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The Impact of Institutional Quality on Bank Lending Activity: Evidence from Bayesian Model Averaging

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Abstract

Svatopluk Kapounek: **The Impact of Institutional Quality on Bank Lending Activity: Evidence from Bayesian Model Averaging**

The paper investigates the link between macroeconomic shocks, the institutional environment and the responses of bank lending activities to the financial crisis. We assume that property rights and the enforcement of rules are crucial for well-functioning markets, especially in transition and emerging market economies where new institutions were created. The empirical analysis adopts panel regression models with bank fixed effects. Our rich dataset contains 10,565 banks from 66 countries across the whole world. The uncertainty caused by fat data (17 indices of institutional environment) is reduced by Bayesian model averaging. Additionally, we differentiate between the banks related to their specific conditions, especially size and location. Special emphasis is placed on the dynamic of probability changes to involve selected variables into the model after the financial crisis. The empirical results confirm positive impact of economic activity and selected institutions related to globalization, freedom, government spending, low corruption and low marginal tax rates. We also identify a positive impact of increasing financial assets of central banks on the lending activity of small banks.

Key words

Institutions, regulation, banks, lending, Bayesian model averaging

JEL: G21, O17, C11

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Introduction

The drop in bank lending activity was generally caused by the worsening quality of credit portfolios, liquidity shocks, and lack of investment demand after the financial crisis (Busch et al., 2010; Ciccarelli, et al., 2010; Bassett et al., 2014; Fidrmuc, et al., 2015; Košak et al., 2015; Gambetti and Musso, 2016). However, economic uncertainty during the crisis period points to the important role of institutional factors, especially protection of creditors (Fernández et al., 2013), asymmetric information (Beltran et al., 2017; Banerji and Basu, 2017), moral hazard (Antzoulatos and Tsoumas, 2014; Duran and Lozano-Vivas, 2015), bank competition (Fungáčová et al., 2014), and central bank transparency (Horváth and Vaško, 2016). This paper aims to extend this line of research and deals with the uncertainty with model selection caused by the large amount of institutional indices.

In addition, we contribute to the current discussions on monetary policy efficiency. In response to traditional transmission mechanism deterioration central banks have employed unconventional monetary policy, especially quantitative easing, forex interventions, negative interest rates and forward guidance. Salachas et al. (2016) show that, during the financial crisis, banks prefer balance-sheet funding rather than interbank funding while unconventional monetary policy promotes interbank liquidity. However, it is not generally agreed that the implementation of unconventional monetary policy is effective in increasing bank performance and stimulating lending activity in the post-crisis period. There is a large body of literature that argues that a higher level of financial frictions and underdeveloped financial markets are associated with a stronger transmission mechanism of monetary policy and banks' dependency on the liquidity provided by the local central bank. From this perspective, well-developed stock markets reduce the amplitude of business cycles because well-developed financial markets help to deal with financial frictions more efficiently than the banking sector (Fidrmuc and Scharler, 2013). Ma and Lin (2016) show that economies with well-developed financial markets tend to have deeper and more efficient financial intermediaries which limit monetary policy efficiency after the financial crisis. However, monetary policy efficiency is negatively affected also by the market power of large banks (Fungáčová, et al., 2014).

Moreover, Mamatzakis and Bermpei (2016) contribute that banks' specifics (especially a high level of asset diversification and low deposit funding) affect negative effects of unconventional monetary policy on banks' performance. Brei and Schclarek (2016) emphasize the different responses of government-owned and private banks during the crisis. However, there are also differences between lending cuts of domestic and foreign banks (Dekle and Lee, 2015).

Furthermore, recent literature shows the contradictory effects of banking regulation. Gavalas (2015) shows that the new bank capital requirements increase the marginal costs of funding, thus leading to higher lending interest rates and tightening of credit supply. However, Beck et al. (2005) argue that private monitoring of banks (third pillar of Basel II) helps ease information costs and increases integrity of the banking sector, especially in countries with sound legal institutions, with positive impact on bank lending activities.

Our paper makes three contributions to the literature on the role of institutional environment associated with the banking sector. Firstly, we use 17 different indicators of the quality of institutional environment and cover a wide range of branches with various, often conflicting effects on bank lending activity. Secondly, using Bayesian Model Averaging (BMA) proposed by Sala-i-Martin (1997), we deal with the uncertainty of model selection and identify the probability of each variable to be involved in the model. In robustness analysis we focus on dynamic changes of the probability in time and different regions. Thirdly, we cover 10,565 banks from 66 countries and provide comprehensive empirical analysis of the difference in the quality of institutions across the whole world. It is generally agreed that the U.S. and economies of emerging Europe have been hit particularly hard by the financial crisis (Fadejeva, 2017). However, the balance sheets' shocks of banks in the U.S. and Europe were transmitted to Latin America, Asia, and other countries (Dekle and Lee, 2015; Vithessonthi, 2016, Hanisch, 2017).

The paper is organised as follows. Section 2 contains the literature review. A detailed overview of methods and data is provided in Section 3, where the Bayesian framework is introduced. Section 4 presents the results of the econometric models and section 5 presents robustness analysis in several ways. Section 6 presents some concluding remarks.

1 Literature Overview

Institutions are generally believed to be a major precondition for ownership rights, investment security, and long-term growth. There are several studies which have handled the effects of the quality of institutions on bank lending. Seen from this perspective, financial development decreases firms' dependency on funds provided by banks when a sudden negative shock obliges them to tighten their lending activities. The country's financial development is related to its legal and institutional framework (La Porta et al., 1997, 1998; Levine, 2005; Rajan and Zingales, 1998) and the negative effects of a financial crisis will be emphasized in sectors in which growth is dependent on funds provided by banks (Krozsner et al., 2007; Dell'Ariccia et al., 2008; Fernández, et al., 2013). Moreover, a better

institutional environment results in lower net interest margins (Marcelin and Mathur, 2014) and higher financial leverage (An, et al., 2016).

Djankov et al. (2008b) and Miletkov and Wintoki (2012) show that creditor protection and the quality of property rights institutions are associated with more developed financial systems. Concurrently, property rights and the enforcement of rules are crucial for well-functioning markets (Ostrom, 1998). In related research, Djankov et al. (2008a) show that financial development is also related to debt enforcement rules. Property rights and enforcement rules are especially important for transition economies where new institutions were created (Raiser et al., 2008). Ranciere, Tornell and Vamvakidis (2010) view the general expectations of bailout policies (including not only bailouts of banks but also the retention of unsustainable exchange rate pegs) as one of the major motivations for foreign currency borrowing.

Creditor rights are strongly correlated with stronger legal creditor protection and information sharing among creditors related to enhancing credit availability (Pagano and Jappelli, 1993; Djankov et al., 2008b; Brown et al., 2009). An important contribution is provided by Houston et al. (2010). They follow previous literature and argue that stronger creditor rights tend to greater bank risk taking. Especially, they use microeconomic data from the Bankscope database and provide cross-country analysis of the impact of creditor rights and information sharing on bank lending activity in 79 countries (2,430 banks) and show that credit rights increase the likelihood of that country experiencing a financial crisis. Obviously, these arguments are very different from general expectations that stronger creditor rights tend to risk-reducing strategies of banks (Acharya et al., 2011) or higher return on equity (Hartwell, 2015). At the same time, Acharya et al. (2011) point out that the existence of stronger creditor rights is not always desirable because of their negative effects on corporate risk-taking, operating performance, and the demand for debt. Bose et al. (2012) emphasize the negative effects of property rights. Based on information asymmetries, they agree that stronger property rights increase capital formation but, on the other hand, encourage bad borrowing practices.

Other arguments concentrate on possible policy failures such as corruption, asymmetric information or the shadow economy. Asymmetric information problems cause banks to impose higher interest rates, especially in those countries with poor institutions, embryonic and/or non-existent stock markets, and non-existent credit information bureaus (Boot and Thakor, 2000; Marcelin and Mathur, 2014). Barth et al. (2009) and Houston et al. (2011) show that credit availability is associated with corruption in lending. They show that borrower and lender competition, as well as information sharing via credit bureau/registries, reduce corruption in bank lending. They also emphasize the effects of the

ownership structures of firms and banks, legal environment, firm competition, media concentration, and state ownership of media.

State ownership is a particularly important determinant of the institutional environment, especially bank and firm ownership. Generally, increasing government size limits the financial development of the country, especially trade and financial openness (Chinn and Ito, 2006; Ito, 2006; Herwartz and Walle, 2014). Based on this association, La Porta et al. (2002) show that a higher degree of public ownership of banks is associated with a lower level of banking sector development and lending activity. Marcelin and Mathur (2015) contribute that decreasing government size in firms caused by privatization allows firms to improve efficiency while driving the development of the financial sector but only in countries with better regulatory and legal frameworks. However, the negative effects of ownership are not related only to the size of government. Dheera-aumpon (2013) points out negative effects of concentrated bank control and possible business relationships with other firms in the market.

It is generally agreed that an unregulated system of enterprises tends to achieve an optimal allocation of resources. However, there are many positive effects of bank regulation. The main role of bank regulation is to reduce financial market vulnerability at the macro as well micro level. While the low-risk environment provides positive effects in the long run, there is particular negative effect on bank lending activity in the short term. Fidrmuc and Hainz (2013) contribute with the evidence of cross-border lending if the national regulations differ. Beck et al. (2006) show that traditional bank regulation which involves empowering official regulatory institutions to monitor, discipline and influence banks directly, does not improve the integrity of bank lending. They point out that forcing banks to disclose accurate information to the private sector leads to greater obstacles in obtaining bank loans because of corrupted bank officials. They emphasize the role of private monitoring, which has a particularly beneficial effect on bank lending with sound legal institutions.

In addition, there are significant negative effects of excessive taxation on bank lending activity. Chiorazzo and Milani (2011) show that corporate income tax affects loss provisions with negative implications on the stability of the banking system. Chaudhry et al. (2015) show that bank taxation is an alternative to prudential regulations. They recommend taxation as the corrective measure to reduce risk-taking by the banking sector because tax revenues could be underpinned by taxpayers as a ‘fair contribution’ to public finances.

Starting with Bagehot’s doctrine (Bagehot, 1873), institutions have become increasingly popular in economics after banking crises. Especially the role of securitization increasing availability of credit risk

transfer mechanisms changed the role of banks from their traditional function based on lending disposable funds from creditors to debtors (Shin, 2009). Keys et al. (2010) show that securitization had a moral hazard effect on lender screening. It is not surprising that banks with higher social responsibility are associated with higher financial performance after the financial crisis (Cornett et al., 2016). Out of direct reach of supervisory institutions and state control, the regulative order of markets depends on many practices of wellbeing known as informal institutions. Granville and Leonard (2010) show the direct impact of informal institutions on property rights and technological progress in the countries. Informal institutions have positive impact also on the growth of the private sector which tends to the integrity of bank lending (Steer and Sen, 2010). Obviously, formal and informal institutions must be fully compatible (Kouba, 2009). Finally, according to Pitlik and Kouba (2015) matured informal institutions, e.g. high level of social trust, can reduce transaction costs both at macroeconomic and at firm level.

To sum up, the variety of institutional factors has resulted in a surge of research creating different institutional indices and documenting their potential importance for various factors of the institutional environment. However, we must be very careful in the interpretation of the empirical results because it is often not clear which aspects of institutional quality are proxied by a particular institutional index. From this perspective, our findings imply that institutional quality can be understood in two ways. Firstly, institutional quality is the ability to perform property rights and to resolve the insolvency of creditors by risk-reducing strategies of banks. Secondly, there are negative effects of excessive market regulations and limited financial openness worsening the optimal allocation of funds.

2 Data and Methods

The literature witnesses many attempts to measure the quality of the institutional environment in order to employ a numerical variable empirically. Traditionally, the original institutional indices focused both on economic and political broad economic categories or protection against expropriation. The economic freedom index presents the individual component indices describing various aspects of economic institutions (property rights, corruption, fiscal freedom, government spending, business freedom, monetary freedom, trade freedom, investment freedom), which were summarized into a joint index of economic freedom. Other institutional indices identify special economic institutions such as, for example, different aspects of globalization or taxation. Following this approach, there are many authors who concentrate on institutional weaknesses that restrict free market, growth and entrepreneurship. These aspects include, for example, top marginal tax rate (Gwartney et al., 2013; Heidera and Ljungqvist, 2015), economic, social and political globalization (Dreher and Axel, 2006), and financial openness (Chinn and Ito, 2006 and 2008). To assess political risks

we take into account a country's underlying political and regulatory structure. One of the suitable indicators is the political constraint index offered by Henisz (2002 and 2004). This index identifies a measurable number of veto points in a political system, multiple branches of the government and judicial independence. The interpretation of the political constraint index is that a political system with no checks and balances would have no constraints on the leading politicians because nobody dominates the power to veto key decisions.

In addition, we collected macroeconomic fundamentals and microeconomic data from banks' financial statements for 70 countries. The dataset consists in 12,694 banks, especially commercial banks, savings banks, cooperative banks, mortgage banks and investment banks from all over the whole world. In total we have 112,512 yearly observations of unbalanced panel dataset in the period 2000–2015. To obtain banking controls we use the Bankscope database, which provides detailed data including balance sheets and key financial indicators of the banks. The detailed description of the used variables is presented in Table A1. Table A2 presents descriptive statistics and Table A3 shows possible correlations between the variables.

To improve the stability of our models we drop microeconomic data below 1 percentile and over 99 percentiles as outliers related to each country. Thus, we do not reflect the largest and smallest banks in the sample. Moreover, we drop all negative values of total assets, deposits and short term funding, liquid assets, gross loans and impaired loans (non-performing loans). Most of the data was obtained as the ratios. The data at levels was transformed by chain indices and natural logarithms.

Using our rich dataset we focus on the share of gross loans to total assets of the bank *i* in time *t*. Our panel regression model is specified as:

$$loans_{it} = \sum_{s=1}^{S} \beta_s shocks_{sct} + \sum_{m=1}^{M} \beta_m bcontr_{mit} + \sum_{l=1}^{L} \beta_l inst_{lct} + \mu_i + \theta_t + \varepsilon_{it}, \qquad (1)$$

where the variable *shocks* represents selected macroeconomic fundamentals (GDP, deflator, monetary policy changes), *s*, in a country *c*. The second set of variables, denoted by *bcontr*, represents selected banking controls (performance, liquidity, financial leverage, interest rate margin, funding specifics), *m*, in a bank *i*. The last set of variables, *inst*, includes determinants of institutional environment quality (e.g. economic freedom, property rights). Finally, we include bank fixed effects, μ, time effects, θ, and a residual, ε. We apply the forward orthogonal deviations transformation suggested by Arellano and Bover (1995) to eliminate the fixed effects which subtracts the average of all future observations of a variable.

The number of regressors (26 regressors) leads to very imprecise inference using conventional methods (OLS or MLM), especially wide confidence intervals. Therefore we employ the Bayesian Model Averaging framework to reduce uncertainty with the model selection, which is widely used in financial econometrics as robust to model uncertainty (Feldkircher et al., 2014; Hasan et al., 2017; Fidrmuc, et al., 2017). The empirical analysis is based on the regression where the share of gross loans to total assets of a bank *i* and time *t*, where $i \times t = 1, \dots, N$ are regressed on an intercept α and number of explanatory variables selected from a set of *k* variables in a matrix *X* of dimension $N \times K$. Let us assume that rank $(\iota_N : X) = K + 1$, where ι_N is an N-dimensional vector of ones, and define β as the full k-dimensional vector of regression coefficients:

$$y = \alpha \iota_N + X_r \beta_r + \varepsilon, \qquad (2)$$

where we assume $r = 1, \dots, R$ models, denoted by M_r and X_r is an $N \times k_r$ matrix containing (or all) columns of *X*. The N-vector of errors, ε, is assumed to be $N(0_N, h^{-1} I_T)$. Thus, $R = 2^K$ because there are 2^K possible subsets of *X* and 2^K possible choices for X_r (Koop, 2003).

We consider up to 26 regressors to be included in the model. That means 2^{26} different models to deal with, which is far too many to evaluate. To solve this problem we apply the Markov chain Monte Carlo techniques (MC^3) pioneered by Madigan and York (1995). The results are based on taking 2,200,000 draws and discarding the first 200,000 draws models as burn-in replications.

In a Bayesian framework we receive posterior model probabilities $p(M_r|y)$, for $r = 1, \dots, R$, where each model depends upon a vector of parameters ϑ_r and is characterized by prior $p(\vartheta_r|M_r)$ likelihood $p(y|\vartheta_r, M_r)$ and posterior $p(\vartheta_r|y, M_r)$. Let us assume a vector of parameters ϕ which is the function of ϑ_r for each of $r = 1, \dots, R$. Then we should obtain results for every model under consideration and average them where the weights in the averaging are the posterior model probabilities:

$$p(\phi \mid \mathrm{y}) = \sum_{r=1}^{R} p(\phi \mid \mathrm{y}, \mathrm{M_r}) p(\mathrm{M_r} \mid \mathrm{y}), \qquad (3)$$

alternatively, if $g(\phi)$ is a function of ϕ, the rules of conditional expectation imply that

$$E[g(\phi) \mid \mathrm{y}] = \sum_{r=1}^{R} E[g(\phi) \mid \mathrm{y}, \mathrm{M_r}] p(\mathrm{M_r} \mid \mathrm{y}), \qquad (4)$$

where $E[g(\phi) \mid \mathrm{y}, \mathrm{M_r}]$ and $p(\mathrm{M_r} \mid \mathrm{y})$ are calculated by posterior simulation. (Koop, 2003)

Additionally, we differentiate between small and large banks, where large banks represent banks with total assets to GDP over the median in country *c*. For the definition of large banks we use the distribution of bank size in each particular year.

In the robustness analysis, firstly, we calculate posterior model probabilities analytically and using the MC^3 algorithm to show convergence and stability of the results. Secondly, we show dynamic changes of probability to involve selected variables into the model. For this purpose we apply cross-sectional regression in each particular year. Thirdly, we focus on the different impact of macroeconomic fundamentals, banking controls and the quality of the institutional environment separately in the selected regions (Europe, North America, Asia and other countries).

3 Results

Table 1 presents results of the Bayesian Model Averaging approach. The first column provides information about the probability to include the regressor in the model. The mean is the mean impact of the regressor, calculated as a weighted average of estimates or forecasts from all models with weights given by $p(\mathrm{M_r} \mid \mathrm{y})$. It is very important that the posterior mean of the regressors that we prefer to include in the model is greater than its posterior standard deviation. We show that economic activity, financial central bank assets and all banking controls should be included in the model in the first place, because their posterior probability is nearly one hundred percent. Along with these factors we should include in the model economic and social globalization, top marginal tax rate, freedom from corruption, government spending, monetary freedom, investment freedom and financial freedom.

The last two columns present Bayesian Model Selection results (BMS). The model selection results present selected single model estimates and act as though it were true. The BMA results incorporate uncertainty about which model generated the data; therefore we assume greater posterior standard deviation of BMA than BMS results. The BMS results confirm the important role of economic activity and central bank operations. While the financial assets of the central bank affect the supply of loans, economic activity affects both loan supply and demand. Increasing economic activity pushes up the demand for loans via transaction motives; simultaneously it improves the quality of credit portfolios of banks and stimulates loan supply.

Table 1: Bayesian Model Averaging Results – Baseline Regressions

Explanatory Variables		BMA			BMS	
		Prob.	Mean	St. Dev.	Mean	St. Dev.
1	GDP	1.0000	0.1324	0.0089	0.1322	0.0082
2	Deflator	0.0049	-0.0001	0.0031	-	-
3	Policy Interest Rate	0.0264	0.0000	0.0003	-	-
4	Central Bank Financial Assets	0.9998	0.0184	0.0033	0.0186	0.0033
5	Shareholder Equity Ratio	1.0000	-0.0744	0.0032	-0.0744	0.0032
6	Net Interest Margin	1.0000	0.2686	0.0036	0.2685	0.0036
7	Cost to Income Ratio	1.0000	0.0346	0.0041	0.0345	0.0041
8	Deposit to Asset Ratio	1.0000	-0.1208	0.0073	-0.1208	0.0073
9	Liquid Assets/Deposits, Short t.fund	1.0000	-0.0949	0.0011	-0.0949	0.0011
10	Political Constraints	0.0059	-0.0001	0.0017	-	-
11	Financial Openness	0.0360	0.0004	0.0023	-	-
12	Economic Globalization	1.0000	0.0052	0.0005	0.0053	0.0004
13	Social Globalization	1.0000	0.0048	0.0007	0.0048	0.0007
14	Political Globalization	0.0098	0.0000	0.0001	-	-
15	Business Regulations	0.0046	0.0000	0.0001	-	-
16	Freedom to Trade Internationally	0.0769	0.0008	0.0032	-	-
17	Top Marginal Tax Rate	1.0000	-0.0163	0.0010	-0.0165	0.0010
18	Property Rights Index	0.0073	0.0000	0.0000	-	-
19	Freedom from Corruption	1.0000	0.0018	0.0003	0.0018	0.0002
20	Fiscal Freedom	0.0179	0.0000	0.0001	-	-
21	Government Spending Index	1.0000	0.0013	0.0002	0.0014	0.0002
22	Business Freedom	0.1183	0.0001	0.0002	-	-
23	Monetary Freedom	1.0000	0.0026	0.0003	0.0026	0.0003
24	Trade Freedom	0.0190	0.0000	0.0001	-	-
25	Investment Freedom	1.0000	0.0023	0.0001	0.0023	0.0001
26	Financial Freedom	1.0000	0.0017	0.0001	0.0017	0.0001
Mean number of regressors in models			16.3267		-	
Prob of top 10 models out of total No of models			0.9662		-	
No of countries			66		66	
No of banks			10,565		10,565	
No of observations			83,072		83,072	

The negative effect of shareholder equity ratio represents a positive effect of financial leverage on the banks' lending activity which is evidence of involving borrowed funds in the purchase of assets because the bank expects that returns from assets will exceed the borrowing costs. Increasing/decreasing net interest margin is related to higher/lower supply of credit provided by the selected bank. Lower cost to income ratio indicates higher efficiency but a number of factors can affect this ratio, including a bank's business model or regulatory changes. We assume that a positive relation between the cost to income ratio and lending activity is caused by higher regulatory requirements after a financial crisis when lending activity falls down. Negative effect of deposit to asset ratio is caused by maturity

transformation because accepting deposits from many customers enables fewer longer-term loans. Finally, a higher share of liquid assets does not allow creation of illiquid credits.

Based on our theoretical assumptions, globalization and freedom (economic globalization, social globalization, monetary freedom, investment freedom and financial freedom) contribute to the financial development of the market and better allocation of funds. Thus, it is not surprising that these factors increase the lending activity of banks. In addition, lower corruption has positive impact on bank lending activity which is associated with information sharing, limited concentration of ownership, and efficient functioning of the regulatory authorities.

The government spending index is associated with the size of government. Our results confirm the theoretical assumptions that decreasing government size improves efficiency of fund allocation and drives the development of the financial sector. Finally, we show that the top marginal tax rate index has negative impact on bank lending. A higher level of the index represents higher income thresholds for higher marginal tax rates. The results show that progressive taxation reduces bank lending activity in the country.

Secondly, we focus on differences between large and small banks (Table 2). Our results show that central bank operations increasing central bank financial assets have positive impact only on the small bank because they are more dependent on the liquidity of the interbank market. We did not find any significant differences between the effects of banking controls on large and small banks, but we point out that economic freedom is an important factor of the quality of the institutional environment only for large banks. Especially, large banks increase their lending activity with higher financial openness, lower corruption, and higher trade freedom. In comparison with small banks, they are affected by government expenditures. It is not surprising because large banks are the main creditors of large companies and they are not negatively affected by government size. On the contrary, the customers of small banks comprise small and medium-sized companies which are negatively affected by the government size.

Table 2: Bayesian Model Averaging Results – Augmented Regressions

Explanatory		BMA			BMS	
Variables		Prob.	Mean	St. Dev.	Mean	St. Dev.
1	GDP (large)	1.0000	0.1827	0.0097	0.1836	0.0093
2	GDP (small)	0.9998	0.0761	0.0108	0.0762	0.0098
3	Deflator (large)	0.0031	0.0000	0.0022	-	-
4	Deflator (small)	0.0085	-0.0004	0.0054	-	-
5	Policy Interest Rate (large)	0.0063	0.0000	0.0001	-	-
6	Policy interest Rate (small)	0.0129	0.0000	0.0002	-	-

7	Central Bank Fin. Assets (large)	0.0041	0.0000	0.0003	-	-
8	Central Bank Fin. Assets (small)	1.0000	0.0325	0.0039	0.0327	0.0039
9	Shareholder Equ.Ratio (large)	1.0000	-0.0669	0.0046	-0.0671	0.0046
10	Shareholder Equ.Ratio (small)	1.0000	-0.0831	0.0043	-0.0831	0.0043
11	Net Interest Margin (large)	1.0000	0.2642	0.0050	0.2639	0.0050
12	Net Interest Margin (small)	1.0000	0.2748	0.0048	0.2749	0.0048
13	Cost to Income Ratio (large)	1.0000	0.0492	0.0057	0.0494	0.0056
14	Cost to Income Ratio (small)	0.9567	0.0214	0.0069	0.0223	0.0053
15	Deposit to Asset Ratio (large)	1.0000	-0.0956	0.0100	-0.0953	0.0099
16	Deposit to Asset Ratio (small)	1.0000	-0.1390	0.0104	-0.1394	0.0104
17	Liquid Assets and Deposits (large)	1.0000	-0.0850	0.0016	-0.0850	0.0016
18	Liquid Assets and Deposits (small)	1.0000	-0.1030	0.0015	-0.1030	0.0015
19	Political Constraints (large)	0.0043	-0.0001	0.0016	-	-
20	Political Constraints (small)	0.0065	-0.0001	0.0022	-	-
21	Financial Openness (large)	0.9999	0.0359	0.0059	0.0370	0.0054
22	Financial Openness (small)	0.0587	-0.0010	0.0042	-	-
23	Economic Globalization (large)	1.0000	0.0042	0.0004	0.0043	0.0004
24	Economic Globalization (small)	1.0000	0.0062	0.0005	0.0063	0.0005
25	Social Globalization (large)	0.3141	0.0007	0.0012	0.0022	0.0007
26	Social Globalization (small)	1.0000	0.0045	0.0010	0.0041	0.0005
27	Political Globalization (large)	0.0415	0.0000	0.0002	-	-
28	Political Globalization (small)	0.0053	0.0000	0.0000	-	-
29	Business Regulations (large)	0.0060	0.0000	0.0003	-	-
30	Business Regulations (small)	0.0042	0.0000	0.0002	-	-
31	Freedom to Trade Intern. (large)	0.0041	0.0000	0.0003	-	-
32	Freedom to Trade Intern. (small)	0.0465	0.0005	0.0026	-	-
33	Top Marginal Tax Rate (large)	1.0000	-0.0196	0.0012	-0.0197	0.0012
34	Top Marginal Tax Rate (small)	1.0000	-0.0123	0.0012	-0.0123	0.0012
35	Property Rights Index (large)	0.0041	0.0000	0.0000	-	-
36	Property Rights Index (small)	0.0103	0.0000	0.0001	-	-
37	Freedom from Corruption (large)	1.0000	0.0029	0.0003	0.0029	0.0003
38	Freedom from Corruption (small)	0.0243	0.0000	0.0001	-	-
39	Fiscal Freedom (large)	0.0061	0.0000	0.0000	-	-
40	Fiscal Freedom (small)	0.0082	0.0000	0.0000	-	-
41	Government Spending Index (large)	0.0217	0.0000	0.0001	-	-
42	Government Spending Index (small)	1.0000	0.0019	0.0002	0.0019	0.0002
43	Business Freedom (large)	0.0037	0.0000	0.0000	-	-
44	Business Freedom (small)	0.0751	0.0000	0.0001	-	-
45	Monetary Freedom (large)	1.0000	0.0033	0.0003	0.0033	0.0003
46	Monetary Freedom (small)	1.0000	0.0021	0.0003	0.0021	0.0003
47	Trade Freedom (large)	0.9894	0.0018	0.0004	0.0018	0.0004
48	Trade Freedom (small)	0.0091	0.0000	0.0001	-	-
49	Investment Freedom (large)	1.0000	0.0016	0.0002	0.0016	0.0002
50	Investment Freedom (small)	1.0000	0.0028	0.0002	0.0028	0.0002
51	Financial Freedom (large)	1.0000	0.0015	0.0001	0.0015	0.0001
52	Financial Freedom (small)	1.0000	0.0020	0.0002	0.0020	0.0002
Mean number of regressors in models			29.6345		-	
Prob of top 10 models out of total No of models			0.8112		-	

No of countries	66	66
No of banks	10,565	10,565
No of observations	83,072	83,072

4 Robustness Analysis

We check the sensitivity of our analysis in several ways. Firstly, we focus on the robustness of the MC^3 algorithm that we apply to reduce the number of estimations. As we mentioned in the section Data and Methods, we run the MC^3 algorithm for 2,200,000 draws and discard the first 200,000 as burn-in. The robustness check of this approach and convergence diagnostic are approved by calculating and comparing posterior model probabilities analytically and using MC^3. The results presented in Table 3 indicate convergence. Note that the best single model receives more than 78% (62% in the case of augmented regressions) of posterior model which is quite robust because model selection puts all weight on the single model ignoring the huge amount of model uncertainty (smaller standard deviation). The BMS approach also reduces parsimony by choosing 15 variables (29 variables in the case of augmented regressions).

Table 3: Posterior Model Probabilities for Top 10 Models

	Basic		Augmented	
	$p(M_r\|y)$	$p(M_r\|y)$	$p(M_r\|y)$	$p(M_r\|y)$
	Analytical	MC^3 estimate	Analytical	MC^3 estimate
1	0.7896	0.7888	0.6199	0.6214
2	0.0629	0.0619	0.2244	0.2212
3	0.0440	0.0442	0.0335	0.0337
4	0.0298	0.0310	0.0247	0.0228
5	0.0239	0.0234	0.0221	0.0232
6	0.0167	0.0168	0.0220	0.0218
7	0.0109	0.0111	0.0178	0.0192
8	0.0105	0.0102	0.0153	0.0153
9	0.0061	0.0066	0.0109	0.0114
10	0.0056	0.0059	0.0095	0.0100

Secondly, we check the robustness of our results using dynamic changes of the probability to involve selected variables into the model in time. Moreover, we present this robustness check separately for large and small banks (Figure 1 and Figure 2). All the variables are divided into four groups. Firstly, we show changes of probability to involve the all macroeconomic fundamentals into the model; secondly we present changes of probability of the all selected banking controls. The third and the fourth subplots present changes in the probability of only variables available in all the analyzed years. Therefore we reduce the number of the measures of institutional environment on only 9 indices. These institutional indices create two groups. The first group is focused on rights protection and the quality

of the legal environment (property rights index, index of corruption freedom, monetary freedom, and financial freedom). The second group is associated with the size of government (fiscal freedom, government spending, business freedom, trade freedom, and investment freedom).

Figure 1: Dynamic changes of Posterior Model Probabilities for large banks

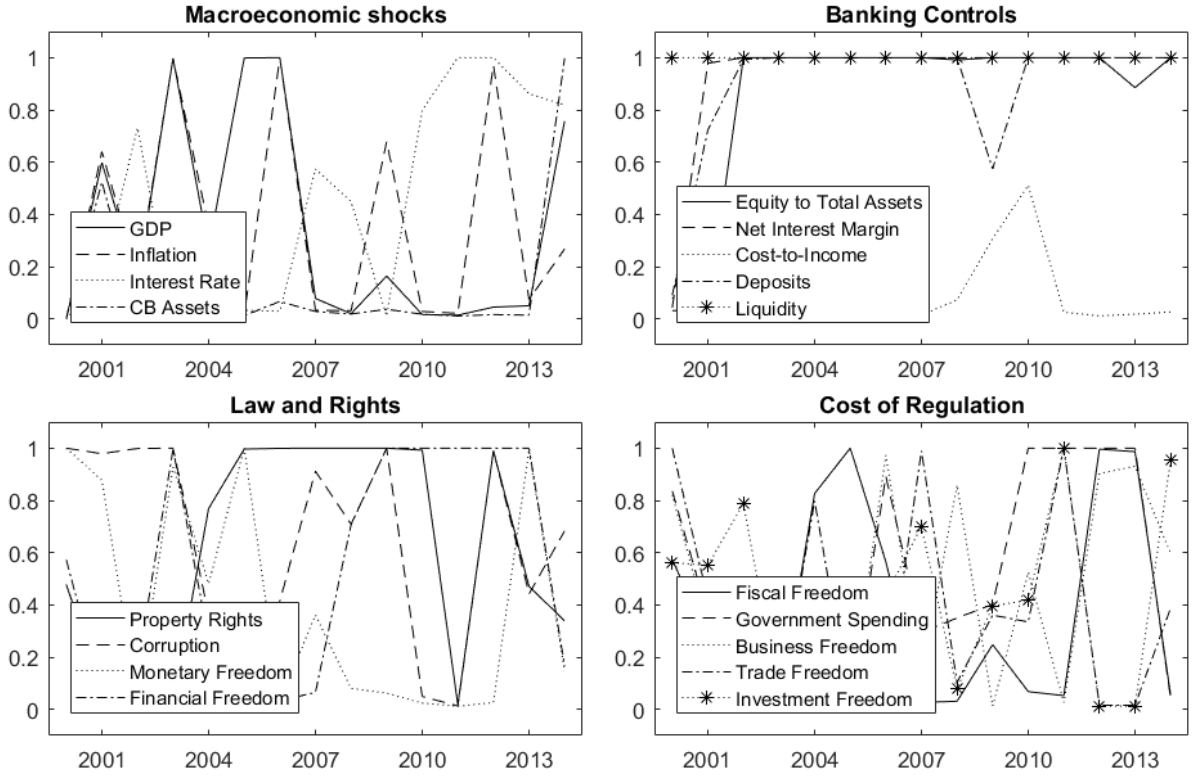
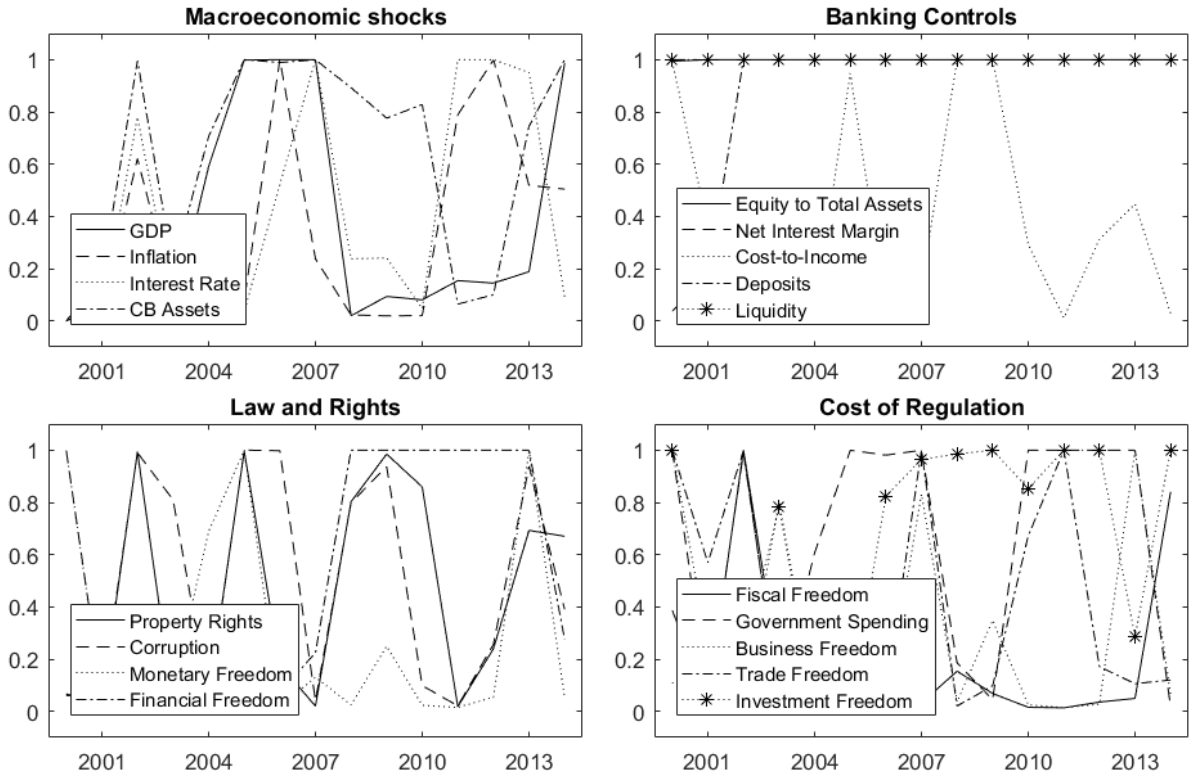


Figure 2: Dynamic changes of Posterior Model Probabilities for small banks



Our results show that only bank controls are stable regressors in the whole analyzed time period. In the case of large banks we can see a low probability of cost to income ratio, similarly to the case of small banks, where the probability of cost to income ratio increased only in the years 2005, 2008 and 2009 when regulatory changes appear.

We can conclude that economic activity was an important factor of bank lending activity only before the financial crisis when excessive credit demand caused a price bubble on the asset market, similarly in both large and small banks. Simultaneously, the loan loss provisions decreased and boosted credit supply in the years 2005 and 2006. Moreover, we show that central bank assets positively affected the lending activity of small banks immediately after the financial crisis. The probability to involve financial assets of the central bank into the model of large banks remains very low during the whole analyzed period.

In addition, we confirm that property rights are important for bank lending activity, especially for large banks in the years 2005–2011. On the contrary, financial freedom is an important regressor of bank lending activities for both large and small banks, especially from the year 2008. Financial freedom is associated with competition in the financial market, especially banking security and independence of banks from government control. Obviously, the fact that financial institutions operated freely and foreign banks were treated the same as domestic institutions increased bank lending activity after the financial crisis particularly forced the banking system over the whole world.

The last subplot focus on regulation costs. We find that restrictions on investment, especially restrict access to foreign exchange, impose restrictions on transfers, payments or foreign direct investments negatively affect the bank lending activity of small banks in the years 2005-2014. The lending activity of small banks was positively affected by low government expenditures during the credit boom in the years 2005-2006 and after the year 2009.

Finally, we focus on the different effects of macroeconomic fundamentals, banking controls and institutional indices on lending activity in different regions. Table 4 presents the results of Bayesian Model Selection (the best selected models) for Europe, North America, Asia and the rest of the sample. However, we have to be very careful with the results in Asia and other countries because the number of banks significantly decreased in these subsamples. Therefore, we emphasize differences between the European (bank-based) and the North American (market based) economies.

We show the heterogeneous effect of the selected variables in these two regions, excluding banking controls. While economic activity and financial assets of central banks are generally positive factors of bank lending activity, we show that small banks in North America increased their lending activity

especially during the times of recession. The economic intuition of this effect is probably associated with the heterogeneous quality of banks' credit portfolio during the financial crisis.

Table 4: Bayesian Model Averaging Results – Regional differences

Explanatory	Europe		North America		Asia		Other Countries	
Variables	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
GDP (large)	0.3257	0.0196	1.1841	0.0579	-	-	-	-
GDP (small)	0.2307	0.02	-1.0828	0.0651	0.5488	0.1198	-	-
Deflator (large)	-0.2032	0.0686	-2.1921	0.1211	-	-	-	-
Deflator (small)	-	-	1.8782	0.1315	-0.7952	0.2132	-	-
Policy IR (large)	-	-	-	-	-	-	-	-
Policy IR (small)	-	-	-	-	-	-	-	-
CB Assets (large)	0.0455	0.0065	-	-	-	-	-	-
CB Assets (small)	0.0568	0.0058	-0.1793	0.0066	0.1859	0.0678	-	-
Equ.Ratio (large)	-	-	-0.0774	0.0058	-0.2043	0.0590	-	-
Equ.Ratio (small)	-0.0421	0.0073	-0.1091	0.0054	-0.2578	0.0617	-	-
IR Margin (large)	0.1818	0.0082	0.3387	0.0065	-	-	0.2233	0.051
IR Margin (small)	0.137	0.0079	0.3645	0.0062	0.1991	0.0567	0.2939	0.0585
Cost to Inc.(large)	0.0826	0.0108	0.0442	0.0066	-	-	-	-
Cost to Inc.(small)	0.0371	0.0102	0.0299	0.0063	-0.2542	0.0636	-	-
Dep. Ratio (large)	-0.1309	0.0133	-0.0816	0.0160	-0.4986	0.1641	-	-
Dep. Ratio (small)	-0.2698	0.0151	-0.1654	0.0157	0.3529	0.0896	-	-
Liquidity (large)	-0.1026	0.0029	-0.0756	0.0018	-0.2723	0.0396	-0.1374	0.0247
Liquidity (small)	-0.1325	0.0029	-0.0901	0.0017	-0.3067	0.0340	-0.134	0.0289
Pol.Constr.(large)	-	-	-	-	-	-	-0.2027	0.1253
Pol.Constr.(small)	0.0885	0.0215	-	-	0.7831	0.1674	-	-
Fin.Open. (large)	0.0346	0.0081	0.0737	0.0184	0.0172	0.0260	0.0885	0.0317
Fin.Open. (small)	-0.0502	0.0091	-	-	-0.0937	0.0236	-	-
Econ.Glob. (large)	-	-	0.0134	0.0009	-	-	-	-
Econ.Glob. (small)	0.0097	0.0006	-0.0135	0.0008	-	-	-	-
Soc.Glob. (large)	0.0051	0.0011	-	-	-	-	-	-
Soc.Glob. (small)	-	-	-	-	0.0070	0.0021	-	-
Pol.Glob. (large)	-0.0055	0.0007	-	-	-	-	-	-
Pol.Glob. (small)	-	-	-	-	-	-	0.0028	0.0017
Bus.Regul. (large)	-	-	-0.0183	0.0034	-	-	-	-
Bus.Regul. (small)	-0.0162	0.0028	0.0868	0.0049	-	-	0.0249	0.0301
Trade Int. (large)	0.0279	0.005	-0.0444	0.0076	-	-	-	-
Trade Int. (small)	0.0244	0.0052	-0.1407	0.0067	-	-	-	-
Tax Rate (large)	-0.0075	0.0017	-0.0299	0.0026	-	-	0.0853	0.0189
Tax Rate (small)	-0.0064	0.0016	-	-	-	-	0.0505	0.0232
Prop.Rights (large)	-	-	-	-	-	-	-	-
Prop.Rights (small)	-	-	-	-	-	-	-	-
Corruption (large)	0.0037	0.0004	-0.0035	0.0006	-	-	-	-
Corruption (small)	-	-	-	-	-	-	-	-
Fiscal Free. (large)	-	-	-0.0048	0.0012	-0.0153	0.0032	-	-
Fiscal Free. (small)	-	-	-	-	-	-	-	-
Gov.Spend. (large)	-0.0008	0.0002	-	-	-	-	-	-

Gov.Spend. (small)	-	-	-	-	-	-	0.0026	0.002
Bus.Free. (large)	-0.0012	0.0002	0.0017	0.0005	-	-	-	-
Bus.Free. (small)	-0.0018	0.0002	0.0130	0.0006	-	-	-	-
Mon.Free. (large)	-0.0016	0.0005	-	-	-	-	-	-
Mon.Free. (small)	-	-	-	-	-	-	-	-
Trade Free. (large)	-	-	-	-	-	-	-	-
Trade Free. (small)	-	-	0.0080	0.0006	-0.0027	0.0027	-	-
Invest.Free. (large)	-	-	0.0069	0.0002	-	-	-	-
Invest.Free. (small)	0.0008	0.0002	-	-	-	-	0.0055	0.0018
Fin.Free. (large)	-0.0014	0.0002	0.0022	0.0002	-	-	-	-
Fin.Free. (small)	-	-	-	-	-	-	-	-
Model Prob (analytical)		0.2276		0.2264		0.2445		0.1960
Model Prob (MC^3 estimate)		0.2211		0.2148		0.2616		0.1895
No of countries		28		8		16		14
No of banks		3,606		6,603		182		174
No of observations		26,816		55,020		616		620

While financial freedom, financial openness, political globalization, low business regulation, business freedom and financial freedom are associated with higher lending activity in North America, our results present the opposite relationship in European countries. Evidently, economic freedom or low regulation is associated with higher risk-taking or asymmetric information in Europe. On the contrary, economic globalization or freedom to trade internationally are positive factors of bank lending activity in Europe.

Surprisingly, there is different impact of freedom from corruption in Europe and North America. Probably, information-sharing via credit bureau registries, which generally reduces corruption in bank lending activities, is widely used in Europe, while the same bureaucratic institutions in North America increase costs of funding and force creditors to find alternate equity or bond financing.

Conclusions

Our research builds upon, and is related to, previous literature related to the role of the quality of the institutional environment, especially economic freedom and globalization, property rights, corruption, taxation, business and banking regulation. The contribution of this paper is in detailed analysis of 17 indices of the institutional environment, macroeconomic fundamentals and banking controls related to the liquidity, performance and funding specifics of 10,565 banks from 66 countries. The problem of a long list of potential explanatory variables and uncertainty caused by fat data is resolved by the Bayesian Model Averaging.

Our results confirm that globalization and freedom (economic globalization, social globalization, monetary freedom, investment freedom and financial freedom) increase bank lending activity.

Moreover, we find a positive impact of low corruption and decreasing government size. However, the effect of the quality of the institutional environment differs in Europe and North America. We argue that regulation and government size contribute to information-sharing via credit bureau registries which generally reduces corruption in bank lending activities in Europe. In North America, the same bureaucratic institutions increase costs of credit funding and force creditors to find alternate forms of equity or bond financing in North America we found negative effect of corruption on bank lending activity.

In addition, we find a positive impact of economic activity and financial assets of the central bank on bank lending activity. We emphasize that increasing financial assets of central banks boosts the lending activity only of small banks because they are much more dependent on the inter-banking market than large banks.

Finally, we point out that only banking controls affect lending activity in all the analyzed years. Especially higher financial leverage and interest margins have a positive effect on credit demand. On the contrary, we found a negative effect of cost to income ratio and deposit to asset ratio. We argue that the cost to income ratio is affected particularly by higher regulatory requirements after the financial crisis.

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Appendix

Table A1: Definition of all Analysed Variables

Name and Source	Definition
GDP IMF, Eurostat, http://data.imf.org http://ec.europa.eu/eurostat/data/database	Gross domestic product at market prices and local currency. Completely empty series provided by IMF (International Financial Statistics) were filled in by data provided by Eurostat (National Accounts Indicators).
Deflator IMF, Eurostat, http://data.imf.org http://ec.europa.eu/eurostat/data/database	Deflator is calculated by dividing an aggregate measured at current prices by the same aggregate measured at constant prices. It is constructed as index (2010=100). Completely empty series provided by IMF (International Financial Statistics) were filled in by data provided by Eurostat (National Accounts Indicators).
Policy Interest Rate IMF, Official websites of local central banks, http://data.imf.org	Central Bank policy rate (marginal lending rate) in percent per annum. Completely empty series provided by IMF (International Financial Statistics) were filled in by manually collected data from websites of local central banks.
Central Bank Financial Assets IMF, Official websites of local central banks, http://data.imf.org	Financial Assets of Central Banks in current Central Bank policy rate (marginal lending rate) at current prices and national currency. Completely empty series provided by IMF (International Financial Statistics) were filled in by manually collected data from websites of local central banks.
Shareholder Equity Ratio Bankscope Database	Shareholder Equity Ratio (Equity-to-asset ratio) is an investment leverage or solvency ratio that measures the amount of assets that are financed by owners' investments by comparing the total equity in the bank to the total assets. Equity includes common shares and premium, retained earnings, reserves for general banking risks and statutory reserves.
Net Interest Margin Bankscope Database	This ratio is the net interest income expressed as a percentage of earning assets. The higher this figure, the cheaper the funding or the higher the margin the bank is commanding. Higher margins and profitability are desirable as long as the asset quality is being maintained.
Cost to Income Ratio Bankscope Database	This is one of the most focused-on ratios currently and measures the overheads or costs of running the bank, the major element of which is normally salaries, as percentage of income generated before provisions. It is a measure of efficiency although if the lending margins in a particular country are very high then the ratio will improve as a result. It can be distorted by high net income from associates or volatile trading income.
Deposit to Asset Ratio Bankscope Database	This ratio covers total customer deposits, deposits from banks and all other deposits and short-term borrowings, divided by total assets of the bank.
Liquid assets to deposits Bankscope Database	Liquid assets to deposits and Short term funding ratio looks at the amount of liquid assets available to borrower as well as depositors.
Political Constraints Index V Henisz (2002 and 2004) http://www-management.wharton.upenn.edu/henisz/	The index measures political constraint, that is, to identify underlying political structures and measure their ability to support credible policy commitments. The scale ranges from 0 to 1. The low level of index means that political changes may become highly unpredictable which represents a lot of risk for the lending activities in the country.
Financial Openness Chinn and Ito (2008) http://web.pdx.edu/~ito/Chinn-Ito_website.htm	The Chinn-Ito index is an index measuring a country's degree of capital account openness. The index is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions. This index takes

	on higher values the more open the country is to cross-border capital transactions. By construction, the series has a mean of zero.
Economic Globalization Comp. of Globalization Index Dreher and Axel (2006) http://globalization.kof.ethz.ch/	Economic globalization is characterized as long distance flows of goods, capital and services as well as information and perceptions that accompany market exchanges. Each of the variables is transformed to an index on a scale of one to a hundred, where a hundred is the maximum value for a specific variable over the period and one is the minimum value.
Social Globalization Comp. of Globalization Index Dreher and Axel (2006) http://globalization.kof.ethz.ch/	Index of social globalization is expressed as the spread of ideas, information, images and people. Each of the variables is transformed to an index on a scale of one to a hundred, where a hundred is the maximum value for a specific variable over the period and one is the minimum value.
Political Globalization Comp. of Globalization Index Dreher and Axel (2006) http://globalization.kof.ethz.ch/	Index of political globalization is characterized by a diffusion of government policies. Each of the variables is transformed to an index on a scale of one to a hundred, where a hundred is the maximum value for a specific variable over the period and one is the minimum value.
Business regulations, Frazer Institute Economic Freedom of the World Index http://www.freetheworld.com/index.html	The index covers price controls, administrative requirements, bureaucracy costs, requirements for starting a business, extra payments (bribes) licensing restriction, and tax compliance. The more widespread different regulations are mirrored in a lower value of the index.
Freedom to Trade Internationally Comp. of Economic Freedom Index http://www.heritage.org/index/explore	The index measures a wide variety of restraints that affect international exchange: tariffs, quotas, hidden administrative restraints, and exchange rate and capital controls. The index ranges from least free to most free.
Top Marginal Tax Rate Gwartney et al. (2013) http://www.pwc.com/extweb/pwcpublications.nsf/docid/9B2B76032544964C8525717E00606CBD	The indicator is comprised of the top marginal income tax rate and top marginal income and payroll tax rates. Countries with higher marginal tax rates, income and payroll (wage) tax rates that take effect at lower income thresholds received lower ratings.
Property Rights Index, Comp. of Economic Freedom Index http://www.heritage.org/index/explore	The index indicates the freedom to accumulate private property, secured by laws and enforced by the state including the likelihood of expropriation. It covers also the independence of the judiciary, corruption, and contract enforcement.
Freedom from Corruption Comp. of Economic Freedom Index http://www.heritage.org/index/explore	The index is based on a 10-point scale in which a score of 10 indicates very little corruption and a score of 0 indicates a very corrupt government. The score for this component is derived primarily from Transparency International's Corruption Perceptions Index.
Fiscal Freedom, Comp. of Economic Freedom Index http://www.heritage.org/index/explore	Fiscal freedom measures the fiscal burden in terms of the top income tax for households and firms and tax revenues in GDP.
Government Spending Index, Comp. of Economic Freedom Index http://www.heritage.org/index/explore	This index is based on the level of government expenditures in GDP, $GEI = 100 - \alpha\,(G/GDP)^2$. Thus, large governments receive over-proportionally low scores.
Business Freedom, Comp. of Economic Freedom Index http://www.heritage.org/index/explore	This index shows the ability to start, operate, and close a business that represents the overall burden of regulation and the efficiency of government regulations. The score is based on ten factors from the World Bank's Doing Business study.
Monetary Freedom, Comp. of Economic Freedom Index http://www.heritage.org/index/explore	Monetary freedom combines price stability (weighted average inflation for previous three years) with an assessment of price controls (a penalty up to 20% if price controls are important).

Trade Freedom, Comp. of Economic Freedom Index http://www.heritage.org/index/explore	Trade freedom is a composite measure of the absence of tariff (based on the weighted average tariff) and non-tariff barriers (a penalty up to 20% if non-tariff barriers are important).
Investment Freedom, Comp. of Economic Freedom Index http://www.heritage.org/index/explore	The index evaluates the severity of restrictions related to investment including rules for foreign and domestic investment, restrictions on payments, transfers, foreign exchange and capital transactions, labour regulations, corruption, red tape, weak infrastructure, and political and security conditions.

Table A2: Descriptive statistics

Variables[1]	Obs	Mean	Std. Dev.	Quantiles					Skewness[2]	Kurtosis[2]
				Min	0.25	Mdn	0.75	Max		
Gross Loans to Total Assets Ratio	83072	0.636	0.146	0.001	0.241	0.651	0.910	1.932	-0.0005	0.0033
GDP	83072	1.427	1.527	1.000	1.000	1.324	7.006	120.001	0.0522	3.7485
Deflator	83072	1.213	0.634	0.990	1.000	1.158	3.605	46.033	0.0422	2.7463
Policy Interest Rate	83072	0.360	0.313	0.007	0.019	0.304	1.000	3.333	0.0005	0.0027
Central Bank Financial Assets	83072	2.017	2.022	0.641	1.000	1.307	6.775	131.896	0.0247	1.1821
Shareholder Equity Ratio	83072	9.889	3.605	4.030	4.300	9.310	22.330	30.290	0.0014	0.0062
Net Interest Margin	83072	3.678	1.058	1.130	1.470	3.690	6.660	7.840	0.0004	0.0034
Cost to Income Ratio	83072	67.718	12.023	38.380	41.520	67.320	97.860	102.540	0.0002	0.0029
Deposit to Asset Ratio	83072	0.843	0.092	0.048	0.445	0.868	0.938	1.136	-0.0028	0.013
Liquid Assets/Deposits, Short t.fund	83072	13.997	11.501	2.670	2.820	10.640	61.110	81.130	0.0022	0.0093
Political Constraints	83072	0.415	0.053	0.000	0.210	0.400	0.550	0.720	-0.0011	0.0155
Financial Openness	83072	2.327	0.390	-1.890	0.040	2.390	2.390	2.390	-0.007	0.0552
Economic Globalization	83072	64.259	6.879	26.770	53.270	62.160	87.840	95.790	0.0015	0.0067
Social Globalization	83072	79.161	5.827	21.600	47.700	78.340	91.460	92.100	-0.0038	0.0302
Political Globalization	83072	91.990	4.146	35.710	71.608	92.280	97.880	98.160	-0.0064	0.061
Business Regulations	83072	6.775	0.504	3.520	5.440	6.810	7.790	8.660	-0.001	0.0068
Freedom to Trade Internationally	83072	8.069	0.454	4.870	6.642	8.060	9.410	9.590	-0.0002	0.0076
Top Marginal Tax Rate	83072	6.463	1.579	0.500	1.500	7.000	8.000	10.000	-0.0013	0.0041
Property Rights Index	83072	85.265	11.973	10.000	30.000	90.000	90.000	95.000	-0.0032	0.0133
Freedom from Corruption	83072	73.070	10.432	18.000	22.000	75.000	92.000	100.000	-0.0028	0.0126
Fiscal Freedom	83072	63.872	8.139	29.800	35.400	67.500	82.700	99.900	-0.0012	0.0059
Government Spending Index	83072	50.636	14.986	0.000	9.900	58.000	77.600	96.100	-0.0008	0.0031
Business Freedom	83072	85.970	8.241	40.600	55.000	89.600	94.800	100.000	-0.0017	0.0057
Monetary Freedom	83072	82.606	4.040	0.000	67.600	83.900	89.400	91.100	-0.002	0.018
Trade Freedom	83072	83.584	3.752	44.400	68.200	85.800	87.600	89.200	-0.0014	0.0075
Investment Freedom	83072	74.860	9.464	5.000	30.000	75.000	90.000	95.000	-0.0016	0.0109
Financial Freedom	83072	73.856	14.264	30.000	40.000	70.000	90.000	90.000	-0.0004	0.0021

[1] all variables in indexes before logarithmic transformation

[2] ×10[3]

Table A3: Correlation matrix

	Loans	GDP	Defl	IR	CB	Equ	Mar	Cost	Dep	Liq	Pol	Fin	Glob	Soc	Pol	Bus	Trade	Tax	Prop	Cor	Fis	Gov	Bus	Mon	Trad	Invest
GDP	-0.05	1.00																								
Defl.	-0.05	0.97	1.00																							
IR	0.00	-0.17	-0.14	1.00																						
CB Ass.	-0.05	0.66	0.63	-0.64	1.00																					
Equit	-0.05	0.26	0.23	-0.24	0.22	1.00																				
Margin	0.19	0.20	0.18	-0.25	0.09	0.39	1.00																			
Cost	-0.03	0.06	0.07	-0.06	0.09	-0.16	-0.09	1.00																		
Depos	-0.08	-0.27	-0.32	-0.12	-0.11	-0.29	0.06	0.03	1.00																	
Liquid	-0.33	0.18	0.20	0.11	0.15	-0.04	-0.17	0.10	-0.12	1.00																
Polcon	-0.06	-0.26	-0.23	0.14	-0.08	-0.30	-0.37	0.06	0.17	0.11	1.00															
Finop	0.09	-0.63	-0.62	-0.13	-0.20	-0.10	-0.10	0.02	0.21	-0.22	0.17	1.00														
Ecglob	0.00	-0.23	-0.22	0.50	-0.27	-0.27	-0.50	-0.03	-0.09	0.24	0.26	0.10	1.00													
Socglob	0.04	-0.57	-0.54	0.11	-0.23	-0.33	-0.44	0.05	0.22	-0.01	0.40	0.63	0.54	1.00												
Polglob	0.08	-0.38	-0.32	-0.09	-0.10	0.05	-0.13	-0.02	-0.06	-0.11	0.09	0.42	0.07	0.48	1.00											
Busreg	0.04	-0.35	-0.37	-0.02	-0.35	0.00	0.19	-0.04	0.36	-0.27	-0.03	0.29	-0.14	0.19	0.02	1.00										
Freet	0.04	-0.75	-0.70	0.39	-0.72	-0.31	-0.16	-0.05	0.23	-0.11	0.16	0.43	0.38	0.45	0.09	0.44	1.00									
Tax	0.03	0.19	0.13	-0.32	0.07	0.34	0.56	-0.04	0.14	-0.32	-0.39	-0.01	-0.75	-0.45	-0.13	0.29	-0.26	1.00								
Property	0.03	-0.61	-0.65	-0.12	-0.38	-0.16	0.00	0.00	0.54	-0.31	0.15	0.59	-0.05	0.56	0.26	0.61	0.50	0.20	1.00							
Corrupt	0.02	-0.63	-0.66	-0.02	-0.38	-0.19	-0.11	-0.01	0.49	-0.23	0.21	0.60	0.13	0.67	0.31	0.57	0.53	0.01	0.93	1.00						
Fiscal	0.00	0.51	0.43	-0.33	0.31	0.34	0.47	0.00	0.03	-0.17	-0.32	-0.26	-0.69	-0.60	-0.32	0.04	-0.56	0.83	-0.11	-0.29	1.00					
Govern	0.04	0.20	0.14	-0.25	-0.05	0.34	0.57	-0.07	0.11	-0.30	-0.43	-0.16	-0.70	-0.59	-0.23	0.27	-0.20	0.84	0.11	-0.07	0.78	1.00				
Busfree	0.06	-0.13	-0.21	-0.46	0.15	0.22	0.16	-0.01	0.25	-0.28	-0.04	0.45	-0.33	0.20	0.29	0.18	-0.19	0.40	0.53	0.50	0.32	0.30	1.00			
Monfree	0.09	-0.70	-0.69	0.43	-0.76	-0.23	-0.13	-0.05	0.19	-0.20	0.10	0.41	0.31	0.41	0.16	0.41	0.73	-0.14	0.52	0.49	-0.39	-0.10	-0.05	1.00		
Trade	0.03	-0.05	-0.12	-0.55	0.36	0.05	-0.13	0.05	0.18	-0.10	0.13	0.38	0.00	0.34	0.26	-0.10	-0.25	0.03	0.28	0.27	0.09	-0.08	0.64	-0.20	1.00	
Invest	0.02	-0.51	-0.52	-0.06	-0.24	-0.33	-0.31	0.07	0.29	-0.09	0.27	0.51	0.27	0.58	0.15	0.11	0.38	-0.24	0.56	0.57	-0.32	-0.31	0.26	0.41	0.51	1.00
Finfree	0.11	-0.21	-0.26	-0.10	-0.29	0.36	0.39	-0.14	0.12	-0.36	-0.30	0.25	-0.28	-0.08	0.22	0.48	0.14	0.56	0.42	0.32	0.33	0.63	0.47	0.28	-0.03	-0.18