Abstract

The accounting practices as regards provisioning of the losses on loans adopted by banks fluctuate with the business cycle and can reinforce financial instability. The objective of this study is to examine whether and to what extent provisioning policy are procyclical. We focus on the interaction between business cycle and provisioning policy (loan loss reserves and loan loss provisions) consistent with the Basel Accord of 1988 which made Loan Loss Reserves no longer part of Tier I capital in the numerator of the capital adequacy ratio. An empirical model on panel data is then adapted on the European banks of 1992 to 2004. In this model we consider two types of provisioning policy determinants: loan loss provisions and loan loss reserves. We find that large banks tend to hold less risk. They establish fewer reserves than small banks. However, our results provide that functional diversification has no impact on provisioning policy. We also find that risk weighted assets reduce the volatility of the provisioning policy during the cycle. The findings of our research are consistent with the empirical work of Bikker and Hu (2002), Laeven and Majnoni (2003), of Bikker and Metzemakers (2005) who show that banks more fund the losses on loans in period of economic downturn than in period of economic upturn for a whole of the OECD countries.

Key words: Procyclicality, loan loss provisions, loan loss reserves, European banks, panel data.

JEL codes: G21, F34

1. Introduction

These twenty last years were characterised by the introduction of the solvency ratios by the Basle\(^1\) Committee on the Banking Regulation and Supervisory Practices. The Basel Committee revised the 1988 Basle accord to Basle II. The aim of the revisions is to closely align the regulatory capital requirements with the underlying risks in the on and off-balance sheet activities. However, capital ratios (Cooke ratio and currently Mc Donough) were suspected to be sources of financial instability. Indeed, capital ratios proved to be procyclical

\(^1\) The Basle Committee includes governors of Central Banks and presidents of the authorities of supervision of the G 10 countries.
as they tend to exacerbate the economic cycle. Moreover, provisioning is closely related to the business cycle. Provisions are more sensitive to the fluctuations coming from the macroeconomic environment and from borrower’s solvency. It reduces the profits which banks can add to their capital. Provisions are related to the quality of the credit banks’ portfolio. It is one of the first quantitative indicators of deterioration in loan quality and, at the same time, a key contributor to fluctuations in bank earnings and capital (Hoggarth and Pain (2002)). Consequently, provisions are a proxy of the overall riskiness of the banks’ portfolio. The beginning of an expansionary phase is characterised by an increase in the economy firms’ profits, a rise in asset prices and the optimistic of customer’s expectations leads to a growth in bank lending. During this phase (expansionary phase), banks underestimate their risk exposures, reduce their credit standards and provisions for future losses. However, the risk materializes in recessionary phase because of a worsen customer’s profitability and the deterioration of borrowers’ creditworthiness. Borrowers can not be able to repay their debts. The consequence of this phenomenon is the deterioration of banks’ balance sheet because of the appearance of loan losses. The risk exposure of banks increase associated to the high cost of capital and to the high level of provisions. Banks react by reducing lending. The reduction of lending exacerbates the effects of economic downturn (procyclicality). Borio, Furfine and Lowe (2001) show that provisions increase during the recession and that provisions reach their maximum one year after the real deceleration of the economy.2

Provisioning policy differs across countries and institutional types (practical accountants, regulations and tax policy for example). It depends of the banks’ behaviour. Banks create provisions during economic upturn and they are forced to increase them in economic downturn because of a high failure rate of the borrowers and this in spite of the fall of their results. This behaviour justifies the procyclical character of provisioning policy because provisioning varies according to economic fluctuations. During upwards periods, banks feed more the stock of provision than in downswings periods when the results are low and the capital expensive3. The increase of provisions (decrease) during periods of weak (strong) economic growth is synonymous with a reinforcement of the cycle. The capital ratio

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2 It is the case for example in Japan where provisions increased only in the middle of the years 1990, a long time after the problems of the Japanese banking structure were recognized.

3 We suppose that Loan loss provisions are stocks (of provisions) deducted by banks each year to cover the share of presumed existing unrecovered loan in the banks’ loan portfolio. This stock could be fed by financial flows such as movements of currency entering or outgoing of the banking profits on a given date. Consequently, in upward period, this stock would be fed because of the high results of banks. However, in downswings period, this stock would not be fed any more following the fall of the results and more still this stock would strongly decrease because banks will have to fund more (because of the very high failure rate of the borrowers).
itself was suspected to be procyclical (Turner (2000)). Several work concerning the analysis of Loan loss provisions, such as Bikker and Metzemakers (2005), Bikker and Hu (2001), Cavallo and Majnoni (2001), Fonseca and Gonzalez (2005), Bouvatier and Lepetit (2006), Perez, Fumas and Saurina (2006), Laeven and Majnoni (2003), Anandarajan (2005), Lobo and Yang (2001), Dewenter and Hess (2006) mainly approached following points: the introduction of Loan loss provisions like an integral part of the capital regulation, the amplification of the fluctuations of the credit supply induced by the capital adequacy constraint and the provisioning system, the management of loan loss provisions at universal banks and specialized banks and finally the use of provisions for managing objectives and for signalling. Another work focuses on signalling effects of bank Loan Loss Reserves additions (Hatfield and Lancaster (2000)). Such approaches are rich lesson. However, they do not integrate the impact of functional diversification on the procyclical character of provisioning policy and they do not consider the effect of the risk weighting asset imposed by the Basle Committee.

The aim of this article is to determine the procyclical behaviour of provisioning policy of European banks within the period 1992-2004 by distinguishing banks according to their degree of diversification and by respecting risk weighting assets as required by the Basle Committee. This choice is mainly explained by the fact that on the one hand universal bank principle of is very common throughout Europe and on the other hand we supposed that the procyclicality of provisioning policy could be reduced if banks respect the regulatory constraint. For this purpose, we adopt a panel data approach of inspired by Laeven and Majnoni (2003), Bikker and Metzemakers (2005) on a basis of European banks data containing the individual information extracted the database Bankscope. According to the empiric literature, we use two possible measures depending on whether information on provision has been extracted of banks’ balance sheet or from the income statement. So we

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4 Universal banks are banks which carry on several activities. They offer an exhaustive range of banking services to all customers. The cover of the whole of the financial services would lead to savings of range and scale. At the present time in European countries where banking consolidation is most advanced, the banking environment is structured in oligopoly of universal banks. Engaged in processes of externalisation and delocalization, these banks get some their products, either near specialized subsidiary companies, or near external suppliers. It is the case of the insurance but also for trades closer to the traditional bank and the consumer credit. In addition, Germany, Switzerland and Austria never derogated from the concept of the universal bank since nineteenth century. Each bank being entitled to cover the entirety of the banks’ operations. What does not exclude the existence from banks specialized in certain types of operations. Spain, France, United Kingdom and Italy performed the choice much more tardily. In France, the universal bank principle was introduced by the banking law of 1984 which removed the traditional distinction between investment banks and deposit banks. The second banking directive of 1989 made it possible to combine deposit banks, investment banks, credit management, financial advisory activities and operations related to the insurance. The law of july 2, 1996 of “modernization of the financial activities” founded a single statute of financial intermediaries authorized to exert activity related to stock exchange.
propose two models with two different ratios (loan loss reserves/total assets and loan loss provisions/total assets) to represent provisioning policy. Our results confirm banks procyclical behaviour of provisioning policy. In particular, these results show that the taking into account of the risk weighted assets as defined by the Basle Committee reduce the volatility of provisioning policy during the business cycle.

This article is organized in the following way. Section 1 examines the credit risk along the business cycle. Model specifications and variables used in this study along with a description of our data are provided in section 2. Section 3 analyzes, discusses principal results obtained and concluded this article.

2. Credit risk along the business cycle

Credit risk is related to the business cycle because of the cyclicality of bank lending. Several explanations of the cyclicality of bank lending can be given such as disaster myopia, over-optimism, asymmetric effects and insufficient market discipline. However, for a better understanding of your study, it is necessary to discuss bank lending behaviour to business over the business cycle (2.1) and to examine the link between provisions for loan losses and procyclicality (2.2).

2.1 Bank lending and the business cycle

Bikker and Hu (2002) argue that lending depends on either demand or supply variables. Indeed, the demand for credit depends on the business cycle and the interest of loans. However, credit supply depends on the interest rate on loans, banking-specific factors and expected profits. Capital and reserves are the most important banking-specific factors. Bikker and Hu find that lending is shown to be strongly dependent on demand.

Bank lending to business tend to be procyclical (Gorton and He (2007)). Bank lending is contracted during economic downturn and increased during economic upturn. According to bank lending theory, the central point in the issue of procyclical behaviour of banks is to examine lending into the macroeconomic sphere. The procyclical feature of bank lending to business is driven by the supply of credit. Borrowers have private information about their ability to repay their loans. At the beginning of the loan agreement, this private information may not be known by banks. Moral hazard problem create risks that banks can address both through terms and conditions of lending in their contracts and through the selection of their asset portfolios. Moreover, the quality of banks loans may deteriorate during expansions because banks may expand their business loans portfolios beyond the standard level. This
excess lending create an adverse selection and after leads to an excessive contraction of bank lending. The adverse selection is mostly due to the “institutional memory” which means that loans officers obsolesces over time (Berger and Udell (2003)). Indeed, during economic downturn, loans officers acquire the skills to recognize risky borrowers and they lose these skills as the economic downturn recedes into the past. This implies that some experienced officers may forget the lessons of the past (short memory). We can add that the availability of bank credit has a significant effect on the aggregate economy. It helps firms to obtain alternatives sources of funding. Direct access to credit markets is not an option for many firms. This availability of banks loans to fund the economic activities of business may exacerbate the magnitude of economic business cycles (Berger and Udell (1992)). However, Gorton and He (2007) show that the relative bank performance of commercial and industrial loans is an autonomous source of macroeconomic fluctuations.

The procyclical feature of bank lending to business is also involving the demand of credit. During economic downturn characterized by a decline of the business investment, the demand decrease. This weaker demand affects the quantity of bank loans.

However, banks lending are exposed to changes in the overall economic conditions. These changes can lead to several risks such as credit risk. Credit risks are themselves influences by the business cycle conditions. Vennet and al. (2004) give three explanations of the link between banks risk and the business cycle. The first explanation is the association between business cycle, the degree of asymmetric information and bank default risk. They argue that the banking sector is vulnerable to adverse selection and moral hazard, both caused by asymmetric information. It is difficult for banks to assess the creditworthiness of borrowers. During economic downturn, the value of collateral attached to loans decrease and the degree of asymmetric information increase. This leads to a risky bank intermediation. The second explanation is a shift in the risk profile of banks over the business cycle. During economic downturn, banks are tempted to lower their lending standards. Loans granted during boom periods have a higher probability of default than those granted during slow credit growths periods (Jimenez and Saurina (2005)). However, during economic upturn, banks increase loans growth. Three reasons can explain the increase of growth loans such as the principal-agent problem, herd behaviours and short-term objectives. The principal–agent problem between bank shareholders and managers can lead to excessive volatility into loan growth (Perez, Jimenez and Saurina (2006)). In order to obtain a reasonable return on equity for their shareholders, managers may engage in other activities and more focus on their own rewards. The reward of the managers can be more in terms of growth objectives instead of
profitability targets. In this case, managers have incentives to increase loan growth. They also may increase loan growth if their profitability decreases. The second reason is herd behaviours. During boom periods, many banks are encouraged to increase their growth loans in order to preserve their market share. The third reason is short-term objectives. Banks finance more projects during economic upturns because they have short-term objectives.

The third explanation concerns the evidence of bank lending channel in most developed economies such as European countries where lending channel is particularly relevant. Monetary shocks for example may trigger a tightening of lending standards. Credit rationing is one of the responses of banks during economic downturn. Credit rationing is the restriction of the quantity of credit available to potential borrowers. Banks choose to ration credit in order to avoid adverse selection and negative incentive effects (Bernauer and Koubi (2002)). Another response of banks during economic downturn is to reorganize their credits portfolios. They can redirect their portfolios toward less risky assets at that moment. The refusal of banks to make loans even though borrowers are willing to pay reduce financial resources of these borrowers at their disposal or making the cost of external financing higher. This fact can prolong the economic downturn.

To summarize, bank lending channel is explained by the supply and demand for credit. Bank lending to business cycle is procyclical that means it moves at the same way as the business cycle. However, during economic downturn, Banks reduce their lending standards. Credit contraction exacerbated the business cycle (procyclicality).

2.2 Provisions for loan losses and procyclicality

Provisions are used to anticipate a probable loss. Provisions are deducted from the banks’ profits to face loan losses. Provisions for loan losses are considered as a charge because their calculations also involve a reduction in the value of the credit net, generally by a reduction of the measured value of the loans. Dewenter and Hess (2003) add that provisions for loan loss reduce net profits which banks can add in their capital. This fact reduces banks capacity to increase the amount of their credits or their risk and to satisfy capital requirements. Provisioning gives a more faithful image of banks’ profits (Borio and Lowe, 2001). Banks fund loans losses for two main reasons. The first reason relates to the obligation of the balance sheet transparency. As the second reason, it emphasizes the impact of provisioning policy on the volatility and the cyclical evolution of earnings.

We distinguish two types of provision: general provisions and specific provisions (Cortavarria and Al (2000)). General provisions are used to be protected from loan losses on
banks’ loan portfolio while specific provisions are made up for individually evaluated loans losses. General provisions may be subject to banks ‘discretion. That is why regulator has set up rules for this class of provision. Specific provisions are only given when losses are probable (Cavallo and Majnoni (2001)). Specific provisions have a retrospective nature that means they reduce risks of accounts manipulation but they can amplify business cycles (Borio et Lowe (2001), Bouvatier et Lepetit, (2006)). Indeed, this retrospective nature contributes to the increase of provisions during downswings periods because of to the deterioration of the credit quality. The result of this fact is the increase in the variability of the accounting incomes.

Provisions for loan losses have procyclical behaviour. The level of provision depends on the phase of the economic cycle. There is interdependence between loan loss provisions and business cycles. Granger causality tests (table 1) show that there is a feedback between loan loss provisions and GDP growth rate. Thus, loans loss provisions may have significant effects on the macroeconomic activity and may amplify swings in the economy. Banks generate high profits during the upswing periods. They increased loan growth rates. The excessive abundance of funding in these periods involves a little assessment of risks by banks in approving all projects (risky and non risky).

Favourable economic conditions lead to a positive borrower’s payment capacity and to any specific provisioning for loans granted in these periods. During these boom periods that banks are characterized by low provisioning and high reported profits. However, during downswings periods banks generate low profits. Thus, provision for loan losses is one of the most important factors affecting bank profitability (Walter (1991)). The economy deterioration leads to a decrease of borrower’s repayment capacity and to the materialization of the loan risks that banks acquired during upswing period. Provision levels increase which will negatively affect profits and capital adequacy ratios of these banks. Thus, we remark that the determination of the actual level of provision will continue to depend on the phase of the economic cycle. The current practice used to evaluate risks associate to the bank’s portfolio is to determine provisions according to the deterioration of the portfolio instead of taking into account the future potential risks on assets. The new proposals on provisions made in the Basle agreement focus on measuring credit risk by using models that are internal or external to banks, taking as a reference the probability of default within a horizon of one year. Thus, banks make low provisions during period of economic boom, when probability of default is less and then banks make excessive provisions during times of recession. That is why to
resolve this problem; it is proposed to set up statistical provisions\(^5\) (dynamic provisioning) to lower profit volatility throughout the economic cycle. Statistical provisions offset the cyclical effect of specific provisions on profit and loss account. Statistical provisions are implemented in Spain in July 2000 to correct the trend of making little provisions during boom periods and excessive provisions during period of recession.

If capital ratio is suspected to have procyclical behaviour for example according to the rating system “through the cycle” then we can suppose that provisions will also have procyclical behaviour. We can use the link between Loan loss provisions and equities to explain this point of view. The relation between loan loss provisions and equities is explained by the covering of credit risk: the conceptual framework of the credit risk management supposes that expected losses must be covered by provisions on losses on credit while unexpected losses must be covered by capital. If banks’ profits are not sufficient to cover provisions, there is an erosion of the banking capital. Cavallo and Majnoni (2001) argue that in the presence of shock, loan losses provisions make it possible to cover expected losses while capital makes it possible to cover unexpected losses. They notice that capital requirements only concern unexpected losses and loan loss provisions do not include like component of the capital regulation. General provisions are built-in in the owners’ equity of category 2 (within the limit of 1, 25% of the credits balanced according to the risk) under Basle I\(^6\).

Borio and Lowe (2001) analyze the need for clarifying the relation between provisions and capital. They theoretically suggest the exclusion of general provisions of capital equities\(^7\) and the determination of provisions so as to cover the estimated amount of net losses in the banks’ portfolio. Thus, provisions should cover identified credit losses and capital unidentified credit losses. The solution suggested by the Basle committee is to anticipate and to be able to equip with provisions for expected losses and not yet identified losses (Bank of France, 2003).

\(^5\) Statistical provisions are the difference between latent losses and specific provisioning. For latent losses, we may use to determine them internals models on the basis of an institution’s history, specific provisions -gross portfolio average ratio throughout the previous cycle, according to homogeneous risk category, to be multiplied by the current amount subject to exposure. Banks which can not use internal models have to take the exposure coefficients by risk types, which are imposed by the regulator, to calculate the latent losses.

\(^6\) The Basle Committee proceeded to a revision of the treatment of provisions for Basle II. It proposes to adjust the criteria to taking into account provisions beyond the amount which can be included in capital equities of category 2. Provisions higher than the ceiling can compensate for capital requirements but only insofar as the share of loss anticipated in capital requirement NI also exceeds the maximum amount of the provisions being able to be included in equities of category 2.

\(^7\) Opinions are divided between banks authorities and banks supervisors. Researchers (in the banking field) consider that equities are intended to protect it from unidentified losses rather than losses envisaged resulting from the solvency of the borrower. Banks supervisors disagree with his opinion.
Laeven and Majnoni (2001), Bikker and Metzemakers (2005), Cavallo and Majnoni (2001), Ahmed and Al (1999), Perez and Al (2005) confirm that loan loss provisions must be taken into account in the capital regulation. They empirically find a relation negative between capital ratio and Loan loss provisions. Indeed, by holding risky credits banks fund more (in the loss event) and they have evil to respect capital requirements thereafter what is coherent with the capital management hypothesis which postulates that banks fund more when their ratio of capital is weak or low. Anandarajan, Hasan and McCarthy (2005) do not share this idea. They confirm the relation between Loan loss provisions and capital management on the Australian banks.

Ahmed and Al (1999), Moyer (1990), Beatty and Al (1995), Collins and Al (1995), Perez and Al (2006) show that banks use loan loss provisions for managing their capital with an aim of satisfying capital requirements specified by regulators. Lobo and Yang (2001) show that banks which have a small capital ratio can increase their loan loss provisions in the intention to reduce the regulatory costs imposed by capital requirements. However, in period of recession, capital becomes expensive and loan loss provisions are high. Banks often answer by reducing their loans. Consequently, it is difficult for banks to manage their capital by the way of loan loss provisions in period of recession. Martins and Pinho (2003) argue that unlike the capital adequacy rules set forth by the Bank of International Settlements proposals and according to principles advanced by the Basle Committee on Banking Supervision, there is no underlying proposal for full harmonization of the provision requirements. Generally, all countries and bank supervision authorities agree upon the necessity of creating buffers against loan losses on future defaults and past-due loans. However, the way this is implemented in practice differs amongst countries. Some countries specifically define provisions for expected futures losses and provisions for past due loans. This is the case of Portugal, Italy, France, Denmark, Spain or Netherlands. Other countries, such as the USA, Germany and the UK rely on firms to actually determine the adequate amount to provision. This implies that capital management and loan loss provisions may differ across countries.

In the analysis of the impact of the provisions on the capital, we must consider taxes. Cortavarria and Al (2000) show that the deductible tax can increase the capital ratio. By supposing for example a rate of tax identical and a detention of general provisions to a level for banks of emergent countries, the deductible tax (of general provisions) can contribute to increase the ratio of capital and to cause a strong incentive of the banks to be subjected to capital requirements. Conversely, a very restrictive tax policy discourages banks to fund adequately their loans (Cavallo and Majnoni (2001)).
To summarize, banks need to make provisions to anticipate unexpected losses. Provisions for loan losses reduce banks profits. Loan loss provision rose to cover the potential losses on non performing loans (specific provisions). Banks used loan loss provisions as a tool to adjust the (historical) value of loans to reflect their true value. Banks make little provision during expansion period and excessive provision followed by the ensuing possibilities of bankruptcy during period of recession. This leads to procyclicality behaviour of provisions. This behaviour can also be explained by the relationship between capital and loan loss provisions. Indeed, if capital adequacy ratios are suspected to be procyclical then we can deduce that provisions for loan losses will also be procyclical. Thus, it is necessary to set up an anticyclical provisioning scheme to offset the cyclical effect of specific provisions on profit and loss account and to reduce profit volatility of banks throughout the economic cycle.

We analyze in the following our empirical model.

3. Empirical approach of the sensibility of Loan loss provisions and Loan Loss Reserves along the business cycle

The aim of this paper is to determine the procyclical behaviour of provisioning policy depending on whether information on reserve has been extracted of banks’ balance sheet or from the income statement. We use the information on reserve because the loan quality information should be most trustworthy immediately after regulators examine a bank and they provide additional information about the riskiness of the loan portfolio (Walter (1991)). We propose two models with two different ratios (loan loss reserves/total assets and loan loss provisions/total assets) to represent provisioning policy. We adopt an empiric approach different of those generally adopted in the existing literature by adding two proxy of diversification of the banks activities and the risk weighted asset.

3.1 Methodology and data

3.1.1 Data

The bank accounting data is retrieved from annual accounts available in the Bankscope database of the agency of rating IBCA (International Credit Analysis Limited). These data relate to the details of the asset and the liability harmonized and on the income statement. We use a sample consisting of an unbalanced panel of annual report data from 1992 to 2004 for a set of European banks in 17 European countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands,
Norway, Portugal, Spain, Switzerland, Sweden and United-kingdom. These banks are listed and are commercial banks. The choice of the only commercial banks is explained by the fact that commercial banks concentrate more on their activity on loans and deposits. The sample initially contained at the beginning 2512 banks and 32669 observations (table 2 in appendix). A majority of banks do not give information on some variables needed in this study (loan loss provisions and total capital ratio). Some outliers have been eliminated in order to avoid the possibility that a small number of observations, with a very low relative weight over the total sample, could bias the results. To minimize effects of measurement due to the presence missing observations in our estimates, we exclude banks whose information is not indicated over three consecutive years. Thus, the final sample consists of 105 banks with 627 observations.

Before presenting the methodology, we specify the retained variable.

3.1.1.1 The dependent variables

We have chosen two main dependent variables which correspond to two different ratios: loan loss reserves/total assets and loan loss provisions/total assets. These two ratios represent the provisioning policy. The empiric literature proposed two measures of provisioning depending on whether information on reserves has been extracted of banks’ balance sheet or from the income statement. The first possibility consists in using the available information in the bank’s balance sheets\(^8\). Indeed, we calculated, for every bank of our sample, an annual ratio of Loan Loss Reserves/ total Asset. This variable indicate the global amount of provision for loan losses build by the bank to a t date. This measure coming from the banks balance sheet has been used in numerous empiric studies in particular those of Grammatikos and Saunderses (1990).

The second possible measure proposes to extract data on reserves from the income statement since some authors as Wahlen and al. (1994) and Ahmed and al. (1999) preferred to measure the impact of reserves on the value of banks in term of flow. Loan Loss provision reflect the observation of a reserve grant or allocate during the t exercise. This measure with the provision write-off corrects the amount of reserves of every exercise. It can be considered

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\(^8\) The reserve for loan loss account appears on the asset side of a bank’s balance sheet as a deduction from total loans. It is called by the accountants a *contra asset account*. The total book value of a bank’s loans less the reserve for loan losses should be, if the bank is accurate in its assessment of future loan losses, the best estimate of the net realizable value of the loan portfolio as of the financial statement date. Total loans less reserves are called *net loans*. Nevertheless, the reserve for loan account is established and maintained by periodic charges against earnings. Charges show up on the income statement as an expense category named *provision for loan losses* or *loan loss provisions*. For more details see Walter (1991).
as the stock of provision (in term of flow). We have use the ratio of loan loss provisions/ total asset as the second dependent variable.

We add two other dependent variables which represent the volatility of LLR (Loan Loss Reserves) and LLP (Loan Loss Provisions).

3.1.1.2 The explanatory variables

Valckx (2003) models loan loss provision as a function of GDP growth, interest rate and some bank-specific indicators both at sector level and for individual banks.

* Microvariables

The earning before tax (EBT_A). We expect a negative sign between this variable and LLR or LLP. Banks increase their loan loss provisions or add additional reserves when their profits are weak.

Loans growth rate (GL). It is a proxy variable of the risk (Bikker and Metzemakers (2005), Jimenez and Saurina (2006), Laeven and Majnoni (2003)) because the increase of the loans in economic upswings leads to an increase of the risk. Banks pursuing higher lending growth rates are more likely to accept riskier borrowers (Quagliariello, 2004). Loans growth is associated to a fall of the efforts of banks’ monitoring and a deterioration of the quality of the portfolio. We expect a negative sign.

The ratio of total loans on total assets (TL/TA). This variable reflects the importance of loans in the bank’s portfolio. This variable represents the size of lending and serves to characterize a bank’s balance sheet (Bikker and Hu, (2002)). We supposed that if the proportion of loans in the total assets is high then banks may reduce their LLP or they no add additional reserves during economic upswings. However, during economic downswing, credit risk materializes with a high borrower’s probability of default. The expected sign is positive.

Size equals log of total assets. It is introduced as a control variable. It controls the too-big-to-fail phenomenon and the possibility that loan loss provisions or loan loss reserves variables differ for large and small banks. We suppose that universal banks are large bank and they tend to hold less risk (Dewenter and Hess, 2003). If universal banks have closer ties to their clients, they should have an informational advantage over specialized banks. They have longer lasting relationships with their borrowers than do specialized banks, they are more likely to renegotiate. Then we can suppose that the larger the size of the bank is, the more the loan loss provisions (or loan loss reserves) decrease.

The return on asset per unit of risk (SHP_ROA). We expected a negative sign between LLP and LLR. The more the return on asset per unit of risk is high, the lower is LLP.
The ratio of Equity on total assets (EQTA). It makes it possible for banks to absorb their unexpected losses of banks’ portfolio. Thus a more important cover of the credit by the capital makes it possible to absorb not anticipated losses. The expected sign is positive.

Her is the herfindhal index. It is also used here as a proxy of functional diversification. Revenue diversification is measured using a herfindhal index (Stiroh (2003)). It also measures the concentration of the banks activities.

Risk-weighted assets ratio (RWAA). It is a measure of banks profile. It is also a measure of portfolio composition (“regulatory risk”). The impact of RWAA on loan loss provisions or loan loss reserves depends on the extent to which banks portfolio is risky. The risk weights are determined by the Basel Capital Accord of 1988 and independent of cyclical influences. The sign expected is negative.

We include for diversification strategies two variables: Herfindahl indexes (HER) and the share of non interest income over total revenue (DIV2). DIV2 measures the degree of revenue diversification and a larger value indicates a more diversified mix. More banks diversify their activities, less they increase loan loss provisions or loan loss reserves. The expected sign is negative.

* Macrovariable

The real rate of growth of the domestic product (GDPG). It is the most general and most direct measure of macroeconomic developments. It is the single most useful indicator of the business cycle (Bikker and Hu, 2002). Even if provisions go down in economic upswings, banks tend to reserve more in good years. In this case, we will expect a positive sign and we can conclude that banks are less procyclical concerning loan loss provisions. However, we will expect a negative sign if banks fund more provisions in economic downswings than in economic upswings.

3.1.2 Methodology

We consider in our estimates two categories of explanatory variables. The first relates to the LLP_A and LLR_A; the second is the volatility of LLP_A (RISK_LLP) and LLR_A (RISK_LLR). Principal equations of estimates are as follows:

From the balance sheet model

Equation (1.1) and equation (1.2)
To have robust and valid results, we carried out several tests as a preliminary. First of all, a Fisher test was carried out to check if we are in the presence of a homogeneity or heterogeneity of the behaviours. In other words, we want to know if European banks (resulting from our sample) have or not individual specificities which can induce different behaviours with regard to loans loss provisions or loan loss reserves. For that, we confront the null assumption $H_0$ (complete homogeneity of the behaviours) with alternative assumption $H_A$ (complete heterogeneity of the behaviours) on the basis of Fisher test statistics. We reject the null assumption with a threshold of risk to strongly be mistaken in 1%. We can thus affirm that there is heterogeneity of the behaviours. Then, we tested the individual effect if it is fixed or variable by the Haussman test. This test consists in testing the exogeneity of the explanatory variables compared to the specific error of the model. The null assumption of these statistics of test is the absence of correlation between the specific error and the specific variables. Results of this test reveal the need for taking into account specific effects to banks. These specific effects can be related for example to the accounting of the non-performing loans and to tax policy. Then, we checked if errors respect the good properties in fact if they are homoscedastic by applying White test to the residues obtained in the regression. We point out that White test is based on a significant relation between the square of the residue and one or more explanatory variables in level and with the square within the same regression equation. Taking into consideration White test, we conclude that the heteroscedasticity is present. We corrected this heteroscedasticity by the matrix of white. Lastly, we check if the errors are correlated between them by the Durbin Watson (DW) test. The autocorrelation is present and we correct it by the Newey - West method.
In addition, a unit root test was worked out for the whole of the banking series of our sample. For that, we carried out three tests of stationary to knowing the test of Im-Pesaran-Shin (IPS)\(^9\), the test of Levin-Flax-Chu (LLC) and tests of Fisher relating to the data of each bank (Maddala and Wu (1999) and Choi (2001)) Fisher-type tests using ADF and PP tests (Maddala and Wu (1999) and Choi (2001)), and Hadri (1999). Results of these tests applied to our data confirm as a whole a rejection of the null assumption of non stationary to the threshold of risk of 1%. The data are stationary. Results of the tests for PIB are provided table 3 in appendix.

4. Discussion of findings

4.1 Descriptive statistics

Table 4 contains descriptive statistics for selected variables. Most of the variables are deflated by total assets except of DIV2, HER, SHP_ROA. Reference to the average of loan to total assets indicates that most of banks in European countries focus their activities on loans. The share of loans to total assets is between 55% and 97%. This result proves that these banks are commercial banks. Loans growth rate is on average 13.32%.

A brief inspection, of the mains variables of interest, loan loss provision and loan loss reserves, shows that banks do not make enough provisions for loans losses. Loan loss provision are on average 0.38% with a maximum of 5.60% and loan loss reserves are 1.48% with a maximum of 17.48%. Thus, on average, banks fund fewer provisions for loans losses according to their loans. The share of non interest revenue over total revenue is on average 36.17%, the herfindhal index is on average 59% and the return on asset per unit of risk is on average 6.65%.

Table 5 reports correlation matrix coefficients among the variables.

4.2 Simultaneous equation results

Table 6 reports the results of the estimate equation of LLP by the GLS method (models 1) or the first column of the table 6. All the coefficients associated to the selected variables are significant expect coefficients for EQTA, HER and RWAA. As expected GDPg which is the useful business indicator are relevant in loan loss provisions and loan loss reserves equations. The coefficient of growth rate (\( \alpha_t \)) is significant and negative. It means

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\(^9\) The H0 assumption of the IPS test is: all the series are non stationary against the alternative assumption: only a fraction of the individual series is stationary. A probability of the test lower than 10% leads to the reject of H0. The null assumption of the LLC test is: all the series are non stationary against the alternative assumption: all the series are stationary. A probability of the test lower than 10% leads to the reject of H0.

We also find that banks use their earnings before tax to increase or to decrease loan loss provisions as the coefficient $\alpha_2$ is negative and significant. This result is also conforming to the conclusions found by Laeven and Majnoni (2003), Anandarajan (2005). We can interpret this result by the fact that banks minimize (maximize) loan loss provisions when their income are weak (high). We can note that banks adopt an imprudent behaviour with regard to their provisioning policy. Furthermore, banks decrease loan loss provisions when they give more loans during economic upswings as the coefficient $\alpha_3$ is negative and significant. However, if the proportion of loans in the total assets is high then banks may increase their LLP or they add additional reserves during economic upswings.

The size coefficient in the LLP equation is significantly negative and significant at the .01 level, suggesting that large banks make relatively small provisions. Larger banks tend to hold less risk. Universal banks are considered as large banks. This result is consistent with the hypothesis that if universal banks have closer ties to their clients, they should have an informational advantage over specialized banks. We also find that if the return per unit of risk is high, default risk is reduce and then banks make fewer loan loss provisions. The coefficient of RWAA is significant. This result suggests that if banks weight their assets according to their risk then they will have less default rate. Thus, they will fund fewer loan loss provisions.

The insignificant coefficient on HER and DIV2 suggests that diversification did not impact the provisioning strategy of banks, after controlling for the other determinants. The coefficient on E is insignificant.

The standard deviation is often used to measure the risk. It is a better measure of volatility. The results for the risk of loan loss provision equation show that if banks cash flows are weak then loan loss provisions are more volatile. At the same way, if banks weight their assets according to their risk then the volatility of loan loss provisions is reduced. Banks have less risk. However, we find a positive correlation between E and risk_llp. This result is surprising. The other coefficients are not significant.

To summarize, we have shown on whether information on reserve has been extracted from the income statement that provisioning policy behaviour is procyclical. We find that functional diversification has no impact on loan loss provisions. However, if banks weight
their assets according to their risk then they will have less risk and less loan loss provisions to constitute.

Concerning LLR equation, only SHP_ROA and EQTA are insignificant. The coefficients of five variables (GDPG, EBT_A, GL, TLTA, and SIZE) are significant with the expected signs. A significant negative coefficient on earnings (EBT_A) indicates that banks with lower earnings increase their LLR. We find that banks increase their loan loss allowance when the share of loans to total assets is high. Larger banks decrease their loan loss allowance (or reserve) as they negotiate their loans before charging them off. In the same way, we find that universal banks establish fewer loan loss reserves. DIV2 are negatively significant. HER and RWAA coefficients are significant. In terms of risk, GDPG, GL, SHP_ROA, HER, DIV2 have no impact on the LLR volatility. A high level of banks’ earning reduces the volatility of loan loss reserves for expected future losses. Banks establish more reserves when their equities levels are high. The risk weight asset reduces the volatility (risk) of banks.

5. Conclusion

In this paper, we investigate the procyclical behaviour of provisioning policy whether information on reserve has been extracted of banks’balance sheet (loan loss reserves) or from the income statement (loan loss provisions). We develop a panel data approach to test this hypothese.

First, we find that loan loss provisions and loan loss reserve have procyclical behaviour. Positive (negative) GDP growth rate has significantly negative (positive) effect on loan loss reserves or loan loss provisions. This suggests that provisioning policy react to predicted changes in the business cycle and they can potentially reinforce economic phases. This finding is in response to the interrogations caused par the basel II accord such as procyclicality.

Second, our results provide strong evidence that the risk weight assets reduce the volatility of both loan loss provisions and loan loss reserves. If banks weighted their assets according to the counterparty’s risk weighting then they have less risky portfolio. Furthermore, results also indicate that large banks tend to hold less risk as they make relatively small provisions. At the same way, these banks decrease their loan loss allowance as they renegotiate their loans before charging them.

Third, we find that on whether information on reserves has been extracted of banks’ balance sheet or from the income statement, provisioning policy is procyclical. These results imply that provisioning policy varies over the business cycle.
This finding offers support to the claim for implementation of a dynamic provisioning system in Europe as in Spain and in Portugal. Such dynamic provisioning system will reduce the procyclicality of provisioning policy. However, our main results clearly suggest that future research on the implications of IFRS (International Financial Reporting Standards) norms and capital requirements for the provisioning policy is warranted.

References:


Tables

Table 1: Granger Causality for GDP growth (lag 2). Sample 1993-2004.

<table>
<thead>
<tr>
<th></th>
<th>Granger Cause</th>
<th>(p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIB</td>
<td>LLP ASSET does not</td>
<td>0.00163</td>
</tr>
<tr>
<td>LLP ASSET</td>
<td>Granger Cause</td>
<td>0.60158</td>
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Table 2: Distribution of the observations by country

<table>
<thead>
<tr>
<th>Countries</th>
<th>Number of banks * available on</th>
<th>Number of observations retained in our sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bankscope  Fitch IBCA</td>
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</tr>
<tr>
<td>Austria</td>
<td>145</td>
<td>21</td>
</tr>
<tr>
<td>Belgium</td>
<td>81</td>
<td>-</td>
</tr>
<tr>
<td>Danemark</td>
<td>93</td>
<td>12</td>
</tr>
<tr>
<td>Finland</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>France</td>
<td>461</td>
<td>41</td>
</tr>
<tr>
<td>Germany</td>
<td>456</td>
<td>37</td>
</tr>
<tr>
<td>Greece</td>
<td>29</td>
<td>-</td>
</tr>
<tr>
<td>Ireland</td>
<td>48</td>
<td>21</td>
</tr>
<tr>
<td>Italy</td>
<td>272</td>
<td>69</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>147</td>
<td>-</td>
</tr>
<tr>
<td>Netherlands</td>
<td>73</td>
<td>9</td>
</tr>
<tr>
<td>Norway</td>
<td>21</td>
<td>90</td>
</tr>
<tr>
<td>Portugal</td>
<td>40</td>
<td>33</td>
</tr>
<tr>
<td>Spain</td>
<td>137</td>
<td>169</td>
</tr>
<tr>
<td>Sweden</td>
<td>30</td>
<td>27</td>
</tr>
<tr>
<td>Switzerland</td>
<td>270</td>
<td>10</td>
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<tr>
<td>United Kingdom</td>
<td>197</td>
<td>88</td>
</tr>
<tr>
<td>Total</td>
<td>2513</td>
<td>627</td>
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</table>

- Commercial and cooperative banks are considered
**Table 3: Unit root test for GDPg. Sample 1993 -2004**

Panel unit root test: Summary
Exogenous variables: Individual effects
User specified lags at: 1
Newey-West bandwidth selection using Bartlett kernel

<table>
<thead>
<tr>
<th>Method</th>
<th>Statistic</th>
<th>Prob.**</th>
<th>Cross-sections</th>
<th>Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null: Unit root (assumes common unit root process)</td>
<td>-</td>
<td>0.0000</td>
<td>46</td>
<td>306</td>
</tr>
<tr>
<td>Levin, Lin &amp; Chu t*</td>
<td>36.4027</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Null: Unit root (assumes individual unit root process)</td>
<td>-</td>
<td>0.0000</td>
<td>46</td>
<td>306</td>
</tr>
<tr>
<td>Im, Pesaran and Shin W-stat</td>
<td>5.94732</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADF - Fisher Chi-square</td>
<td>163.00</td>
<td>0.0000</td>
<td>46</td>
<td>306</td>
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<tr>
<td>PP - Fisher Chi-square</td>
<td>177.97</td>
<td>0.0000</td>
<td>46</td>
<td>352</td>
</tr>
<tr>
<td>Null: No unit root (assumes common unit root process)</td>
<td>-</td>
<td>0.0000</td>
<td>105</td>
<td>627</td>
</tr>
<tr>
<td>Hadri Z-stat</td>
<td>11.877</td>
<td>0.0000</td>
<td></td>
<td></td>
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</table>

**Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.**
Table 4: Descriptive statistics for European commercial and cooperative banks over the period 1993-2004

<table>
<thead>
<tr>
<th></th>
<th>DIV2</th>
<th>EBT_A</th>
<th>EQTA</th>
<th>GL</th>
<th>HER</th>
<th>LLP</th>
<th>LLR</th>
<th>TLTA</th>
<th>SHP_ROA</th>
<th>SIZE</th>
<th>GDPG</th>
<th>RWAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>36.17</td>
<td>0.91</td>
<td>6.14</td>
<td>13.32</td>
<td>0.59</td>
<td>0.38</td>
<td>1.48</td>
<td>0.55</td>
<td>6.65</td>
<td>16.76</td>
<td>2.68</td>
<td>2.27</td>
</tr>
<tr>
<td>Max</td>
<td>178.12</td>
<td>8.65</td>
<td>24.80</td>
<td>516.97</td>
<td>3.78</td>
<td>5.60</td>
<td>17.49</td>
<td>0.97</td>
<td>302.09</td>
<td>20.63</td>
<td>8.80</td>
<td>0.61</td>
</tr>
<tr>
<td>Min</td>
<td>-23.47</td>
<td>-3.97</td>
<td>1.37</td>
<td>-99.90</td>
<td>0.50</td>
<td>-2.15</td>
<td>0.00</td>
<td>0.01</td>
<td>-0.81</td>
<td>12.14</td>
<td>-1.03</td>
<td>292.01</td>
</tr>
<tr>
<td>Std.Dev</td>
<td>16.63</td>
<td>0.89</td>
<td>3.15</td>
<td>33.33</td>
<td>0.17</td>
<td>0.48</td>
<td>1.38</td>
<td>0.19</td>
<td>23.02</td>
<td>1.912</td>
<td>1.66</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Variable definitions: all variables are in percentage. Except SIZE and SHP_ROA. DIV2: (non interest income/total revenue); EBT_A: earnings before tax/total assets; EQTA: Equity/total assets; GL: loans’ variation of bank i between years (t-1) and t; HER: ((non interest income/total revenue)^2 + (net interest income/total revenue)^2); LLP: Loans loss provision/total assets; LLR: Loan loss reserves/total assets; TLTA: total loans/total assets; SHP_ROA: roa/risk_roa with risk_roa: @sqrt((roa – @ mean roa)^2); SIZE: log of total assets; GDPG: the real rate of growth of the domestic product; RWAA: rwa/total assets with rwa: (tot_capratio)

Table 5: Correlation matrix

<table>
<thead>
<tr>
<th></th>
<th>DIV2</th>
<th>EBT_A</th>
<th>E</th>
<th>GL</th>
<th>HER</th>
<th>LLP</th>
<th>LLR</th>
<th>TLTA</th>
<th>RWAA</th>
<th>SHP_ROA</th>
<th>SIZE</th>
<th>GDPG</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIV2</td>
<td>1.000</td>
<td>-0.055</td>
<td>-0.265</td>
<td>-0.146</td>
<td>0.070</td>
<td>-0.181</td>
<td>-0.091</td>
<td>-0.423</td>
<td>-0.049</td>
<td>0.063</td>
<td>0.352</td>
<td>-0.128</td>
</tr>
<tr>
<td>EBT_A</td>
<td>-0.055</td>
<td>1.000</td>
<td>0.586</td>
<td>-0.008</td>
<td>-0.101</td>
<td>-0.389</td>
<td>0.154</td>
<td>-0.045</td>
<td>0.032</td>
<td>-0.129</td>
<td>0.275</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>-0.265</td>
<td>0.586</td>
<td>1.000</td>
<td>-0.015</td>
<td>0.031</td>
<td>-0.034</td>
<td>0.117</td>
<td>0.296</td>
<td>-0.002</td>
<td>-0.019</td>
<td>-0.421</td>
<td>0.170</td>
</tr>
<tr>
<td>GL</td>
<td>-0.146</td>
<td>-0.008</td>
<td>-0.015</td>
<td>1.000</td>
<td>0.079</td>
<td>-0.118</td>
<td>-0.120</td>
<td>0.047</td>
<td>0.145</td>
<td>0.005</td>
<td>-0.027</td>
<td>0.162</td>
</tr>
<tr>
<td>HER</td>
<td>0.070</td>
<td>-0.101</td>
<td>0.031</td>
<td>0.079</td>
<td>1.000</td>
<td>0.057</td>
<td>-0.026</td>
<td>-0.029</td>
<td>0.009</td>
<td>-0.045</td>
<td>-0.228</td>
<td>-0.041</td>
</tr>
<tr>
<td>LLP</td>
<td>-0.181</td>
<td>-0.389</td>
<td>-0.034</td>
<td>-0.118</td>
<td>0.057</td>
<td>1.000</td>
<td>0.226</td>
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<td>-0.049</td>
<td>-0.013</td>
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<td>LLR</td>
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<td>0.154</td>
<td>0.117</td>
<td>-0.120</td>
<td>-0.026</td>
<td>0.226</td>
<td>1.000</td>
<td>0.158</td>
<td>-0.039</td>
<td>-0.050</td>
<td>-0.133</td>
<td>0.019</td>
</tr>
<tr>
<td>TLTA</td>
<td>-0.423</td>
<td>0.174</td>
<td>0.296</td>
<td>0.047</td>
<td>-0.029</td>
<td>0.191</td>
<td>0.158</td>
<td>1.000</td>
<td>-0.169</td>
<td>-0.043</td>
<td>-0.183</td>
<td>0.160</td>
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<tr>
<td>RWAA</td>
<td>-0.049</td>
<td>-0.045</td>
<td>-0.002</td>
<td>0.145</td>
<td>0.009</td>
<td>-0.029</td>
<td>-0.039</td>
<td>-0.169</td>
<td>1.000</td>
<td>-0.021</td>
<td>-0.108</td>
<td>0.016</td>
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<tr>
<td>SHP_ROA</td>
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<td>0.032</td>
<td>-0.019</td>
<td>0.005</td>
<td>-0.045</td>
<td>-0.049</td>
<td>-0.050</td>
<td>-0.043</td>
<td>-0.021</td>
<td>1.000</td>
<td>-0.007</td>
<td>-0.008</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.352</td>
<td>-0.129</td>
<td>-0.421</td>
<td>-0.027</td>
<td>-0.228</td>
<td>-0.013</td>
<td>-0.133</td>
<td>-0.183</td>
<td>-0.108</td>
<td>-0.007</td>
<td>1.000</td>
<td>-0.139</td>
</tr>
<tr>
<td>GDPG</td>
<td>-0.128</td>
<td>0.275</td>
<td>0.170</td>
<td>0.162</td>
<td>-0.041</td>
<td>-0.221</td>
<td>0.019</td>
<td>0.160</td>
<td>0.016</td>
<td>-0.008</td>
<td>-0.139</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Variable definitions: all variables are in percentage. Except SIZE and SHP_ROA. DIV2: (non interest income/total revenue); EBT_A: earnings before tax/total assets; EQTA: Equity/total assets; GL: loans’ variation of bank i between years (t-1) and t; HER: ((non interest income/total revenue)^2 + (net interest income/total revenue)^2); LLP: Loans loss provision/total assets; LLR: Loan loss reserves/total assets; TLTA: total loans/total assets; SHP_ROA: roa/risk_roa with risk_roa: @sqrt((roa – @ mean roa)^2); SIZE: log of total assets; GDPG: the real rate of growth of the domestic product; RWAA: rwa/total assets with rwa: (tot_capratio)
Table 6: Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>LLP_A (1.1)</th>
<th>LLR_A (1.2)</th>
<th>RISK_LLP (1.3)</th>
<th>RISK_LLR (1.4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.050* (3.51)</td>
<td>0.000* (8.56)</td>
<td>0.65* (2.73)</td>
<td>0.65* (2.73)</td>
</tr>
<tr>
<td>GDPg</td>
<td>0.000 (-4.65)</td>
<td>0.000* (-3.78)</td>
<td>12.29 (-1.54)</td>
<td>12.29 (-1.54)</td>
</tr>
<tr>
<td>EBT_a</td>
<td>0.000* (-8.55)</td>
<td>0.000* (-6.65)</td>
<td>0.000* (-7.12)</td>
<td>0.000* (-7.12)</td>
</tr>
<tr>
<td>GL</td>
<td>0.000* (-6.36)</td>
<td>0.000* (-4.98)</td>
<td>58.49 (0.54)</td>
<td>58.49 (0.54)</td>
</tr>
<tr>
<td>TLTA</td>
<td>0.000* (7.99)</td>
<td>0.000* (19.41)</td>
<td>52.60 (-0.63)</td>
<td>52.60 (-0.63)</td>
</tr>
<tr>
<td>Size</td>
<td>0.000* (-3.57)</td>
<td>0.000* (-8.41)</td>
<td>1.90* (-2.53)</td>
<td>1.90* (-2.53)</td>
</tr>
<tr>
<td>Shp_roa</td>
<td>0.34* (-2.94)</td>
<td>77.27 (-0.28)</td>
<td>20.33 (-1.27)</td>
<td>20.33 (-1.27)</td>
</tr>
<tr>
<td>EQTA</td>
<td>13.89 (1.48)</td>
<td>10.66 (-1.61)</td>
<td>0.58* (2.76)</td>
<td>0.58* (2.76)</td>
</tr>
<tr>
<td>HER</td>
<td>76.09 (0.30)</td>
<td>0.570* (2.77)</td>
<td>73.25 (-0.34)</td>
<td>73.25 (-0.34)</td>
</tr>
<tr>
<td>RWAA</td>
<td>0.05* (-3.50)</td>
<td>4.73** (1.98)</td>
<td>0.31* (-2.97)</td>
<td>0.31* (-2.97)</td>
</tr>
<tr>
<td>DIV2</td>
<td>76.92 (0.29)</td>
<td>1.96 (-2.34)</td>
<td>33.12 (0.97)</td>
<td>33.12 (0.97)</td>
</tr>
<tr>
<td>Ajusted R² (%)</td>
<td>0.87</td>
<td>0.93</td>
<td>0.65</td>
<td>0.65</td>
</tr>
<tr>
<td>Observations</td>
<td>627</td>
<td>627</td>
<td>627</td>
<td>627</td>
</tr>
</tbody>
</table>

Note: *, ** and *** indicate significance respectively at the 1%, 5% and 10% levels. T-statistics are corrected for heteroskedasticity following White’s methodology.

Variable definitions: DIV2: (non interest income/total revenue); EBT_A: earnings before tax/total assets; EQTA: Equity/total assets; GL: loans’ variation of bank i between years (t-1) and t; HER: ((non interest income/total revenue)^2 + (net interest income/total revenue)^2); LLP: Loans loss provision/total assets; LLR: Loan loss reserves/total assets; TLTA: total loans/ total assets; SHP_ROA: roa/risk_roa with risk_roa: @sqrt((roa - @mean roa)^2); SIZE: log of total assets; GDPG: the real rate of growth of the domestic product; RWAA: rwa/total assets with rwa: (tot_cap*100)/(tot_capratio)