decade and late transition**

After dissemination of SFR Yugoslavia, FR Yugoslavia (at that time) was noted for extreme economic and political instabilities. It experienced reversals in macroeconomics stability, one of the highest hyperinflations, the postponement of political reforms and postponement of the establishment of market institutions. Inward-orientation and international isolation further characterized the 1990s, the decade which is referred to as a lost decade (Uvalić, 2007).

The collapse of the Milosevic regime in October 2000, which has brought major political changes, the transition of the banking sector and a rapid catching-up process has begun (Barisitz & Gardó, 2008). High level of indebtedness linked to debts to foreign debtors, to households on the account of frozen foreign currency deposits, and the weak position of the Central Bank (politically) were the main reasons for an unenviable position of its banking sector. By enacting independence of the National Bank of Serbia, sound prudential control and stricter capital requirements were introduced. This resulted in a consolidation of the banking system, to be exact in 18 forced mergers, 23 losses of licenses, and the number of banks decreased from 106 in 1997 to 54 in 2001 (Filipović & Hadžić, 2012).

#### **2.1.4.2 Foreign bank entry and unsustainable pace of catch-up process**

Taking into consideration the rehabilitation of the banking system, the Serbian government used a distinct approach. Instead of recapitalizing the main banks, which was estimated to require 92% of GDP, National Bank of Serbia decided to open the market to foreign banks in 2001 and withdraw the licenses of four largest banks in early 2002. Raiffeisenbank, Hypo bank, National bank of Greece, Alpha bank and Micro Credit Bank (Pro Credit Bank) acquired the license to start greenfield investment, and initiated the integration of Serbian banking system to the European system (Filipović & Hadžić, 2012). As indicated, linkages (and thus exposure) to Greek banks has been characteristic already for the early-transition period, through National bank of Greece and Alpha bank.

Under the law of 2002 that regulated the debt toward foreign creditors, the government rehabilitated the rest of the troubled banking sector; eight banks were nationalized and thirteen banks were in part state-owned. Privatization process progressed in 2005, after four state-owned banks were sold to foreigners (Filipović & Hadžić, 2012). State-ownership decreased from 90.9% in 2000, 34.1% in 2003 to 14.9% in 2006 (European Bank for Reconstruction and Development, 2013).

Simultaneously with the entry of foreign banks, financial deepening has progressed and Serbia experienced a period of rapid growth of credit to private sector. According to Četković (2011) foreign banks are largely responsible for a credit boom, experienced by Serbia, Croatia and Bosnia and Herzegovina in a precrisis period. Stability concerns arose especially due to the pace of convergence to the intermediation levels of CEE peers and the high degree of euroization (Barisitz & Gardó, 2008).

## **2.1.5 Slovenian banking system**

### **2.1.5.1 Absence of banking crisis during the 1990s**

Similarly to other former Yugoslav republics, Slovenia had to contend with frozen foreign currency deposits after its independence and the government assumed responsibility. In 1993, bank rehabilitation began with its two largest banks placed in formal rehabilitation status and the third smaller one followed at the beginning of 1994 (Bonin, 2004). The government assumed responsibility for the frozen accounts of all Slovenian depositors. In addition, this rehabilitation program also dealt with bank solvency problems caused by the loss of about 40% of enterprises' markets in the former Yugoslavia (Štiblar, 1997).

In 1994, two new banks were based on a remainder of the two largest republic-level banks from the previous regime. Nova Ljubljanska Banka and Nova Kreditna Banka Maribor retained their dominant position in the Slovenian banking system and remained in majority state-owned up to now. The nationalization of all large Slovenian banks and a strengthened banking system was the outcome of the rehabilitation process, completed in 1997. One of the main differences to other studied countries is the absence of a crisis in the banking sector during the 1990s (Bonin, 2004; Štiblar & Voljč, 2004).

### **2.1.5.2 Opening of financial sector to international competition with a lag**

Slovenia started reform and the establishment of institutions early on, but compared to other countries studied (for example Croatia), it remained closed to the international competition longer. Foreign banks were not allowed to open branches and no new foreign-owned banks have been licensed in the period of 1994-1999 (European Bank for Reconstruction and Development, 1999). In 1998, privatization entered a more difficult phase, shifting to the financial sector and larger state-owned companies and the private sector involvement in infrastructure. Competition was inadequate resulting in the top three banks (two of which are

in majority state-owned) accounting for half of the bank assets. A tendency toward consolidation in the sector has been evidenced, and by liquidation and three mergers in late 1998, the banking system consisted of 24 banks (European Bank for Reconstruction and Development, 2013).

In 2001, Nova Ljubljanska Banka and Nova Kreditna Banka Maribor were included into the program of privatization, adopted by the government of Slovenia. The government attempts to privatize the two largest state-owned banks failed. 48% share of Nova Ljubljanska Banka and 65% share of Nova Kreditna Banka Maribor, allocated for sale remained state owned. However, in 2002, Belgian KBC bought 34% share in Nova Ljubljanska Banka (Štiblar & Voljč, 2004).

## **2.2 Banking systems today: comparative analysis**

Several attempts have been made to systematically evaluate the financial system. Merton and Bodie (1995) recommend benchmarking and measuring the financial system against four basic determinants: financial depth, defined as the size of financial institutions and markets; access, defined as a degree to which individuals can and do use financial institutions and markets; efficiency and stability. The approach of Beck, Demirguc-Kunt and Levine (2009) is similar but its authors replace access with activity, which to some extent overlaps with financial depth as defined by Merton and Bodie (1995).

A banking system could also be evaluated from a micro-level perspective. In his discussion on holistic approach to evaluating overall condition of a bank, Podlesnik (2000) defines profitability, liquidity, quality of bank assets, capital adequacy, and cost efficiency as the main determinants of banks performance. This is also in compliance with the one of the point-in-time rating system methods widely used in the US to measure risk Borio et al. (2001). As this characteristic has important implications for functioning of one bank, it is believed that it also has important implications in explaining the financial system as a whole.

In this section, we present the basic characteristics of banking systems in the studied countries. The aim of the analysis is to get the overview of the most important characteristics of banking systems as a whole that might play an important role when explaining bank lending. Banking systems are determined roughly in the boom, bust and recovery period.

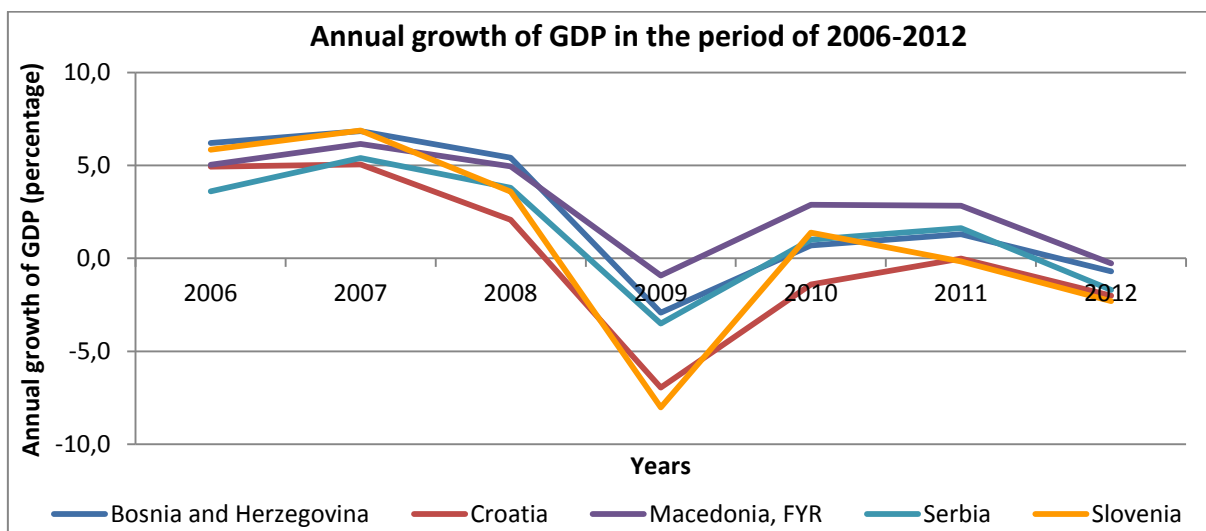
### **2.2.1 Background**

#### **2.2.1.1 Gross domestic product**

To present the relevance of the thesis, the transmission channels between financial and real sector are used. Consequently, interactions between the mentioned sectors are crucial for establishing better insight into the empirical research and its results. We begin with characterizing the economies on the macroeconomic level by presenting annual growth rates

of gross domestic product. In Figure 1, annual percentage growth rates of GDP at market prices based on constant local currency with base year 2005 can be found. The data are presented for the period from 2006 to 2012 for Bosnia and Herzegovina, Croatia, Macedonia, Serbia, and Slovenia.

Figure 1. Annual growth of GDP in the period of 2006 and 2012



Source: The World Bank, *GDP growth (annual %)*, 2013d.

Figure 1 indicates that the growth rates of GDP in the studied countries have rather similar dynamics with few deviations. In the period of 2006-2008, they all recorded relatively high growth rates of GDP with reaching the peak in 2007. The growth rates were ranging from 5.06% in Croatia to 6.87% in Slovenia. Despite the deceleration of growth in 2008, the numbers were still relatively high and positive. The crisis hit the majority of countries in the last quarter of 2008, but the consequences on the economy became visible in 2009. All the countries experienced a decrease in GDP. Macedonia stood out on the upper margin as its GDP contracted for 0.92%, whereas Slovenia and Croatia experienced the highest fall, by 8.01% and 6.95%, respectively.

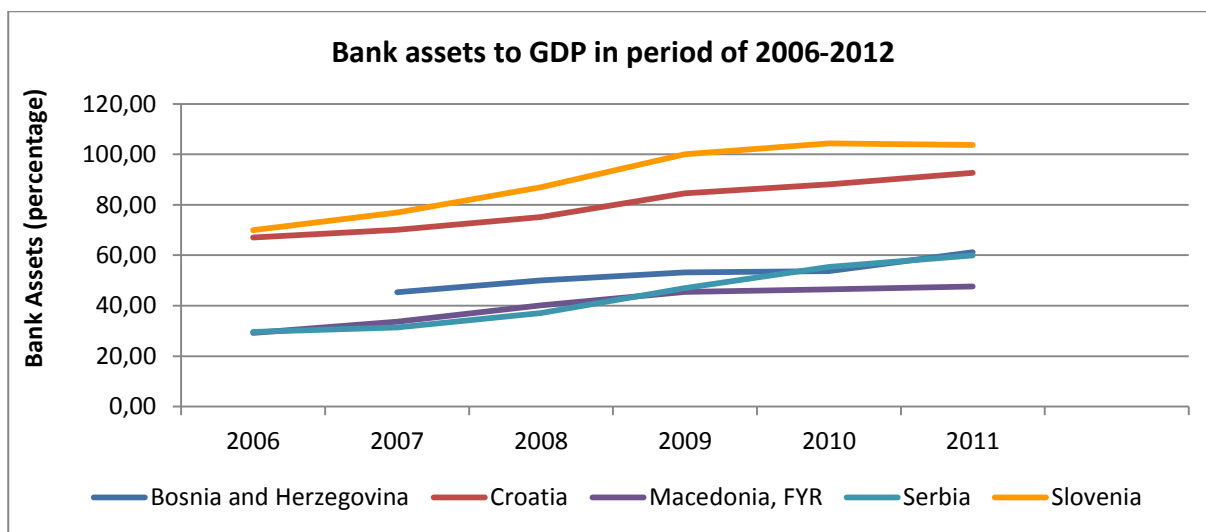
After the year 2009 the distinctions in dynamics of growth rates of GDP has grown to become more significant. While year 2010 was for the majority of countries a year of recovery, Croatia experienced a decrease in GDP again. This trend has continued to 2012, when the decrease in GDP was second highest. Growth rates of GDP were back to positive in 2010 for all other countries studied. The highest growth rate was recorded in Macedonia, as well as was the deterioration the lowest in 2012. 2012 was again noted for the decreases in GDP in all studied countries. Slovenia stood out on the lower margin in 2012, with a contraction of 2.3%.

## 2.2.2 Determinants of Banking Systems

### 2.2.2.1 Size

Measuring financial depth, there are remarkable differences among countries studied. In Figure 2, we illustrate deposit money bank assets to GDP in percent. Slovenia and Croatia have the most developed financial systems, whereas Serbia, Macedonia and Bosnia and Herzegovina are lagging behind, but in the period studied, their growth was stable (The World Bank, 2013c). Slovenian banking system registered reduction in total balance sum of the banking system in absolute terms after reaching its peak. This trend had started already at the beginning of 2009 (Banka Slovenije, 2012).

Figure 2. Bank assets to GDP in period of 2006-2012



Source: The World Bank, *Financial Development and Structure Dataset (updated April 2013)*, 2013c.

It is also worth mentioning that underdevelopment of a banking system was often designated as an advantage after the crisis. Macedonian banking system is the least developed and was the least affected by the global financial crisis when bank lending is considered. In contrast, Slovenian banking system as the most developed and the most integrated to global financial markets was affected the most. The underdevelopment, in a precrisis period seen as a weakness, thus proved to be strength (Nenovski & Smilkovski, 2012).

Another measure of financial activity are financial system deposits to GDP, or narrower, deposit money institutions (banks) deposit to GDP. It measures the amount of deposits available for lending activity and is found to be positively correlated to the income level of countries (Beck et al., 2009).

As the period 2006-2012 was noted for rapid economic development in studied countries, one can expect deposit to GDP ratio to increase. Indeed, there was a positive trend in the ratio of deposit to GDP in all countries considered. Croatia reached the highest values, with deposits

corresponding to 66.96% of total output. It was followed by Slovenia, Macedonia, Bosnia and Herzegovina and Serbia, with 57.56%, 48.68%, 44.49% and 41.90%, respectively (The World Bank, 2013c). In the absolute terms, deposits demonstrate similar dynamics. In Figure 1 in the appendixes, values on deposits to GDP are presented in the period 2006-2012.

In 2009, Croatia and Slovenia, with 68.2% and 91.2%, have the highest ratios of private credit to GDP ratio. Bosnia and Herzegovina, Macedonia and Serbia are lagging behind with private credit to GDP ratio of 55.4%, 42.5% and 43.0% respectively. Due to high returns available, also increases in loans to the household sector are noticeable in the years prior the crisis. In 2009, credit to household sector account for approximately half of the lending to private sector in Croatia and in Bosnia and Herzegovina (The World Bank, 2013b).

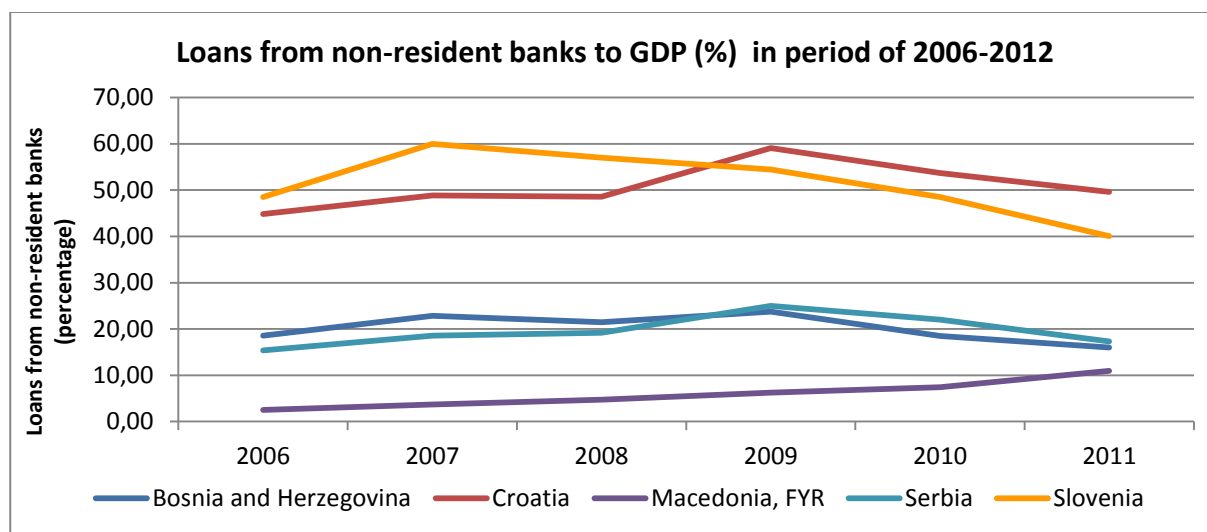
### **2.2.2.2 Financial integration**

In compliance with Beck et al. (2009) financial integration can be measured by loans from non-resident banks (amount outstanding) to GDP (%). Figure 3 illustrates the developments in the period of 2006-2012.

Taking into consideration the inefficient level of deposits to finance the credit, countries increased their dependence upon external financing in the pre-crisis period. Loans from non-resident banks to GDP vis-a-vis all sectors are again the highest in Croatia with 59.1% and Slovenia with 54.5%. As an indicator of financial integration, it also illustrates that financial markets of Macedonia, Bosnia and Herzegovina, and Serbia are interlinked with international financial markets to a limited degree. In particular, Serbia and Macedonia, used to depend on domestic sources of finance before the crisis (The World Bank, 2013c). The structure of financial sources of Serbian banks was comprised by approximately 75% of domestic sources and other were foreign sources (National Bank of Serbia, 2009).

Furthermore, loans from non-resident banks to GDP decreased in the period from 2009 to 2011 the most for Slovenia and Croatia. However, the following indicator also includes the financing that was for example directly provided by parent banks to non-financial sectors in host country. Increase in marginal reserves imposed in 2006 by Croatian national bank resulted in the mentioned behaviour of subsidiaries. To circumvent the new regulations they acted as an intermediary between their parents and potential borrowers (Bokan, Grguric, Krznar, & Lang, 2009). In addition, the last quarter of 2008 was marked for a substantial deposit withdrawal from the Croatian banks. In particular, subsidiaries of parent banks, that were believed to be the most vulnerable, increased the reliability on their parent banks' funds. Despite an increase in interest rates, borrowing from abroad continued after a decrease in deposits; this has been characteristic for both financial and non-financial sector (Bokan et al., 2009).

Figure 3. Loans from non-resident banks to GDP (%) in period of 2006-2012



Source: The World Bank, *Financial Development and Structure Dataset (updated April 2013)*, 2013c.

### 2.2.2.1 Ownership structure

At the beginning of the transition period, the banks of the former Yugoslav republics were not state owned but rather socially-owned. Although their ownership was transmitted to real sector enterprises passively at first, the process of privatization accelerated in 1999-2001. The time varied in line with the degree of development, economic as well as financial, and for other countries in line with political and macroeconomic stabilisation. As a result of privatization process, mainly carried out with the participation of foreign strategic investors, foreign owned-banks dominate the market in studied countries with exception of Slovenia.

With regard to that, foreign ownership is believed to be in a close relation with rapid credit extension in a precrisis period, the move from domestic-ownership to foreign-ownership is of an interest (under 70%). Croatian banking system has been allocated to foreign ownership as the first in 2000, followed by Bosnia and Herzegovina in 2002, Montenegro in 2005, and Serbia in 2006. Macedonian banks have become majority foreign-owned in 2007. The share of foreign ownership remains relatively stable. In 2011, the share of foreign assets in total banking system assets was 92.0%, 90.6%, 92.4%, 74.5% and 29.3% in Bosnia and Herzegovina, Croatia, FYR Macedonia, Serbia and Slovenia, respectively (Raiffeisen Bank International AG, 2012). Simultaneously with an increase in foreign ownership the state ownership declined, and reached less than 5% (2010) in Bosnia and Herzegovina, Croatia, and Macedonia. 16.0% and 16.7% of total banking assets in Serbia and Slovenia, respectively, are still state-owned. As the figure for Slovenia represents direct state-ownership, it is clearly underestimated (European Bank for Reconstruction and Development, 2013).

Banks in studied countries are for the most part owned by EU-based parent banks, and thus exposed to economic situation of their home countries. This was also seen as one of



transmission channels of the crisis; from parent to subsidiary. The banking systems of Western Balkans region are dominated by Austrian, Italian, Greek, French and Russian bank-holding groups (Bankscope database, 2013). In addition, there is a high degree of interdependency among countries studied, e.g. Slovenian NLB has its subsidiaries and branches throughout the whole region.

#### **2.2.2.2 Capital inflows to banking sector**

Considering the countries studied with exception of Slovenia, foreign capital inflows are seen as one of the main drivers behind economic expansion in a pre-crisis period (Ćetković, 2011). According to Botrić (2010), foreign capital inflows and especially their characteristics, e.g. volume and quality, are critical to the economies of South East Europe. Although there is a need for greenfield investments and orientation towards export-oriented activities, most of investments relate to the privatization process. In a similar way, transition economies of Central Europe experienced high inflows of capital into the service sector.

Investments in financial intermediation, except insurance and pension funding, accounted for the most part of direct foreign investments. In Croatia, the share belonging to financial intermediation is as high as 32.4% in the period from 1993 to 2013 (Croatian National Bank, 2013).

The financial intermediation sector is of a similar attractiveness to foreigners in Bosnia and Herzegovina and Serbia, accounting for 33.12% and 30.53% in the period from 2004 to 2009, respectively. The largest share of foreign direct investment in Bosnia and Herzegovina came from Serbia (23.8%), followed by Austria (12.5%), Croatia (12.1%), Slovenia (8.7%), Russia (8.1%) and Lithuania (7.6%) (Botrić, 2010). As three countries from the region, are the main investors in Bosnia, we can conclude that countries are highly exposed to risks from one another (Botrić, 2010; Muller-Jentsch, 2007). Serbia experienced high inflows of capital in the years from 2001 to 2007, owing to the privatisation process. In 2007, when privatization process slowed down, there was a noticeable deceleration in foreign direct investment inflows (Barisitz & Gardó, 2008).

In Macedonia, investments in financial intermediation have been revived only recently; before 2008 they accounted for 9.74% of total foreign direct investments, after 2008 the numbers are stable at around 25%. This also coincides with an increase in foreign ownership. In general the main investors are from the Netherlands, Austria, Slovenia, Greece and Hungary, whereas Greek, Austrian, Bulgarian and Turkish banks dominate the banking sector (National Bank of the Republic Macedonia, 2013a; National Bank of the Republic Macedonia, 2013b).

As the second largest bank in Macedonia and around 15% of total banking assets in Serbia are owned by Greek banks, these two countries were the most exposed to potential contagion. However, Greek National Bank as a parent of Stopanska bank capitalized its subsidiary before the crisis evolved (Nenovski & Smilkovski, 2012).

### 3 EMPIRICAL RESEARCH

In the following section the empirical research is presented. The aim of the empirical research is to determine the factors that have a significant influence on bank lending behaviour. This is studied in different regimes, namely, in boom (2007-2008), bust (2009-2010) and recovery regime (2011-2012). The research is conducted on financial accounts data (balance sheets and income statements) of 112 banks, operating in the former Yugoslav countries; Bosnia and Herzegovina, Croatia, Macedonia, Serbia and Slovenia. Kosovo and Montenegro are excluded from the comparative analysis due to limitations in data availability. The unbalanced panel comprises data on banks within the period of 2006-2012.

The first part is devoted to the description of methodology that was used for the purpose of empirical research. To be concrete, model, data collection process and sample's data are described. In the second part, we present empirical results.

#### 3.1 Model

The model is derived from empirical (to some extent theoretical) considerations presented under the literature review section. It is designed to identify determinants that might influence bank's capacity to lend and alternatively banks' reluctance to lend. In the first place, it is specified to capture the variations in growth of bank loans as a result of variations in the funding structure of banks.

In order to present the underlying logic, we base our model on the principle of flow-of-funds constraints. According to Gertler and Kiyotaki (2010), the value of loans funded within a given period equals to the sum of bank net worth, borrowings on interbank market and deposits. Bank capital represents the bank's net worth (Jayaratne & Morgan, 2000). The following basic equation is used:

$$L_i = D_i + C_i + I_i \quad (2)$$

where

- $L_i$ : denotes loans for a bank  $i$
- $D_i$ : denotes deposit for a bank  $i$
- $C_i$ : denotes capital for a bank  $i$
- $I_i$  denotes borrowings on interbank market for a bank  $i$

As indicated, bank lending is limited to bank net worth i.e. capital or alternatively equity, retail deposits and interbank intermediation. We start with a simple case, in which a bank is limited to finance its lending with retail (partly insured) deposits. Empirical literature on bank lending channel regards insured deposits as internal funds because of the government insurance on (as the term indicates) these deposits. The external finance premium, the

difference between internally and externally raised funds, is thus (theoretically) equal to zero. Consequently, retail deposits represent the least costly source of funding.

If bank lending is constrained by the availability of insured deposits, a link between the supply of bank loans and the supply of insured deposits is formed. Under the assumption of perfect capital markets, i.e. without informational asymmetries or incentive distortions, the reduction in insured deposits should not cause the loans to decrease. Banks are assumed to be able to compensate for the reduction in insured deposit by raising uninsured liabilities, as an alternative source of funds (Huang & Ratnovski, 2010; Jayaratne & Morgan, 2000). In contrast, under the assumption that capital market frictions exist, a reduction in insured deposits causes a reduction in bank loans. Through capital market imperfections the accessibility to external funds is limited or at least costs more.

Assuming that banks want to maintain loan growth after a reduction in the amount of insured deposits available, banks should make adjustments in the structure of their liabilities. The uninsured deposits are to be substituted for other uninsured liabilities, usually raised on an interbank market. The term, as in the case of insured deposits, indicates that these liabilities are uninsured, thereby dependent on the riskiness of a borrower (the bank). Observable factors that influence the risk perception of a bank are thus believed to have an impact on the relation studied.

Consistent with Feldman and Schmidt (2001), it is indeed the case that banks increasingly supplement retail deposits for wholesale funds, usually short-term and on a rollover basis. It is believed that wholesale funding is especially beneficial, as banks are not constrained by the availability of retail deposits to finance their investment opportunities. The rationale behind the interbank intermediation and other long-term funding is, hence, to supplement deposits and reduce constraints. As deposits decrease, these funds are supposed to offset the reduction. However, banks are on the one hand limited by regulatory requirements and on the other by the availability of external funds conditional on level of capital.

As size and ownership might have important implications on the ability to raise funds on interbank assets, they were further included as control variables. Ownership is captured by a dummy variable, which is in addition expected to isolate effects of a parent bank and home country characteristics (for subsidiaries). The power of this variable to isolate the effects mentioned might be limited, as the majority of the banks in Western Balkans region are foreign banks with the same parent banks and from the same home countries.

Here also bank capitalization followed by loan loss provisions enters the equation. Based on the literature of asymmetric information, a key determinant of external finance premium is borrower's net worth or a bank's capital (Bernanke & Gertler, 1995). Lessening the information asymmetries, a higher level of capital has a favourable influence on the external finance premium. An increase in the level of capital eases an access to external finance (at a

lower cost) and is thus expected to counterbalance (to some extent) the reductions in insured deposits. To rephrase, positive correlation is expected.

Level of capital is seen as a measure of risk also independently to the background presented, as it protects against losses and prevents insolvency or even worse bank failure. The higher is the capital, held in excess to the regulatory requirements, the higher the capacity to absorb losses and the lower the risk. An alternative view also derives from the role of bank capital. It is connected to risk-aversion and assumes negative correlation. To be precise, a risk-averse bank maintains a higher level of capital in order to insure against failure. It is in particular reluctant to extend loans in a bust period when the assessment of a borrower's risk becomes more difficult.

In a similar way, loan loss provisions are expected to influence loan growth. Although Borio et al, (2001) argue that bank provisioning should be forward-looking and thereby counter-cyclical, this balance sheet item has a clearly pro-cyclical behaviour. German banks were the only exception as they were found to be able to smooth profits through hidden reserves in provisions. In a boom period banks are inclined to decrease the level of loan loss provisions whereas in a bust period banks increase the level of loan loss provisions (Borio et al., 2001). It is thus believed that they represent an acceptable indicator of how a bank perceives risk (outside the bank). In contrast to capital that can mitigate or in turn exacerbate the liquidity constraints, loan loss provisions do not influence capacity to lend but rather bank's motivation to lend.

This interpretation is also supported by the literature on credit crunch with a minor distinction; loan loss provisions are replaced by non-performing loans as an indicator of risk and quality of assets. Banks with higher or increasing levels of non-performing loans in their portfolio may become reluctant to take up (potential) new risks caused by committing new loans. This interpretation is especially relevant in the times of financial distress, when simultaneously with a decrease in banks' informational capital, it becomes harder to assess borrower' risk (Hou & Dickinson, 2007).

The empirical literature further documents the relevance of country specific variables, e.g. macroeconomic variables, demand-side factors and other bank characteristic, when the loan growth is studied. We also believe that the bank sector characteristics and institutional setting discussed in the previous section is important (but hard to be captured by the econometric models). As a result, we introduced country dummies into the model to allow for comparison across the countries. Namely, changes in structural characteristics might play a significant role in easing liquidity constraints of banks and also of the whole banking system. This is above all characteristic for the periods of financial distress and thus particularly interesting for a comparative analysis.

Furthermore, country dummies are included to absorb the effects of country specific variables that are related to bank lending. The fore mentioned country specific variables, real output

growth, exchange rates and interest rates, are used to isolate the demand-effects (De Haas, et al., 2012). As it is rather unlikely, that the variations on demand-side are alike in the studied countries, the issue of an omitted variable is mitigated.

Country dummies are expected to capture other country “specificities.” Bole, Prašnikar and Trobec (2012) define country specificities in the context of debt accumulation process of non-financial sector as country differences in financial intermediation system, firm leverage and their sources of finance, the size of firms, distribution of investment, etc. Again the implications for financial system might be derived; specificities in our case are the characteristics of a financial-system including bank regulations and supervision, firm’s dependence on bank loans and other demand-side factors, macroeconomic variables, differences in the distribution of the main variables etc.

It is important to emphasize that Macedonia serves as a reference for other countries. We specified the model in such a way because the consequences of the global financial crisis are believed to be the least severe for the Macedonian banking system. It is seen as underdeveloped, but the structural characteristics are rather favourable. It is noted for high capitalization, low level of non-performing loans and favourable structure of funding with prevailing domestic retail deposits (The World Bank, 2013c).

The estimating equation takes the following form:

$$L_i = b_0 + b_1 I_i + b_2 D_i + b_3 L_{t_i} + b_4 E_i + b_5 P_i + b_6 Size_i + b_7 Foreign_i + b_8 BA_i + b_9 HR_i + b_{10} RS_i + b_{11} SI_i \quad (3)$$

where

- $L_i$  denotes net loans for a bank i
- $I_i$  denotes interbank intermediation (net position) for a bank i
- $D_i$  denotes retail deposits for a bank i
- $L_{t_i}$  denotes long-term funding for a bank i
- $C_i$  denotes equity for a bank i
- $P_i$  denotes loan loss provisions for a bank i
- $Size_i$  denotes the proxy for the size for a bank i in a country j
- $Foreign_i$  denotes a dummy variable for foreign ownership and takes value of 1 for foreign ownership of a bank and 0 otherwise
- $BA$  denotes a dummy variable for Bosnia and Herzegovina and takes value of 1 for a bank i from Bosnia and Herzegovina, and 0 otherwise
- $HR$  denotes a dummy variable for Croatia and takes value of 1 for a bank i from Croatia, and 0 otherwise

*RS* denotes a dummy variable for Serbia and takes value of 1 for a bank *i* from Serbia, and 0 otherwise

*SI* denotes a dummy variable for Slovenia and takes value of 1 for a bank *i* from Slovenia, and 0 otherwise

All data used as the basis for own calculations are obtained from Bankscope database provided by Bureau van Dijk. The database was improved to some extent by gathering the data from banks annual reports, web site, etc. The notations, under which the data are found in Bankscope database, are bolded.

The dependent variable in the model is based on data from **net loans**, calculated as gross loans less reserves for impaired loans. It is given in units of total earning assets. Due to the data limitations the definition is broader; it includes residential mortgage loans, other mortgage loans, other consumer/retail loans, corporate and commercial loans, other loans.

When considering interbank lending and borrowing, the net position of a bank is used to reflect the funding. Namely, the variable is calculated as a difference between **loans and advances to banks** and **deposits from banks**. Loans and advances to banks encompasses interest-earning balances with central banks and loans and advances to banks net of impairment value including loans pledged to banks as collateral, whereas deposits from banks narrowly covers deposits, loans and repos from banks. In addition, it is divided by total liabilities less equity.

As a reflection of bank capitalization, we use **equity** in units of total assets. It is comprised of common equity, i.e. common shares and premium, retained earnings, reserves for general banking risks and statutory reserves, non-controlling interest, i.e. loss absorbing minority interests, securities revaluation reserve, i.e. net revaluation of available for sale securities, foreign exchange revaluation reserve, fixed asset revaluations and other accumulated other comprehensive income, i.e. revaluations other than securities deemed to be equity.

**Long-term funding** is given in the units of total liabilities less equity as well. According to Bankscope database (2013), it includes senior debt maturing after 1 year, i.e. loans from banks, debt securities in issue, the liability component of convertible bonds, and other borrowed funds, subordinated borrowing, i.e. subordinated loans and debt including any dated hybrid instruments and other funding, i.e. capital markets funding not otherwise categorized.

In a similar way, deposits are in the units of total liabilities less equity. When using the term deposits (here and hereafter), we refer to retail deposits, which are in part insured and contrasting to bank deposits and other deposits. The data retrieved from Bankscope database are for **total customer deposits** and include current customer deposits, savings customer deposits and term customer deposits.

A ratio between total assets of a bank and sum of total assets is used as a proxy for size. To be exact, it is calculated by dividing **total assets** for bank  $i$  from country  $j$  by sum of total assets in country  $j$  in year  $t$ . The country dummies take the value one when a bank is from the country of a dummy and zero otherwise.

We included additional determinants that have been found to have an influence on bank lending. To be concrete, these are foreign ownership of a bank, participation in Vienna Initiative 1.0 and loan loss provisions or non-performing loans as a reflection of risk perception within a bank. Due to the low explanatory power or limited data availability, we excluded them from the empirical model.

Limited data availability as well as low explanatory power was the reason to exclude **loan loss provisions** normalized by total earning assets. Low explanatory power might be due to the data chosen to reflect quality of assets. Non-performing loans or coverage ratio, calculated as non-performing loans divided by loan loss provisions, might give information that is more accurate. As the availability of data is limited and would cause, besides Montenegro exclusion of a number of banks from Serbia and Bosnia and Herzegovina, loan loss provisions were used to measure quality of assets and risk perception. Based on the five-tier classification of non-performing loans, we assumed a high positive correlation between non-performing loans and loan loss provisions and tested the correlation on the sample of banks. A strong positive and significant correlation (0.95) between the variables is found.

In Table 2, the list of variables is given and the way the variables are calculated is presented. We use the terminology used in the Bankscope database.

Table 2. The list of variables and their composition

Variable		Calculation of the variable
$L_i$	net loans for a bank $i$	gross loans less reserves for impaired loans in the units of total earning assets
$I_i$	interbank intermediation (net position) for a bank $i$	difference between loans and advances to banks and deposits from banks the units of total liabilities less equity
$D_i$	retail deposits for a bank $i$	total customer deposits in the units of total liabilities less equity
$Lt_i$	long-term funding for a bank $i$	long-term funding in the units of total liabilities less equity
$C_i$	equity for a bank $i$	equity in the units of total assets

*(table continues)*

(continued)

$P_i$	loan loss provisions for a bank $i$	loan loss provisions in the units of total earning assets
$Size_i$	the proxy for the size for a bank $i$ in a country $j$	total assets of a bank divided by total assets of a banking system
$Foreign_i$	a dummy variable for foreign ownership	value of 1 for foreign ownership of a bank and 0 otherwise
$BA$	a dummy variable for Bosnia and Herzegovina	value of 1 for a bank $i$ from Bosnia and Herzegovina, and 0 otherwise
$HR$	a dummy variable for Croatia	value of 1 for a bank $i$ from Croatia, and 0 otherwise
$RS$	a dummy variable for Serbia	value of 1 for a bank $i$ from Serbia, and 0 otherwise
$SI$	a dummy variable for Slovenia	value of 1 for a bank $i$ from Slovenia, and 0 otherwise

### 3.2 Methodology

As mentioned, micro-level data from banks' balance sheets and income statements are used to estimate the specified model. Compared to aggregated data, this is an improvement as the bias associated with the ignorance to heterogeneity of banks and measurement errors is reduced (Domadenik, Prašnikar, & Svejnar, 2008).

Furthermore, expressing the variables in the form of units of balance sheet, units of total liabilities less equity, and units of total earning assets enabled us to mitigate the problem of heteroscedasticity. It usually arises, when we have an increasing variance of the potential distribution of a disturbance term for the variables included in the model. Homoscedasticity, one of the assumptions underlying the method used, is often disregarded in regression analysis as it does not give a rise to bias of the estimators. However, heteroscedasticity causes standard errors to be misleading and the true standard deviation to be underestimated (Dougherty, 2011).

One of the main problems is endogeneity, more precisely simultaneity. This is a special type of endogeneity problem, in which the explanatory variable is jointly determined with the dependent variable (Wooldridge, 2009). To rephrase, explanatory variables are not distributed independently of the disturbance term. As the fourth Gauss–Markov condition (weak one) is violated, ordinary least squares method would yield inconsistent results if used to fit the equation (Dougherty, 2011). The model is thus estimated with the instrumentalized two-stage least squares method. We use lagged values of net loans, lagged values of deposits, lagged



values of net interbank position, lagged values of equity, and lagged values of size and employment as instruments.

Another limitation that arises is connected to the dependent variable, namely we have a regression with a limited dependent variable. As the values of dependent variables are relatively distant from the limits, it is assumed that the linear model used does not yield errors of a significant size. It would be optimal to estimate the equation with instrumentalized logistic regression and this is also an attempt for the continuation of the research. With regard to the specification of the model, also seemingly unrelated regressions could be used.

There are also possible extensions (improvements) in terms of the comprehension of variables. First, there would be a possibility to study the impact of bank deposits on bank lending separately from loans and advances to banks. To be exact, the existent specification to some extent also indicates liquidity of a bank. Second, we only concentrate on the supply-side factors and we do not account for the demand-side factors directly. The differences in country specific characteristics, for example expectations or economic performance, are absorbed in the country dummies. This would yield to improvements in the accuracy of conclusions about supply-side and demand-side determinants of bank lending. Also conclusions associated to country specific structural characteristics of banking systems would be more precise. Third, interactions between real and financial sector could be introduced into the model by using the second- or third-order lag.

### **3.3 Data collection**

The primary source of bank-level data for the empirical research is Bankscope database, provided by Bureau van Dijk. Containing information on more than 28,000 public and private banks worldwide, it represents a comprehensive source of bank related data. Bankscope database is used to examine the association between various variables and bank lending behaviour by a number of researchers, among others by Kořak et al. (2011), De Haas et al. (2012) and Mendoza and Terrones (2008). In general, financial accounts are available for a period of maximum 16 years. The accessibility of detailed accounts through Research Centre of Faculty of Economic is limited to the period of 2006-2012 and consequently the analysis presented in the continuation is focused on the period of 2006-2012.

Data collection began with setting the search criteria region/country and status. Banks located in the former Yugoslav republics, in particular Bosnia and Herzegovina, Croatia, Macedonia, Serbia and Slovenia, are attractive for the analysis. Due to limited data availability for Kosovo and Montenegro, we left these countries out of the analysis. Furthermore, banks with the status defined as active or active that no longer has accounts on Bankscope database are included. Financial accounts of 167 banks that had had accounts for at least 2 consecutive years were obtained. The data were retrieved in a standardized format that allows for comparisons between individual banks and countries. To enable further comparability all data are presented in US dollars.

Since the search criteria are rather unrestrictive, the database needed additional inspection. The sample of banks was reduced for 12 banks with latest accounts date up to December 2007. In addition, 21 banks were eliminated based on the criterion called specialisation. To be concrete, six central banks and four specialized government credit institutions, including Slovenian SID Banka, two real estate and mortgage banks, four finance companies with their focus on credit cards, factoring and leasing and six investment banks were removed from the database. In addition, 22 banks were eliminated due to the limited data availability.

As the data on some banks were rather limited and some variables were missing in the initial database additional sources of information were used. To improve the data sources ranging from annual reports of banks, central banks reports to reports of auditors and press releases were utilized. The focus was for the most part to find the missing data for the variables that are crucial for the analysis.

The final database includes balance sheet and income statement information for 112 commercial banks, savings banks and micro-financing institutions. According to Bankscope database definition, commercial banks combine their operations in retail banking i.e. individuals and small and medium enterprises, in wholesale banking i.e. large enterprises and in private banking. Cooperative banks and savings banks that are more often than not a part of a group of savings banks are for the most part active in retail banking. Micro-financing institutions are defined as institutions providing micro finance to individuals and small companies. The database extracted contains an additional description on bank activities and in line with it micro-financing institutions, whose operations are seen as operations of a commercial bank, are included in the analysis.

Attributable to the limited availability of unconsolidated data, the database consists of 22 banks with consolidated statements C2, three banks with consolidated statements C1 and 87 banks with unconsolidated statements U1. C1 denotes the statement of a bank integrating the statements of its subsidiaries without unconsolidated companion in Bankscope database. C2 denotes the statement of a bank integrating the statements of its subsidiaries but with an unconsolidated companion in Bankscope database. U1 denotes a statement not integrating the possible subsidiaries and a bank without unconsolidated companion in Bankscope database.

To evaluate the extent to which data reflect the banking sectors of analysed countries, we used additional sources to acquire data on a number of banks and total banking assets of each analyzed country. Due to the limited availability of data we only compare the number of commercial banks in the sample and in the population, and the coverage of commercial banks' total assets in the population by the sample. Table 3 presents the data on the size of the population i.e. number of banks of a particular country in a particular year and the size of the sample i.e. the number of banks in a particular country in a particular year included in the sample. Table 3 also shows the coverage of the total banking assets by the sample.

Table 3. Number of banks in a sample and in a population, and coverage ratio

Year	Indicator	Country				
		Bosnia and Herzegovina	Croatia	Macedonia	Serbia	Slovenia
2006	No. of Banks (sample)	14	25	8	19	14
	No. of Banks (population)	32	33	19	37	22
	Coverage (% of total assets)	52.9	88.7	68.3	51.2	n.a.
2007	No. of Banks (sample)	16	25	11	19	13
	No. of Banks (population)	32	33	18	35	24
	Coverage (% of total assets)	76.2	89.7	88.4	56.5	99.7
2008	No. of Banks (sample)	18	28	11	21	14
	No. of Banks (population)	30	34	18	34	21
	Coverage (% of total assets)	83.3	89.6	87.9	67.5	96.7
2009	No. of Banks (sample)	18	28	11	25	14
	No. of Banks (population)	30	34	18	34	22
	Coverage (% of total assets)	63.4	92.0	88.1	74.3	94.0
2010	No. of Banks (sample)	20	28	11	26	14
	No. of Bank (population)	29	33	18	33	22
	Coverage (% of total assets)	86.7	91.7	88.0	82.5	90.9
2011	No. of Banks (sample)	19	28	11	24	14
	No. of Banks (population)	29	32	17	33	22
	Coverage (% of total assets)	78.6	90.8	87.3	78.2	87.4
2012	No. of Banks (sample)	11	25	8	19	12
	No. of Banks(population)	n.a.	n.a.	n.a.	n.a.	n.a.
	Coverage (% of total assets)	46.2	n.a.	78.9	n.a.	75.0

Source: *Banka Slovenije*, 2013; *Centralna banka Bosne i Hercegovine*, 2013; *Hrvatska narodna banka*, 2013; *Narodna Banka Srbije*, 2013.

When total assets of the sample are examined against the total assets of the population, the variations in coverage from country to country, year to year are observed. Considering the coverage in terms of years, the lowest coverage is characteristic of years 2006 and 2012. The highest coverage (on average) of 87.9% and 85.0% is reached in 2010 and 2008, respectively. As stated, coverage also varies from country to country. The share of total banking assets of the sample in total banking assets of the population is the lowest for Serbia with a bit less than 68.3%.

Considering the number of banks, the coverage is lower indicating that the largest banks are included in the sample. This is assessed by using country rank provided by Bankscope database. With exception of Macedonia, where three out of ten largest banks are missing in the sample, the 10 largest banks are included in the sample for all other studied countries.

The result of data collection process is the unbalanced panel of 112 banks located in Bosnia and Herzegovina, Croatia, Macedonia, Serbia and Slovenia. We study the bank lending behaviour within the period of 2007-2012, based on annual data from banks' balance sheets and income statements. The banks included in the analysis have the data available for at least two consecutive years. In addition, we calculated some additional ratios believed to be better proxies of banks characteristics influencing loan growth than individual items from financial accounts.

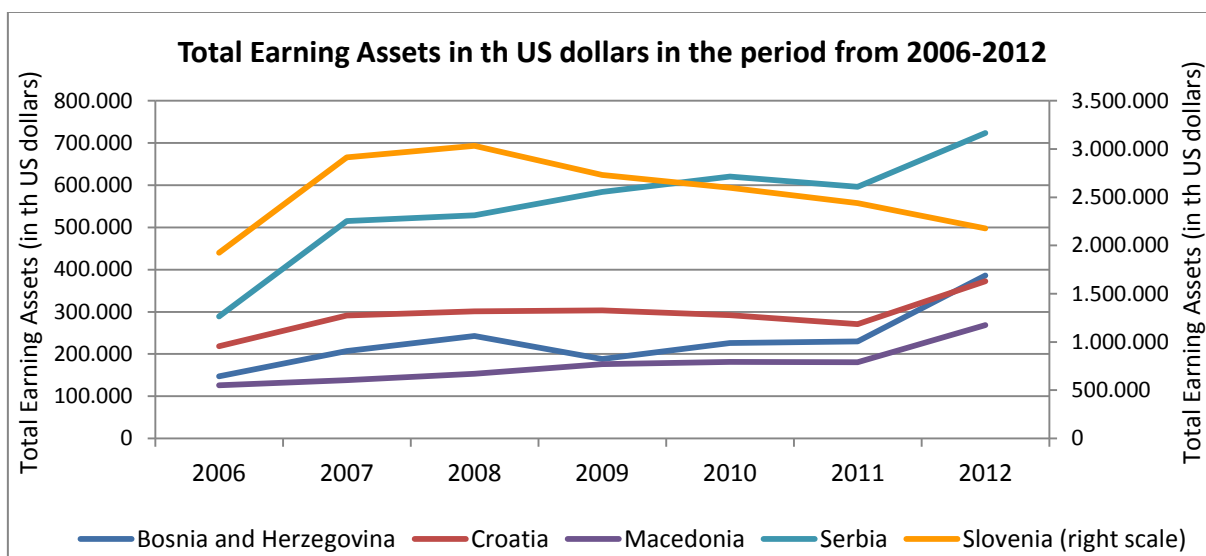
### **3.4 Description of the sample**

In the next section, we present descriptive statistics of the variables included in the model. The statistics on model dependent variable, net loans to total earning assets, retail deposits, long-term funding, and interbank intermediation to total liabilities less equity, and equity to total assets are presented for a median bank (Figure 2-6). We additionally emphasize the most expressive insights from the distributions of banks in the text. Figures 4-7 in appendixes illustrate point estimates for five quantiles, p20, p40, p50, p60 and p80 for net loans to total earning assets, retail deposits, long-term funding, and interbank intermediation to total liabilities less equity. We present point estimates because the median bank shows relatively similar dynamics for all the studied countries in the boom, bust or recovery period whereas on the margins more lively dynamics is noted. Boom-bust-recovery regimes are common to all the variables. 2007 and 2008 represent boom period, 2009 and 2010 bust period, 2011 and 2012 recovery period.

#### **3.4.1 Development of total banking assets for a median bank**

In Figure 1 in appendixes, total assets in thousands of US dollars for a median bank are given for all countries studied. In Figure 4, total earning assets in thousands of US dollars for a median bank are presented. With regard to that Slovenian median bank is much larger in terms of total assets, values are presented on the right scale. The period included is from 2006 to 2012. An additional notice is needed, when considering year 2006 and 2012. The numbers might not be the best representative of the whole banking system since the coverage of the total banking system by the sample decreases to less than 70%.

Figure 4. Total Earning Assets in thousand US dollars in the period from 2006-2012



Source: Bureau Van Dijk, *Bankscope database*, 2013.

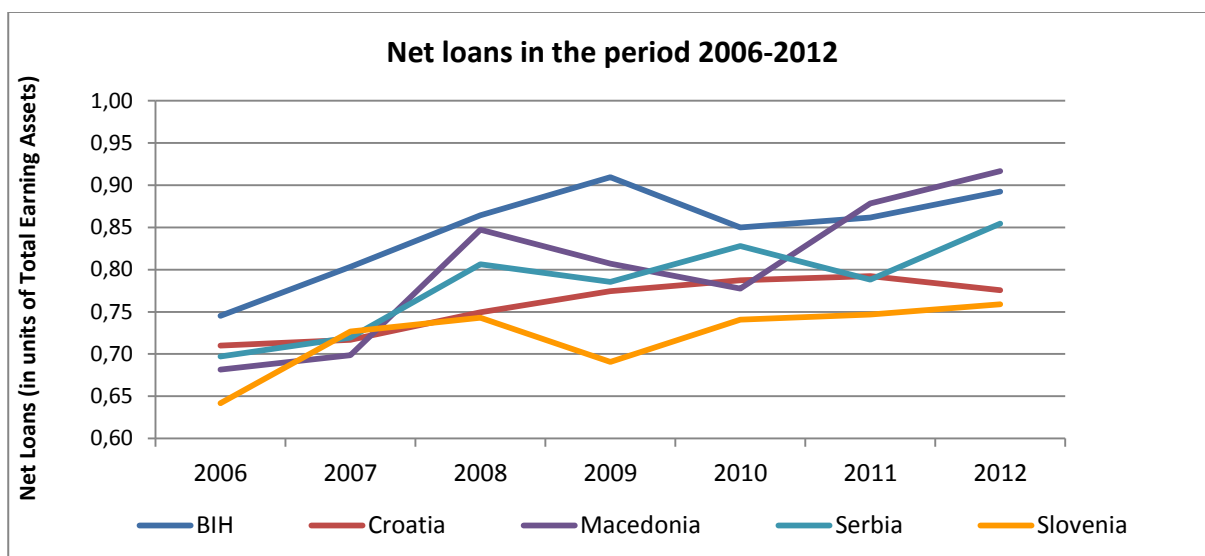
When analyzing the developments (at least increasing and decreasing) of total assets for a median bank, we discovered that they to some extent coincide with the developments of growth rates of GDP. In the years from 2006 to 2008 there is an increasing trend with deceleration in 2008. However, in 2009 total assets decreased in Slovenia, Croatia and Bosnia and Herzegovina, and kept increasing in Macedonia and Serbia. Taking into consideration total assets on the level of the whole banking system (aggregated), fluctuations coincide with movements of total assets for a median bank in Figure 4, when expressed in thousand US dollars. However, when expressed in local currency, total assets had been growing steadily throughout 2006-2012 in Croatia, Serbia, and Macedonia. For Slovenia, they are in a decrease from 2008, and in Bosnia and Herzegovina they decreased in 2009 but recovered afterwards.

In year 2010 and 2011, total assets were rather stagnant with the exception of Slovenia. As well as in the previous years, Slovenia was a notable exception in 2012, being the only country among studied countries that recorded a decrease in total assets of a median bank. In contrast, a median bank in other countries studied experienced growth in total assets.

### 3.4.2 Development of net loans for a median bank

We present the development of a model dependent variable, net loans to total earning assets, in Figure 5. In order to address country specificities, values are given for all the countries of our interest, Bosnia and Herzegovina, Croatia, Macedonia, Serbia and Slovenia. The period from 2006 to 2010 is analysed.

Figure 5. Net loans in units of total earning assets in the period 2006-2012



Source: Bureau Van Dijk, *Bankscope database*, 2013.

It can be observed that the changes in net loans expressed in units of earning assets for a median bank were not so intense in the period studied. However, when the changes in total earning assets are included in the interpretation, more can be said. In the period of 2006-2008, net loans are increasing in all studied countries. In 2009, there is a disruption in the increasing trend of net loans. With regard to that, we are dealing with net loans, this might in part be a consequence of an increase in loan loss reserves. In 2010, there are signs of recovery, but the accurate development is hard to determine. In 2011, net loans increased again.

As net loans represent the lowest share of total earning assets, roughly speaking, in Slovenia and Croatia, it can be assumed that this is due to the development of banking systems. A median bank from Bosnia and Herzegovina, as well as from Macedonia, has the highest share of net loans in total earning assets.

Based on the developments of net loans presented in the Figure 5 we set additional hypothesis that account for country specific factors. The point estimates for banks from five different quantiles, p20, p40, p50, p60 and p80 are also considered, when setting the hypotheses associated with differences among countries. The hypotheses are not specified for each year separately despite the influences might differ in different periods. In the section, where results are presented the years and the way of influence are specified.

**Hypothesis 12:** Slovenian banks provided lower amount of loans as banks in Macedonia.

**Hypothesis 13:** Croatian banks provided lower amount of loans as banks in Macedonia.

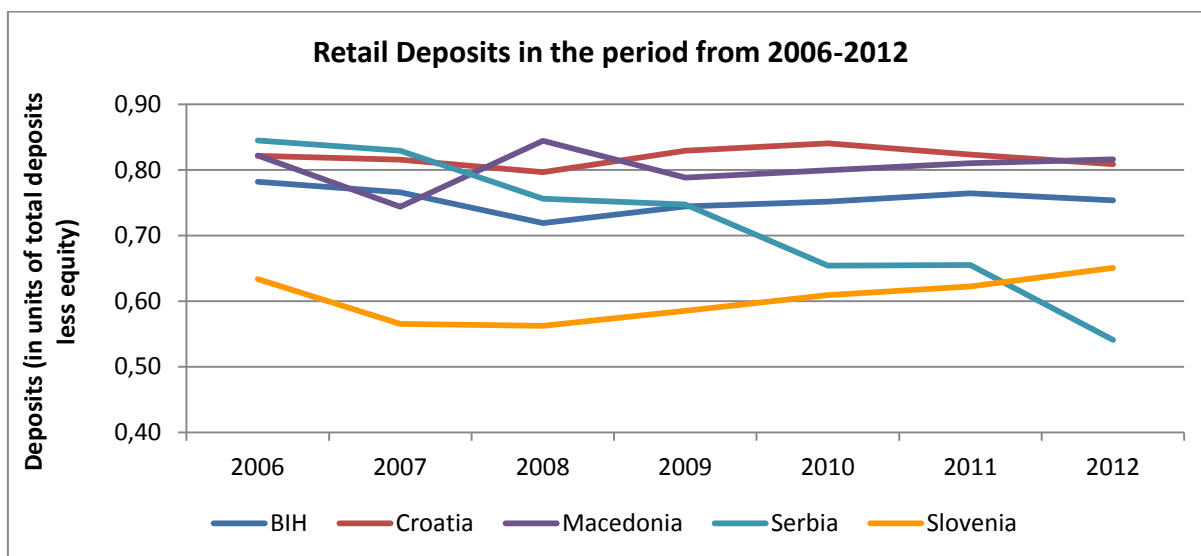
**Hypothesis 14:** Serbian banks provided lower amount of loans as banks in Macedonia.

**Hypothesis 15:** Bosnian banks provided lower amount of loans as banks in Macedonia.

### 3.4.3 Development of retail deposits for a median bank

Figure 6 shows the fluctuations in retail deposits in units of total liabilities less equity for the period of 2006-2012. The data are given for a median bank in all the countries studied; Bosnia and Herzegovina, Croatia, Macedonia, Serbia and Slovenia are presented.

Figure 6. Retail Deposits in units of total liabilities less equity in the period from 2006-2012



Source: Bureau Van Dijk, *Bankscope database*, 2013.

As it can be seen, a Slovenian median bank noticeably sticks out on the lower margin in the observed period. The share of deposits as a source of funding represents less than 60 percent of all funds in 2007-2008, while in other years this limit is exceeded. On the upper margin, Croatian median bank and Macedonian median bank can be found with deposits accounting for more than 80% (in line with aggregate data). When banks across the whole distribution are considered, the level of deposits is high in all regimes studied for the Croatian and Macedonian median bank.

Despite the fact that deposits present a smaller part of total liabilities less equity for Bosnia and Herzegovina (income) compared to Croatia and Macedonia, a median bank sustained the level of deposits in the period from 2006-2012 well. Additionally, the distribution is rather similar with an exception of banks from 20<sup>th</sup> percentile, for which the values fall as low as 28% in the year 2008.

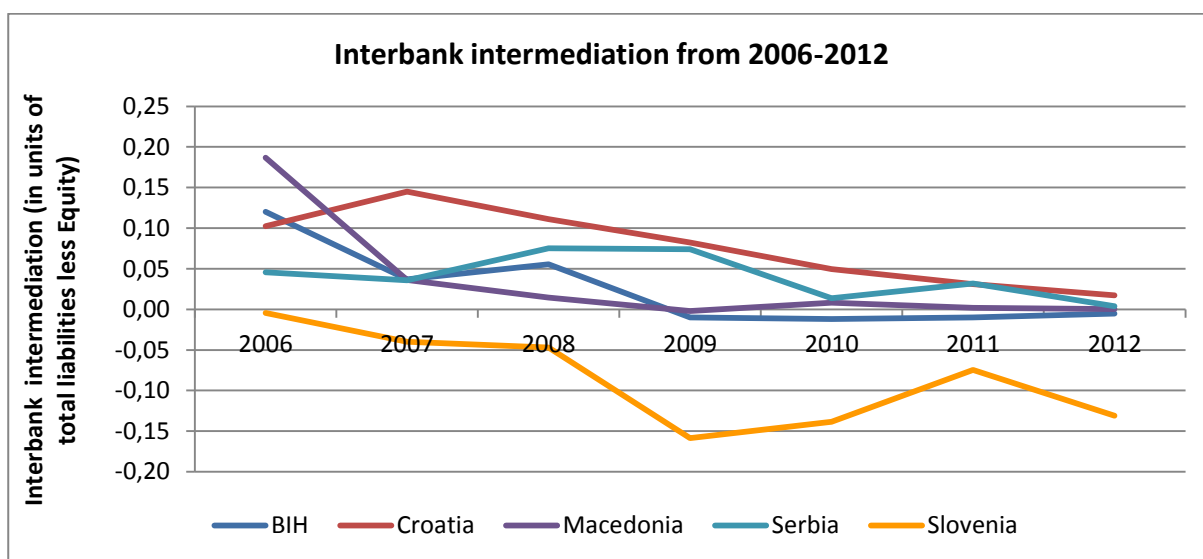
It is also noticeable that the share of deposits steadily decreases for a median bank from Serbia. The decrease in share of deposits for a median bank was from 84.5% in 2006 to 54.1% in 2012. Relative importance of deposits in total liabilities less equity especially decreased for

the banks of the lower two quartiles after 2009, whereas banks from 90<sup>th</sup> percentile maintain high levels of deposit throughout the observed period.

### 3.4.4 Development of interbank intermediation for a median bank

In Figure 7, we present the interbank intermediation in units of total liabilities less equity. To illustrate the differences among countries, data are given for each country separately within the period of 2006-2012. The picture is similar to retail deposits in total liabilities less equity; Croatia on the upper limit and Slovenia on the lower limit.

Figure 7. Interbank intermediation in units of total liabilities less equity in the period from 2006-2012



Source: Bureau Van Dijk, *Bankscope database*, 2013.

Slovenia is again a noticeable exception. A median Slovenian bank (compared to other median banks and not compared to banks over the whole distribution) is the only net borrower on the interbank market during the whole period of 2006-2012. After 2009, when the consequences of the crisis were the most remarkable, the borrowing on the interbank market in total liabilities less equity started to decrease, but it gained importance in the structure of funding in 2012 again. However, for the banks in the lowest two deciles a significant reduction in dependency on interbank market is notable. The dynamics is interesting also when the whole distribution is analysed; with the exception of banks from upper two deciles in 2006-2011, all Slovenian banks included in the sample were net borrowers.

As well as in Slovenia, the situation worsened after 2008 in Bosnia and Herzegovina. A median bank has become a net borrower on the interbank market in 2009. The situation has been deteriorating markedly in 2010-2012, especially for the banks from the first two deciles.

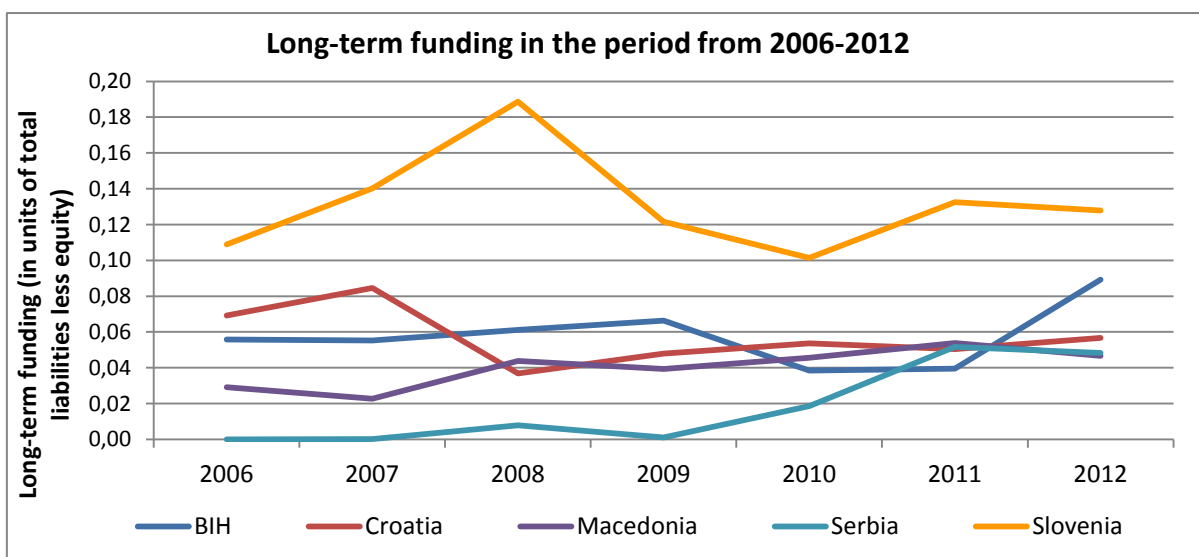


Croatia, was positioned the most favourably in 2006, when the lending highly exceeded borrowing on the interbank market. However, after the peak in 2007 the net interbank position deteriorated. A similar development was observed in Serbia after the peak in 2008, but with more fluctuations. Net interbank position of a median bank from Macedonia deteriorated immediately after 2006 and stayed stagnant at around zero during 2007-2012.

### 3.4.5 Development of long-term funding for a median bank

In Figure 8, we present long-term funding in units of total liabilities less equity over the observation period. In line with previous descriptive statistics we include all countries separately Bosnia and Herzegovina, Croatia, Macedonia, Serbia and Slovenia.

Figure 8. Long-term funding in units of total liabilities less equity in the period from 2006-2012



Source: Bureau Van Dijk, *Bankscope database*, 2013.

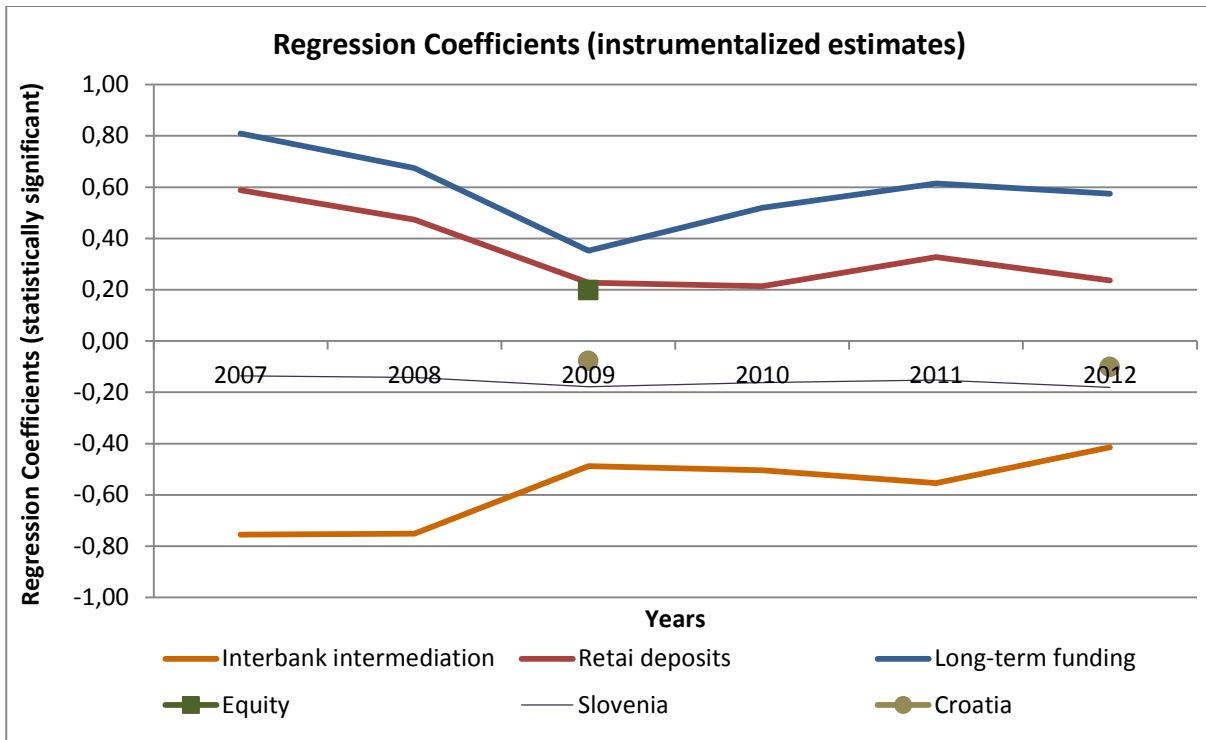
The figure shows that for a Slovenian median bank, long-term funding is relatively more important compared to other median banks. Long-term funding reached its peak in 2008 for a median Slovenian bank, declined in 2009 and 2010. An increase can be seen again in the year of recovery 2011, but a decrease in 2012. For Serbia, in contrast to Slovenia, long-term funding in units of total liabilities less equity is the least important source of funds when compared to other studied countries. It was close to zero until 2009; however, there is an increasing trend from 2009 to 2011, but similarly as for Slovenia a decrease in 2012.

A median bank from Macedonia, Croatia and Bosnia and Herzegovina maintained a relatively stable level of long-term funding in their balance sheets during the observed period. Croatia registered a considerable reduction in 2008, Bosnia and Herzegovina in 2010.

### 3.5 Empirical results

In the following section, empirical results are given. Table 2 documents the results of 2SLS estimation (instrumentalized) for equation (3). In Figure 9, statistically significant regression coefficients are presents.

Figure 9. Regression Coefficients (instrumentalized estimates)



Source: Bureau Van Dijk, *Bankscope database*, 2013.

The estimated coefficients of retail deposits are all statistically significant and positive in the observed period. In the boom period, the coefficient is larger than in the bust and recovery period. Compared to interbank intermediation and long-term lending, the differences in the size of the coefficient of customer deposits are the least pronounced in the bust period, whereas in the other regimes interbank intermediation or long-term lending changes less. When studied sources of funds are taken into consideration, the magnitude of the coefficients is the lowest for retail deposits. It is worth emphasizing that the size of the coefficient decreased already in year 2008 when the crisis hit the studied countries. The decrease is even more noticeable in year 2009. This might be an indication that retail depositors are not uninformed or unable to answer to the increases in risk, when negative public information are too loud to be ignored. It is interesting that after the initial sharp reduction the size of the coefficient is rather stagnant (except for 2011). This might be an indication that retail depositors are rather insensitive to less intense public information.

Table 4. TSLS instrumental variable estimation of the baseline model for net loans (dependent variable)

Variable	Coeff.	2007	2008	2009	2010	2011	2012
Interbank Intermediation ( <i>Net_Intebank_TLNC</i> )	$b_1$	-0,756 (0,108)***	-0,751 (0,175)***	-0,489 (0,098)***	-0,504 (0,103)***	-0,554 (0,127)***	-0,414 (0,149)***
Retail Deposits ( <i>TCD_TLNC</i> )	$b_2$	0,588 (0,137)***	0,474 (0,184)***	0,227 (0,101)**	0,213 (0,105)**	0,327 (0,126)***	0,236 (0,124)*
Long-term funding ( <i>Longterm_TLNC</i> )	$b_3$	0,809 (0,155)***	0,675 (0,253)***	0,352 (0,158)**	0,520 (0,157)***	0,615 (0,203)***	0,575 (0,205)***
Equity ( <i>lag_Equity_TA</i> )	$b_4$	0,141 (0,109)	0,132 (0,11)	0,198 (0,105)*	0,185 (0,155)	0,243 (0,16)	0,256 (0,218)
Size ( <i>lag_Size</i> )	$b_6$	-0,154 (0,151)	-0,082 (0,202)	-0,056 (0,156)	-0,009 (0,185)	0,074 (0,17)	-0,084 (0,149)
BA ( <i>BA</i> )	$b_8$	0,018 (0,045)	0,025 (0,044)	0,011 (0,042)	0,002 (0,073)	-0,032 (0,049)	-0,041 (0,04)
HR ( <i>HR</i> )	$b_9$	-0,053 (0,044)	-0,053 (0,041)	-0,078 (0,041)*	-0,079 (0,072)	-0,068 (0,049)	-0,102 (0,04)**
RS ( <i>RS</i> )	$b_{10}$	0,011 (0,043)	0,065 (0,049)	-0,055 (0,042)	-0,034 (0,073)	-0,046 (0,051)	-0,064 (0,043)
SI ( <i>SI</i> )	$b_{11}$	-0,135 (0,046)***	-0,142 (0,043)***	-0,178 (0,044)***	-0,162 (0,073)**	-0,152 (0,051)***	-0,181 (0,043)***
Constant	$b_0$	0,277 (0,135)**	0,404 (0,184)**	0,622 (0,103)***	0,622 (0,129)***	0,522 (0,144)***	0,642 (0,145)***
Adjusted R-square		0,65	0,57	0,51	0,44	0,34	0,39
Sargan statistic (p-value)		1,0	0,4	0,6	0,5	0,3	0,9
Cragg Donalds		15,6	3,1	22,5	35,2	25,1	12,9
Observations		73	74	77	78	85	63

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Bureau Van Dijk, *Bankscope database*, 2013.

In the observed period, the estimated coefficients of interbank intermediation are highly statistically significant and negative. A negative sign is a consequence of the construction of the variable; borrowing from banks is deducted from lending to banks. Thus, the association is two-fold; net loans might be influenced through the decrease (increase) in lending to banks or through an increase (decrease) in borrowing from banks or both. The coefficient of interbank intermediation is of considerable size in all regimes. In the boom period, it reaches higher (negative) value and a lower (negative) value in the bust and recovery period.

The coefficients of long-term funding are also statistically significant and positive in the period studied. The changes in the coefficients are aligned with the changes of the coefficients of retail deposits and interbank intermediation. In particular, they increase together and also decrease together. Compared to the coefficients mentioned, the coefficients of long-term lending attain higher values when different regimes are considered (exception of 2009).

Results in Table 4, provide a support for hypothesis 1 and all its sub hypotheses. The influence of retail deposits is positive in all regimes. The size of the coefficient of retail deposits is the most considerable in the boom period, followed by the recovery period, and the bust period. However, it is worth mentioning that in 2012, the influence of retail deposits on the amount of loans provided is closer to the bust period.

We confirmed Hypothesis 2 by the results of the empirical research. All sources of funds are associated with bank lending in a similar way with distinctions in the size of the coefficient throughout the observed boom, bust and recovery period. The coefficients attain high values in boom period and the lowest values in 2009. Retail deposits and interbank intermediation move even more closely together, again with a notable difference in the size of coefficient of interbank intermediation. After a sharp decrease in 2009, the influence of retail and wholesale intermediation stayed rather stagnant in 2010. In 2012, the coefficients decreased again, including long-term funding, indicating to the decrease in intermediation. One of the possible explanations on the similar changes (decrease or increase) of coefficients is bank's reluctance to extend loans under a particular limit, in the case of deposit withdrawal; with raising other sources of funds the costs of funds are increasing. The other possible explanation might be associated with retail deposits acting as a cushion that enables wholesale funds to exit when higher risk is detected.

Hypothesis 3 does not hold; the volatility of retail deposits is not lower than the volatility of other uninsured liabilities in all regimes. The reduction in the size of the coefficient is rather unexpected and contrasting to theoretical views. In particular, the majority of literature regards deposits as sluggish and insensitive to bank risk taking but the results indicate that this was not the case in the bust year 2009 when the coefficient decreased significantly.

Interbank intermediation has a positive influence on the amount of loans provided in all regimes, which is in line with Hypothesis 4. It needs to be noted that the influence is positive, when taking into account the construction of the variable. In addition, hypotheses 4.a) and

4.b) are confirmed, whereas the size of the coefficient is lower in recovery period (2012) than in 2009 and thus the results do not give a full support for hypothesis 4.c).

Hypotheses 5, 5.b), 5.b) and 5.b) are supported by the data. Long-term funding, similarly to other types of funding, attains highest values in boom period, intermediate in recovery period and lowest in the bust period. In contrast, hypothesis 6 cannot be fully confirmed by the results as the loans depend more on interbank intermediation in year 2009. To rephrase, long-term funding does contribute more to net loans than interbank intermediation in all years, except in 2009.

In line with hypotheses 7 and 7.a), we assumed that Tier 1 capital or other alternative measure of bank capitalization have a significant influence on the amount of loans provided. However, equity has a significant and positive influence on loans only in the crisis year, year 2009. In the period of higher uncertainty, capitalization as a reflection of risk is clearly of a great importance. When taking into consideration bust period, this might be a result of capital injections to subsidiaries from parent banks. Another notification is associated with net loans. While regulators focus on capital regulations based on risk-weighted assets (Total adequacy ratio or Tier 1 capital ratio), we do not find significant dependence of bank loans. This might indicate that investors assess risk based on other indicators than regulators.

Hypotheses from 8 to 11 do not yield statistically significant results. As it can be seen from the Table 4, the results on coefficient on loan loss provisions, on foreign ownership dummy and on participation in Vienna Initiative 1.0 dummy are not included. We tested the dependence of net loans on the mentioned variables, but the results are insignificant. In order to clear the equation, we excluded them from the final estimation equation.

The coefficients on country dummies are insignificant for Serbia and Bosnia and Herzegovina and thus hypotheses 13 and 14 are not confirmed. This might be a result of the similarities in structural characteristics of banking systems. There is a distinction between Macedonia and Croatia in the years of the most pronounced retrenchment of gross domestic product in Croatia. To be exact, the coefficient on dummy for Croatia is significant and negative in 2009 and 2012. It is not statistically significant for other years considered, thus we conclude that hypothesis 12 is not supported. We confirmed hypothesis 11 as the coefficient on dummy for Slovenia is significant and negative throughout all regimes. Considering the characteristics of Slovenian banking system, the level of capitalization, lower level of deposits as a source of funding, consequently higher dependence on external funds are possible underlying reasons.

## CONCLUSION

How seemingly minor effects can have major consequences for a particular economy (Williamson, in Miller & Stiglitz, 2010)? That was our starting point, and one of the questions that arose from the consequences of financial crisis of 2007-2009. The question above revived the interest to include financial intermediation into the existing macroeconomic framework, to account for the influences of financial intermediation on the real sector.

The link between financial sector and consequences for real sector provides a rationale behind our research. In particular, via bank lending, external shocks are amplified and propagated in an economy where non-financial sector is highly dependent on bank lending. To understand bank lending, we determine how it varies in relation to retail deposits, interbank intermediation, and long-term funding. The panel of 112 banks from Bosnia and Herzegovina, Croatia, Macedonia, Serbia, and Slovenia further enabled to analyse bank lending, taking into account differences among countries, so-called country specificities. Determinants of bank lending are studied in different regimes; in boom (2007-2008), bust (2009-2010) and recovery (2011-2012) regimes.

We find evidence that country specific structural characteristics play a significant role only in the case of Slovenia throughout the observed period. Their influences on bank lending are negative (Macedonia as a reference). For Croatia, the differences are statistically significant only in years of economic downturn, 2009 and 2012. Sources of funds with statistically significant coefficients, i.e. retail deposits, interbank intermediation, and long-term funding act procyclically. In the boom period all sources of funds mentioned work together to promote (excessive) bank lending (measured by net loans), whereas in the bust period the size of their coefficients and thus their influence on net loans decreases significantly. In a bust period, bank lending is driven comparatively more by interbank mediation than by long-term funding and retail deposits. In contrast to theoretical considerations, retail deposits are found to be responsive to negative public information; the size of the coefficient decreases considerably in 2008 and even more in 2009. In 2010, long-term funding again has the most pronounced impact on bank loans, whereas the other two sources stayed rather stagnant. Year 2011, the first year of the recovery period, is again noted for increases in size of coefficients indicating to strengthened intermediation, but there is a decrease again in 2012. It is more pronounced for retail deposits and interbank intermediation. This might raise some concerns as it to some extent indicates that the definition of boom, bust and recovery period could be revised. Namely, retail deposit and interbank intermediation decreased (simultaneously) again in year 2012. To conclude with a question: Are we there again?

## POVZETEK

Izhajajoč iz finančne in gospodarske krize 2007-2009, kot časovni okvir določi Williamson (v Miller & Stiglitz, 2010), se pojavi eno ključnih vprašanj za nadaljnje raziskovanje: kako razložiti razsežnosti krize kot posledico navidezno manj pomembnih gibanj v gospodarstvu? To je med teoretiki oživilo zanimanje za revidiranje obstoječih modelov v smeri vključevanja nepopolnosti finančnih trgov. Empirične raziskave se prav tako bolj intenzivno usmerjajo v testiranje vpliva finančnega sektorja na realni sektor.

Banka za mednarodne poravnave v pregledu literature na temo povezanosti finančnega sektorja in realnega sektorja identificira dolžnikovo bilanco stanja, bančno bilanco stanja in likvidnost kot ključne (Basel Committee on Banking Supervision, 2011). Kljub temu, da je osrednja pozornost namenjena monetarni politiki, lahko mehanizem delovanja do neke mere prenesemo na vsa dogajanja, ki krepijo ali slabijo bilance stanja. Posredno to pomeni vpliv na rast bančnih posojil, ki je tako na eni strani vezana na robustnost bančne bilance stanja ter na drugi na robustnost dolžnikove bilance stanja. To je še posebej pomembno z vidika obravnave različnih obdobj, obdobja v času pred krizo, med krizo in v času izhoda iz krize.

V času ekonomskega razcveta okrepljene bilance stanja omogočajo (presežno) zadolževanje tako finančnega kot tudi nefinančnega sektorja. V času ekonomskega upadanja, ko je situacija obratna, oslABLJENE bilance stanja onemogočajo ali izdatno otežujejo zadolževanje. Vplivi zunanjih šokov se tako krepijo preko dostopnosti bančnih posojil predvsem v državah, v katerih so bančni sistemi ključni vir financiranja realnega sektorja.

V skladu z napisanim je razumevanje dejavnikov bančnih posojil in njihovih variacij v obdobju pred krizo, med krizo in v času izhoda iz krize ključno. Ključno je za zmanjševanje in obvladovanje tveganj v bančnem sistemu ter za vzpostavitev ustreznega sistema nadzora in regulacije bank. Namen magistrske naloge je preko razumevanja dejavnikov vpliva na rast posojil prispevati k stabilnosti bančnega sektorja kot tudi realnega.

Cilj magistrske naloge je določiti dejavnike vpliva rasti bančnih posojil v času pred krizo (2007-2008), med krizo (2009-2010) in v času izhoda iz krize (2011-2012). Zanimajo nas predvsem spremembe v smeri in velikosti posameznega dejavnika na rast bančnih posojil v proučevanih obdobjih. V prvem delu magistrske naloge, sicer sestavljene iz treh delov, posvetimo pozornost pregledu literature s poudarkom na dejavnikih rasti bančnih posojil. Preučimo sekundarne vire, ki se ukvarjajo z vplivom obveznosti do virov sredstev na bančna posojila, t.j. depozitom podjetij in prebivalstva, medbančnim obveznostim, dolgoročnem zadolževanju in kapitalu. Nadaljujemo z opredelitvijo ostalih dejavnikov vpliva na rast bančnih posojil, in sicer s kakovostjo sredstev, velikostjo banke, lastniško strukturo ter sodelovanje v Vienna Initiative 1.0.

Glede na predpostavko o pomembnosti strukture bančnih sistemov in državi specifičnih značilnosti na rast bančnih posojil, v drugem delu sledi pregled bančnih sistemov. Začnemo s

kratkim pregledom zgodovine razvoja bančnih sistemov v posameznih državah ter nakažemo na pomembne strukturne značilnosti, ki iz tega izhajajo. Sledi še oris bančnih sistemov danes.

Tretji del je namenjen empirični raziskavi, v katero je vključenih 112 bank iz Bosne in Hercegovine, Hrvaške, Makedonije, Srbije in Slovenije, za obdobje od leta 2007 do leta 2012. Kot osnovo za raziskavo uporabimo podatke iz računovodskih izkazov bank, dostopnih preko baze Bankscope. Izboljšali smo jih s pomočjo zbiranja podatkov neposredno iz letnih poročil bank, poročil revizorjev, itd. Prav v dostopnosti podatkov pa je vzrok omejitev raziskave. Tako smo zaradi neustreznosti podatkov izločili Črno Goro in Kosovo, ter se osredotočili izključno na dejavnike ponudbe bančnih posojil. Vplivi povpraševanja so delno vključeni v model preko nepravilnih spremenljivk za države. Za ekonometrično analizo uporabimo programsko opremo GRETL. Enačbo ocenimo z dvostopenjsko metodo najmanjših kvadratov ter z instrumentalnimi spremenljivkami.

## **Pregled literature**

### **Dejavniki vpliva na rast bančnih posojil: obveznosti do virov sredstev**

Najpomembnejši vir financiranja za banke predstavljajo depoziti podjetij in prebivalstva, in sicer njihov delež variira med eno tretjino vseh obveznosti do virov sredstev v evroobmočju (Cappiello, et al., 2010) do treh četrtin vseh obveznosti do virov sredstev v ZDA (Jayaratne & Morgan, 2000). Za depozite je značilno, da so vsaj delno zavarovani.

Cappiello et al. (2010) pripiše depozitom podjetij in prebivalstva, bančni depoziti so izvzeti, poseben status. Le-ta izhaja iz nepopolne substitucije med depoziti in ostalimi viri financiranja, ki je posledica nepopolnih finančnih trgov. Depoziti podjetij in prebivalstva tako do neke mere omejujejo rast bančnih posojil in ostalih virov financiranja. Tudi Stein (1998) pokaže, da banke niso naklonjene nadomeščanju (zavarovanih) depozitov z ostalimi nezavarovanimi obveznostmi do virov sredstev, z namenom povečanja razpoložljivosti bančnih posojil. Razloge išče predvsem v višjih stroških financiranja in posledično manjši dobičkonosnosti.

Depoziti podjetij in prebivalstva so v skladu s Choudhry (2011) bolj stabilni od ostalih virov financiranja. Povedano drugače, tveganje nenadnega oziroma množičnega dviga depozitov, ko se na primer pojavijo negativne informacije o tveganosti poslovanja banke, je manjše. Posledično so depozitarji v literaturi obravnavani kot neinformirani in zato neodzivni na spremembe tveganj v bančnem poslovanju. Neodzivnost se v veliki meri pripisuje (delnem) zavarovanju depozitov, ki ne spodbuja k nadzoru bančnega poslovanja (Huang & Ratnovski, 2010). Odziv na spremembe v tveganosti poslovanja banke pa se pričakuje v primeru močno negativne, javno dostopne informacije, ki doseže tudi predhodno neinformirane. To se je pokazalo leta 2008, ko so govornice o problemih v bankah materah, povzročile množičen dvig depozitov na Hrvaškem in v Srbiji (Bokan et al., 2009; National Bank of Serbia, 2009).



**Hipoteza 1:** Depoziti prebivalstva in podjetij imajo pozitiven vpliv na rast posojil v vseh obravnavanih obdobjih (depoziti imajo večji vpliv pred krizo kot med krizo, pred krizo kot v času izhoda iz krize, ter manjši vpliv med krizo kot v času izhoda iz krize)

**Hipoteza 2:** Depoziti prebivalstva in podjetij se gibajo v enako smer kot medbančno poslovanje in dolgoročno zadolževanje v vseh obravnavanih obdobjih.

**Hipoteza 3:** Spremenljivost depozitov prebivalstva in podjetij je manjša kot spremenljivost ostalih nezavarovanih obveznosti do virov sredstev.

Poleg depozitov banke svoja sredstva financirajo z zadolževanjem na medbančnih trgih. Feldman in Schmidt (2001) evidentirata, da banke v vedno večji meri nadomeščajo pomanjkanje depozitov z obveznostmi do bank ter ostalih institucionalnih investitorjev, ter tako financirajo dobičkonosne investicije. Poleg omenjenega avtorji prednosti pripisujejo še tržni disciplini preko nadzorovanja s strani sofisticiranih investitorjev (Calomiris, 1999; Goodfriend & King, 1988).

Vpliv zadolževanja na medbančnih trgih je predvsem odvisen od odnosa med bankami. Ko obravnavamo banke matere in banke hčere, so vplivi zadolževanja pozitivni, in sicer tudi v času krize (Košak, et al., 2011). Preko dostopa do finančnih virov matere hčerinskim bankam nudijo stabilnost, uravnavajo vplive države gostiteljice, ali se obnašajo kot posojilodajalci v zadnji sili (De Haas & Van Lelyveld, 2010). Zadolževanje na medbančnih trgih izven odnosa mati-hči negativno vpliva na rast posojil (Košak, et al., 2011). Do enakih zaključkov, da večja odvisnost od medbančnih trgov pomeni večje zmanjšanje rasti posojil v času krize, pridejo tudi Allen et al. (2012), Popov in Udell (2012). Nasproti temu, banke neodvisne od zadolževanja na medbančnih trgih ter odvisne od domačih depozitov, manj zmanjšajo razpoložljivost posojil (Ivashina & Scharfstein, 2010).

**Hipoteza 4:** Medbančno poslovanje ima pozitiven vpliv na rast posojil v vseh obravnavanih obdobjih (medbančno poslovanje ima večji vpliv pred krizo kot med krizo, pred krizo kot v času izhoda iz krize ter manjši vpliv med krizo kot v času izhoda iz krize).

Choudhry (2011) označi dolgoročno zadolževanje za najbolj primeren vir financiranja, ki sledi depozitom podjetij in prebivalstva. Banke z dolgoročnimi obveznostmi do virov sredstev znižujejo likvidnostno tveganje in zmanjšajo neuskklajenost v ročnosti sredstev (bančna posojila), ter obveznosti do virov sredstev.

Kljub temu, da v osnovi gre za informirane investitorje, Huang in Ratnovski (2010), Barrell et al. (2011) ugotovijo, da se le-ti ne odločajo vedno za drag nadzor in s tem ne zagotavljanje tržne discipline. Ko so na voljo relativno natančne in brezplačne javne informacije, se investitorji odločijo za neučinkovite likvidacije in s tem optimizirajo svoj položaj. To predvsem velja za nosilce nadrejenega dolga in v primeru, ko ima banka zadostno količino depozitov podjetij in prebivalstva, da bo prenesla izgubo likvidnosti. Podlaga za likvidacijo v

skladu s Huang in Ratnovski (2010) je lahko šibka, na primer negativna javna informacija o povečanem tveganju podobne banke. Glede na povedano pričakujemo, da se bo iz prehoda iz časa pred krizo in med krizo dolgoročno financiranje močno zmanjšalo.

**Hipoteza 5:** Dolgoročno zadolževanje ima vpliv na rast posojil v vseh obravnavanih obdobjih (dolgoročno zadolževanje ima večji vpliv pred krizo kot med krizo, pred krizo kot v času izhoda iz krize ter manjši vpliv med krizo kot v času izhoda iz krize).

**Hipoteza 6:** Dolgoročno zadolževanje ima večji vpliv na rast posojil kot medbančno poslovanje v vseh obravnavanih obdobjih.

V okviru obveznosti do virov sredstev pregled literature vključuje še kapital, katerega vloga je banko ščiti pred izgubami, posledično insolventnostjo ali celo stečajem (Barrell et al., 2011; Borio et al., 2001). Sposobnost absorpcije izgub je odvisna od kapitalske ustreznosti (minimum zakonsko določen), ki jo na eni strani razumemo kot delež kapitala v obveznostih do virov sredstev, in na drugi strani kot strukturo kapitala (Barrell, et al., 2011). Glede na to pričakujemo, da temeljni, najkakovostnejši kapital in dodatni kapital različno vplivata na rast bančnih posojil.

Poleg neposrednega vpliva kapitala, slednji tudi posredno vpliva na financiranje sredstev in njihovo dostopnost. Kapitalska ustreznost je namreč odraz tveganosti bančnega poslovanja. Boljša kot je kapitalska ustreznost, manjše je tveganje in posledično je manjša tudi premija na zunanje financiranje (razliko med stroški notranjega in zunanjega financiranja).

**Hipoteza 7:** Temeljni kapital oziroma alternativna oblika kapitala (osnovni kapital) pozitivno vpliva na rast posojil (vpliv je večji med krizo kot pred krizo).

### **Dejavniki vpliva na rast bančnih posojil: ostalo**

Preko vpliva na dolgoročno dobičkonosnost bank in dojemanje tveganja, je kakovost sredstev posredno in neposredno povezana z rastjo posojil. Glede na odvisnost od stanja gospodarstva in značilno procikličnost, predpostavljamo, da je kakovost sredstev primeren indikator dojemanja zunanjega tveganja ter tako odraz pripravljenosti banke, da poveča razpoložljivost posojil. V času razcveta so banke na eni strani nagnjene k zmanjševanju oslabitev sredstev in v skladu z mehanizmom finančnega akceleratorja omogočajo preko okrepljenih bilanc stanja izdatno zadolževanje. V času krize banke na drugi strani povečujejo oslabitve kot odraz povečanega dojemanja tveganja banke in slabitve bilanc. Borio et al. (2001) zagovarjajo stališče, da se kakovost sredstev slabša že v času razcveta.

**Hipoteza 8:** Oslabitve imajo negativen vpliv na rast posojil v vseh obdobjih.

Velikost bank lahko razumemo predvsem kot približek za dostopnost do medbančnih trgov in organizacijske značilnosti banke. V skladu z raziskavami na temo dostopnosti do medbančnih

trgov je korelacija med bančnimi posojili in velikostjo pozitivna. Večje banke lažje dostopajo do nezavarovanih virov financiranja kot manjše banke (Jayaratne & Morgan, 2000).

V skladu z bančništvom odnosov manjše banke igrajo ključno vlogo pri zagotavljanju posojil med krizo. Organizacijska struktura jim namreč omogoča procesiranje t.i. mehkih informacij, v nasprotju z velikimi bankami, katerih sistem temelji na formalnih pravilih odločanja. V krizi bo tako razpoložljivost posojil s strani manjših bank manj omejena (Boot, 2007).

**Hipoteza 9:** Velikost banke ima pozitiven vpliv na rast posojil v vseh obdobjih.

**Hipoteza 10:** Tuje lastništvo ima vpliv na rast posojil.

**Hipoteza 11:** Sodelovanje banke v Vienna Initiative 1.0 ima vpliv na rast posojil.

## **Bančni sistemi**

V času po osamosvojitvi so obravnavane države najprej preoblikovale dvotirni bančni sistem in vpeljale principe tržnega gospodarstva (Bonin, 2004; Šević, 2000). Soočene so bile s številnimi problemi z izvorom v neučinkovitosti prejšnjega sistema, in sicer s problemom zamrznjenih depozitov prebivalstva, za katerega so vlade prevzele odgovornost in praznine v bilancah stanja nadomestile z izdajo obveznic, izgubo trga in posledično insolventnostjo (Muller-Jentsch, 2007). Poleg omenjenega se je s pasivno privatizacijo bank preko privatizacije podjetij v večini držav institucionaliziralo nezdravo navzkrižno lastništvo. Konkretno, glavni posojilojemalci so hkrati lastniki banke, ki nimajo cilja maksimiranja dobička, temveč enostaven dostop to mehkih posojil (problem moralnega hazarda glede na to, da so vlade v večini primerov garantirale za omenjena posojila) (Šević, 2000).

Ko proučujemo za državo specifično razvojno pot bančnega sistema, je za Hrvaško ključna bančna kriza v letih 1998-1999 in z njo povezan zgoden vstop tujih bank. Rehabilitacija štirih največjih bank (1995-1996) omogoči ostalim bankam izven rehabilitacije doseganje visoke dobičkonosnosti, na račun zagotavljanja financiranja bankam v rehabilitaciji na medbančnem trgu. Poleg omenjenega se neučinkovito ocenjevanje tveganj, visoke obrestne mere, neizkušenost v združitvah in prevzemih ter slabe politike kreditiranja končajo z bančno krizo v letih 1998-1999. V času po krizi država pospešeno privatizira banke s pomočjo tujih investitorjev (Jovančević, 2000; Šonje & Vujčić, 1999). Leta 2002 tuje banke nadzorujejo 90.2% bančnih sredstev (European Bank for Reconstruction and Development, 2013). Tuje lastništvo še vedno prevladuje v hrvaškem bančnem sistemu in v letu 2011 obsega visokih 90.6% celotnih bančnih sredstev. Preko hčerinskih bank je hrvaški bančni sistem tudi močno integriran z globalnimi finančnimi trgi, ki se kaže visoki zadolženosti do tujih bank, kljub doseganju najvišje vrednosti depozitov v BDP in uravnoteženosti z bančnimi krediti.

Bančni sistem Bosne in Hercegovine se od ostalih držav razlikuje predvsem po svoji ureditvi in ustavni razdelitvi na dve entiteti v skladu z Daytonskim sporazumom, ki je končal vojno

1992-1995. Federacija Bosna in Hercegovina kot tudi Republika Srbska imata vsaka svojo bančno agencijo, ki ja zadolžena za reguliranje in nadzor bank. Centralna banka na bančni sistem v veliki meri vpliva le preko spreminjanja obveznih rezerv, edinega razpoložljivega instrumenta monetarne politike v okviru valutnega odbora. Politični antagonizem je glavni krivec (tudi danes) za prelaganje finančne reforme (Tesche, 2000). Vstop tujih bank, pomoč mednarodnih skladov in izboljšanja razpoložljivosti depozitov po uvedbi evra (Cottarelli, et al., 2005) prispevajo k pospešenemu razvoju bančnega sistema po letu 2000. Pehar (2008) in Četković (2011), označita obdobje pred krizo kot obdobje presežne rasti kreditov privatnemu sektorju. Značilnosti bosanskega bančnega sistema ne izstopajo v nobeni smeri.

Proces reformiranja bančnega sistema se je v Makedoniji zaradi moči interesnih skupin pričel z zamikom. Kot posledica pasivne privatizacije imajo omenjene skupine v obdobju pred letom 1995 le en interes, dostop do mehkih posojil. To se je končalo z dvakratno dokapitalizacijo največje makedonske banke in prodajo le-te leta 2000, ko so vidni prvi znaki stabilizacije in napredka po seriji notranjih in zunanjih šokov (Petkovski & Bishev, 2004; Nenovski & Smilkovski, 2012). V letu 2000 se poveča tuje lastništvo na 53.4% ter stagnira do 2008, ko doseže 85.9% bančnih sredstev. Zaradi problemov z albansko manjšino se v letu 2001 razvoj ponovno ustavi in se pospešeno nadaljuje šele po letu 2006. Bančni sistem v času pred krizo tako ostane razmeroma nerazvit, kar pa mnogi avtorji poudarjajo kot prednost vidika posledic krize (Nenovski & Smilkovski, 2012). V okviru značilnosti bančnega sistema v obdobju od 2006-2012 je potrebno izpostaviti zelo ugodno strukturo financiranja, tako z vidika depozitov kot z vidika zunanje zadolženosti. Depoziti v letu 2011 predstavljajo 48.68% BDP in v celoti pokrivajo kredite privatnemu sektorju z 42.5% BDP. Zunanja zadolženost presega mejo 10% le v letu 2011.

Politična in ekonomska nestabilnost s hiperinflacijo, prelaganje reform in postavitve temeljev tržnega gospodarstva so značilnosti Srbije v 90-h letih, ki jih poimenujejo tudi izgubljeno desetletje. Politične spremembe v letu 2000 omogočijo pospešen proces razvoja in konvergence bančnega sistema z ostalimi državami v regiji (Uvalić, 2007). Vlada leta 2002 odvzame licence štirim glavnim bankam ter podeli pet licenc tujim bankam, ter tako k rehabilitaciji bančnega sistema pristopi drugače (Filipović & Hadžić, 2012). Prične se integracija v evropski bančni sistem in z njo obdobje izdatnega zadolževanja nefinančnega sektorja in gospodinjstev, evroizacije ter naraščanje skrb-vzbujajočih nestabilnosti (Barisitz & Gardó, 2008). V primerjavi z že obravnavanimi državami ima Srbija nižji delež tujega lastništva, in sicer 74.5%. Z vidika razpoložljivosti depozitov je vrednost indikatorja depoziti v BDP najnižja in ne zadošča za pokritje kreditov v BDP.

Razvoj slovenskega bančnega sistema se od ostalih držav razlikuje po tem, da je bil vstop tujih bank v bančni sektor onemogočen do leta 1999 (European Bank for Reconstruction and Development, 1999), in po tem, da ni izkusila bančne krize v 90-h letih prejšnjega stoletja. Rezultat uspešno zaključene rehabilitacije bank leta 1997, natančneje dveh največjih državnih bank in ene manjše, je visoko koncentriran bančni sektor. Leta 1998 predstavljajo sredstva

treh največjih bank, od tega dveh državnih, okrog polovice bančnih sredstev (Štiblar & Voljč, 2004). Prevlada državnega lastništva se zaradi neuspešne privatizacije bank ohrani do danes. Leta 2012 delež tujih bank v celotnih bančnih sredstvih posledično znaša le 29.3%. V skladu z razvitostjo ekonomije, je delež depozitov v BDP relativno visok, vendar pa jih krediti v BDP močno presegajo. Značilna je visoka zunanja zadolženost in znaten upad po letu 2007.

## **Empirična raziskava**

Raziskava temelji na podatkih iz računovodskih izkazov 112 bank iz Bosne in Hercegovine, Hrvaške, Makedonije, Srbije in Slovenije. Za oceno enačbe smo uporabili programsko orodje GRETL in dvostopenjsko metodo najmanjših kvadratov z instrumentalnimi spremenljivkami.

## **Opisna statistika**

V okviru analize vzorca preučimo celotna bančna sredstva ter deskriptivno statistiko odvisne spremenljivke, t.j. neto posojila, ter pojasnjevalne spremenljivke, t.j. depozite podjetij in prebivalstva, medbančno poslovanje in dolgoročno zadolževanje.

Celotna bančna sredstva do neke mere sovpadajo z gibanjem bruto domačega proizvoda; naraščajo v letih 2006, 2007 ter leta 2008 po zmanjšani stopnji rasti. V letu 2009 so celotna bančna sredstva upadla v Sloveniji, na Hrvaškem in v Bosni in Hercegovini, medtem ko se je rast nadaljevala v Makedoniji in Srbiji. V letih 2010 in 2011 celotna bančna sredstva stagnirajo, z izjemo Slovenije, ki beleži upadanje bančnih sredstev v celotnem obdobju od leta 2009 do 2012.

Za mediano vrednosti neto posojil, ki so izražena kot delež v celotnih obrestno-nosnih sredstvih, je značilna relativno nizka stopnja spreminjanja v proučevanem obdobju. Od leta 2006 do leta 2008 neto posojila naraščajo v vseh proučevanih državah. V letu 2009 pride do prekinitve naraščajočega trenda, v letu 2010 in 2011 se pokažejo prvi znaki okrevanja po krizi. Najmanjši delež posojil v celotnih obrestno-nosnih sredstvih je značilen za najbolj razvita bančna sistema, in sicer za slovenskega in hrvaškega. Razmeroma nerazvita bančna sistema Bosne in Hercegovine in Makedonije imata visok delež neto posojil v celotnih obrestno-nosnih sredstvih.

**Hipoteza 11:** Banke iz Slovenije so zagotovile manj posojil kot banke iz Makedonije.

**Hipoteza 12:** Banke iz Hrvaške so zagotovile manj posojil kot banke iz Makedonije.

**Hipoteza 13:** Banke iz Srbije so zagotovile manj posojil kot banke iz Makedonije.

**Hipoteza 14:** Banke iz Bosne in Hercegovine so zagotovile manj posojil kot banke iz Makedonije.

Analiza depozitov podjetij in prebivalstva za srednjo banko pokaže, da Slovenija vidno izstopa in sicer z najmanjšo vrednostjo depozitov v celotnih obveznostih do virov sredstev,

zmanjšanih za kapital. Depoziti kot vir financiranja, predstavljajo manj kot 60% v letih 2007-2008 in presežejo omenjeno mejo v naslednjih letih. Na zgornji meji izstopata Makedonija in Hrvaška, katerih depoziti za srednjo banko dosežejo več kot 80% celotnih obveznosti do virov sredstev, zmanjšanih za kapital. V primerjavi z omenjenima državama je financiranje z depoziti podjetij in prebivalstva v Bosni in Hercegovini nižje, kljub temu pa relativno visoko in stabilno od 2006 do 2012. Delež depozitov v celotnih obveznostih do virov sredstev, zmanjšanih za kapital, se zmanjšuje za srbsko srednjo banko.

Slika medbančnega poslovanja, ki je enako izraženo v celotnih obveznostih do virov sredstev, zmanjšanih za kapital, kaže podobno kot v primeru bančnih depozitov. Glede na to, da je spremenljivka izračunana kot razlika med depoziti od bank in posojili bankam, negativne vrednosti predstavljajo slabše izhodišče oziroma nakazujejo na manj ugodno strukturo financiranja. Na spodnji meji zopet izstopa srednja banka iz Slovenije, ki je med obravnavanimi državami edini neto dolžnik skozi celotno obdobje. Zadolženost se predvsem poveča v letu 2009, ter se nato zmanjšuje v letih 2010 in 2011. Podobno se po letu 2008 poslabša pozicija na medbančnem trgu v primeru Bosne in Hercegovine, posebno za banke iz prvih dveh decilov v letih 2010 in 2012. Hrvaška srednja banka je v najboljšem položaju od leta 2007 naprej, vendar pa presežna likvidnost upada. Tudi za Srbijo in Makedonijo je značilno sorodno gibanje.

Dolgoročno financiranje je izraženo v celotnih obveznostih do virov sredstev, zmanjšanih za kapital. Ponovno Slovenija izstopa z največjim deležem dolgoročno financiranja. Po doseženem vrhu leta 2009 se začne proces razdolževanja, odvisnost od dolgoročnega financiranja upada, a se ponovno okrepi v letih 2011 in 2012. Srbska srednja banka je bila v nasprotju s slovensko najmanj odvisna od dolgoročnega financiranja v času pred krizo, se pa odvisnost povečuje. Dolgoročni viri so stabilni za srednjo banko iz Bosne in Hercegovine, Makedonije in Hrvaške.

## Rezultati raziskave

Iz pregleda literature o dejavnikih rasti bančnih posojil, strukturnih značilnost bančnih sistemov in opisne statistike izpeljemo spodnjo enačbo. Specificirana je tako, da Makedonija predstavlja referenčno državo.

$$L_i = b_0 + b_1 I_i + b_2 D_i + b_3 L_{t_i} + b_4 E_i + b_5 P_i + b_6 Size_i + b_7 Foreign_i + b_8 BA_i + b_9 HR_i + b_{10} RS_i + b_{11} SI_i \quad (3)$$

kjer

$L_i$  označuje neto posojila za banko  $i$ ,  $I_i$  označuje medbančno poslovanje za banko  $i$ ,  $D_i$  označuje depozite podjetij in prebivalstva za banko  $i$ ,  $L_{t_i}$  označuje dolgoročno zadolževanje za banko  $i$ ,  $C_i$  označuje osnovni kapital za banko  $i$ ,  $P_i$  označuje oslabitve za banko  $i$ ,  $Size_i$  označuje velikost banke  $i$  v državi  $j$ ,  $Foreign_i$  označuje nepravo spremenljivko za tuje

lastništvo z vrednostjo 1 za tuje lastništvo in vrednostjo 0 v nasprotnem primeru, *BA* označuje nepravo spremenljivko za Bosno in Hercegovino z vrednostjo 1 za banke iz Bosne in Hercegovine in vrednostjo 0 v nasprotnem primeru, *HR* označuje nepravo spremenljivko za Hrvaško z vrednostjo 1 za banke iz Hrvaške in vrednostjo 0 v nasprotnem primeru, *RS* označuje nepravo spremenljivko za Srbijo z vrednostjo 1 za banke iz Srbije in vrednostjo 0 v nasprotnem primeru, *SI* označuje nepravo spremenljivko za Slovenijo z vrednostjo 1 za banke iz Slovenije in vrednostjo 0 v nasprotnem primeru.

V proučevanih obdobjih, obdobju pred krizo (2007-2008), med krizo (2009-2010) in v času izhoda iz krize (2011-2012), so koeficienti depozitov podjetij in prebivalstva ter dolgoročnih sredstev statistično značilni in pozitivni. Koeficienti medbančnega poslovanja so prav tako statistično značilni, ampak glede na kompozicijo spremenljivke negativni.

Hipoteza 1 je podprta z rezultati empirične raziskave, in sicer je vpliv na rast bančnih posojil v vseh obravnavanih obdobjih pozitiven ter nezanemarljiv. Velikost koeficienta dosega največje vrednosti v obdobju pred krizo, sledita obdobji izhoda iz krize in obdobje krize. Zanimivo je tudi, da rezultati ne kažejo neodzivnosti in neinformiranosti depozitarjev, saj se velikost koeficienta bistveno zmanjša, najprej v letu začetka krize 2008 in nato še v letu 2009.

Tudi Hipoteza 2 je potrjena. Spremembe v velikostih koeficientov depozitov podjetij in prebivalstva, dolgoročnih sredstev in medbančnega poslovanja (upoštevajoč kompozicijo spremenljivke) se namreč gibajo v enaki smeri v vseh obravnavanih obdobjih. Razlikujejo se po velikosti koeficienta. V obdobju pred krizo imajo vsi viri financiranja močan vpliv na rast posojil, v obdobju krize je vpliv na rast posojil bistveno nižji in najnižji v letu 2009. Zaskrbljujoč je podatek, da velikost koeficientov v letu 2012 ponovno pade. Postavi se vprašanje, če smo ponovno na poti v krizo.

Kljub teoretičnim predpostavkam o neodzivnosti in neinformiranosti nebančnih depozitarjev, Hipoteza 3 ni potrjena. Spremenljivost koeficienta depozitov podjetij in prebivalstva tako ni najmanjša. Znaten upad velikosti koeficienta v letu 2009 do neke mere potrjuje, da depozitarji odgovorijo na močno negativno javno dostopno informacijo z dvigom vlog. V primeru, da informacije o naraščanju tveganja niso dovolj močne, da bi dosegle v principu neinformirane depozitarje, vpliv depozitov na rast posojil stagnira (2009, 2010, 2012).

Osnovna hipoteza 4 je potrjena in v skladu slednjo, medbančno poslovanje pozitivno vpliva na rast posojil (upoštevajoč kompozicijo spremenljivke). V obdobju pred krizo je vpliv na rast posojil večji kot v obdobju med krizo in v obdobju izhoda iz krize. Hipoteza, ki predpostavlja, da je vpliv medbančnega poslovanja večji v času izhoda iz krize kot med krizo, ni potrjena. V letu 2012 je namreč velikost koeficienta manjša kot v letu 2010.

Skladno s hipotezo 5 ima dolgoročno zadolževanje pozitiven vpliv na rast posojil, in sicer koeficient dosega najvišje vrednosti v obdobju pred krizo, sledi obdobje izhoda iz krize in obdobje krize. V nasprotju hipoteze 6 ne moremo potrditi v celoti. Dolgoročno zadolževanje,

ne glede na ujemanje v ročnosti in likvidnosti, ne presega vpliva medbančnega poslovanja v letu 2009.

Hipoteza 7 ni potrjena, saj je koeficient osnovnega kapitala v obravnavanem obdobju z izjemo kriznega leta 2009 statistično neznačilen. To nakazuje, da se pomen kapitala okrepi v času krize, v času povečanega tveganja (kot to dojemajo banke), in posledično vodi v večjo previdnost investitorjev.

Rezultati raziskave ne podpirajo hipotez od 8 do 11. Koeficienti pojasnjevalnih spremenljivk oslabitev, neprave spremenljivke za tuje lastništvo in neprave spremenljivke za sodelovanje v Vienna Initiative 1.0. so statistično neznačilni. Glede na to, da nimajo dodatne pojasnjevalne moči, smo jih z namenom izboljšanja modela (statistike se pokazale, da je model boljši v primeru izključitve) izključili iz analize.

Državi specifične značilnosti, ki so zajete z nepravimi spremenljivkami, so v celotnem obdobju značilne le za Slovenijo. Koeficienti so negativni, kar je v skladu s pričakovanji in strukturnimi značilnostmi slovenskih bank; relativno nizka kapitalska ustreznost, večja odvisnost od medbančnih trgov in dolgoročnega zadolževanja ter naraščajoča stopnja slabih posojil. Koeficienti za Hrvaško so statistično značilni in negativni le v najmanj ugodnih letih z vidika gospodarske aktivnosti, t.j. v letu 2009 in v letu 2012. Predpostavljamo, da koeficienti nepravih spremenljivk za Bosno in Hercegovino in Srbijo niso statistično značilni, zaradi podobnosti v strukturnih značilnostih z referenčno državo Makedonije in relativno slabšo razvitostjo sistemov.

## **Sklep**

Po pričakovanjih so vplivi depozitov podjetij in prebivalstva, medbančnega poslovanja in dolgoročnega zadolževanja prociklični. To pomeni, da v obdobju pred krizo (obdobje gospodarskega razcveta) vsi viri financiranja vplivajo na pospešeno oziroma presežno rast kreditov. V obdobju med krizo se velikosti koeficientov občutno zmanjša in ponovno vsi viri financiranja neugodno vplivajo na rast posojil v primerjavi z obdobjem pred krizo. V obdobju izhoda iz krize koeficienti dosegajo vrednosti med tistimi iz obdobja pred in med krizo. Zaskrbljujoči so predvsem rezultati za leto 2012, ki nakazujejo, da krize morda še ni konec. Konkretno se velikost koeficientov ponovno zmanjša in se približa, v primeru depozitov podjetij in prebivalstva ter medbančnega poslovanja, tistim iz obdobja krize.



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## **APPENDIXES**





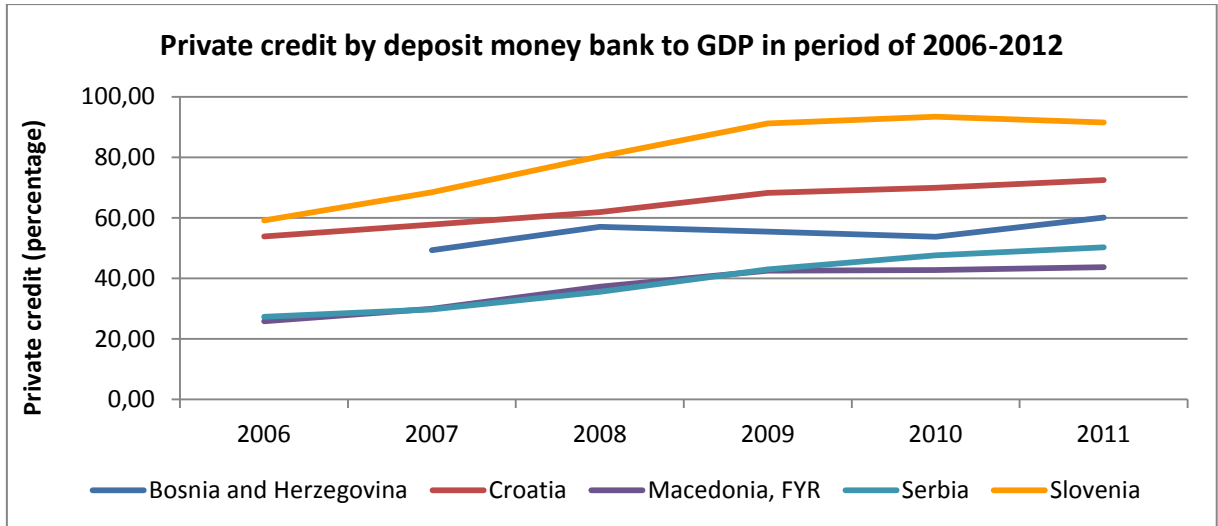
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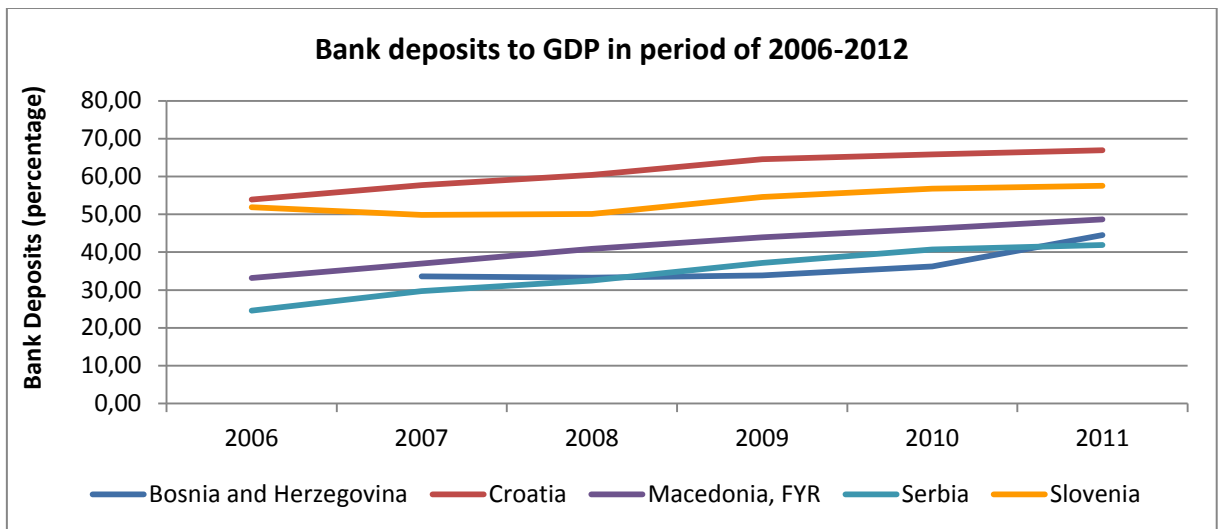
## Appendix A: Determinants of Banking System

Figure 1. Private credit by deposit money bank to GDP in period of 2006-2012



Source: The World Bank, *Financial Development and Structure Dataset (updated April 2013)*, 2013c.

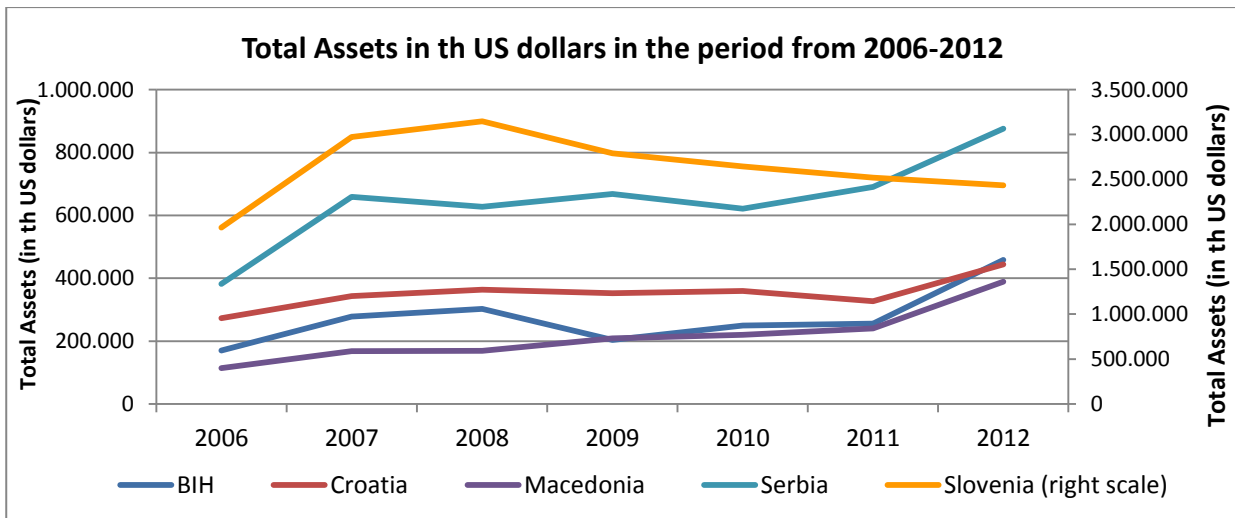
Figure 2. Bank deposits to GDP in period of 2006-2012



Source: The World Bank, *Financial Development and Structure Dataset (updated April 2013)*, 2013c.

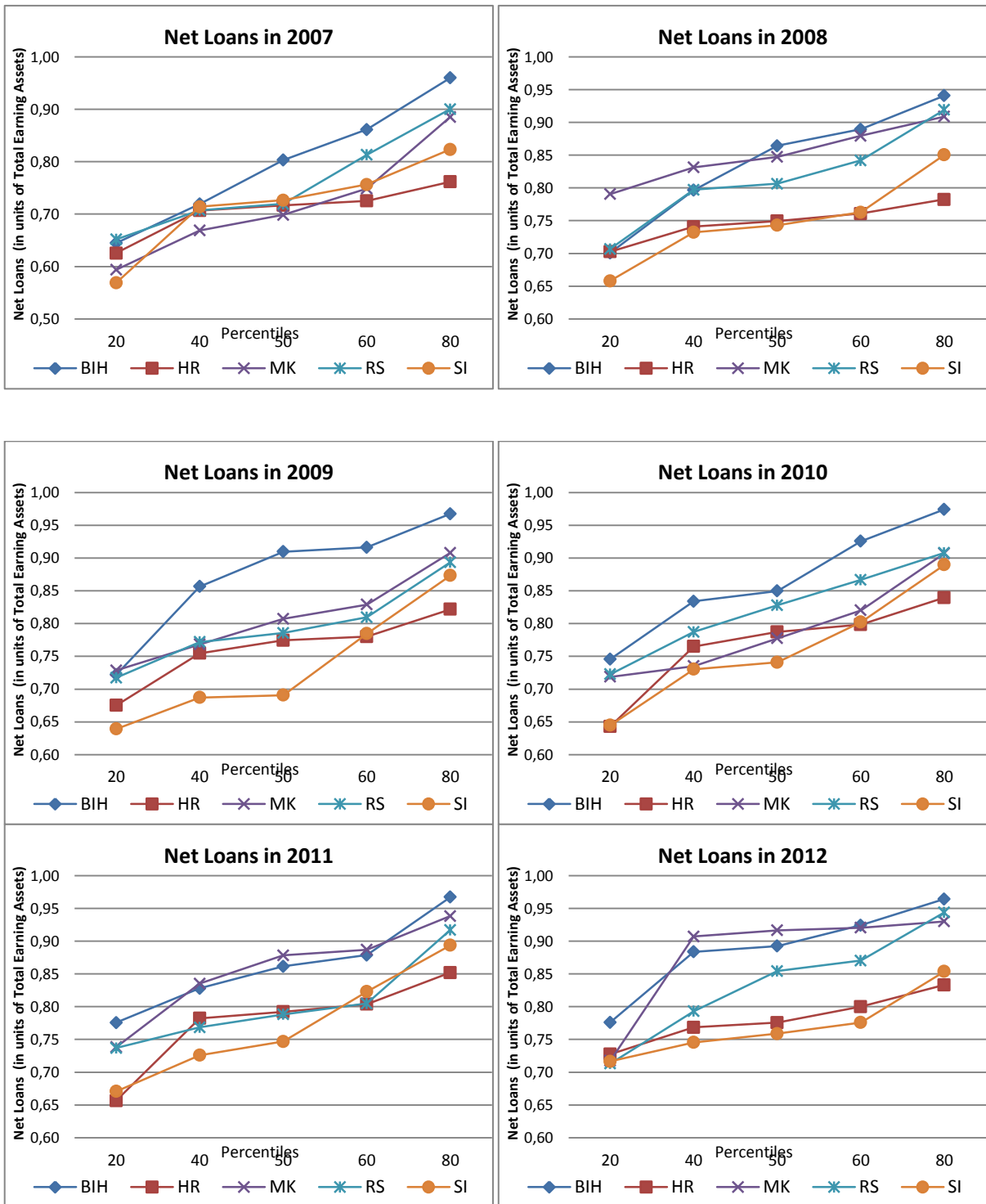
## Appendix B: Description of the sample

Figure 3. Total Assets in thousands US dollars in the period from 2006-2012



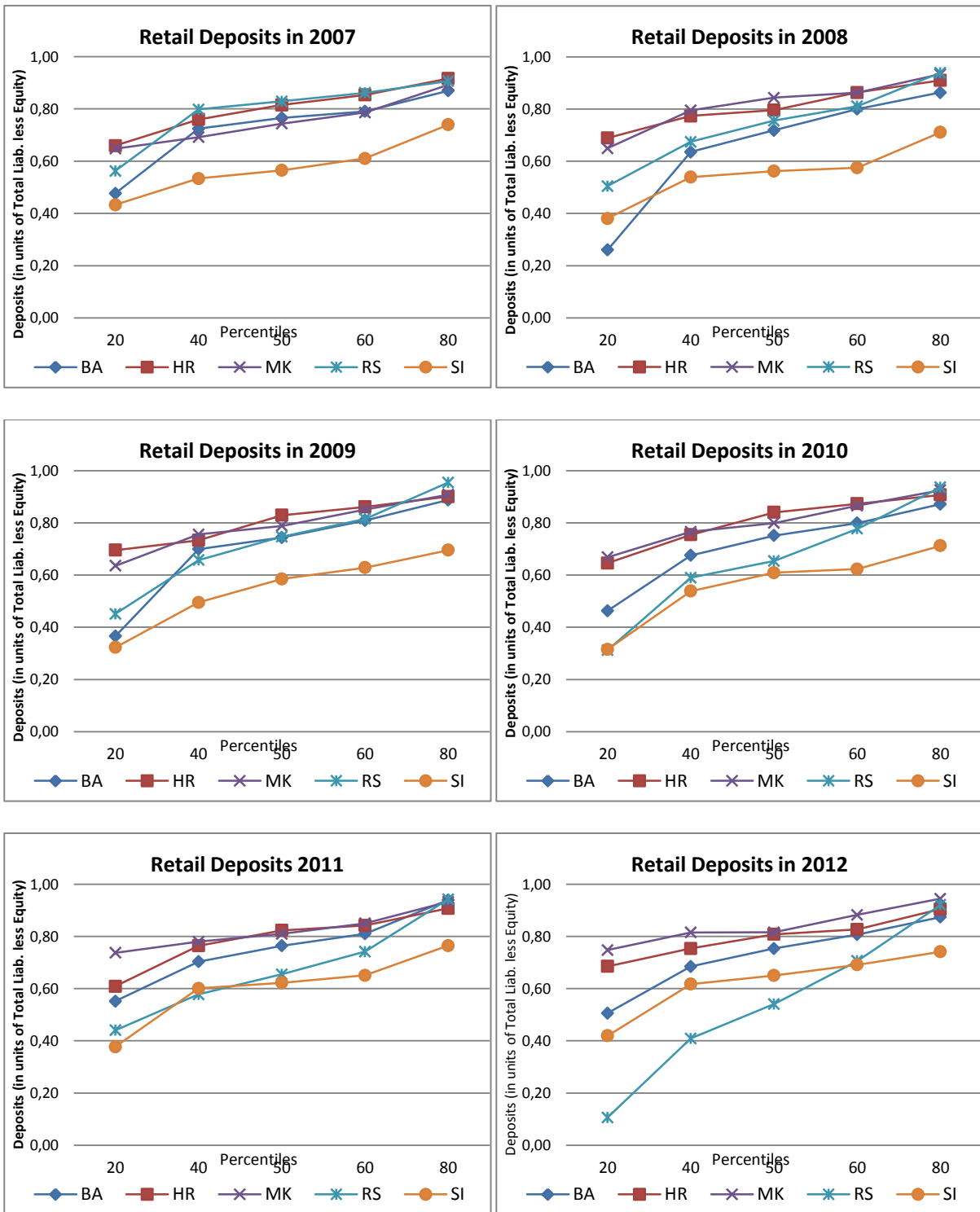
Source: Bureau Van Dijk, *Bankscope database*, 2013.

Figure 4. Net loans in units of total earning assets in the period 2007-2012



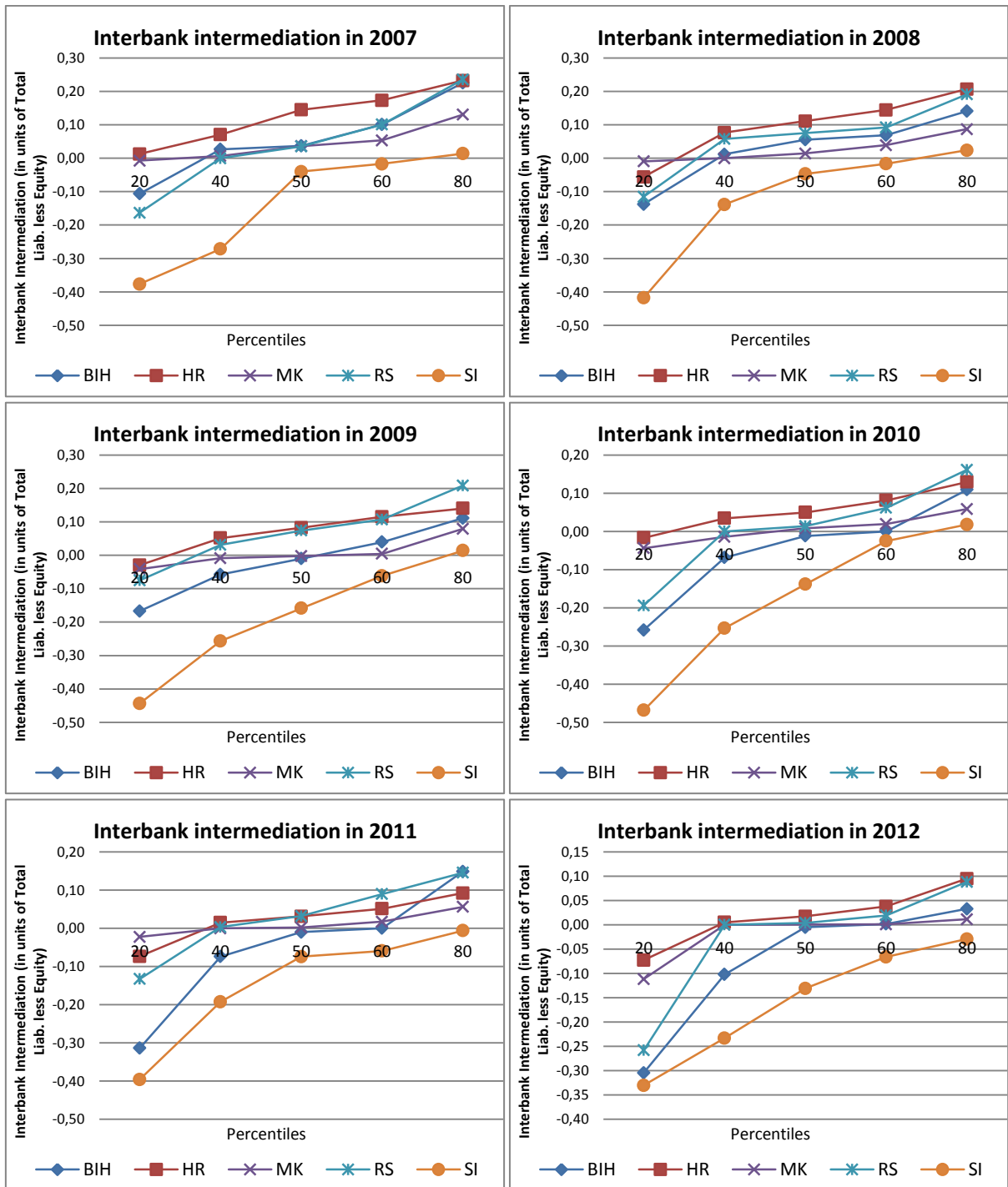
Source: Bureau Van Dijk, *Bankscope database*, 2013.

Figure 5. Retail deposits in units of total liabilities less equity in the period 2007-2012



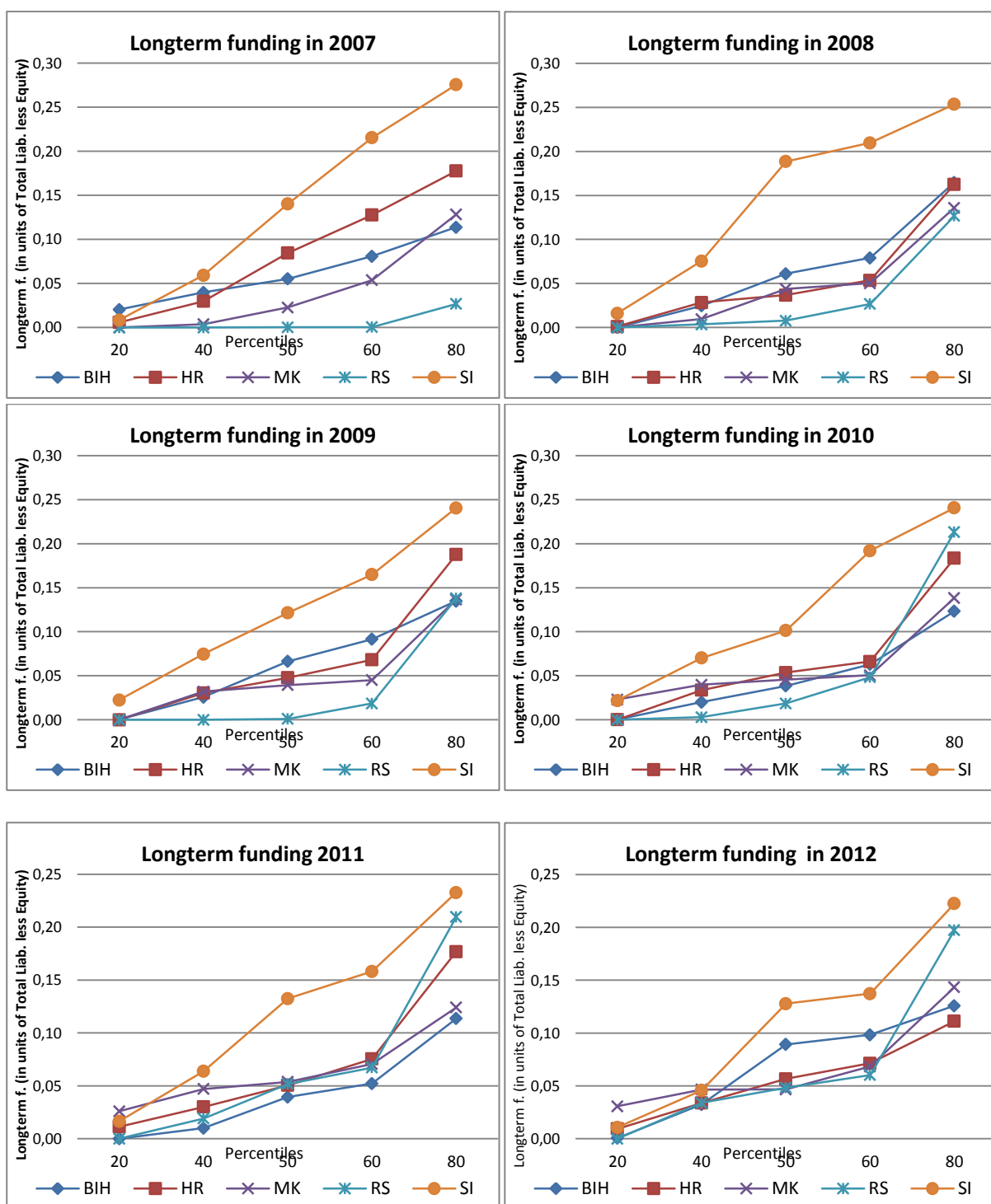
Source: Bureau Van Dijk, *Bankscope database*, 2013.

Figure 6. Interbank intermediation in units of total liabilities less equity in the period 2007-2012



Source: Bureau Van Dijk, *Bankscope database*, 2013.

Figure 7. Longterm funding in units of total liabilities less equity in the period 2007-2012



Source: Bureau Van Dijk, *Bankscope database*, 2013.



### **Appendix C: GRETTL output for the estimated regression equation (3)**

NL\_TEA: net loans

Net\_Intebank\_TLNC : interbank (net position) intermediation

TCD\_TLNC: retail deposits

Longterm\_TLNC: long-term funding

lag\_Equity\_TA: equity

lag\_Size: proxy for the size

BA: a dummy variable for Bosnia and Herzegovina

HR: a dummy variable for Croatia

RS: a dummy variable for Serbia

SI; a dummy variable for Slovenia

Table 1. GRETTL output for the estimated regression equation (3) year 2007

Model 31: TSLS, using observations 1-110 (n = 73)  
 Missing or incomplete observations dropped: 37  
 Dependent variable: NL\_TEA 2007  
 Instrumented: Net\_Intebank\_TLNC TCD\_TLNC Longterm\_TLNC  
 Instruments: const lag\_Net\_Intebank\_TLNC lag\_TCD\_TLNC lag\_longterm\_TLNC  
 lag\_Equity\_TA lag\_Size SI RS BA HR Employees\_TA

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>	
const	0,276639	0,134754	2,0529	0,04008	**
lag_Equity_TA	0,141129	0,108663	1,2988	0,19402	
lag_Size	-0,15374	0,151067	-1,0177	0,30882	
SI	-0,135291	0,0458642	-2,9498	0,00318	***
RS	0,0107964	0,0434358	0,2486	0,80370	
BA	0,0181124	0,045043	0,4021	0,68760	
HR	-0,0530364	0,0438012	-1,2108	0,22596	
Net_Intebank_TL NC	-0,755688	0,107563	-7,0256	<0,00001	***
TCD_TLNC	0,587896	0,137208	4,2847	0,00002	***
Longterm_TLNC	0,808899	0,154837	5,2242	<0,00001	***

Mean dependent var	0,732516	S.D. dependent var	0,133047
Sum squared resid	0,392207	S.E. of regression	0,078902
R-squared	0,692283	Adjusted R-squared	0,648324
F(9, 63)	9,494092	P-value(F)	5,66e-09

Hausman test -

Null hypothesis: OLS estimates are consistent

Asymptotic test statistic: Chi-square(3) = 3,26966

with p-value = 0,351888

Sargan over-identification test -

Null hypothesis: all instruments are valid

Test statistic: LM = 0,0026482

with p-value =  $P(\text{Chi-square}(1) > 0,0026482) = 0,958958$

Weak instrument test -

Cragg-Donald minimum eigenvalue = 15,6369

Source: Bureau Van Dijk, *Bankscope database*, 2013.

Table 2. GRET output for the estimated regression equation (3) year 2008

Model 32: TSLS, using observations 2-109 (n = 74)  
 Missing or incomplete observations dropped: 34  
 Dependent variable: NL\_TEA 2008  
 Instrumented: Net\_Intebank\_TLNC TCD\_TLNC Longterm\_TLNC  
 Instruments: const lag\_Net\_Intebank\_TLNC lag\_TCD\_TLNC lag\_longterm\_TLNC  
 lag\_Equity\_TA lag\_Size SI RS BA HR Employees\_TA

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>	
const	0,404388	0,183673	2,2017	0,02769	**
lag_Equity_TA	0,131824	0,110492	1,1931	0,23285	
lag_Size	-0,0824348	0,201591	-0,4089	0,68260	
SI	-0,141531	0,042839	-3,3038	0,00095	***
RS	0,0654717	0,0490415	1,3350	0,18187	
BA	0,0251885	0,0444013	0,5673	0,57052	
HR	-0,0529043	0,0411136	-1,2868	0,19817	
Net_Intebank_TL NC	-0,751091	0,17454	-4,3033	0,00002	***
TCD_TLNC	0,473746	0,18357	2,5807	0,00986	***
Longterm_TLNC	0,674954	0,253397	2,6636	0,00773	***

Mean dependent var	0,791598	S.D. dependent var	0,098494
Sum squared resid	0,310741	S.E. of regression	0,069680
R-squared	0,624717	Adjusted R-squared	0,571942
F(9, 64)	6,761064	P-value(F)	9,45e-07

Hausman test -

Null hypothesis: OLS estimates are consistent

Asymptotic test statistic: Chi-square(3) = 8,36744

with p-value = 0,0389979

Sargan over-identification test -

Null hypothesis: all instruments are valid

Test statistic: LM = 0,660583

with p-value = P(Chi-square(1) > 0,660583) = 0,416354

Weak instrument test -

Cragg-Donald minimum eigenvalue = 3,09629

Source: Bureau Van Dijk, *Bankscope database*, 2013.

Table 3. GRETTL output for the estimated regression equation (3) year 2009

Model 35: TSLS, using observations 1-112 (n = 77)

Missing or incomplete observations dropped: 35

Dependent variable: NL\_TEA 2009

Instrumented: Net\_Intebank\_TLNC TCD\_TLNC Longterm\_TLNC

Instruments: const lag\_Net\_Intebank\_TLNC lag\_TCD\_TLNC lag\_longterm\_TLNC

lag\_Equity\_TA lag\_Size SI RS BA HR Employees\_TA

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>	
const	0,622242	0,10267	6,0606	<0,00001	***
lag_Equity_TA	0,197869	0,104813	1,8878	0,05905	*
lag_Size	-0,0560598	0,155824	-0,3598	0,71902	
SI	-0,178376	0,0435679	-4,0942	0,00004	***
RS	-0,0550509	0,04195	-1,3123	0,18942	
BA	0,0107904	0,0423501	0,2548	0,79889	
HR	-0,0779689	0,0414025	-1,8832	0,05967	*
Net_Intebank_TLNC	-0,488518	0,0980928	-4,9802	<0,00001	***
TCD_TLNC	0,226933	0,100682	2,2540	0,02420	**
Longterm_TLNC	0,352284	0,158384	2,2242	0,02613	**

Mean dependent var	0,781167	S.D. dependent var	0,103729
Sum squared resid	0,352235	S.E. of regression	0,072507
R-squared	0,569259	Adjusted R-squared	0,511398
F(9, 67)	8,016233	P-value(F)	6,04e-08

Hausman test -

Null hypothesis: OLS estimates are consistent

Asymptotic test statistic: Chi-square(3) = 3,37161

with p-value = 0,3378

Sargan over-identification test -

Null hypothesis: all instruments are valid

Test statistic: LM = 0,337626

with p-value =  $P(\text{Chi-square}(1) > 0,337626) = 0,561203$

Weak instrument test -

Cragg-Donald minimum eigenvalue = 22,5098

Source: Bureau Van Dijk, *Bankscope database*, 2013.

Table 4. GRET output for the estimated regression equation (3) year 2010

Model 36: TSLS, using observations 1-112 (n = 78)  
 Missing or incomplete observations dropped: 34  
 Dependent variable: NL\_TEA 2010  
 Instrumented: Net\_Intebank\_TLNC TCD\_TLNC Longterm\_TLNC  
 Instruments: const lag\_Net\_Intebank\_TLNC lag\_TCD\_TLNC lag\_longterm\_TLNC  
 lag\_Equity\_TA lag\_Size SI RS BA HR Employees\_TA

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>	
const	0,622469	0,128837	4,8314	<0,00001	***
lag_Equity_TA	0,184512	0,155438	1,1870	0,23521	
lag_Size	-0,00853418	0,185305	-0,0461	0,96327	
SI	-0,162293	0,0732826	-2,2146	0,02679	**
RS	-0,0335841	0,0726076	-0,4625	0,64369	
BA	0,00225691	0,0727132	0,0310	0,97524	
HR	-0,0794631	0,0715013	-1,1114	0,26642	
Net_Intebank_TLNC	-0,504028	0,102844	-4,9009	<0,00001	***
TCD_TLNC	0,213222	0,105241	2,0260	0,04276	**
Longterm_TLNC	0,519756	0,15658	3,3194	0,00090	***

Mean dependent var	0,789269	S.D. dependent var	0,120725
Sum squared resid	0,560402	S.E. of regression	0,090781
R-squared	0,503406	Adjusted R-squared	0,437680
F(9, 68)	5,076281	P-value(F)	0,000030

Hausman test -

Null hypothesis: OLS estimates are consistent

Asymptotic test statistic: Chi-square(3) = 4,42043

with p-value = 0,219499

Sargan over-identification test -

Null hypothesis: all instruments are valid

Test statistic: LM = 0,55177

with p-value = P(Chi-square(1) > 0,55177) = 0,457595

Weak instrument test -

Cragg-Donald minimum eigenvalue = 35,2411

Source: Bureau Van Dijk, *Bankscope database*, 2013.

Table 5. GRETTL output for the estimated regression equation (3) year 2011

Model 37: TSLS, using observations 1-112 (n = 85)

Missing or incomplete observations dropped: 27

Dependent variable: NL\_TEA 2011

Instrumented: Net\_Intebank\_TLNC TCD\_TLNC Longterm\_TLNC

Instruments: const lag\_Net\_Intebank\_TLNC lag\_TCD\_TLNC lag\_longterm\_TLNC

lag\_Equity\_TA lag\_Size SI RS BA HR Employees\_TA

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>	
const	0,521541	0,143547	3,6332	0,00028	***
lag_Equity_TA	0,243121	0,159554	1,5238	0,12757	
lag_Size	0,0741865	0,169975	0,4365	0,66251	
SI	-0,151905	0,0509887	-2,9792	0,00289	***
RS	-0,0456426	0,0509629	-0,8956	0,37046	
BA	-0,0323724	0,0486787	-0,6650	0,50604	
HR	-0,0680308	0,0490648	-1,3866	0,16558	
Net_Intebank_TL NC	-0,554119	0,126594	-4,3771	0,00001	***
TCD_TLNC	0,327215	0,126396	2,5888	0,00963	***
Longterm_TLNC	0,614764	0,202568	3,0349	0,00241	***

Mean dependent var	0,807234	S.D. dependent var	0,106796
Sum squared resid	0,563813	S.E. of regression	0,086704
R-squared	0,411783	Adjusted R-squared	0,341198
F(9, 75)	4,952792	P-value(F)	0,000032

Hausman test -

Null hypothesis: OLS estimates are consistent

Asymptotic test statistic: Chi-square(3) = 3,86012

with p-value = 0,27697

Sargan over-identification test -

Null hypothesis: all instruments are valid

Test statistic: LM = 1,10243

with p-value = P(Chi-square(1) > 1,10243) = 0,293733

Weak instrument test -

Cragg-Donald minimum eigenvalue = 25,1025

Source: Bureau Van Dijk, *Bankscope database*, 2013.

Table 6. GRET output for the estimated regression equation (3) year 2012

Model 38: TSLS, using observations 2-110 (n = 63)  
 Missing or incomplete observations dropped: 46  
 Dependent variable: NL\_TEA 2012  
 Instrumented: Net\_Intebank\_TLNC TCD\_TLNC Longterm\_TLNC  
 Instruments: const lag\_Net\_Intebank\_TLNC lag\_TCD\_TLNC lag\_longterm\_TLNC  
 lag\_Equity\_TA lag\_Size SI RS BA HR Employees\_TA

	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>	
const	0,796813	0,149656	5,3243	<0,00001	***
lag_Equity_TA	0,0809163	0,260598	0,3105	0,75618	
lag_Size	-0,211435	0,234774	-0,9006	0,36781	
SI	-0,200953	0,0564219	-3,5616	0,00037	***
RS	-0,0614867	0,056057	-1,0969	0,27270	
BA	-0,0581043	0,0508064	-1,1436	0,25277	
HR	-0,128101	0,0497563	-2,5746	0,01004	**
Net_Intebank_TL NC	-0,321396	0,164544	-1,9533	0,05079	*
TCD_TLNC	0,120486	0,128044	0,9410	0,34672	
Longterm_TLNC	0,35102	0,217203	1,6161	0,10607	

Mean dependent var	0,830601	S.D. dependent var	0,094597
Sum squared resid	0,381763	S.E. of regression	0,084871
R-squared	0,319787	Adjusted R-squared	0,204279
F(9, 53)	3,282705	P-value(F)	0,003027

Hausman test -

Null hypothesis: OLS estimates are consistent

Asymptotic test statistic: Chi-square(3) = 5,77663

with p-value = 0,122998

Sargan over-identification test -

Null hypothesis: all instruments are valid

Test statistic: LM = 0,213161

with p-value = P(Chi-square(1) > 0,213161) = 0,644301

Weak instrument test -

Cragg-Donald minimum eigenvalue = 9,67673

Source: Bureau Van Dijk, *Bankscope database*, 2013.