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NON-PERFORMING LOANS IN THE EURO AREA: DOES MARKET POWER MATTER?

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Abstract

As consolidation in the banking sector has increased impressively in the wake of the global financial crisis, the question of the impact of market power on bank risk has become topical again. In this study we investigate empirically the impact of market power as evidenced by concentration (CR5 and HHI) and (lack of) competition (Lerner indices) on the change in NPL ratios (ΔNPL). We use an unbalanced panel dataset of 646 euro area banks over the period 2005-2017. Since the distribution of ΔNPL is found not to be normal but positively skewed, we employ a penalized quantile regression model for dynamic panel data. We find conflicting results which are in line with the argument that more concentration does not always imply less competition. The results suggest that competition supports stability when NPLs increase but concentration enhances faster NPL reduction. In addition, we find that the effect of bank concentration is stronger in periphery euro area countries while the effect of competition is enhanced in banking sectors with higher foreign bank presence. Finally, bank competition is more beneficial for commercial banks in reducing NPLs than for savings and mortgage banks, while commercial banks are more prone to creating NPLs than the other two bank types. A tentative conclusion of our study could be that post-crisis consolidation facilitates the faster reduction of NPLs, while as the situation normalizes competition discourages the growth of new NPLs. Policy makers should take such findings into account by encouraging consolidation especially in periphery countries but also inserting competition in the banking sector through either regulating anti-competitive behavior or inviting new and/or foreign entrants.

Keywords: Non-performing loans; Competition; Lerner index; Concentration; Quantile regression; PQRFE estimator; PIVQRFE estimator

JEL Classification: C23; C51; G21

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1. Introduction

Although several years have passed since the onset of the global financial crisis of 2008, many euro area banks still have high levels of non-performing loans (NPLs) on their balance sheets[1]. According to the latest ECB data (2019), the non-performing loans to total gross loans ratio (NPL ratio) of the euro area reached 3.7% in March 2019, following a downward trend after 2012, when it reached an all-time high of 8.1%. But despite this positive evolution for the euro area in total, large dispersions remain across euro area countries (ratios between 0.9% and 41.4%). Such a large stock of NPLs puts serious constraints on many banks' lending capacity and their ability to build further capital buffers, thus exerting a strong negative influence on economic growth through the reduction of credit supply.

Bank competition is one of the factors that have been extensively investigated in the past as one of the major determinants of bank risk in general. So far, two completely opposing views have emerged about the relationship between bank competition and the overall bank risk: the "competition-fragility" view which predicts a negative relationship between bank competition and financial stability, arguing that lower competition mitigates risk-taking incentives, and the "competition-stability" view which indicates a positive relationship between bank competition and financial stability, arguing that higher competition tends to reduce bank risk. The debate is still ongoing supported by conflicting theoretical predictions and empirical results. As bank consolidation in the euro area has taken large proportions post-2008 leading to higher concentration and possibly less competition, while at the same time the increase in NPLs has become the major problem of European banks, the analysis of their relationship has received renewed attention recently.

The investigation of the possible impact of bank competition on NPLs has so far been based on linear regression methods, describing the impact of bank competition on the mean of the NPL distribution. This approach does not take into account the possibility that bank competition may have a different impact at various points of the NPL distribution, especially if this distribution is not normal. To fill this gap in the literature, we follow a Quantile Regression (QR) approach which allows assessment of the impact of bank competition, as expressed by (the inverse of) profit margins or Lerner indices, and of

[1] A widely used approach to determine whether a loan is nonperforming is the '90-day criterion' which classifies a loan as NPL when payments of principal and interest are past due by 90 days or more.

concentration (CR5 and HHI concentration indices) at any point of the NPL distribution. More specifically, we follow a penalized quantile regression for dynamic panel data with fixed effects approach, using both the Penalized Instrumental Variables Quantile Regression with Fixed Effects (PIVQRFE) estimator, developed by Galvao and Montes-Rojas (2010), and the Penalized Quantile Regression with Fixed Effects (PQRFE) estimator introduced by Koenker (2004).

To our knowledge this is the first attempt to use QR in order to estimate the impact of competition and concentration on changes in NPL ratios in the euro area using a new data sample covering the 2005-2017 period. Three different Lerner indices have been used in order to test the robustness of our results. This is also the first attempt to examine the interaction of competition and concentration with (a) fragmentation between core and periphery countries, (b) foreign bank presence, and (c) type of bank (commercial banks vs savings banks and mortgage banks).

The rest of the paper is organized as follows: Section 2 reviews the theoretical and empirical literature of the impact of competition on loan portfolio and general bank risk. Section 3 describes the data and the econometric model, while Section 4 explains the econometric methodology. Section 5 specifies the measurement of market power. Section 6 presents the empirical results, while Section 7 concludes.

2. Literature review

2.1 Measurement of competition

A key issue in the investigation of the impact of bank competition on NPLs is the measurement of competition. The literature on the measurement of competition follows two major approaches: the structural and the non-structural.

The structural approach, which has its roots in the traditional Industrial Organization theory, embraces the Structure-Conduct-Performance (SCP) paradigm and the Efficiency Structure Hypothesis (ESH). The SCP paradigm states that a higher degree of concentration is likely to cause collusive behavior among the larger banks, resulting in superior market performance. Because of their ability to capture structural features of a market, concentration ratios are often used to explain banks' competitive performance as the result of market structure (Bikker and Haaf, 2002). The most frequently used concentration ratios are the Herfindahl-Hirschman Index (HHI) and the k-bank concentration ratios (CRk). The

HHI index is the sum of the squares of the market shares in total banking assets of all banks in a banking system, while the CRk concentration ratio is the sum of the shares of the k largest banks. Beck et al. (2006) consider concentration as an insufficient measure of competition in the banking system. Also, the theory of contestability (Baumol, 1982) argues that concentration and competition can coexist under particular conditions. The Efficiency Structure Hypothesis (ESH) investigates the relationship between the efficiency of larger banks and their performance. A widely used ESH indicator is the Boone indicator (Boone, 2008), which is calculated as the elasticity of profits or market share to marginal costs. The idea underlying the Boone indicator is that competition improves the performance or market share of efficient firms and weakens the performance or market share of inefficient ones.

The non-structural approach developed on the basis of the New Empirical Industrial Organization (NEIO) theory assesses the competitive behavior of firms without having to rely on information about the structure of the market. The H-statistic, developed by Panzar and Rosse (1987), and the Lerner index, developed by Lerner (1934), are the most well-known non-structural measures of competition. Sanya and Gaertner (2012) note that by estimating bank-pricing behavior, the Panzar and Rosse's H-statistic and the Lerner index are better able to gauge market contestability.

The Panzar and Rosse's (usually abbreviated as "PR") model uses firm-level data to investigate the degree to which a change in input prices is reflected in equilibrium revenues. The PR model uses the H-Statistic, which takes a negative value to indicate a monopoly, a value between 0 and 1 to indicate monopolistic competition and the value 1 to indicate perfect competition. The Lerner index is a direct measure of a bank's market power. It represents the markup of prices over marginal cost and its value theoretically ranges between 0 (perfect competition) and 1 (pure monopoly). In practice, however, negative values may be observed for banks that face problems. Although both the H-statistic and the Lerner index are calculated using bank-level data, Carbó et al. (2009) note that the Lerner index can be considered as a price-cost spread in average terms, while the H-statistic can be thought as a price-cost spread in marginal terms.

2.2 Theoretical literature

There are two main opposing views in the theoretical literature on the relationship between competition and risk in banking: the competition-fragility view and the competition-stability view.

The competition-fragility view, also known as franchise value paradigm, has long been the dominant view in the literature. This view was developed in the midst of the US banking system deregulation in the 1980s and 1990s. During the preceding years, the US banking system had experienced stability, which was challenged seriously by the new reforms. The above two decades witnessed a large amount of consolidation through both mergers and failures, with net bank entries having been negative from 1984 onwards (Jeon and Miller, 2003). The competition-fragility view, initiated by Marcus (1984), suggests that higher competition erodes banks' profits and reduces their franchise value. Hence, banks may take excessive risks to enhance their profitability. In the same vein, Chan et al. (1986) show that increased competition reduces the surplus that banks can earn by identifying high-quality borrowers, leading banks to reduce screening expenditures and the quality of banks' assets worsens. Using a state preference model, Keely (1990) shows that declines in banks' charter values, caused by increases in competition, raises banks' default risk. Besanko and Thakor (1993) employ a framework of relationship banking, where banks create informational rents by accumulating private information on their borrowers. As long as banks appropriate these informational rents, they do not have any incentive to increase their risk exposure. When competition increases, the value of relationship banking decreases and banks take more risks. Allen and Gale (2000) develop a model of contagion through the interbank market in the case of a perfectly competitive banking sector. They show that a small aggregate shock in liquidity demand can lead to systemic risk, as banks act as price takers and have no incentive to provide liquidity to troubled banks with negative consequences for the entire banking sector. The analysis is complemented by Allen and Gale (2004) who show that under imperfect competition the banking sector is not so susceptible to contagion as in the case of perfect competition. Hellmann et al. (2000) show in a dynamic model of moral hazard that competition can undermine prudent bank behavior.

The competition-stability view predicts that more competition will lead to more stable banking systems. In their influential work, which challenged seriously the competition-fragility view, Boyd and De Nicoló (2005) disagree with the view that banks rationally choose riskier portfolios, when confronted with increased competition. In contrast, they show that when competition decreases, banks charge higher loan rates, leading borrowers to choose higher risk projects. Allen et al. (2011) argue that when credit markets are competitive, market discipline that comes from the asset side of balance sheet provides banks with the incentive to hold more capital than required by the regulation in order to commit to higher monitoring of their borrowers, thus improving the borrowers’ expected payoff and reducing the banks’ credit risk. Martinez-Miera and Repullo (2010) extend the model of Boyd and De Nicoló by introducing imperfect correlation among borrowing firms. They use a static model of Cournot competition in a market for entrepreneurial loans in which the probability of default of the loans is endogenously chosen by the entrepreneurs. Moreover, loan defaults are imperfectly correlated. They show that more competition in monopolistic markets leads to lower loan rates, which subsequently lead to lower default probability. But as competition leads to lower loan rates and lower revenues from non-defaulting loans that provide a buffer against loan losses, bank risk increases suggesting a U-shaped relationship between competition and the risk of bank failure. In addition, Wagner (2010) argues that the stability effect of competition on the loan market may be reversed if banks can adjust their own loan portfolios. Specifically, in a theoretical model of competition arising from falling switching costs for entrepreneurs, Wagner (2010) shows that as competition in the loan market erodes banks’ franchise values, they may try to offset the negative impact of safer borrowers on their balance sheets by taking on more risk.

2.3 Empirical literature

Despite the large number of empirical studies investigating the relationship between bank competition and risk, no clear answers are provided so far. The relationship has proven to be extremely complex, as a set of different factors have been identified to affect the results.

First, regression results are greatly influenced by the selection of the competition measure. Davis and Karim (2013) study the dynamics of the relationship between bank competition and risk, measured by the Z-score, using a dataset on 6,008 banks from the EU-27 countries for the years 1998-2012. The usage of two different competition measures, the H-statistic and the Lerner index, led to contradicting results. Using the H-statistic, they find a negative effect of the level of competition on risk. When competition is measured by the Lerner index, it is found to have a positive effect on risk. The above differences in the effects of the H-statistic and the Lerner index are attributed by the authors to the different impact of the above measures on the volatility of profits, a key input for the calculation of the Z-score risk indicator. Using a dataset provided by the Deutsche Bundesbank which comprises bank-level balance-sheet data and risk-taking information for all German banks over the period 1994-2010, Kick and Prieto (2015) investigate the links between competition and bank risk-taking behavior. The study shows that market power, proxied by the Lerner index, reduces the default probability. In contrast, when the Boone Indicator or the regional branch share is used as a measure of competition, the results suggest that increased competition lowers the riskiness of banks. Titko et al. (2015) study the competition-stability relationship in the Latvian banking sector using a sample of 16 commercial banks over the period 2007-2013. When competition is measured by the Lerner index, the hypothesis about a positive effect of competition on bank stability is rejected. The study shows doubtful results when the Boone indicator is used as a proxy for bank competition. A meta-analysis by Zigraiova and Havranek (2016) shows that the use of the H-statistic leads to higher estimates, perhaps due to the restrictive assumption of the Panzar and Rosse's (1987) model that the banking market is in a long-run equilibrium. In contrast, the reported estimates tend to be smaller when competition is measured by the Boone indicator.

In other cases, different results may be obtained despite the use of the same competition measure, depending on its estimation procedure. A typical example is that of the Lerner index, which may be correlated with the Z-score measured bank stability. To address the potential endogeneity bias, some studies use the efficiency-adjusted Lerner index suggested by Koetter et al. (2012). In addition to the efficiency-adjusted Lerner index, Turk-Ariss (2010) employs a funding-adjusted Lerner index in order to account for market power which arises from the deposit market.

Differences in regression results may also be attributed to the employed measure or type of risk (individual-bank vs systemic risk). Some empirical studies use banking system-wide measures of risk, which are focused on the stability of the banking system as a whole. Beck et al. (2006) employ a dummy variable which equals one when a country is going through a systemic crisis. Using data on 69 countries worldwide and 47 crisis episodes in the period 1980-1997, they find that banking crises are less likely in countries with more concentrated banking systems. On the other hand, they find that fewer regulatory restrictions on banks, such as lower barriers to entry and fewer restrictions from engaging in non-loan making activities, reduce the banking system fragility. Moreover, the results of the study indicate that institutions which foster competition are associated with a lower likelihood of a systemic banking crisis. In the same vein, Schaeck et al. (2009) employ a dummy variable which equals one when a systemic crisis is observed in a particular year. Using a dataset with 31 systemic crises in 45 countries for the period 1980-2005, they find that competition reduces the likelihood of a crisis and increases time to crisis.

The empirical studies which are focused on individual bank risk typically employ the Z-score as the dependent variable in their regression models. A Z-score measures the number of standard deviations by which a bank's ROA has to fall for the bank to become insolvent. A higher value of Z-score indicates a lower probability of insolvency. Using the Z-score for data from EU-25 banks over the period 1997-2005, Uhde and Heimeshoff (2009) find that bank concentration has a negative impact on financial soundness. Some other types of bank risk have also been used in the empirical literature, such as the market-value capital to assets ratio and the interest cost on large CDs (Keely, 1990), a dummy variable denoting revocation or not of a bank's license (Fungacova and Weill, 2013), the probability of bankruptcy (Fu et al., 2014), the distance to default (Anginer et al., 2014; Kabir and Worthington, 2017; Leroy and Lucotte, 2017), and outright bank defaults or milder forms of bank distress (Kick and Prieto, 2015). The NPL ratio is widely used in the empirical literature as a measure of credit risk or, less frequently, as an alternative measure of overall bank risk (Amidu and Wolfe, 2013; Berger et al., 2009; Brei at al., 2018; Fernandez and Garza-Garcia, 2015; Jimenez et al., 2013; Kabir and Worthington, 2017; Kick and Prieto, 2015; Noman et al., 2017; Schaeck and Cihak, 2014; Vardar, 2015; Yeyati and Micco, 2007).

The differences in the obtained results due to the employed measure or type of risk are more perceptible in studies which examine the impact of competition on both the individual banks' risk and systemic risk. Leroy and Lucotte (2017) examine the relationship between bank competition and risk, using a sample of the largest 97 European listed banks for the period 2004-2013. Their results indicate that competition increases individual bank risk, thus supporting the competition-fragility view. In contrast, competition reduces systemic risk, a result which is attributed to the fact that correlation in the risk-taking behavior of banks tends to increase under weak competition conditions. The degree to which a specific bank contributes to systemic risk is measured by SRISK, which indicates the expected capital shortfall of a bank, conditional on a severe banking market crisis (Brownlees and Engle, 2017). De-Ramon et al. (2018) examine the impact of competition on bank stability in the United Kingdom over the period 1994-2013. They find that competition decreases individual banks' risk, thus lending support to the competition-stability view. On the other hand, competition is found to lower the overall banking market stability, providing support to the competition-fragility view. Using quantile regression, they find that the effect of competition on the overall stability depends on the financial health of each bank. Competition lowers the incentives of stronger banks (i.e. those with higher Z-scores, risk-adjusted capital ratios and risk-adjusted returns) to increase their capital, leading to a decrease of their stability. In contrast, competition encourages weakest banks to reduce their costs and build higher equity capital, thus enhancing their stability.

Mixed results have also emerged due to the use of concentration measures (CR3/CR5 and HHI) as inverted proxies of competition. Based on results indicating that both bank concentration and competition are positively related with banking stability, Beck et al. (2006) suggest that bank concentration is an insufficient measure of bank competition. Carbó et al. (2009) also confirm that the Lerner index is not correlated with the HHI.

Moreover, differences in the obtained results may arise from the use of different regression models or methods. The fixed effect within-group estimator is the most used regression method for static panel data models (De Nicolò and Loukoianova, 2007; Turk-Ariss, 2010; Davis and Karim, 2013), while GMM is the method typically used for dynamic panel data models (Berger et al., 2009; Fu et al., 2014; Noman et al., 2017). A couple of other regression methods have also been used, such as the 2SLS/3SLS methods (Uhde and Heimeshoff, 2009; Amidu and Wolfe, 2013) and the logistic regression method (Fungacova and Weill, 2013; Beck et al., 2006). Moreover there are studies which employ quantile regression methods to examine the impact of competition at different quantiles of the distribution of risk. Using a sample of 3,325 banks from 10 European countries (Austria, Belgium, Denmark, France, Italy, Germany, Luxembourg, Netherlands, Switzerland, and the UK) over the period 1995-2005, Schaeck and Cihak (2014) find that efficiency is the channel through which bank competition has an enhancing effect on stability. In addition, two-stage quantile regression estimates of the Boone indicator on Z-score suggest that the stability enhancement effect of competition is increased in accordance with the heath level of a bank (higher Z-scores indicating stronger banks). Kabir and Worthington (2017) investigate the relationship between competition and risk, using data from 16 countries (Bahrain, Bangladesh, Brunei, Egypt, Indonesia, Jordan, Kuwait, Lebanon, Malaysia, Mauritania, Pakistan, Qatar, Saudi Arabia, Syria, UAE and Yemen) which have both conventional and Islamic banks for the period 2000–2012. The results from the use of the PVAR and the two-stage quantile regression methods are in support of the competition-fragility hypothesis in both banking systems. In addition, the quantile regression results suggest that the impact of the Lerner index of market power is larger at the median quantile of credit risk.

Some studies examine the case of one country only, such as Fungacova and Weill (2013) who find that an increase in bank competition in Russia over the period 2001-2007 has been associated with more bank failures, thus supporting the competition-fragility view. On the other hand, Vardar (2015) finds that competition has a negative impact on the financial fragility of 28 Turkish banks over the period 2002-2011, a result supporting the competition-stability view. In contrast, concentration is found to be negatively related to bank risk.

Mixed results are also received from cross-country empirical studies which provide more generic results by estimating the average effect of competition on stability for a group of countries, while controlling for country-specific effects. Except for other differences across groups, in terms of geographical coverage and number of countries, some country groups may actually be less homogeneous than expected. Zigraiova and Havranek (2016) show that studies which use samples including both developed and developing countries tend to obtain lower estimates. Turk-Ariss (2010) investigates how different levels of market power affect cost and profit efficiency levels and overall bank stability in 60 developing countries worldwide over the period 1999-2005. Higher market power leads to greater bank stability and profit efficiency, while there is a significant negative impact of bank market power on cost efficiency. These results are different to those reported by Amidu and Wolfe (2013) who use a sample of 978 banks from 55 emerging and developing countries over the period 2000–2007. Their results reveal the significance of the revenue diversification as a channel through which competition increases stability in emerging countries. Using data on 14 Asia Pacific economies over the period 2003-2010, Fu et al. (2014) find a negative association between market power and individual bank risk, supporting the competition-fragility view. This result is opposite to that presented by Liu et al. (2012) who investigate the effects of competition on bank risk in four South East Asian countries (namely, Indonesia, Malaysia, Philippines and Vietnam) over the period 1998-2008. They find that increased competition reduces bank risk-taking. Also, Noman et al. (2017) find that competition increases bank stability, using a sample of 180 commercial banks from the Association of Southeast Asian Nation (ASEAN) countries (Indonesia, Malaysia, Philippines, Singapore, and Thailand) over the period 1990-2014. Yeyati and

Micco (2007) examine the case of eight Latin American countries (Argentina, Brazil, Chile, Colombia, Costa Rica, El Salvador, Mexico and Peru) over the period 1993-2002, which was marked by an accelerated process of banking concentration and foreign penetration. They find that increased concentration did not weaken bank competition, which was found to be negatively associated with bank risk. Using a cross-sectional dataset of about 2,500 U.S. banks in 2003 and a panel dataset of about 2,600 banks in 134 non-industrialized countries over the period 1993-2004, Boyd et al. (2006) find that bank concentration, considered as an inverse proxy for competition, is positively associated with banks' probability of failure. De Nicolò and Loukoianova (2007) extend the work of Boyd et al. (2006), using a dataset including more than 10,000 annual observations for 133 non-industrialized countries over the period 1993-2004. They find that the positive impact of concentration on banks' probability of failure, predicted by Boyd et al. (2006), is stronger when bank ownership is taken into account, and it is strongest when state-owned banks have sizeable market shares. Anginer et al. (2014) investigate the relationship between bank competition and systemic risk using a sample of 1,872 publicly traded banks in 63 countries over the period 1997-2009. Instead of focusing on the absolute level of risk of individual banks, they examine the correlation in the risk-taking behavior of banks. They find that greater competition encourages banks to take on more diversified risks, making the banking system less fragile to shocks. Another finding is that banking systems are more fragile in countries with public policies that restrict competition.

2.4 Reconciling ambivalent results

Even if some of the differences in employed measures, estimation methods, and time or geographical coverage could be lessened, it would still be too risky to give a clear vote in favor of the competition-fragility or the competition-stability hypothesis.

First, under certain conditions the two hypotheses may to some extent be reconciled. By examining a sample of 8,235 banks in 23 industrialized countries over the period 1999-2005, Berger et al. (2009) find that banks with a greater degree of market power have less overall risk exposure, measured by the Z-score. Their results also show that market power increases loan portfolio risk, proxied by the NPL ratio, which however may be offset in part by higher equity capital ratios. Fernandez and Garza-Garcia (2015) examine the relationship between bank competition and financial stability in the Mexican banking system over the period 2001-2008. The Z-score and the NPL ratio are employed as proxies of the financial stability and bank portfolio risk respectively. The results show that there is a positive relationship not only between competition and financial stability, supporting the competition-stability view, but also between competition and bank portfolio risk, supporting the competition-fragility view. However, the relationship between bank competition and financial stability is stronger than between competition and bank portfolio risk observed. Besides, given the low levels of NPLs in the Mexican banking sector during the period under examination, the benefits of greater competition on the overall stability of the banking system outweigh the increases in bank portfolio risk.

Second, there may be a non-linear relationship between competition and risk, thus supporting both hypotheses in different parts of the distribution. Using data from 10 Latin American countries (Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Mexico, Panama, Peru and Venezuela) over the period 2003-2008, Tabak et al. (2012) find that competition affects the risk-taking behavior of banks in a non-linear way. While both high and low competition levels enhance financial stability, the opposite effect is observed for average competition levels. Investigating whether the above relationship is affected by bank size and capitalization, they find that the larger a bank, the more it benefits from competition. A higher capital ratio is also found to be advantageous in collusive bank markets, while capitalization is considered to enhance the stability of larger banks under average or high competition. Using information on loan data for the period 1988-2003, Jimenez et al. (2013) find that the relationship between competition (measured by HHI and CR5) and risk taking is convex in the loan market, but concave in the deposit market. Brei et al. (2018) use data for 221 banks from 33 countries in Sub-Saharan Africa over the period 2000-2015 to investigate the influence of bank competition on credit risk which is estimated to be U-shaped. Increased competition can lower credit risk via efficiency gains, while excessive competition can cause adverse effects (lower profit margins and increased risk incentives).

Table 1 provides a detailed summary of the empirical literature by classifying empirical studies into three groups: (1) Studies supporting the competition-fragility view, (2) Studies supporting the competition-stability view, and (3) Studies suggesting a complex relationship between competition and risk. Within each group, studies are presented in chronological order.

In the present study, we have tried to eliminate some potential sources of bias in the estimation of the trade-off between competition and risk. First, we use a dataset which contains data from euro area countries only. The euro area has a common currency and a single bank supervisory mechanism. From this point of view, our data should be considered adequately homogeneous, thus reducing the bias that could result from the use of data coming from a heterogeneous group of countries. In addition, our data have been obtained from the unconsolidated financial statements of banks, thus eliminating any potential bias stemming from double counting of assets or liabilities. Second, we use three different specifications of the Lerner index, as well as two measures of concentration (HHI and CR5) so as to mitigate a possible bias stemming from the use of only one competition or concentration specification. And third, we employ quantile regression to investigate the possibility that bank competition may have a different impact at various points of the NPL distribution. Linear regression methods can describe the impact of competition on the mean of the NPL distribution, so they may mask substantial heterogeneity across other parts of the distribution.

[Table 1, here]

3. Data and econometric model

3.1 Data description

We use macroeconomic, sectoral and bank-specific annual data for the period 2005-2017 from the 19 member countries of the euro area (namely, Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Portugal, Slovakia, Slovenia, and Spain).

We employ two datasets:

(1) An unbalanced panel dataset containing 13,890 observations from 1,442 banks from all euro area countries. The full dataset was used to calculate the three different versions of the Lerner index.

(2) A subset of the above dataset, containing only the observations which include a non-missing value of the NPL ratio. This second dataset, which is used as the basis of our econometric estimations, contains 3,747 observations from 646 banks from all euro area countries.

Bank-specific data have been collected from the Orbis BankFocus (BankScope) Database provided by Bureau van Dijk and obtained from the unconsolidated financial statements of commercial banks, savings banks and mortgage banks. Macroeconomic and sectoral data have been collected from Eurostat, the World Bank, and the ECB.

3.2 Econometric model

Our empirical analysis is based on the following dynamic panel data model with individual fixed effects:

$$y_{it} = \alpha y_{it-1} + x'_{1,it}\beta_1 + x'_{2,it-1}\beta_2 + \eta_i + \delta Crisis + u_{it} \quad (1)$$

where

y_{it} is the dependent variable (the first difference of the NPL ratio (ΔNPL), described in Table 2) for bank i and year t, $x_{1,it}$ is a vector of macroeconomic variables, $x_{2,it-1}$ is a vector of sectoral and bank-specific variables, η_i represent the unobserved individual (bank specific) effects, Crisis is a dummy variable used to assess the impact of the global financial crisis of 2008 on NPLs, and u_{it} is the error term.

3.3 Regression variables

The variables used in our econometric estimations are presented in Table 2.

[Table 2, here]

The first difference of the NPL ratio (ΔNPL) is used as a proxy for the loan portfolio risk.

The real GDP annual growth rate (GDP) is used as a proxy for the fluctuations in economic activity. A negative effect of GDP growth on NPLs has been thoroughly documented in the literature (Jimenez and Saurina, 2006; De Bock and Demyanets, 2012; Beck et al., 2015; Louzis et al., 2012).

The inflation rate (Inflation) is measured by the annual rate of change of the Harmonized Index of Consumer Prices (HICP). According to Klein (2013), the impact of inflation on NPLs may be ambiguous, since higher inflation reduces both the real value of outstanding loans and the borrowers' real income. Under these conditions, loan servicing would be easier for borrowers, unless their wages remained sticky.

The ratio of total net loans to total assets (LAR) is used as a proxy for the portfolio mix of a bank. It can also be useful as a measure of the specialization of a bank in providing loans. Brei et al. (2018) find that banks that are more involved in lending report relatively more NPLs.

The natural logarithm of the total assets of a bank is used as a measure of the size of the bank (SIZE). It should be noted here that there is not a general agreement in the literature about the impact of bank size on NPLs. Reddy (2015) suggests a negative relationship between size and NPLs, while Garcia-Marco and Robles-Fernandez (2008) find that small banks in Spain appear to assume lower loan risks. However, when size interacts with ownership, the results reveal that Spanish commercial banks of medium size seem to be the riskiest entities, while there are no differences related to size in the case of Spanish savings banks. Jimenez et al. (2013) find that larger banks have lower NPL ratios, which is attributed to possibly better portfolio diversification and better managerial ability at larger banks.

The annual growth rate of total gross loans (Loans_growth) is used to measure the degree of the credit expansion of a bank. Jimenez and Saurina (2006) find a positive, although quite lagged, relationship between rapid credit growth and future NPLs. They also note that during lending booms riskier borrowers obtain funds, while the collateral requirements are significantly decreased. The credit risk, which has increased during these good times, pops up as loan losses during bad times.

The ratio of total net loans to total customer deposits (LDR**)** is used as a proxy for the liquidity risk of a bank. An increase in the loans to deposits ratio is expected to increase NPLs (Anastasiou et al., 2019).

The return on assets (ROA) is used as a proxy for the quality management of the bank, in order to investigate the “bad management” hypothesis, according to which reduced cost efficiency fosters an increase in NPLs. Based on prior evidence in the literature (Messai and Jouini, 2013; Anastasiou et al., 2016; Charalambakis et al., 2017), we expect a negative sign for ROA.

The three different Lerner indices are used to measure the market power of a bank (in this study, market power is used as an inverse proxy for competition). They are described in more detail in Section 5.

The Herfindahl-Hirschman Index (HHI) and the CR5 concentration index are used to measure bank concentration.

A crisis dummy variable (Crisis) is used to assess the impact of the global financial crisis of 2008 on NPLs in the euro area taking the value 1 for the years 2008-2014 and 0 for the rest.

The sign of the Maastricht Treaty in 1992, the establishment of the European Single Market in 1993 and the introduction of the euro in 1999 are three major milestones in the process of the financial integration in the euro area, absolutely essential for the adequate and smooth transmission of monetary policy as adopted by the ECB in all member countries. The euro area witnessed a rapidly growing financial integration up to the outbreak of the global financial crisis, which however went into reverse in 2008 because of the increased uncertainty and loss of confidence between lenders and borrowers. Fragmentation peaked during the euro area debt crisis (2011-2012) and declined afterwards due to the measures taken by the ECB. After a temporary correction between late 2015 and end 2016, the aggregate post-crisis reintegration trend in the euro area resumed strongly in prices, but not in quantities (ECB, 2018). The existence of financial fragmentation in the euro area brings up the question of the possible influence of fragmentation on the impact of competition and concentration on ΔNPL (Anastasiou et al., 2019). This possibility is tested by interacting the competition and concentration indices with the Periphery dummy variable, which takes the value 1 for periphery euro countries (namely, Cyprus, Greece, Ireland, Italy, Malta, Portugal, Slovenia and Spain) and 0 otherwise.

Another issue is that of the possible influence of foreign banks on the impact of competition and concentration on the dependent variable ΔNPL. This issue is examined through the interaction of the competition and concentration indices with the Foreign variable which represents the share of foreign banks (in terms of total assets) in a banking system. To facilitate the interpretation of the results, the terms participating in the interaction have been centered. In addition, the Foreign variable is expressed in first-difference form in order to achieve its stationarity, since a Fischer-type Augmented Dickey-Fuller (ADF) test showed the presence of unit root at levels. It should also be noted that due to data limitations, the above interaction is tested only for the period 2008-2017.

The possibility that the impact of competition and concentration on the dependent variable ΔNPL is differentiated according to the type of bank pursuing a different business model, is examined by interacting the competition and concentration indices with the Commercial dummy variable, which takes the value 1 for commercial banks and 0 otherwise (i.e. for savings banks and mortgage banks).

3.4 Data cleaning

The data cleaning procedure of both datasets comprised the following steps:

(1) Observations with missing values for one or more variables were excluded from the sample.

(2) A set of basic plausibility checks were performed on the sample (e.g. total assets should exceed total loans). The incorrect observations were deleted from the sample.

(3) Each variable was checked for possible outliers using the Median Absolute Deviation method (MAD). This method is generally more effective than the traditional mean and standard deviation method, which may fail to detect outliers because outliers increase the standard deviation.

(4) The MAD method was also used to check for large fluctuations within each bank. The detected outliers were removed from the sample.

(5) The remaining data were checked to ensure that each bank had at least four consecutive observations, otherwise the bank was deleted from the sample.

4. Econometric methodology

4.1 The non-normality of the ΔNPL distribution

Both Figure 1 and Table 4 indicate that the distribution of the dependent variable ΔNPL is positively skewed (skewness=1.83) and leptokurtic (kurtosis=14.45).

[Figure 1, here]

Faced with the above distributional characteristics, a reliable solution for the estimation of our regression model would be the use of Quantile Regression (QR), which models quantiles of the dependent variable's distribution as functions of explanatory variables. As Buchinsky (1998) notes, quantile regression estimators are not only robust to outlier observations, but also more efficient than least-square estimators when the regression errors are not normal.

Furthermore, since any quantile of the dependent variable distribution can be used, QR provides the capability to assess the impact of explanatory variables at any point of its distribution. This important feature of QR offers the unique opportunity to investigate the possibility that bank competition may have a different impact at various points of the NPL distribution, thus extending the usual approach in the literature which is focused only on the mean.

Also, quantiles enjoy a property, termed "equivariance to monotone transformations" (Koenker, 2005), according to which the quantiles of a transformed random variable are simply the transformed quantiles of the original variable. In contrast, the mean does not have this property. The logarithmic transformation is a typical example of a monotone transformation.

For all the above reasons, we decided to employ QR as the approach that fits better to the distributional characteristics of our dataset and the goals of our study. Regarding the selection of the most appropriate quantile regression method, QR methods can be divided into two broad categories, unconditional and conditional.

(1) Unconditional quantile regression methods assess the impact of changing the distribution of explanatory variables on the marginal quantiles of the dependent variable.

(2) Conditional quantile regression methods assess the impact of an explanatory variable on a quantile of interest of the dependent variable, conditional on specific values of the other explanatory variables.

In the case of our model, which is a dynamic panel data model with fixed effects, the value of the dependent variable will be treated as conditional on its one year lagged value, following the conditional quantile regression approach (Koenker and Basset, 1978).

4.2 Penalized quantile regression for dynamic panel data model with fixed effects

For a specific quantile τ, of interest, the τ-th conditional quantile function of y_{it} is:

$$Q_{y_{it}}(\tau|y_{it-1}, x_{1,it}, x_{2,it-1}) = \alpha(\tau)y_{it-1} + x'_{1,it}\beta_1(\tau) + x'_{2,it-1}\beta_2(\tau) + \eta_i + \delta_t \quad (2)$$

Koenker (2004) points out that if the number of observations for each individual (bank) is too small (in our case there are 13 observations per individual, at most), then it would be quite unrealistic to estimate a τ-dependent distribution effect for η_i's. For this reason, in (2) only the effects of variables x_1 and x_2 are permitted to depend upon the quantile τ. In contrast, the η_i's have a pure location shift effect.

We estimate (2) following the method introduced by Koenker (2004) for estimating quantile regressions for panel data with fixed effects. By applying this method, we have to solve the following equation:

$$(\widehat{\alpha},\widehat{\beta_1},\widehat{\beta_2},\widehat{\eta},\widehat{\delta}) = \min_{\alpha,\beta_1,\beta_2,\eta,\delta} \sum_{k=1}^{K}\sum_{i=1}^{N}\sum_{t=1}^{T} w_k\,\rho_{\tau_k}(y_{it} - \alpha(\tau_k)y_{it-1} - x'_{1,it}\beta_1(\tau_k)$$

$$-x'_{2,it-1}\beta_2(\tau_k) - \eta_i - \delta_t) \quad (3)$$

where $\rho_\tau(u)=u(1 - I(u < 0))$ denotes the piecewise linear quantile loss function of Koenker and Bassett (1978). The weights w_k control the relative influence of the K quantiles on the estimation of the η_i parameters. Koenker (2005) notes that the above approach pools sample information over several quantiles in order to improve the estimation of the individual specific estimates of the η_i's.

When the number of individuals is large relating to the number of observations per individual (which fits to our case), it may be advantageous in controlling the variability introduced by the large number of estimated η_i's. In this case, Koenker (2004, 2005) proposes the introduction of the $\ell 1$ penalty

$$P(\eta) = \sum_{i=1}^{N} |\eta_i|$$

Equation (3) now becomes:

$$(\widehat{\alpha},\widehat{\beta_1},\widehat{\beta_2},\widehat{\eta},\widehat{\delta}) = \min_{\alpha,\beta_1,\beta_2,\eta,\delta} \sum_{k=1}^{K}\sum_{i=1}^{N}\sum_{t=1}^{T} w_k\,\rho_{\tau_k}(y_{it} - \alpha(\tau_k)y_{it-1} - x'_{1,it}\beta_1(\tau_k)$$

$$-x'_{2,it-1}\beta_2(\tau_k) - \eta_i - \delta_t) + \lambda\sum_{i=1}^{N}|\eta_i| \quad (4)$$

For $\lambda \to 0$ we obtain the fixed effects estimator described in (3), while as $\lambda\to\infty$ then $\widehat{\eta_i} \to 0$ for all i = 1, 2, ..., N and we obtain an estimate of the regression model purged of the fixed effects.

If our model were not dynamic, we would estimate regression coefficients using the Koenker's (2004) Penalized Quantile Regression with Fixed Effects (PQRFE) estimator. However, by applying a Monte Carlo simulation approach, Galvao (2011) showed that Koenker's estimator is downward biased in the presence of lagged dependent variables as regressors when T is moderate. This problem can be ameliorated through the use of instrumental variables (IV), as proposed by Chernozhukov and Hansen (2006, 2008) who introduced the Instrumental Variables Quantile Regression (IVQR) estimator.

Galvao and Montes-Rojas (2010) introduced the Penalized Instrumental Variables Quantile Regression with Fixed Effects (PIVQRFE) estimator as a penalized panel data version of the IVQR method, using lagged values (or lagged differences) of the regressors as instruments.

The PIVQRFE estimator is defined as

$$\hat{\alpha}\,(\lambda) = \min_{\alpha} ||\,\hat{\gamma}\,(\alpha,\lambda)||_A \qquad (5)$$

where

$$(\widehat{\beta_1}\,(\alpha,\lambda), \widehat{\beta_2}\,(\alpha,\lambda), \hat{\eta}\,(\alpha,\lambda), \hat{\delta}\,(\alpha,\lambda), \hat{\gamma}\,(\alpha,\lambda)) =$$

$$\min_{\beta_1,\beta_2,\eta,\delta,\gamma} \sum_{k=1}^{K} \sum_{i=1}^{N} \sum_{t=1}^{T} w_k\, \rho_{\tau_k}(y_{it} - \alpha(\tau_k) y_{it-1} -$$

$$x'_{1,it}\beta_1(\tau_k) - x'_{2,it-1}\beta_2(\tau_k) - \eta_i - \delta_t - w'_{it}\gamma(\tau_k)) + \lambda \sum_{i=1}^{N} |\,\eta_i| \qquad (6)$$

and

$||x||_A = \sqrt{x'Ax}$, where A is a positive definite matrix.

The intuition underlying this estimator is that the coefficient γ of w should be zero, since w is a valid instrument and independent of u. Based on this, the estimator finds a value for α through the inverse step (5) such that the coefficient of γ in (6) is as close to zero as possible. According to Galvao (2011), values of y lagged (or differences) two periods or more and/or lags of the exogenous variables can be potentially used as instruments.

To implement the PIVQRFE procedure, for a specific quantile of interest τ and a specific value for λ, we follow the steps below:

(1) We define a grid of values {aj, j = -0.99, -0.98, …, 0.98, 0.99}.

(2) For each a_j, we run the ordinary τ-quantile panel regression of ($y_{it} - a_j y_{it-1}$) on ($x_{1,it}$, $x_{2,it-1}$, w_{it}, η_i, δ_t) to obtain coefficients $\widehat{\beta_1}\,(a_j,\tau)$, $\widehat{\beta_2}\,(a_j,\tau)$, $\hat{\gamma}\,(a_j,\tau)$, $\hat{\eta}\,(a_j,\tau)$, and $\hat{\delta}\,(a_j,\tau)$. In our case, we are using as an instrument (w_{it}) the second lag of the dependent variable y. Regressions are performed using the program rqpd, developed in R software.

(3) We choose $\widehat{\alpha}(\tau)$ as that value of the grid that makes $||\hat{\gamma}(a_j,\tau)||$ closest to zero.

In our case, $\widehat{\alpha}(\tau)$ is the value of the coefficient of the autoregressive term (ΔNPL lagged one year). Standard errors are calculated following the bootstrap approach, introduced by Efron (1979), based on 200 resamples of our actual observed dataset.

(4) The estimates $\widehat{\beta_1}(\tau)$ and $\widehat{\beta_2}(\tau)$ are given by $\widehat{\beta_1}(\widehat{\alpha}(\tau),\tau)$ and $\widehat{\beta_2}(\widehat{\alpha}(\tau),\tau)$ respectively.

The value of the parameter λ was set to 1, which is a value that was found to set about the one third of the FE terms to zero.

Except for the implementation of the PIVQRFE method, we have also estimated (4) using the PQRFE method with equally weighted quantiles, in order to have the opportunity to compare the results of both methods.

In addition, we have performed Wald tests for the equality of coefficients across different quantiles in order to find out whether the differences between coefficients corresponding to the same independent variable but across different quantiles, are statistically significant. The hypothesis test is the following:

$$H_0\colon \beta_j^{(p)} = \beta_j^{(q)} \text{ versus } H_1\colon \beta_j^{(p)} \neq \beta_j^{(q)} \quad (7)$$

where $\beta_j^{(p)}$ and $\beta_j^{(q)}$ are the coefficients corresponding to the j-th independent variable at quantiles p and q respectively.

The test is based on the following Wald statistic:

$$\text{Wald statistic} = \frac{(\hat{\beta}_j^{(p)} - \hat{\beta}_j^{(q)})^2}{\hat{\sigma}^2_{\hat{\beta}_j^{(p)} - \hat{\beta}_j^{(q)}}} \quad (8)$$

The term $\hat{\sigma}^2_{\hat{\beta}_j^{(p)} - \hat{\beta}_j^{(q)}}$, which is the variance of the difference $\hat{\beta}_j^{(p)} - \hat{\beta}_j^{(q)}$, can be obtained from the following equation:

$$\text{Var}(\hat{\beta}_j^{(p)} - \hat{\beta}_j^{(q)}) = \text{Var}(\hat{\beta}_j^{(p)}) + \text{Var}(\hat{\beta}_j^{(q)}) - 2\text{Cov}(\hat{\beta}_j^{(p)}, \hat{\beta}_j^{(q)}) \quad (9)$$

Under the null hypothesis, the Wald statistic has an approximate χ^2 distribution with one degree of freedom.

5. Measuring market power

5.1 The Lerner index and market power

In this study, market power is used as an inverse proxy for competition. According to Posner and Landes (1980), the term market power refers to the ability of a firm to raise its price above the competitive level without losing so many sales so rapidly that the price increase is unprofitable. The most widely used measure of market power is the Lerner index of monopoly power which identifies the degree of monopoly power as the difference between the price (P) of a firm and its marginal cost (MC) at the profit-maximizing rate of output:

$$L = \frac{P - MC}{P} \qquad (10)$$

A zero value of the Lerner index indicates competitive behavior, while a bigger distance between price and marginal cost is generally considered to be associated with higher market power.

We consider the following translog cost function:

$$lnTC_{it} = \alpha_0 + \alpha_Q lnQ_{it} + 0.5\alpha_{QQ}(lnQ_{it})^2 + \sum_{k=1}^{3} \alpha_k lnW_{k,it} + \sum_{k=1}^{3} \alpha_{Qk} lnQ_{it} lnW_{k,it} +$$

$$+ 0.5 \sum_{j=1}^{3} \sum_{k=1}^{3} \alpha_{jk} lnW_{j,it} lnW_{k,it} + \alpha_E lnE_{it} + 0.5\alpha_{EE}(lnE_{it})^2 + \sum_{k=1}^{3} \alpha_{Ek} lnE_{it} lnW_{k,it} +$$

$$+ \alpha_{EQ} lnE_{it} lnQ_{it} + \alpha_T T + 0.5\alpha_{TT} T^2 + \alpha_{TQ} T\, lnQ_{it} + \sum_{k=1}^{3} \alpha_{Tk} T\, lnW_{k,it} \qquad (11)$$

where TC is total cost (sum of total interest and non-interest expenses), Q is total assets (proxy for bank output), W1 is the ratio of other operating expenses to total assets (proxy for input price of capital), W2 is the ratio of personnel expenses to total assets (proxy for input price of labor), W3 is the ratio of total interest expenses to total funding (proxy for input price of funds), T is a time trend and E is total equity. The subscripts i and t denote bank i and year t, respectively.

The time trend (T) has been included in (11) to account for advances in banking technology. Following Hughes and Mester (1993), we have also included in (11) the level of Total Equity (E), since it can be used in loan funding as a substitute for deposits or other borrowed funds.

Symmetry conditions and linear homogeneity in input prices can be imposed by dividing in (11) both total cost and input prices by one of the input prices.

$$ln(TC_{it}/W_{3,it}) = \alpha_0 + \alpha_Q lnQ_{it} + 0.5\alpha_{QQ}(lnQ_{it})^2 + \sum_{k=1}^{2} \alpha_k ln(W_{k,it}/W_{3,it}) +$$

$$+ \sum_{k=1}^{2} \alpha_{Qk} lnQ_{it} ln(W_{k,it}/W_{3,it}) + 0.5 \sum_{j=1}^{2} \sum_{k=1}^{2} \alpha_{jk} ln(W_{j,it}/W_{3,it})\, ln(W_{k,it}/W_{3,it}) +$$

$$+ \alpha_E lnE_{it} + 0.5\alpha_{EE}(lnE_{it})^2 + \sum_{k=1}^{2} \alpha_{Ek} lnE_{it} ln(W_{k,it}/W_{3,it}) + \alpha_{EQ} lnE_{it} lnQ_{it} +$$

$$+ \alpha_T T + 0.5\alpha_{TT} T^2 + \alpha_{TQ} T\, lnQ_{it} + \sum_{k=1}^{2} \alpha_{Tk} T\, ln(W_{k,it}/W_{3,it}) \quad (12)$$

5.2 Calculation of a Lerner index using the Kumbhakar et al. (2012) method

The traditional approach of using the coefficients from the estimation of a cost function to calculate marginal cost (MC) is based on the unrealistic assumption that all firms are profit maximizers. This approach may also produce negative values for the Lerner index, although this index should normally be expected to be non-negative. These problems can be solved by employing a procedure suggested by Kumbhakar et al. (2012) who draw on a stochastic frontier methodology from the efficiency literature to estimate the mark-up for each observation.

Starting from the fact that a profit-maximizing behavior of a bank i at time t requires that

$$P_{it} \geq MC_{it} \equiv \frac{\partial TC_{it}}{\partial Q_{it}} \quad (13)$$

where P is defined as the ratio of total revenues (total interest and non-interest income) to total assets, and after doing some mathematics, we arrive at the following equation:

$$\frac{TR_{it}}{TC_{it}} = \frac{\partial lnTC_{it}}{\partial lnQ_{it}} + v_{it} + u_{it} \quad (14)$$

where TR denotes the total revenues, v_{it} is a symmetric two-sided noise term and u_{it} is a non-negative term which captures the mark-up. This way, Equation (14) becomes a stochastic frontier function, where $\frac{\partial lnTC_{it}}{\partial lnQ_{it}} + v_{it}$ represents the stochastic frontier of $\frac{TR_{it}}{TC_{it}}$, i.e. the minimum level that $\frac{TR_{it}}{TC_{it}}$ can reach.

Taking the partial derivative in (12), we get:

$$\frac{\partial lnTC_{it}}{\partial lnQ_{it}} = \alpha_{Q} + \alpha_{QQ} lnQ_{it} + \sum_{k=1}^{2} \alpha_{Qk} ln(W_{k,it}/W_{3,it}) + \alpha_{EQ} lnE_{it} + \alpha_{TQ} T \quad (15)$$

Substituting (15) into (14), we get:

$$\frac{TR_{it}}{TC_{it}} = \alpha_{Q} + \alpha_{QQ} lnQ_{it} + \sum_{k=1}^{2} \alpha_{Qk} ln(W_{k,it}/W_{3,it}) + \alpha_{EQ} lnE_{it} + \alpha_{TQ} T + v_{it} + u_{it} \quad (16)$$

Equation (16) is estimated separately for each country in order to account for different banking technologies per country. The non-negative term u_{it} is independently half-normally distributed with mean 0 and variance σ_u^2, while v_i is independently normally distributed with mean 0 and variance σ_v^2. The estimation of (16) also allows to calculate the Jondrow et al. (1982) conditional mean estimator of u_{it}. Estimation is performed using the Stata program sfmodel, developed by Kumbhakar et al. (2012), which is suitable for cross-sectional stochastic frontier data models.

The estimated parameters from (16) are substituted into (15) to calculate $\frac{\partial lnTC_{it}}{\partial lnQ_{it}}$ and, after omitting v_{it} from (14) and doing some calculations, we finally get:

$$\frac{P_{it} - MC_{it}}{MC_{it}} = u_{it} \frac{1}{\frac{\partial lnTC_{it}}{\partial lnQ_{it}}} \quad (17)$$

The left part of (17) contains a definition of mark-up, labelled by Kumbhakar et al. (2012) as Θ_{it} , where the distance between price and marginal cost is a fraction of the marginal cost. Then, the Lerner index is calculated from Θ_{it} as follows:

$$L_{it} = \frac{\Theta_{it}}{1 + \Theta_{it}} \quad (18)$$

5.3 Calculation of an efficiency-adjusted Lerner index

As Koetter et al. (2012) show, the Lerner index is biased when profit inefficiencies, which arise when firms do not fully exploit their pricing opportunities due to market power, are ignored. For this reason, following Koetter et al. (2012), who take into account potential profit inefficiencies, we estimate total revenues (TR) as the sum of the predicted values for total (TC) cost derived from Equation (12) and the predicted values for profit (π) derived from an alternative profit function, proposed by Humphrey and Pulley (1997).

$$\widehat{TR}_{it} = \widehat{TC}_{it} + \hat{\pi}_{it} \quad (19)$$

The price of output (p) is then derived by dividing the estimated total revenues with total assets.

$$P_{it} = \frac{\widehat{TR}_{it}}{Q_{it}} \quad (20)$$

The above predicted values of total cost and profit will differ from their corresponding observed values by the amount of inefficiency, hence the term “efficiency-adjusted” Lerner index. The alternative profit function was proposed by Humphrey and Pulley (1997) as the more adequate profit efficiency model when the standard assumptions of a perfectly competitive market do not hold. The dependent variable in the alternative profit function is the natural logarithm of profit (π) divided by W3. Since π may be negative, ln(π/W3) is replaced by ln(π/W3 + θ + 1), where θ is the absolute value of the minimum value of the ratio π/W3. With the addition of number 1, the minimum value of (π/W3 + θ + 1) will always be greater than or equal to 1. The alternative profit function employs the same exogeneous variables with the cost function.

The estimation of the cost function and the alternative profit function is performed using the Battese and Coelli (1992) time decay panel data model which considers that inefficiency may change over time and across banks. The estimation of the above model is performed using the Stata program sfpan developed by Kumbhakar et al. (2012). The estimation is performed on the whole sample, using country dummies in order to disentangle possible country effects.

5.4 Calculation of a Lerner index using the fixed effect within group (WG) estimator

Finally, a common approach in the empirical literature is to calculate the Lerner index using the fixed effect within-group estimator. We employ this method to calculate a Lerner index on a country-by-country basis.

6. Empirical results

The results of our econometric estimations describe the impact of the explanatory variables, presented in Section 3.3, on the dependent variable ΔNPL (annual change in NPL ratios). As shown in Table 4, the quantiles up to the median of the ΔNPL distribution correspond to decreases in NPL ratios, while the quantiles above the median correspond to increases in NPL ratios. The results showed robustness when alternative variables and methods were used.

The results are presented in Tables 7-12 (competition impact on ΔNPL) and Tables 13-16 (concentration impact on ΔNPL). Tables 17-20 present, indicatively, the results of the Wald tests for two variables (Lerner_KBL and CR5, respectively). The Wald tests, described in the last part of Section 4.2, are performed in order to find out whether the differences between coefficients corresponding to the same independent variable, but across different quantiles, are statistically significant. To preserve space, the results of the Wald tests for the rest of the variables are not presented in this study, but can be provided upon request.

As shown in Tables 7-12, the three different specifications of the Lerner index exert a statistically significant and positive impact on ΔNPL at quantiles 0.40-0.90, across all models. Since the Lerner index is used as an inverse proxy for competition, the results show that competition has a negative impact on ΔNPL at its medium and upper quantiles, thus supporting the "competition-stability" hypothesis. The Wald tests show that only the coefficients of the Lerner index at quantiles 0.70-0.90 are statistically different.

The Herfindahl-Hirschman Index (HHI) and the CR5 concentration index have a statistically significant and negative impact on ΔNPL at quantiles 0.10-0.25, as well as a statistically significant and positive impact at quantiles 0.60-0.90 (Tables 13-16). The negative impact at quantiles 0.10-0.25 is possibly due to the ability of concentration to help banks create more homogeneous loan portfolios, which in turn can facilitate the resolution of problem loans. The positive impact at the upper quantiles suggests that greater concentration worsens the NPL problem, perhaps due to a delay in the pooling of loan portfolios, a process which may require additional time for proper analysis and monitoring. The results from the Wald tests show that the coefficients of HHI, as those for CR5, are statistically different from each other at all quantiles.

The real GDP growth (GDP) has a statistically significant and negative (as expected) impact on NPLs across all models and quantiles. The Wald tests for the equality of coefficients across quantiles show that GDP has a homogeneous effect on ΔNPL.

The inflation rate (Inflation) has a positive impact on NPLs, which however is not statistically significant across all quantiles.

The impact of total net loans to total assets ratio (LAR) is statistically significant and positive at all quantiles up to the median across all models. This suggests that the bigger the loan portfolio, the greater is the difficulty to reduce NPLs. The results from the Wald tests show that the coefficients of LAR in the above quantiles are statistically different from each other.

The size of a bank (SIZE), proxied by the natural logarithm of the total assets of the bank, has a statistically significant influence on NPLs, which is positive at the lower quantiles (0.10-0.30) and negative at the upper quantiles (0.70-0.90). The results from the Wald tests show that the coefficients of SIZE are statistically different from each other. The positive impact of SIZE at the lower quantiles of the ΔNPL distribution (high decreases in NPL volumes) suggests that larger banks are possibly not so fast in making arrangements that decrease NPLs (write-offs, sales, restructures of loan agreements, etc.). The negative impact of SIZE at the upper quantiles of the ΔNPL distribution can be attributed to a possibly better loan diversification and managerial ability at larger banks.

The growth rate of gross loans (Loans_growth) is found to exert a homogeneous impact on ΔNPL but not statistically significant.

The net loans to customer deposits ratio (LDR) has a statistically significant and positive (as expected) impact on ΔNPL at quantiles 0.25-0.75. An increase of LDR implies that the bank may be taking on higher liquidity risk by increasing loans faster than it could fund them through customer deposits. The Wald tests show that the effect of LDR is homogeneous.

The Return on Assets (ROA) has a statistically significant and negative (as expected) impact on ΔNPL, however not across all models and quantiles. In general, it provides support to the "bad management" hypothesis, according to which reduced cost efficiency fosters an increase in NPLs. As suggested by the Wald tests, ROA has in general a homogeneous effect across different quantiles.

The crisis dummy variable (Crisis) was found to exert a statistically significant and positive impact on NPLs, suggesting that the global financial crisis of 2008 shifted NPLs upwards over the years 2008-2014.

By using beta coefficients (i.e. regression coefficients normalized by the ratio of the standard deviation of the independent variable to the standard deviation of the dependent variable) our regressions' coefficients can be interpreted by their standard deviation, which enables us to compare the relative impact of the independent variables on ΔNPL.

A one standard deviation increase in market power, as expressed by the three Lerner indices (namely, Lerner_KBL, Lerner_adjusted and Lerner_FE respectively) can lead to a change in ΔNPL of up to 0.15 standard deviations (0.04 standard deviations, on average). Concentration, measured by the HHI and CR5 indices, has a bigger influence on ΔNPL than market power as expressed by Lerner indices, since a one standard deviation increase in concentration can produce a change in ΔNPL of up to 0.22 standard deviations (0.11 standard deviations, on average). The impact, in terms of standard deviations, of the above competition and concentration indices on ΔNPL is presented in Figures 2 and 3 respectively.

The real GDP growth (GDP) is the variable that has the largest impact on ΔNPL in terms of standard deviations. When GDP increases by one standard deviation, ΔNPL can decrease up to 0.35 standard deviations (0.19 standard deviations, on average).

With reference to the variables that have a statistically significant impact on ΔNPL, the total net loans to total assets ratio (LAR), the size of a bank (SIZE) and the Return on Assets (ROA) have a milder impact, since a one standard deviation increase in any of these variables can cause a change in ΔNPL of about 0.05 standard deviations, on average. The net loans to customer deposits ratio (LDR) has an even smaller impact, since a one standard deviation increase in its value can result in a change in ΔNPL of about 0.03 standard deviations, on average.

The interaction between the Periphery dummy variable and the bank competition/ concentration indices was found to be statistically significant only in the case of concentration (Tables 21 and 22 present, indicatively, the regression results for the HHI). The sign of the interaction is negative, suggesting that concentration is more favorable to periphery euro area countries, facilitating them to obtain lower increases or bigger decreases in NPL ratios than countries belonging to the core of the euro area. The Periphery dummy variable *per se* is statistically significant and positive, indicating that the periphery euro area countries have a flat disadvantage against the core countries with respect to problem loans.

The interaction between the Foreign variable and the bank competition and concentration indices was found to be statistically significant only in the case of competition, although in a non-systematic way across all quantiles and Lerner indices (Tables 23 and 24 present, indicatively, the regression results for the Lerner_KBL index). The negative sign of the interaction implies that the effect of competition is enhanced when the share of foreign banks in a banking sector is higher. The negative sign of the Foreign variable *per se* indicates that foreign presence is associated with lower NPL ratios.

The interaction between the Commercial dummy variable and the bank competition/ concentration indices was found to be statistically significant only in the case of competition, although in a non-systematic way across all quantiles and Lerner indices (Tables 25 and 26 present, indicatively, the regression results for the Lerner_KBL index). The negative sign of the interaction implies that competition is more beneficial for the commercial banks in reducing NPLs. On the other hand, the positive sign of the Commercial dummy variable *per se* suggests that commercial banks are more prone to creating NPLs than the more conservative savings and mortgage banks.

7. Conclusions

The relationship between market power and stability/fragility in the banking sector has been researched extensively in the literature with ambivalent results. As consolidation in the banking sector has increased impressively in the wake of the global financial crisis, the question of the impact of competition and concentration on bank risk, and more specifically on non-performing loans (NPLs), remains pertinent.

In this study we investigated empirically the impact of both bank competition as expressed by a variety of Lerner indices and bank concentration as expressed by the structural CR5 and HHI indices on ΔNPL. We used an unbalanced panel dataset of 646 banks from the 19 member countries of the euro area over the period 2005-2017. By adopting a penalized quantile regression for dynamic panel data approach, we found that profit margins exert a positive impact on ΔNPL at the medium and upper quantiles of its distribution, supporting the "competition-stability" view. On the contrary, the impact of profit margins on ΔNPL at the lower quantiles of its distribution is not statistically significant. The regression results for concentration suggest another complex relationship. Concentration is found to exert a positive impact on ΔNPL at the upper quantiles of its distribution, supporting the "competition-stability" view, and a negative impact at the lower quantiles, supporting the "competition-fragility view". The conflicting results of the impacts of competition and concentration on ΔNPL, which are in line with the argument that more concentration does not always imply less competition, suggest that competition seems to support stability when it comes to increases in NPLs but that concentration enhances the faster reduction of NPLs. From this point of view, our study can be classified into the strand of the empirical literature that suggests a complex relationship between competition and risk. In some of the works reviewed in Section 2, the complex relationship between competition and risk is related to the different impact of different levels of competition (low/average/high) on the mean of the distribution of NPLs. In our study, the complex relationship is related to the different impact of competition at different quantiles of the ΔNPL distribution.

In addition, the results obtained from the interaction of competition and concentration indices with other regression variables lead to the following findings. First, bank concentration is more favorable to periphery euro area countries, contributing to lower increases or bigger decreases in NPL ratios, than countries belonging to the core of the euro area. On the other hand, the periphery euro area countries have a flat disadvantage against the core ones with respect to NPLs. Second, bank competition is enhanced by the presence of foreign banks in reducing NPLs. A higher share of foreign banks in a banking sector is also associated with lower NPL ratios. Third, bank competition is more beneficial for commercial banks in reducing NPLs than for the savings banks and mortgage banks. On the other hand, commercial banks are more prone to creating NPLs than other more conservative types of banks. Our results showed remarkable robustness to alternative variables and methods.

A tentative conclusion of our study could be that post-crisis consolidation facilitates the faster reduction of NPLs, while as the situation normalizes competition discourages the growth of new NPLs. Policy makers should take such findings into account by encouraging consolidation since concentration has been found to exert a stronger effect, but also by inserting competition in the banking sector through either regulating anti-competitive behavior or possibly inviting entry by new and/or foreign banks.

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Tables

Table 1: Summary of empirical literature

Authors / Publication year	Risk measure	Competition / concentration measure	Econome-tric methods	Region	Data period	Results
1. Empirical literature supporting the competition-fragility view						
Keely (1990)	Market-value capital to assets ratio, interest cost on large CDs	Tobin's q ratio	OLS, 2SLS	USA	1970-1986	Increased competition accounts for the decline in banks' charter values, increasing their default risk.
Berger, Klapper and Turk-Ariss (2009)	Z-score, NPL ratio, Capital ratio	Lerner index, HHI-deposit index, HHI-loan index	GMM	23 industria-lized countries	1999-2005	Banks with a greater degree of market power have less overall risk exposure, although market power can increase loan portfolio risk.
Turk-Ariss (2010)	Z-score, Risk-adjusted ROA/ROE	Conventional, Efficiency-adjusted and Funding-adjusted Lerner indices	Fixed effects, MLE	60 developing countries	1999-2005	Higher market power leads to greater bank stability.
Fungacova and Weill (2013)	Dummy variable denoting revocation (or not) of the banking license	Lerner index, HHI, CR5	Logit	Russia	2001-2007	An increase in bank competition is associated with greater bank failures.
Fu, Lin and Molyneux (2014)	Probability of bankruptcy, Z-score	Lerner index, CR3	GMM, Tobit	14 Asia Pacific countries	2003-2010	(1) There is a negative association between market power and individual bank risk. (2) There is a positive relationship between concentration and bank stability.
Titko, Kozlovskis and Kaliyeva (2015)	Z-score	Lerner index, Boone indicator	OLS	Latvia	2007-2013	There is a negative effect of competition (measured by the Lerner index) on bank stability.

Authors / Publication year	**Risk measure**	**Competition / concentration measure**	**Econome-tric methods**	**Region**	**Data period**	**Results**
Kabir and Worthington (2017)	Z-score, NPL ratio, Merton's distance to default	Lerner index	PVAR, two-stage quantile regression	16 countries with both conventional and Islamic banks	2000-2012	(1) Competition has a positive impact on risk. (2) The impact of market power on credit risk is bigger at the median quantile of credit risk.
2. Empirical literature supporting the competition-stability view						
Boyd, De Nicolò and Jalal (2006)	Z-score	HHI	OLS, FE, GMM	USA, 134 non-industriali-zed countries	2003, 1993-2004	Bank concentration, considered as an inverse proxy for competition, is positively associated with banks' probability of failure.
De Nicolò and Loukoianova (2007)	Z-score	HHI	FE	133 non-industriali-zed countries	1993-2004	The positive impact of concentration on banks' probability of failure, predicted by Boyd et al. (2006), is stronger when bank ownership is taken into account, and it is strongest when state-owned banks have sizeable market shares.
Yeyati and Micco (2007)	Z-score, NPL ratio	H-statistic, CR3/CR5	Panel fixed WLS	8 Latin American countries	1993-2002	Competition is negatively associated with bank risk.
Schaeck, Cihak and Wolfe (2009)	Dummy variable which equals one if a system crisis is observed in a particular year	H–statistic	Duration and logit analysis	45 countries	1980-2005	Competition reduces the likelihood of a crisis and increases time to crisis.
Uhde and Heimeshoff (2009)	Z-score	CR3, CR5, HHI	2SLS	EU-25	1997-2005	Bank concentration has a negative impact on the EU-25 banks' financial soundness.
Amidu and Wolfe (2013)	Z-score, NPL ratio	Lerner Index, HHI	3SLS	55 emerging and developing countries	2000-2007	Revenue diversification is a channel through which competition increases stability in emerging countries.
Anginer, Demirguc-Kunt and Zhu (2014)	Distance to default	Lerner index, H-statistic, CR3	Panel fixed effects, 2SLS, OLS	63 countries	1997-2009	Greater competition encourages banks to take on more diversified risks, making the banking system less fragile to shocks.

Authors / Publication year	**Risk measure**	**Competition / concentration measure**	**Econome-tric methods**	**Region**	**Data period**	**Results**
Schaeck and Cihak (2014)	Z-score, NPL ratio	Boone indicator, HHI	Two-stage quantile regression (on Z-score), Fixed effects, 2SLS	10 European countries	1995-2005	(1) Efficiency is the channel through which bank competition has an enhancement effect on stability. (2) The stability enhancement effect of competition is increased in accordance with the heath level of a bank.
Noman, Gee and Isa (2017)	Z-score, NPL ratio, equity ratio	H-statistic, Lerner index, HHI	GMM	5 Southeast Asian countries	1990-2014	Competition has a positive relationship with the Z-score and the equity ratio, and negative with the NPL ratio.
3. Empirical literature suggesting a complex relationship between competition and risk						
Beck, Demirguc-Kunt and Levine (2006)	Dummy variable which equals one if the country is going through a systemic crisis	CR3	Logit	69 countries	1980-1997	(1) Institutions that foster competition are associated with a lower likelihood of a systemic banking crisis. (2) Banking crises are less likely in countries with more concentrated banking systems.
Liu, Molyneux and Nguyen (2012)	Loan-loss reserves / provisions, profit volatility, Z-score	H-statistic	Ordinary OLS, GLS and GMM	4 South East Asian countries	1998-2008	(1) Competition does not increase bank risk-taking behavior, while increased competition is shown to reduce bank risk taking. (2) Concentration is inversely related to bank risk. (3) Regulatory restrictions appear to increase bank risk.
Tabak, Fazio and Cajueiro (2012)	Z-score	Boone indicator	GMM, Fixed effects	10 Latin American countries	2003-2008	Both high and low competition levels enhance financial stability. The opposite effect is observed for average competition levels.
Davis and Karim (2013)	Z-score	H-statistic, Lerner index	Fixed effects, FGLS	EU-27 countries	1998-2012	Using the H-statistic, competition has a negative effect on risk. Using the Lerner index, competition has a positive effect on risk.
Jimenez, Lopez and Saurina (2013)	NPL ratio	Lerner index, HHI, CR5	GMM	Spain	1988-2003	There is a non-linear relationship between competition and risk.

Authors / Publication year	Risk measure	Competition / concentration measure	Econome-tric methods	Region	Data period	Results
Fernandez and Garza-Garcia (2015)	Z-score, NPL ratio	Lerner Index	GMM	Mexico	2001-2008	(1) There is a positive relationship between competition and financial stability. (2) There is a positive relationship between competition and bank portfolio risk. (3) The benefits of greater competition on the overall stability of the banking system outweigh the increases in bank portfolio risk.
Kick and Prieto (2015)	Outright bank defaults and weaker forms of bank distress, Z-score, NPL ratio	Efficiency-adjusted Lerner index, Share of each bank's branches per German county, Boone indicator	Logit, IV linear and probit, OLS, Fixed effects	Germany	1994-2010	(1) Increased market power, proxied by the Lerner index, leads to the reduction of the default probability. (2) Using the Boone Indicator or the regional branch share as a measure of competition, the results suggest that increased competition lowers the riskiness of banks.
Vardar (2015)	Ratio of loan-loss provisions over total loans, NPL ratio, ROA volatility, Z-score	H-statistic, CR3, CR5, HHI	Panel fixed and random effects, GMM	Turkey	2002-2011	(1) Competition has a negative impact on the financial fragility of the Turkish banks. (2) Concentration is negatively related to bank risk.
Leroy and Lucotte (2017)	Z-score, distance to default, SRISK	Lerner index	Panel fixed and random effects, 2SLS	Europe	2004–2013	(1) Competition increases individual bank risk. (2) Competition reduces systemic risk.
Brei, Jacolin and Noah (2018)	NPL ratio, Impaired loan reserves, Z-score	Lerner index	GMM	33 countries in Sub-Saharan Africa	2000-2015	Increased competition can lower credit risk via efficiency gains, while excessive competition can cause adverse effects (U-shaped relationship between competition and credit risk).

Authors / Publication year	Risk measure	Competition / concentration measure	Econome-tric methods	Region	Data period	Results
De-Ramon et al. (2018)	Z-score and its constituent components	Lerner index, Boone indica-tor, HHI	FE-IV (FE2SLS), Quantile regression	United Kingdom	1994-2013	(1) Competition decreases individual bank risk. (2) Competition increases systemic risk. The impact of competition is not homogeneous across all banks, but depends on the financial health of the bank.

Table 2: Variables

Variable name	Variable Description
ΔNPL	NPL ratio (Impaired Loans to Gross Loans ratio), where Δ denotes first difference
GDP	Real GDP annual growth rate
Inflation	Harmonized Index of Consumer Prices (HICP) annual rate of change
LAR	Total Net Loans to Total Assets ratio
SIZE	Bank size (Logarithm of Total Assets)
Loans_growth	Annual growth of Total Gross Loans
LDR	Total Net Loans to Total Customer Deposits ratio
ROA	Return on Assets
Lerner_KBL	Lerner index computed per country with a cross-sectional SFA method, following Kumbhakar et al. (2012)
Lerner_adjusted	Efficiency-adjusted Lerner index computed with the Battese & Coelli (1992) Time Decay Method, following Koetter et al. (2012)
Lerner_FE	Lerner index computed per country using the fixed effect within-group (WG) estimator
HHI	Herfindahl-Hirschman Index
CR5	CR5 concentration index
Crisis	A dummy variable which equals 1 for the years 2008-2014 and zero otherwise
Periphery	A dummy variable which equals 1 for periphery countries and zero for core countries
Foreign	Share of foreign banks (in terms of total assets) in a banking system (expressed in first-difference form)
Commercial	A dummy variable which equals 1 for commercial banks and zero otherwise

Table 3: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ΔNPL	3747	0.0015	0.0210	-0.0976	0.1738
GDP	3747	0.0101	0.0217	-0.1481	0.2556
Inflation	3747	0.0117	0.0122	-0.0170	0.1530
LAR	3747	0.5980	0.1771	0.0147	0.9687
SIZE	3747	14.4342	1.8714	10.0397	21.0080
Loans_Growth	3747	0.0514	0.1600	-0.8402	3.7657
LDR	3747	1.0704	0.9316	0.0351	13.9043
ROA	3747	0.0032	0.0079	-0.1679	0.0763
Lerner_KBL	3747	0.1637	0.0872	0.0000	0.6731
Lerner_adjusted	3747	0.3060	0.1127	-0.3962	0.6533
Lerner_FE	3747	0.2001	0.1162	-0.1767	0.6414
HHI	3747	0.0570	0.0399	0.0206	0.2613
CR5	3747	0.4400	0.1550	0.2501	0.9728
Foreign	3014	0.0040	0.0190	-0.1684	0.1210

Table 4: ΔNPL additional statistics and quantiles

Additional statistics	Quantiles		
Variance 0.000442	1%	-0.0507	Biggest decrease
Skewness 1.831018	5%	-0.0243	
Kurtosis 14.44932	10%	-0.0153	
	20%	-0.0079	
	25%	-0.0063	NPLs decrease
	30%	-0.0050	
	40%	-0.0029	
	50%	-0.0010	Smallest decrease
	60%	0.0006	Smallest increase
	70%	0.0033	
	75%	0.0057	
	80%	0.0089	NPLs increase
	90%	0.0210	
	95%	0.0364	
	99%	0.0853	Biggest increase

Table 5: Evolution of ΔNPL per year

Year	Average ΔNPL
2006	-0.0054
2007	-0.0026
2008	0.0063
2009	0.0164
2010	0.0068
2011	0.0086
2012	0.0069
2013	0.0026
2014	0.0011
2015	-0.0012
2016	-0.0039
2017	-0.0059

Table 6: Correlation matrix

Variable	ΔNPL	GDP	Inflation	LAR	SIZE	Loans_ Growth	LDR	ROA	Lerner_ KBL	Lerner_ adjusted	Lerner_ FE	HHI	CR5	Foreign_ share
ΔNPL	1													
GDP	-0.3032	1												
Inflation	0.1309	-0.0857	1											
LAR	0.0562	-0.0543	0.0865	1										
SIZE	0.0568	-0.0546	0.0986	0.0682	1									
Loans_Growth	-0.1032	0.0392	0.1358	0.0056	-0.0197	1								
LDR	0.0723	-0.0895	0.1279	0.3101	0.2226	0.0087	1							
ROA	-0.3246	0.1482	0.0714	-0.0178	-0.0058	0.1417	0.0229	1						
Lerner_KBL	0.0827	-0.0382	0.0249	-0.0375	0.0808	0.0735	0.1208	0.3264	1					
Lerner_adjusted	0.0487	0.0286	-0.0475	0.1868	0.3679	-0.0299	-0.0288	0.0319	0.1139	1				
Lerner_FE	0.0366	0.0461	-0.0068	-0.0085	0.0964	0.0496	0.0318	0.3536	0.8012	0.3297	1			
HHI	0.0500	0.0737	0.0839	-0.1488	-0.1001	0.0088	-0.0320	0.0849	0.1025	-0.0658	0.1479	1		
CR5	0.0578	0.0584	0.0732	-0.1715	-0.0998	0.0119	-0.0335	0.0868	0.1409	-0.0617	0.1496	0.9776	1	
Foreign_ share	-0.1087	0.1293	-0.0329	-0.0303	-0.1741	0.0170	-0.0923	0.0060	-0.1430	-0.2208	-0.1567	0.0224	0.0269	1

Table 7	Model 1a (Competition index: Lerner_KBL) - Regression results with the PIVQRFE method								Dependent Variable: ΔNPL	
	Quantile									
Variable	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0455*** (0.0032)	-0.0260*** (0.0025)	-0.0205*** (0.0025)	-0.0169*** (0.0019)	-0.0098*** (0.0017)	-0.0064*** (0.0015)	-0.0002 (0.0019)	0.0074*** (0.0021)	0.0101*** (0.0023)	0.0148*** (0.0026)	0.0320*** (0.0033)
ΔNPL (-1)	-0.0600** (0.0473)	0.0200* (0.0397)	0.0200 (0.0395)	0.0200** (0.0407)	0.0500** (0.0424)	0.1100** (0.0420)	0.1900** (0.0514)	0.2300*** (0.0538)	0.2600*** (0.0588)	0.2800*** (0.0626)	0.2900** (0.0595)
GDP	-0.1975*** (0.0224)	-0.1474*** (0.0231)	-0.1572*** (0.0252)	-0.1622*** (0.0230)	-0.1583*** (0.0182)	-0.1569*** (0.0171)	-0.1714*** (0.0235)	-0.1985*** (0.0332)	-0.2385*** (0.0434)	-0.2492*** (0.0418)	-0.3026*** (0.0590)
Inflation	0.1139*** (0.0384)	0.0429 (0.0314)	0.0520* (0.0287)	0.0536* (0.0299)	0.0578** (0.0254)	0.0508* (0.0269)	0.0507 (0.0315)	0.0453 (0.0316)	0.0530 (0.0334)	0.0559 (0.0414)	0.1241** (0.0542)
LAR (-1)	0.0190*** (0.0018)	0.0118*** (0.0015)	0.0098*** (0.0014)	0.0086*** (0.0013)	0.0064*** (0.0011)	0.0048*** (0.0011)	0.0017 (0.0013)	-0.0011 (0.0014)	-0.0011 (0.0014)	-0.0027 (0.0017)	-0.0052** (0.0026)
SIZE (-1)	0.0018*** (0.0002)	0.0009*** (0.0001)	0.0007*** (0.0001)	0.0006*** (0.0001)	0.0002* (0.0001)	0.0001 (0.0001)	0.0000 (0.0001)	-0.0003*** (0.0001)	-0.0005*** (0.0001)	-0.0007*** (0.0001)	-0.0016*** (0.0002)
Loans_growth (-1)	0.0014 (0.0016)	0.0025 (0.0016)	0.0025 (0.0016)	0.0018 (0.0013)	0.0008 (0.0014)	0.0007 (0.0014)	0.0003 (0.0018)	-0.0003 (0.0020)	0.0000 (0.0025)	-0.0004 (0.0025)	-0.0038 (0.0032)
LDR (-1)	0.0000 (0.0006)	0.0007** (0.0003)	0.0007** (0.0003)	0.0008*** (0.0003)	0.0010*** (0.0003)	0.0011*** (0.0002)	0.0011*** (0.0003)	0.0009*** (0.0003)	0.0008** (0.0004)	0.0008* (0.0004)	0.0008 (0.0008)
ROA (-1)	0.0647 (0.1058)	-0.0893 (0.0830)	-0.1692* (0.0864)	-0.2053*** (0.0715)	-0.2108** (0.0910)	-0.1740** (0.0761)	-0.1565** (0.0656)	-0.1118 (0.0924)	-0.0838 (0.1044)	-0.1417 (0.1302)	-0.3212** (0.1526)
Lerner_KBL (-1)	-0.0076 (0.0048)	-0.0021 (0.0046)	0.0024 (0.0042)	0.0031 (0.0032)	0.0067** (0.0034)	0.0066** (0.0030)	0.0061* (0.0032)	0.0107*** (0.0040)	0.0147*** (0.0044)	0.0182*** (0.0055)	0.0385*** (0.0069)
Crisis	0.0004 (0.0008)	0.0015** (0.0007)	0.0015** (0.0007)	0.0016*** (0.0006)	0.0013*** (0.0005)	0.0012*** (0.0005)	0.0008 (0.0005)	0.0012* (0.0007)	0.0015** (0.0008)	0.0024*** (0.0008)	0.0043*** (0.0013)
Diagnostics											
Nb. of observations	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055
Goodness of Fit	0.4559	0.3512	0.3251	0.3192	0.3246	0.3270	0.3444	0.3685	0.3894	0.4253	0.5366

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Table 8	Model 1b (Competition index: Lerner_KBL) - Regression results with the PQRFE method									Dependent Variable: ΔNPL
	Quantile									
Variable	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0513*** (0.0051)	-0.0287*** (0.0030)	-0.0224*** (0.0023)	-0.0198*** (0.0020)	-0.0105*** (0.0019)	-0.0052*** (0.0017)	0.0014 (0.0020)	0.0071*** (0.0023)	0.0101*** (0.0026)	0.0145*** (0.0031)	0.0341*** (0.0054)
ΔNPL (-1)	-0.0945*** (0.0352)	-0.0529* (0.0272)	-0.0165 (0.0245)	-0.0028 (0.0256)	0.0481** (0.0239)	0.0936*** (0.0238)	0.1383*** (0.0264)	0.1680*** (0.0315)	0.1798*** (0.0319)	0.1906*** (0.0343)	0.2102*** (0.0458)
GDP	-0.1494*** (0.0371)	-0.1632*** (0.0243)	-0.1533*** (0.0222)	-0.1484*** (0.0211)	-0.1616*** (0.0181)	-0.1714*** (0.0191)	-0.1798*** (0.0224)	-0.2048*** (0.0326)	-0.2106*** (0.0352)	-0.2265*** (0.0385)	-0.2709*** (0.0699)
Inflation	-0.0641 (0.0630)	-0.0018 (0.0391)	0.0083 (0.0339)	0.0033 (0.0321)	0.0460 (0.0281)	0.0410 (0.0283)	0.0458 (0.0337)	0.0790** (0.0402)	0.0962** (0.0469)	0.1426** (0.0585)	0.1526** (0.0687)
LAR (-1)	0.0226*** (0.0034)	0.0122*** (0.0021)	0.0099*** (0.0016)	0.0089*** (0.0014)	0.0062*** (0.0012)	0.0046*** (0.0011)	0.0019 (0.0012)	0.0009 (0.0015)	-0.0003 (0.0019)	-0.0004 (0.0025)	-0.0097** (0.0040)
SIZE (-1)	0.0019*** (0.0003)	0.0011*** (0.0002)	0.0008*** (0.0001)	0.0007*** (0.0001)	0.0003*** (0.0001)	0.0001 (0.0001)	-0.0001 (0.0001)	-0.0004*** (0.0001)	-0.0006*** (0.0001)	-0.0008*** (0.0002)	-0.0017*** (0.0003)
Loans_growth (-1)	0.0051*** (0.0016)	0.0043*** (0.0013)	0.0028** (0.0013)	0.0033*** (0.0012)	0.0018 (0.0013)	0.0014 (0.0016)	0.0007 (0.0019)	0.0011 (0.0019)	-0.0002 (0.0020)	0.0000 (0.0025)	0.0066 (0.0060)
LDR (-1)	0.0000 (0.0006)	0.0008* (0.0004)	0.0007** (0.0003)	0.0008*** (0.0002)	0.0009*** (0.0002)	0.0011*** (0.0002)	0.0011*** (0.0002)	0.0010** (0.0004)	0.0014** (0.0006)	0.0014 (0.0011)	0.0033 (0.0021)
ROA (-1)	-0.0902 (0.0954)	-0.2538*** (0.0680)	-0.2522*** (0.0683)	-0.2739*** (0.0707)	-0.3058*** (0.0697)	-0.2918*** (0.0674)	-0.2539*** (0.0706)	-0.3309*** (0.0742)	-0.3398*** (0.0843)	-0.4472*** (0.0961)	-0.6136*** (0.0989)
Lerner_KBL (-1)	-0.0077 (0.0072)	0.0007 (0.0046)	0.0035 (0.0040)	0.0036 (0.0037)	0.0070** (0.0034)	0.0072** (0.0030)	0.0075** (0.0033)	0.0145*** (0.0039)	0.0181*** (0.0042)	0.0240*** (0.0050)	0.0453*** (0.0096)
Crisis	0.0031* (0.0016)	0.0014* (0.0008)	0.0014** (0.0006)	0.0015*** (0.0005)	0.0013*** (0.0005)	0.0013*** (0.0005)	0.0014*** (0.0005)	0.0021*** (0.0006)	0.0025*** (0.0007)	0.0029*** (0.0009)	0.0050*** (0.0018)
Diagnostics											
Nb. of observations	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055
Goodness of Fit	0.4300	0.3166	0.3146	0.3121	0.3070	0.3162	0.3488	0.4006	0.4251	0.4473	0.5507

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Table 9	**Model 2a (Competition index: Lerner_adjusted) - Regression results with the PIVQRFE method**								Dependent Variable: ΔNPL		
	Quantile										
Variable	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0450*** (0.0028)	-0.0250*** (0.0025)	-0.0179*** (0.0023)	-0.0156*** (0.0019)	-0.0080*** (0.0016)	-0.0037** (0.0017)	-0.0001 (0.0017)	0.0101*** (0.0021)	0.0138*** (0.0021)	0.0187*** (0.0023)	0.0384*** (0.0033)
ΔNPL (-1)	-0.0800** (0.0494)	0.0200** (0.0414)	0.0200** (0.0384)	0.0300 (0.0387)	0.0600** (0.0429)	0.1200** (0.0426)	0.1500** (0.0504)	0.2300** (0.0506)	0.2800*** (0.0560)	0.3000*** (0.0586)	0.3300** (0.0579)
GDP	-0.1895*** (0.0236)	-0.1503*** (0.0261)	-0.1620*** (0.0266)	-0.1706*** (0.0243)	-0.1609*** (0.0196)	-0.1619*** (0.0155)	-0.1783*** (0.0225)	-0.1941*** (0.0344)	-0.2263*** (0.0394)	-0.2496*** (0.0389)	-0.3041*** (0.0512)
Inflation	0.1041*** (0.0367)	0.0413 (0.0311)	0.0518* (0.0300)	0.0528** (0.0252)	0.0583* (0.0316)	0.0604** (0.0281)	0.0488* (0.0264)	0.0454 (0.0315)	0.0545 (0.0340)	0.0617* (0.0353)	0.0609 (0.0508)
LAR (-1)	0.0191*** (0.0017)	0.0113*** (0.0016)	0.0082*** (0.0015)	0.0072*** (0.0012)	0.0041*** (0.0014)	0.0033*** (0.0012)	0.0015 (0.0011)	-0.0030* (0.0016)	-0.0032** (0.0016)	-0.0042*** (0.0016)	-0.0106*** (0.0026)
SIZE (-1)	0.0016*** (0.0002)	0.0008*** (0.0001)	0.0005*** (0.0001)	0.0004*** (0.0001)	0.0001 (0.0001)	-0.0001 (0.0001)	-0.0002 (0.0001)	-0.0005*** (0.0001)	-0.0007*** (0.0001)	-0.0009*** (0.0002)	-0.0019*** (0.0002)
Loans_growth (-1)	0.0018 (0.0016)	0.0027* (0.0014)	0.0019 (0.0015)	0.0019 (0.0014)	0.0008 (0.0014)	0.0007 (0.0017)	0.0002 (0.0019)	-0.0001 (0.0023)	0.0001 (0.0028)	0.0023 (0.0031)	-0.0031 (0.0034)
LDR (-1)	-0.0001 (0.0005)	0.0005* (0.0003)	0.0008*** (0.0003)	0.0011*** (0.0002)	0.0012*** (0.0002)	0.0012*** (0.0002)	0.0012*** (0.0002)	0.0011*** (0.0004)	0.0010** (0.0005)	0.0011** (0.0005)	0.0019 (0.0012)
ROA (-1)	-0.0005 (0.0944)	-0.1227 (0.0806)	-0.1852** (0.0757)	-0.1937*** (0.0718)	-0.1928*** (0.0720)	-0.1396** (0.0686)	-0.1315* (0.0677)	-0.0689 (0.0709)	-0.0254 (0.0872)	-0.0283 (0.0966)	-0.0531 (0.1446)
Lerner_adjusted (-1)	0.0045 (0.0028)	0.0040 (0.0026)	0.0051* (0.0029)	0.0064*** (0.0023)	0.0069*** (0.0026)	0.0068*** (0.0022)	0.0083*** (0.0023)	0.0079*** (0.0026)	0.0074*** (0.0024)	0.0087*** (0.0027)	0.0194*** (0.0035)
Crisis	0.0008 (0.0008)	0.0016** (0.0008)	0.0019** (0.0008)	0.0019*** (0.0006)	0.0017*** (0.0006)	0.0013** (0.0005)	0.0013** (0.0005)	0.0016** (0.0007)	0.0022*** (0.0007)	0.0000 (0.0000)	0.0050*** (0.0011)
Diagnostics											
Nb. of observations	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055
Goodness of Fit	0.4578	0.3516	0.3262	0.3179	0.3236	0.3257	0.3516	0.3681	0.3836	0.4198	0.5322

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Table 10	**Model 2b (Competition index: Lerner_adjusted) - Regression results with the PQRFE method**								Dependent Variable: ΔNPL		
	Quantile										
Variable	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0513*** (0.0044)	-0.0282*** (0.0027)	-0.0211*** (0.0022)	-0.0179*** (0.0018)	-0.0097*** (0.0015)	-0.0043*** (0.0016)	0.0027 (0.0017)	0.0102*** (0.0021)	0.0138*** (0.0025)	0.0191*** (0.0028)	0.0412*** (0.0055)
ΔNPL (-1)	-0.1001*** (0.0364)	-0.0528* (0.0275)	-0.0166 (0.0273)	0.0030 (0.0277)	0.0544** (0.0249)	0.1020*** (0.0262)	0.1429*** (0.0262)	0.1759*** (0.0290)	0.1954*** (0.0300)	0.2108*** (0.0328)	0.2351*** (0.0483)
GDP	-0.1469*** (0.0407)	-0.1623*** (0.0244)	-0.1578*** (0.0219)	-0.1538*** (0.0210)	-0.1612*** (0.0186)	-0.1727*** (0.0186)	-0.1834*** (0.0229)	-0.2088*** (0.0306)	-0.2176*** (0.0346)	-0.2303*** (0.0400)	-0.2685*** (0.0616)
Inflation	-0.0315 (0.0587)	0.0061 (0.0369)	0.0044 (0.0334)	0.0139 (0.0308)	0.0428 (0.0281)	0.0437 (0.0281)	0.0422 (0.0337)	0.0790* (0.0446)	0.1005** (0.0482)	0.1190** (0.0540)	0.1397* (0.0781)
LAR (-1)	0.0222*** (0.0035)	0.0112*** (0.0019)	0.0093*** (0.0016)	0.0076*** (0.0014)	0.0051*** (0.0013)	0.0035*** (0.0011)	0.0012 (0.0012)	-0.0020 (0.0016)	-0.0031 (0.0020)	-0.0050* (0.0028)	-0.0145*** (0.0042)
SIZE (-1)	0.0018*** (0.0002)	0.0010*** (0.0001)	0.0007*** (0.0001)	0.0006*** (0.0001)	0.0002** (0.0001)	0.0000 (0.0001)	-0.0003*** (0.0001)	-0.0006*** (0.0001)	-0.0008*** (0.0002)	-0.0010*** (0.0002)	-0.0021*** (0.0003)
Loans_growth (-1)	0.0052*** (0.0015)	0.0042*** (0.0012)	0.0034*** (0.0013)	0.0035*** (0.0013)	0.0025* (0.0014)	0.0017 (0.0016)	0.0013 (0.0017)	0.0009 (0.0018)	0.0011 (0.0020)	0.0020 (0.0022)	0.0077 (0.0057)
LDR (-1)	0.0002 (0.0006)	0.0009** (0.0004)	0.0010*** (0.0003)	0.0010*** (0.0002)	0.0011*** (0.0003)	0.0013*** (0.0002)	0.0013*** (0.0003)	0.0018*** (0.0005)	0.0019** (0.0008)	0.0022* (0.0013)	0.0051** (0.0023)
ROA (-1)	-0.1681** (0.0846)	-0.2661*** (0.0629)	-0.2578*** (0.0604)	-0.2553*** (0.0596)	-0.2613*** (0.0598)	-0.2571*** (0.0565)	-0.2447*** (0.0575)	-0.2364*** (0.0661)	-0.2603*** (0.0716)	-0.3305*** (0.0853)	-0.4570*** (0.1124)
Lerner_adjusted (-1)	-0.0002 (0.0038)	0.0037* (0.0022)	0.0034* (0.0019)	0.0037** (0.0018)	0.0045*** (0.0017)	0.0059*** (0.0016)	0.0066*** (0.0017)	0.0092*** (0.0021)	0.0105*** (0.0023)	0.0136*** (0.0030)	0.0203*** (0.0045)
Crisis	0.0025 (0.0016)	0.0016** (0.0008)	0.0015** (0.0006)	0.0016*** (0.0005)	0.0014*** (0.0004)	0.0015*** (0.0004)	0.0019*** (0.0005)	0.0022*** (0.0006)	0.0026*** (0.0007)	0.0030*** (0.0008)	0.0055*** (0.0018)
Diagnostics											
Nb. of observations	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055
Goodness of Fit	0.4298	0.3151	0.3141	0.3115	0.3067	0.3160	0.3487	0.4000	0.4238	0.4452	0.5460

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Table 11	**Model 3a (Competition index: Lerner_FE) - Regression results with the PIVQRFE method**								Dependent Variable: ΔNPL		
Variable	Quantile										
	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0451*** (0.0031)	-0.0269*** (0.0022)	-0.0209*** (0.0023)	-0.0170*** (0.0018)	-0.0100*** (0.0018)	-0.0060*** (0.0015)	-0.0019 (0.0020)	0.0077*** (0.0020)	0.0098*** (0.0021)	0.0142*** (0.0028)	0.0324*** (0.0035)
ΔNPL (-1)	-0.0600** (0.0474)	-0.0200** (0.0408)	0.0100** (0.0401)	0.0100** (0.0404)	0.0800** (0.0425)	0.1000** (0.0421)	0.1700*** (0.0511)	0.2600*** (0.0548)	0.2700*** (0.0587)	0.3000*** (0.0617)	0.3200** (0.0626)
GDP	-0.1926*** (0.0236)	-0.1537*** (0.0244)	-0.1589*** (0.0243)	-0.1634*** (0.0249)	-0.1600*** (0.0198)	-0.1618*** (0.0171)	-0.1785*** (0.0265)	-0.1979*** (0.0372)	-0.2384*** (0.0388)	-0.2678*** (0.0406)	-0.2809*** (0.0470)
Inflation	0.1008*** (0.0362)	0.0439 (0.0316)	0.0487* (0.0295)	0.0520** (0.0253)	0.0607** (0.0308)	0.0513* (0.0262)	0.0613** (0.0308)	0.0555* (0.0303)	0.0611** (0.0300)	0.0758** (0.0383)	0.1030* (0.0569)
LAR (-1)	0.0202*** (0.0019)	0.0127*** (0.0014)	0.0098*** (0.0014)	0.0092*** (0.0014)	0.0063*** (0.0012)	0.0042*** (0.0010)	0.0027* (0.0014)	-0.0016 (0.0012)	-0.0008 (0.0013)	-0.0019 (0.0018)	-0.0052** (0.0025)
SIZE (-1)	0.0017*** (0.0002)	0.0009*** (0.0001)	0.0007*** (0.0001)	0.0005*** (0.0001)	0.0002* (0.0001)	0.0001 (0.0001)	0.0000 (0.0001)	-0.0004*** (0.0001)	-0.0005*** (0.0001)	-0.0007*** (0.0002)	-0.0016*** (0.0002)
Loans_growth (-1)	0.0018 (0.0016)	0.0023* (0.0014)	0.0016 (0.0016)	0.0013 (0.0014)	0.0011 (0.0017)	0.0008 (0.0013)	-0.0001 (0.0019)	0.0001 (0.0022)	0.0000 (0.0022)	-0.0003 (0.0026)	-0.0040 (0.0035)
LDR (-1)	-0.0003 (0.0006)	0.0005* (0.0003)	0.0007** (0.0003)	0.0008** (0.0003)	0.0011*** (0.0003)	0.0012*** (0.0002)	0.0011*** (0.0003)	0.0011*** (0.0003)	0.0009*** (0.0003)	0.0010** (0.0004)	0.0010 (0.0008)
ROA (-1)	0.0383 (0.1044)	-0.1383 (0.0904)	-0.2040** (0.0864)	-0.2420*** (0.0752)	-0.2179** (0.0900)	-0.2194*** (0.0796)	-0.1843** (0.0816)	-0.1234 (0.0871)	-0.1091 (0.1088)	-0.1937 (0.1315)	-0.3253** (0.1508)
Lerner FE (-1)	-0.0024 (0.0033)	0.0049 (0.0031)	0.0053* (0.0031)	0.0056** (0.0026)	0.0065** (0.0027)	0.0067*** (0.0020)	0.0079*** (0.0026)	0.0100*** (0.0026)	0.0117*** (0.0034)	0.0163*** (0.0039)	0.0277*** (0.0045)
Crisis	0.0007 (0.0007)	0.0016** (0.0007)	0.0017** (0.0007)	0.0018*** (0.0006)	0.0012** (0.0005)	0.0014*** (0.0005)	0.0011* (0.0006)	0.0013* (0.0007)	0.0020*** (0.0007)	0.0024*** (0.0007)	0.0046*** (0.0013)
Diagnostics											
Nb. of observations	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055
Goodness of Fit	0.4599	0.3560	0.3277	0.3209	0.3209	0.3292	0.3487	0.3626	0.3869	0.4205	0.5290

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Table 12	**Model 3b (Competition index: Lerner_FE) - Regression results with the PQRFE method**								Dependent Variable: ΔNPL		
	Quantile										
Variable	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0493*** (0.0048)	-0.0271*** (0.0029)	-0.0215*** (0.0022)	-0.0190*** (0.0020)	-0.0103*** (0.0019)	-0.0049*** (0.0017)	0.0015 (0.0019)	0.0072*** (0.0024)	0.0112*** (0.0027)	0.0157*** (0.0030)	0.0391*** (0.0051)
ΔNPL (-1)	-0.0999*** (0.0370)	-0.0498* (0.0273)	-0.0153 (0.0260)	0.0025 (0.0258)	0.0507** (0.0251)	0.0909*** (0.0261)	0.1369*** (0.0276)	0.1689*** (0.0300)	0.1831*** (0.0307)	0.2050*** (0.0336)	0.2258*** (0.0454)
GDP	-0.1380*** (0.0396)	-0.1607*** (0.0236)	-0.1579*** (0.0210)	-0.1559*** (0.0199)	-0.1645*** (0.0187)	-0.1799*** (0.0190)	-0.1875*** (0.0233)	-0.2041*** (0.0309)	-0.2214*** (0.0336)	-0.2280*** (0.0352)	-0.2832*** (0.0632)
Inflation	-0.0548 (0.0591)	-0.0031 (0.0389)	0.0143 (0.0343)	0.0176 (0.0307)	0.0451* (0.0262)	0.0464* (0.0260)	0.0433 (0.0319)	0.0874** (0.0409)	0.0974** (0.0478)	0.1393*** (0.0536)	0.1350* (0.0726)
LAR (-1)	0.0221*** (0.0036)	0.0121*** (0.0019)	0.0093*** (0.0015)	0.0086*** (0.0014)	0.0062*** (0.0012)	0.0044*** (0.0010)	0.0023* (0.0012)	0.0001 (0.0017)	-0.0004 (0.0019)	-0.0008 (0.0024)	-0.0128*** (0.0039)
SIZE (-1)	0.0018*** (0.0003)	0.0010*** (0.0001)	0.0008*** (0.0001)	0.0007*** (0.0001)	0.0003*** (0.0001)	0.0001 (0.0001)	-0.0002* (0.0001)	-0.0005*** (0.0001)	-0.0007*** (0.0001)	-0.0009*** (0.0002)	-0.0019*** (0.0003)
Loans_growth (-1)	0.0047*** (0.0018)	0.0039*** (0.0014)	0.0029** (0.0013)	0.0034*** (0.0012)	0.0020 (0.0013)	0.0015 (0.0016)	0.0009 (0.0018)	0.0011 (0.0020)	0.0004 (0.0021)	0.0025 (0.0024)	0.0074 (0.0054)
LDR (-1)	0.0002 (0.0006)	0.0008* (0.0004)	0.0007*** (0.0003)	0.0007*** (0.0002)	0.0010*** (0.0003)	0.0012*** (0.0002)	0.0012*** (0.0003)	0.0015*** (0.0004)	0.0016*** (0.0006)	0.0018* (0.0010)	0.0048** (0.0019)
ROA (-1)	-0.0357 (0.0794)	-0.2325*** (0.0617)	-0.2508*** (0.0652)	-0.2756*** (0.0668)	-0.2782*** (0.0701)	-0.3031*** (0.0643)	-0.2665*** (0.0655)	-0.3247*** (0.0744)	-0.3694*** (0.0838)	-0.4627*** (0.0980)	-0.6479*** (0.1037)
Lerner FE (-1)	-0.0102** (0.0045)	-0.0009 (0.0031)	0.0019 (0.0027)	0.0025 (0.0025)	0.0045* (0.0024)	0.0063*** (0.0020)	0.0072*** (0.0023)	0.0111*** (0.0027)	0.0140*** (0.0032)	0.0184*** (0.0037)	0.0337*** (0.0061)
Crisis	0.0028** (0.0014)	0.0016** (0.0008)	0.0012** (0.0006)	0.0014*** (0.0005)	0.0012*** (0.0004)	0.0014*** (0.0004)	0.0015*** (0.0004)	0.0023*** (0.0006)	0.0028*** (0.0007)	0.0034*** (0.0008)	0.0056*** (0.0015)
Diagnostics											
Nb. of observations	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055
Goodness of Fit	0.4295	0.3166	0.3146	0.3122	0.3068	0.3163	0.3489	0.4006	0.4239	0.4455	0.5447

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Table 13	**Model 4a (Concentration index: HHI) - Regression results with the PIVQRFE method**									Dependent Variable: ΔNPL
	Quantile										
Variable	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0358*** (0.0026)	-0.0211*** (0.0019)	-0.0177*** (0.0018)	-0.0133*** (0.0017)	-0.0077*** (0.0017)	-0.0063*** (0.0019)	-0.0018 (0.0022)	0.0056** (0.0022)	0.0084*** (0.0022)	0.0108*** (0.0021)	0.0194*** (0.0032)
ΔNPL (-1)	-0.0300** (0.0514)	0.0200 (0.0376)	0.0300 (0.0415)	0.0800** (0.0432)	0.0600 (0.0411)	0.1500** (0.0422)	0.1500** (0.0495)	0.2100*** (0.0502)	0.2100** (0.0534)	0.2500*** (0.0578)	0.2900** (0.0652)
GDP	-0.1803*** (0.0271)	-0.1713*** (0.0278)	-0.1644*** (0.0250)	-0.1651*** (0.0224)	-0.1576*** (0.0199)	-0.1624*** (0.0179)	-0.1718*** (0.0253)	-0.2094*** (0.0356)	-0.2482*** (0.0382)	-0.2522*** (0.0387)	-0.3606*** (0.0647)
Inflation	0.1577*** (0.0363)	0.0880*** (0.0332)	0.0653** (0.0269)	0.0614** (0.0264)	0.0577** (0.0263)	0.0543** (0.0264)	0.0409 (0.0283)	0.0242 (0.0263)	0.0379 (0.0307)	0.0456 (0.0408)	0.0027 (0.0424)
LAR (-1)	0.0138*** (0.0017)	0.0086*** (0.0013)	0.0080*** (0.0011)	0.0063*** (0.0013)	0.0051*** (0.0011)	0.0055*** (0.0012)	0.0027** (0.0012)	0.0001 (0.0015)	-0.0002 (0.0017)	-0.0013 (0.0015)	0.0016 (0.0021)
SIZE (-1)	0.0016*** (0.0001)	0.0010*** (0.0001)	0.0008*** (0.0001)	0.0006*** (0.0001)	0.0002** (0.0001)	0.0002* (0.0001)	0.0000 (0.0001)	-0.0003** (0.0001)	-0.0004*** (0.0001)	-0.0005*** (0.0001)	-0.0009*** (0.0002)
Loans_growth (-1)	0.0018 (0.0012)	0.0020 (0.0016)	0.0022 (0.0014)	0.0015 (0.0016)	0.0007 (0.0016)	0.0012 (0.0018)	-0.0001 (0.0019)	-0.0003 (0.0022)	-0.0007 (0.0021)	-0.0005 (0.0024)	-0.0027 (0.0025)
LDR (-1)	-0.0006 (0.0005)	0.0004 (0.0003)	0.0008** (0.0003)	0.0009*** (0.0003)	0.0009*** (0.0003)	0.0008*** (0.0003)	0.0011*** (0.0003)	0.0010*** (0.0004)	0.0009** (0.0004)	0.0009*** (0.0003)	0.0006 (0.0007)
ROA (-1)	0.0832 (0.0780)	-0.0282 (0.0788)	-0.0886 (0.0673)	-0.1100 (0.0689)	-0.1618** (0.0703)	-0.1304* (0.0692)	-0.1563** (0.0647)	-0.1020 (0.0952)	-0.1386 (0.1022)	-0.2205** (0.1107)	-0.2872* (0.1711)
HHI (-1)	-0.1199*** (0.0116)	-0.0854*** (0.0123)	-0.0624*** (0.0098)	-0.0493*** (0.0091)	-0.0099 (0.0078)	0.0071 (0.0072)	0.0245*** (0.0066)	0.0419*** (0.0085)	0.0596*** (0.0119)	0.0866*** (0.0113)	0.1187*** (0.0153)
Crisis	0.0007 (0.0009)	0.0014* (0.0008)	0.0016** (0.0007)	0.0015*** (0.0006)	0.0014*** (0.0005)	0.0009** (0.0005)	0.0009* (0.0005)	0.0012* (0.0007)	0.0015** (0.0006)	0.0019** (0.0007)	0.0041*** (0.0012)
Diagnostics											
Nb. of observations	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055
Goodness of Fit	0.4579	0.3553	0.3263	0.3127	0.3228	0.3205	0.3512	0.3737	0.4067	0.4301	0.5360

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Table 14	Model 4b (Concentration index: HHI) - Regression results with the PQRFE method								Dependent Variable: ΔNPL		
	Quantile										
Variable	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0437*** (0.0053)	-0.0257*** (0.0027)	-0.0206*** (0.0023)	-0.0185*** (0.0020)	-0.0120*** (0.0019)	-0.0074*** (0.0017)	-0.0006 (0.0019)	0.0045** (0.0021)	0.0059*** (0.0022)	0.0103*** (0.0028)	0.0283*** (0.0056)
ΔNPL (-1)	-0.0683** (0.0334)	-0.0304 (0.0277)	-0.0137 (0.0271)	-0.0053 (0.0284)	0.0518** (0.0257)	0.0915*** (0.0252)	0.1356*** (0.0265)	0.1718*** (0.0291)	0.1813*** (0.0285)	0.2202*** (0.0320)	0.2452*** (0.0435)
GDP	-0.1153*** (0.0397)	-0.1554*** (0.0233)	-0.1515*** (0.0203)	-0.1390*** (0.0199)	-0.1520*** (0.0192)	-0.1651*** (0.0208)	-0.1845*** (0.0258)	-0.2005*** (0.0315)	-0.2141*** (0.0335)	-0.2412*** (0.0344)	-0.3010*** (0.0612)
Inflation	0.0573 (0.0619)	-0.0025 (0.0357)	0.0131 (0.0294)	0.0257 (0.0294)	0.0388 (0.0271)	0.0353 (0.0242)	0.0370 (0.0299)	0.0691* (0.0396)	0.0841** (0.0418)	0.0887* (0.0483)	0.0558 (0.0800)
LAR (-1)	0.0166*** (0.0036)	0.0105*** (0.0018)	0.0088*** (0.0015)	0.0082*** (0.0014)	0.0062*** (0.0012)	0.0051*** (0.0012)	0.0026* (0.0014)	0.0016 (0.0016)	0.0012 (0.0018)	0.0000 (0.0022)	-0.0085* (0.0045)
SIZE (-1)	0.0018*** (0.0003)	0.0011*** (0.0001)	0.0008*** (0.0001)	0.0007*** (0.0001)	0.0004*** (0.0001)	0.0002** (0.0001)	-0.0001 (0.0001)	-0.0003*** (0.0001)	-0.0004*** (0.0001)	-0.0006*** (0.0002)	-0.0014*** (0.0003)
Loans_growth (-1)	0.0045*** (0.0016)	0.0037*** (0.0013)	0.0032** (0.0013)	0.0035*** (0.0013)	0.0025* (0.0015)	0.0019 (0.0017)	0.0013 (0.0017)	0.0015 (0.0019)	0.0014 (0.0019)	0.0012 (0.0021)	0.0075 (0.0045)
LDR (-1)	0.0003 (0.0006)	0.0009** (0.0004)	0.0008*** (0.0003)	0.0008*** (0.0002)	0.0008*** (0.0002)	0.0011*** (0.0003)	0.0011*** (0.0003)	0.0014*** (0.0004)	0.0014** (0.0006)	0.0016 (0.0011)	0.0042 (0.0026)
ROA (-1)	-0.0630 (0.0741)	-0.1842** (0.0748)	-0.2083*** (0.0640)	-0.2501*** (0.0645)	-0.2541*** (0.0634)	-0.2734*** (0.0587)	-0.2616*** (0.0612)	-0.2981*** (0.0737)	-0.3390*** (0.0801)	-0.3943*** (0.0850)	-0.5124*** (0.0931)
HHI (-1)	-0.1169*** (0.0230)	-0.0440*** (0.0121)	-0.0287** (0.0115)	-0.0130 (0.0099)	0.0081 (0.0068)	0.0192*** (0.0061)	0.0359*** (0.0071)	0.0556*** (0.0087)	0.0739*** (0.0093)	0.0952*** (0.0124)	0.1589*** (0.0175)
Crisis	0.0011 (0.0013)	0.0011* (0.0007)	0.0012** (0.0006)	0.0017*** (0.0005)	0.0014*** (0.0004)	0.0013*** (0.0004)	0.0013*** (0.0004)	0.0018*** (0.0006)	0.0022*** (0.0007)	0.0027*** (0.0008)	0.0052*** (0.0013)
Diagnostics											
Nb. of observations	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055
Goodness of Fit	0.4274	0.3159	0.3131	0.3111	0.3072	0.3167	0.3504	0.4022	0.4269	0.4498	0.5486

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Table 15	Model 5a (Concentration index: CR5) - Regression results with the PIVQRFE method									Dependent Variable: ΔNPL
	Quantile										
Variable	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0260*** (0.0030)	-0.0182*** (0.0026)	-0.0150*** (0.0017)	-0.0114*** (0.0017)	-0.0089*** (0.0018)	-0.0068*** (0.0017)	-0.0038* (0.0022)	0.0025 (0.0023)	0.0050** (0.0023)	0.0066*** (0.0023)	0.0134*** (0.0034)
ΔNPL (-1)	-0.0700** (0.0515)	0.0300** (0.0407)	0.0300 (0.0402)	0.0800** (0.0397)	0.0800** (0.0420)	0.1300** (0.0430)	0.1500** (0.0503)	0.2200*** (0.0503)	0.2200*** (0.0548)	0.2400** (0.0553)	0.2700** (0.0649)
GDP	-0.1885*** (0.0239)	-0.1600*** (0.0275)	-0.1555*** (0.0244)	-0.1675*** (0.0243)	-0.1559*** (0.0194)	-0.1591*** (0.0160)	- 0.1698*** (0.0253)	-0.2028*** (0.0361)	-0.2428*** (0.0360)	-0.2589*** (0.0359)	-0.3406*** (0.0684)
Inflation	0.1896*** (0.0393)	0.0832*** (0.0302)	0.0628** (0.0257)	0.0564** (0.0256)	0.0556* (0.0302)	0.0471* (0.0252)	0.0349 (0.0282)	0.0180 (0.0315)	0.0421 (0.0330)	0.0593 (0.0366)	0.0227 (0.0491)
LAR (-1)	0.0121*** (0.0016)	0.0095*** (0.0014)	0.0085*** (0.0012)	0.0062*** (0.0014)	0.0061*** (0.0011)	0.0049*** (0.0012)	0.0027** (0.0013)	0.0010 (0.0014)	0.0002 (0.0018)	-0.0010 (0.0015)	0.0000 (0.0020)
SIZE (-1)	0.0015*** (0.0001)	0.0010*** (0.0001)	0.0008*** (0.0001)	0.0006*** (0.0001)	0.0003** (0.0001)	0.0002** (0.0001)	0.0001 (0.0001)	-0.0003*** (0.0001)	-0.0005*** (0.0001)	-0.0005*** (0.0001)	-0.0009*** (0.0002)
Loans_growth (-1)	0.0015 (0.0012)	0.0017 (0.0015)	0.0019 (0.0016)	0.0013 (0.0016)	0.0007 (0.0015)	0.0009 (0.0015)	0.0003 (0.0019)	0.0001 (0.0019)	-0.0007 (0.0022)	0.0007 (0.0018)	-0.0022 (0.0025)
LDR (-1)	-0.0004 (0.0005)	0.0003 (0.0003)	0.0007** (0.0003)	0.0009*** (0.0003)	0.0008*** (0.0003)	0.0010*** (0.0002)	0.0011*** (0.0003)	0.0010*** (0.0003)	0.0009** (0.0004)	0.0009** (0.0003)	0.0012* (0.0006)
ROA (-1)	0.0849 (0.0888)	-0.0318 (0.0808)	-0.0783 (0.0741)	-0.1063 (0.0744)	-0.1410** (0.0669)	-0.1237* (0.0680)	-0.1607** (0.0647)	-0.1075 (0.0914)	-0.1621* (0.0972)	-0.2540** (0.1111)	-0.3115* (0.1668)
CR5 (-1)	-0.0304*** (0.0030)	-0.0205*** (0.0028)	-0.0148*** (0.0024)	-0.0111*** (0.0027)	-0.0009 (0.0017)	0.0019 (0.0016)	0.0063*** (0.0017)	0.0127*** (0.0020)	0.0171*** (0.0024)	0.0221*** (0.0027)	0.0295*** (0.0033)
Crisis	0.0003 (0.0008)	0.0017** (0.0007)	0.0018*** (0.0007)	0.0016** (0.0006)	0.0013*** (0.0005)	0.0010** (0.0004)	0.0010* (0.0005)	0.0011* (0.0006)	0.0014** (0.0007)	0.0018** (0.0008)	0.0042*** (0.0012)
Diagnostics											
Nb. of observations	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055
Goodness of Fit	0.4593	0.3539	0.3259	0.3123	0.3200	0.3236	0.3515	0.3716	0.3983	0.4317	0.5376

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Table 16	Model 5b (Concentration index: CR5) - Regression results with the PQRFE method									Dependent Variable: ΔNPL
	Quantile										
Variable	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0412*** (0.0060)	-0.0241*** (0.0028)	-0.0191*** (0.0024)	-0.0190*** (0.0022)	-0.0127*** (0.0019)	-0.0085*** (0.0017)	-0.0023 (0.0019)	0.0013 (0.0025)	0.0021 (0.0026)	0.0056* (0.0031)	0.0177*** (0.0054)
ΔNPL (-1)	-0.0833** (0.0371)	-0.0321 (0.0263)	-0.0136 (0.0246)	0.0005 (0.0247)	0.0479* (0.0248)	0.0917*** (0.0255)	0.1356*** (0.0282)	0.1740*** (0.0311)	0.1864*** (0.0306)	0.2220*** (0.0351)	0.2354*** (0.0450)
GDP	-0.1142*** (0.0418)	-0.1558*** (0.0246)	-0.1538*** (0.0209)	-0.1425*** (0.0209)	-0.1544*** (0.0193)	-0.1652*** (0.0211)	-0.1788*** (0.0263)	-0.1922*** (0.0349)	-0.2096*** (0.0370)	-0.2323*** (0.0369)	-0.2978*** (0.0609)
Inflation	0.0416 (0.0638)	-0.0017 (0.0339)	0.0183 (0.0311)	0.0205 (0.0290)	0.0395 (0.0252)	0.0330 (0.0248)	0.0400 (0.0298)	0.0729* (0.0407)	0.0724 (0.0442)	0.1041** (0.0496)	0.0612 (0.0754)
LAR (-1)	0.0176*** (0.0033)	0.0108*** (0.0017)	0.0086*** (0.0015)	0.0084*** (0.0014)	0.0064*** (0.0012)	0.0049*** (0.0012)	0.0025** (0.0012)	0.0016 (0.0015)	0.0017 (0.0017)	0.0000 (0.0023)	-0.0080** (0.0040)
SIZE (-1)	0.0019*** (0.0003)	0.0011*** (0.0002)	0.0008*** (0.0001)	0.0007*** (0.0001)	0.0004*** (0.0001)	0.0002*** (0.0001)	-0.0001 (0.0001)	-0.0003*** (0.0001)	-0.0004*** (0.0001)	-0.0006*** (0.0002)	-0.0013*** (0.0003)
Loans_growth (-1)	0.0046*** (0.0015)	0.0035*** (0.0012)	0.0037*** (0.0012)	0.0035*** (0.0013)	0.0026** (0.0013)	0.0018 (0.0017)	0.0013 (0.0018)	0.0020 (0.0019)	0.0014 (0.0020)	0.0013 (0.0021)	0.0078 (0.0047)
LDR (-1)	0.0004 (0.0006)	0.0009** (0.0004)	0.0008*** (0.0003)	0.0008*** (0.0002)	0.0009*** (0.0002)	0.0011*** (0.0002)	0.0012*** (0.0002)	0.0014*** (0.0004)	0.0014*** (0.0005)	0.0016 (0.0010)	0.0042* (0.0025)
ROA (-1)	-0.0839 (0.0687)	-0.1872*** (0.0718)	-0.2365*** (0.0616)	-0.2481*** (0.0640)	-0.2659*** (0.0604)	-0.2759*** (0.0581)	-0.2735*** (0.0578)	-0.3139*** (0.0736)	-0.3346*** (0.0787)	-0.4056*** (0.0843)	-0.5158*** (0.0864)
CR5 (-1)	-0.0242*** (0.0051)	-0.0094*** (0.0027)	-0.0056** (0.0025)	-0.0012 (0.0022)	0.0029* (0.0016)	0.0052*** (0.0015)	0.0087*** (0.0016)	0.0145*** (0.0021)	0.0188*** (0.0022)	0.0241*** (0.0028)	0.0398*** (0.0039)
Crisis	0.0015 (0.0014)	0.0011* (0.0007)	0.0011* (0.0006)	0.0016*** (0.0006)	0.0012*** (0.0005)	0.0013*** (0.0005)	0.0014*** (0.0005)	0.0018*** (0.0006)	0.0023*** (0.0006)	0.0026*** (0.0008)	0.0044*** (0.0014)
Diagnostics											
Nb. of observations	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055
Goodness of Fit	0.4295	0.3150	0.3129	0.3111	0.3074	0.3170	0.3509	0.4027	0.4273	0.4499	0.5474

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Table 17	Wald test for Lerner_KBL (PIVQRFE method)										
	Quantile										
Quantile	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
0.10		0.2059	0.0812*	0.0689*	0.0585*	0.0218**	0.0258**	0.0158**	0.0054***	0.0016***	0.0003***
0.20	0.2059		0.3594	0.3482	0.2987	0.1473	0.1659	0.0689*	0.0226**	0.0092***	0.0012***
0.25	0.0812*	0.3594		0.7083	0.5839	0.2733	0.3032	0.1213	0.0314**	0.0119**	0.0018***
0.30	0.0689*	0.3482	0.7083		0.6985	0.2965	0.3681	0.1483	0.0359**	0.0168**	0.0026***
0.40	0.0585*	0.2987	0.5839	0.6985		0.3197	0.4386	0.1670	0.0421**	0.0178**	0.0034***
0.50	0.0218**	0.1473	0.2733	0.2965	0.3197		0.8625	0.3102	0.0689*	0.0239**	0.0054***
0.60	0.0258**	0.1659	0.3032	0.3681	0.4386	0.8625		0.3009	0.0486**	0.0171**	0.0035***
0.70	0.0158**	0.0689*	0.1213	0.1483	0.1670	0.3102	0.3009		0.0902*	0.0355**	0.0056***
0.75	0.0054***	0.0226**	0.0314**	0.0359**	0.0421**	0.0689*	0.0486**	0.0902*		0.1512	0.0158**
0.80	0.0016***	0.0092***	0.0119**	0.0168**	0.0178**	0.0239**	0.0171**	0.0355**	0.1512		0.0902*
0.90	0.0003***	0.0012***	0.0018***	0.0026***	0.0034***	0.0054***	0.0035***	0.0056***	0.0158**	0.0902*	

Notes: The table contains p-values. Ho: equality of coefficients across different quantiles.
*, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.

Table 18	**Wald test for Lerner_KBL (PQRFE method)**										
	Quantile										
Quantile	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
0.10		0.1269	0.0309**	0.0633*	0.0221**	0.0351**	0.0226**	0.0028***	0.0026***	0.0002***	0.0000***
0.20	0.1269		0.3455	0.2435	0.1168	0.0769*	0.1124	0.0013***	0.0013***	0.0002***	0.0001***
0.25	0.0309**	0.3455		1.0000	0.1110	0.2524	0.3681	0.0329**	0.0014***	0.0005***	0.0001***
0.30	0.0633*	0.2435	1.0000		0.0331**	0.1821	0.2367	0.0057***	0.0011***	0.0003***	0.0000***
0.40	0.0221**	0.1168	0.1110	0.0331**		0.9203	0.8231	0.0606*	0.0118**	0.0008***	0.0001***
0.50	0.0351**	0.0769*	0.2524	0.1821	0.9203		0.8415	0.0386**	0.0083***	0.0015***	0.0002***
0.60	0.0226**	0.1124	0.3681	0.2367	0.8231	0.8415		0.0027***	0.0002***	0.0006***	0.0001***
0.70	0.0028***	0.0013***	0.0329**	0.0057***	0.0606*	0.0386**	0.0027***		0.0000***	0.0000***	0.0017***
0.75	0.0026***	0.0013***	0.0014***	0.0011***	0.0118**	0.0083***	0.0002***	0.0000***		0.0060***	0.0008***
0.80	0.0002***	0.0002***	0.0005***	0.0003***	0.0008***	0.0015***	0.0006***	0.0000***	0.0060***		0.0078***
0.90	0.0000***	0.0001***	0.0001***	0.0000***	0.0001***	0.0002***	0.0001***	0.0017***	0.0008***	0.0078***	

Notes: The table contains p-values. Ho: equality of coefficients across different quantiles.
*, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.

Table 19	Wald test for CR5 (PIVQRFE method)										
	Quantile										
Quantile	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
0.10		0.0036***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
0.20	0.0036***		0.0307**	0.0002***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
0.25	0.0000***	0.0307**		0.0029***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
0.30	0.0000***	0.0002***	0.0029***		0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
0.40	0.0000***	0.0000***	0.0000***	0.0000***		0.0267**	0.0053***	0.0000***	0.0000***	0.0000***	0.0000***
0.50	0.0000***	0.0000***	0.0000***	0.0000***	0.0267**		0.0807*	0.0000***	0.0000***	0.0000***	0.0000***
0.60	0.0000***	0.0000***	0.0000***	0.0000***	0.0053***	0.0807*		0.0001***	0.0000***	0.0000***	0.0000***
0.70	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0001***		0.0106**	0.0003***	0.0000***
0.75	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0106**		0.0331**	0.0027***
0.80	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0003***	0.0331**		0.0660*
0.90	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0027***	0.0660*	

Notes: The table contains p-values. Ho: equality of coefficients across different quantiles.
*, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.

Table 20	Wald test for CR5 (PQRFE method)										
	Quantile										
Quantile	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
0.10		0.0018***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
0.20	0.0018***		0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
0.25	0.0000***	0.0000***		0.0032***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
0.30	0.0000***	0.0000***	0.0032***		0.0053***	0.0018***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
0.40	0.0000***	0.0000***	0.0000***	0.0053***		0.0447**	0.0002***	0.0000***	0.0000***	0.0000***	0.0000***
0.50	0.0000***	0.0000***	0.0000***	0.0018***	0.0447**		0.0011***	0.0000***	0.0000***	0.0000***	0.0000***
0.60	0.0000***	0.0000***	0.0000***	0.0000***	0.0002***	0.0011***		0.0000***	0.0000***	0.0000***	0.0000***
0.70	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***		0.0012***	0.0000***	0.0000***
0.75	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0012***		0.0019***	0.0000***
0.80	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0019***		0.0000***
0.90	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	

Notes: The table contains p-values. Ho: equality of coefficients across different quantiles.
*, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.

Table 21	Interaction between the Periphery dummy and HHI (PIVQRFE method)								Dependent Variable: ΔNPL		
	Quantile										
Variable	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0339*** (0.0028)	-0.0215*** (0.0020)	-0.0180*** (0.0018)	-0.0156*** (0.0017)	-0.0099*** (0.0019)	-0.0069*** (0.0018)	-0.0033 (0.0021)	0.0039* (0.0022)	0.0071*** (0.0023)	0.0080*** (0.0025)	0.0181*** (0.0030)
ΔNPL (-1)	-0.0200** (0.0503)	0.0000** (0.0375)	0.0100** (0.0368)	0.0300** (0.0405)	0.0600 (0.0419)	0.0700 (0.0443)	0.1100 (0.0527)	0.1700** (0.0481)	0.2000** (0.0492)	0.2000** (0.0548)	0.2500** (0.0714)
GDP	-0.1785*** (0.0299)	-0.1502*** (0.0262)	-0.1488*** (0.0269)	-0.1383*** (0.0218)	-0.1405*** (0.0189)	-0.1410*** (0.0179)	-0.1323*** (0.0242)	-0.1459*** (0.0381)	-0.1622*** (0.0476)	-0.1820*** (0.0501)	-0.2435*** (0.0635)
Inflation	0.1751*** (0.0384)	0.0788*** (0.0286)	0.0655** (0.0271)	0.0543* (0.0294)	0.0527** (0.0223)	0.0370 (0.0273)	0.0175 (0.0294)	0.0040 (0.0334)	0.0142 (0.0315)	0.0221 (0.0348)	0.0289 (0.0488)
LAR (-1)	0.0121*** (0.0018)	0.0087*** (0.0013)	0.0083*** (0.0012)	0.0069*** (0.0011)	0.0069*** (0.0013)	0.0060*** (0.0014)	0.0043*** (0.0013)	0.0013 (0.0013)	0.0013 (0.0015)	0.0002 (0.0016)	0.0011 (0.0017)
SIZE (-1)	0.0016*** (0.0001)	0.0009*** (0.0001)	0.0007*** (0.0001)	0.0006*** (0.0001)	0.0002** (0.0001)	0.0001 (0.0001)	0.0000 (0.0001)	-0.0003** (0.0001)	-0.0005*** (0.0001)	-0.0004*** (0.0001)	-0.0010*** (0.0002)
Loans_growth (-1)	0.0024** (0.0011)	0.0017 (0.0015)	0.0019 (0.0019)	0.0011 (0.0015)	0.0006 (0.0017)	0.0003 (0.0018)	0.0001 (0.0021)	0.0002 (0.0020)	-0.0006 (0.0024)	0.0014 (0.0025)	0.0001 (0.0030)
LDR (-1)	-0.0002 (0.0006)	0.0003 (0.0003)	0.0005 (0.0003)	0.0008*** (0.0003)	0.0009*** (0.0003)	0.0007** (0.0003)	0.0009*** (0.0003)	0.0006** (0.0003)	0.0006** (0.0003)	0.0005* (0.0003)	0.0006* (0.0003)
ROA (-1)	0.0913 (0.0855)	-0.0651 (0.0780)	-0.1220 (0.0813)	-0.1933** (0.0766)	-0.2169*** (0.0820)	-0.1842** (0.0776)	-0.2015*** (0.0749)	-0.1270 (0.0906)	-0.1532 (0.1107)	-0.2234* (0.1192)	-0.2673* (0.1589)
HHI (-1)	-0.1349*** (0.0242)	-0.0640*** (0.0129)	-0.0423*** (0.0136)	-0.0334** (0.0141)	0.0044 (0.0113)	0.0188* (0.0112)	0.0430*** (0.0109)	0.0418*** (0.0124)	0.0521*** (0.0133)	0.0666*** (0.0171)	0.0974*** (0.0256)
Periphery	-0.0019 (0.0021)	0.0056*** (0.0016)	0.0069*** (0.0017)	0.0070*** (0.0017)	0.0097*** (0.0015)	0.0117*** (0.0014)	0.0134*** (0.0020)	0.0161*** (0.0020)	0.0179*** (0.0027)	0.0199*** (0.0028)	0.0260*** (0.0033)
Periphery **x** HHI (-1)	0.0198 (0.0319)	-0.0773*** (0.0257)	-0.0898*** (0.0279)	-0.0676** (0.0278)	-0.0876*** (0.0211)	-0.1026*** (0.0205)	-0.1215*** (0.0242)	-0.1250*** (0.0258)	-0.1265*** (0.0322)	-0.1340*** (0.0313)	-0.1849*** (0.0447)
Crisis	0.0007 (0.0008)	0.0014* (0.0008)	0.0012* (0.0007)	0.0015** (0.0007)	0.0012** (0.0005)	0.0011** (0.0004)	0.0010* (0.0005)	0.0013* (0.0007)	0.0016** (0.0007)	0.0017** (0.0008)	0.0030*** (0.0009)
Diagnostics											
Nb. of observations	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055
Goodness of Fit	0.4573	0.3565	0.3299	0.3209	0.3275	0.3370	0.3619	0.3854	0.4070	0.4408	0.5455

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values and **x** denotes interaction. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Table 22	Interaction between the Periphery dummy and HHI (PQRFE method)									Dependent Variable: ΔNPL
	Quantile										
Variable	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0373*** (0.0030)	-0.0257*** (0.0022)	-0.0204*** (0.0019)	-0.0172*** (0.0017)	-0.0124*** (0.0020)	-0.0100*** (0.0018)	-0.0045** (0.0018)	0.0007 (0.0020)	0.0018 (0.0021)	0.0034* (0.0018)	0.0113*** (0.0030)
ΔNPL (-1)	-0.0410 (0.0339)	-0.0182 (0.0271)	-0.0172 (0.0255)	-0.0070 (0.0275)	0.0140 (0.0245)	0.0509** (0.0246)	0.0862*** (0.0272)	0.1011*** (0.0282)	0.1039*** (0.0320)	0.1243*** (0.0332)	0.1696*** (0.0420)
GDP	-0.1709*** (0.0270)	-0.1352*** (0.0219)	-0.1408*** (0.0219)	-0.1364*** (0.0204)	-0.1366*** (0.0200)	-0.1394*** (0.0193)	-0.1231*** (0.0227)	-0.1303*** (0.0298)	-0.1421*** (0.0354)	-0.1482*** (0.0421)	-0.1835*** (0.0590)
Inflation	0.1052*** (0.0402)	0.0372 (0.0307)	0.0408 (0.0277)	0.0307 (0.0252)	0.0319 (0.0237)	0.0264 (0.0240)	0.0003 (0.0283)	-0.0062 (0.0318)	0.0021 (0.0359)	0.0078 (0.0341)	-0.0165 (0.0411)
LAR (-1)	0.0182*** (0.0023)	0.0108*** (0.0015)	0.0089*** (0.0014)	0.0087*** (0.0012)	0.0084*** (0.0012)	0.0074*** (0.0012)	0.0049*** (0.0013)	0.0031** (0.0015)	0.0035** (0.0015)	0.0041*** (0.0015)	0.0025 (0.0018)
SIZE (-1)	0.0015*** (0.0002)	0.0010*** (0.0001)	0.0008*** (0.0001)	0.0006*** (0.0001)	0.0003** (0.0001)	0.0002* (0.0001)	0.0000 (0.0001)	-0.0002** (0.0001)	-0.0003*** (0.0001)	-0.0004*** (0.0001)	-0.0009*** (0.0002)
Loans_growth (-1)	0.0041*** (0.0011)	0.0026** (0.0012)	0.0023** (0.0011)	0.0024** (0.0011)	0.0015 (0.0014)	0.0024 (0.0015)	0.0012 (0.0014)	0.0012 (0.0020)	0.0021 (0.0021)	0.0027 (0.0021)	0.0031 (0.0023)
LDR (-1)	-0.0008* (0.0005)	0.0006* (0.0003)	0.0008*** (0.0003)	0.0008*** (0.0003)	0.0011*** (0.0002)	0.0012*** (0.0002)	0.0010*** (0.0003)	0.0010*** (0.0003)	0.0010** (0.0004)	0.0009** (0.0004)	0.0011** (0.0005)
ROA (-1)	0.0136 (0.0790)	-0.1289* (0.0662)	-0.1786*** (0.0665)	-0.2421*** (0.0692)	-0.2686*** (0.0690)	-0.2720*** (0.0691)	-0.2637*** (0.0672)	-0.2933*** (0.0808)	-0.3310*** (0.0952)	-0.4016*** (0.0935)	-0.4214*** (0.1136)
HHI (-1)	-0.0812*** (0.0207)	-0.0358*** (0.0118)	-0.0285* (0.0157)	-0.0003 (0.0143)	0.0151* (0.0082)	0.0256*** (0.0082)	0.0365*** (0.0098)	0.0593*** (0.0119)	0.0805*** (0.0144)	0.0936*** (0.0157)	0.1747*** (0.0318)
Periphery	-0.0013 (0.0020)	0.0059*** (0.0018)	0.0064*** (0.0015)	0.0080*** (0.0015)	0.0096*** (0.0017)	0.0105*** (0.0014)	0.0127*** (0.0017)	0.0166*** (0.0020)	0.0180*** (0.0022)	0.0213*** (0.0030)	0.0313*** (0.0034)
Periphery **x** HHI (-1)	0.0020 (0.0318)	-0.0716** (0.0279)	-0.0615** (0.0240)	-0.0716*** (0.0228)	-0.0717*** (0.0203)	-0.0765*** (0.0176)	-0.0906*** (0.0201)	-0.1232*** (0.0250)	-0.1413*** (0.0276)	-0.1592*** (0.0353)	-0.2678*** (0.0494)
Crisis	0.0013** (0.0006)	0.0010** (0.0005)	0.0009** (0.0004)	0.0010** (0.0004)	0.0009*** (0.0003)	0.0009** (0.0005)	0.0015*** (0.0004)	0.0019*** (0.0005)	0.0021*** (0.0006)	0.0023*** (0.0005)	0.0030*** (0.0006)
Diagnostics											
Nb. of observations	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055
Goodness of fit	0.4284	0.3170	0.3166	0.3155	0.3118	0.3216	0.3548	0.4063	0.4301	0.4507	0.5481

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values and **x** denotes interaction. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Table 23	**Interaction between Foreign share and Lerner_KBL (PIVQRFE method)**								Dependent Variable: ΔNPL		
	Quantile										
Variable	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0457*** (0.0031)	-0.0260*** (0.0025)	-0.0201*** (0.0022)	-0.0156*** (0.0018)	-0.0083*** (0.0018)	-0.0054*** (0.0015)	-0.0014 (0.0021)	0.0071*** (0.0018)	0.0094*** (0.0020)	0.0162*** (0.0026)	0.0345*** (0.0035)
ΔNPL (-1)	-0.0400*** (0.0552)	0.0100*** (0.0440)	0.0200** (0.0437)	0.0500*** (0.0438)	0.0600*** (0.0446)	0.0800*** (0.0475)	0.0800*** (0.0463)	0.0900*** (0.0528)	0.1200*** (0.0606)	0.1500*** (0.0656)	0.2400*** (0.0607)
GDP	-0.1986*** (0.0244)	-0.1513*** (0.0239)	-0.1628*** (0.0243)	-0.1683*** (0.0215)	-0.1640*** (0.0191)	-0.1668*** (0.0197)	-0.1976*** (0.0261)	-0.2330*** (0.0336)	-0.2582*** (0.0406)	-0.2942*** (0.0449)	-0.3410*** (0.0580)
Inflation	0.1421*** (0.0457)	0.0518 (0.0394)	0.0498 (0.0357)	0.0522 (0.0344)	0.0651* (0.0365)	0.0571* (0.0347)	0.0263 (0.0317)	0.0228 (0.0445)	0.0364 (0.0445)	0.0476 (0.0510)	0.1119* (0.0587)
LAR (-1)	0.0179*** (0.0017)	0.0125*** (0.0016)	0.0100*** (0.0013)	0.0078*** (0.0012)	0.0057*** (0.0012)	0.0046*** (0.0011)	0.0030** (0.0014)	0.0022 (0.0014)	0.0022 (0.0013)	-0.0001 (0.0018)	-0.0033 (0.0028)
SIZE (-1)	0.0017*** (0.0002)	0.0009*** (0.0001)	0.0007*** (0.0001)	0.0005*** (0.0001)	0.0002* (0.0001)	0.0002 (0.0001)	0.0001 (0.0001)	-0.0003*** (0.0001)	-0.0003*** (0.0001)	-0.0006*** (0.0001)	-0.0014*** (0.0002)
Loans_growth (-1)	0.0040* (0.0024)	0.0028 (0.0021)	0.0027 (0.0020)	0.0020 (0.0018)	0.0013 (0.0020)	0.0010 (0.0018)	0.0001 (0.0019)	-0.0014 (0.0020)	-0.0018 (0.0021)	-0.0020 (0.0024)	-0.0025 (0.0032)
LDR (-1)	0.0002 (0.0006)	0.0005* (0.0003)	0.0007* (0.0003)	0.0008** (0.0003)	0.0010*** (0.0003)	0.0011*** (0.0003)	0.0009*** (0.0003)	0.0007* (0.0004)	0.0005 (0.0004)	0.0006 (0.0004)	0.0008 (0.0009)
ROA (-1)	0.0608 (0.0983)	-0.1441 (0.0940)	-0.1648* (0.0952)	-0.1610* (0.0948)	-0.1920** (0.0949)	-0.2150** (0.0848)	-0.2128** (0.0885)	-0.2670*** (0.0937)	-0.2645*** (0.0979)	-0.2725*** (0.1010)	-0.2384* (0.1243)
Lerner_KBL (-1)	-0.0108** (0.0055)	-0.0005 (0.0047)	-0.0008 (0.0045)	0.0008 (0.0038)	0.0059* (0.0035)	0.0070** (0.0029)	0.0087** (0.0035)	0.0167*** (0.0045)	0.0197*** (0.0041)	0.0202*** (0.0052)	0.0368*** (0.0059)
Foreign (-1)	-0.0085 (0.0292)	-0.0079 (0.0249)	-0.0124 (0.0235)	-0.0103 (0.0219)	-0.0120 (0.0191)	-0.0234 (0.0158)	-0.0315* (0.0180)	-0.0305* (0.0179)	-0.0345* (0.0187)	-0.0364* (0.0218)	-0.0958*** (0.0327)
Foreign (-1) **x** Lerner_KBL (-1)	-0.0521 (0.2438)	-0.3935* (0.2161)	-0.4250* (0.2226)	-0.3779* (0.2266)	-0.3069 (0.2098)	-0.2043 (0.2212)	-0.3783 (0.2858)	-0.4657* (0.2672)	-0.6750** (0.2883)	-0.7680*** (0.2797)	-1.2944*** (0.3720)
Crisis	0.0002 (0.0008)	0.0014* (0.0007)	0.0015** (0.0007)	0.0015** (0.0006)	0.0012** (0.0005)	0.0010** (0.0005)	0.0010 (0.0006)	0.0016** (0.0008)	0.0018** (0.0008)	0.0022** (0.0010)	0.0027** (0.0013)
Diagnostics											
Nb. of observations	2,352	2,352	2,352	2,352	2,352	2,352	2,352	2,352	2,352	2,352	2,352
Goodness of fit	0.4646	0.3638	0.3363	0.3272	0.3358	0.3457	0.3792	0.4146	0.4367	0.4684	0.5577

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values and **x** denotes interaction. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Table 24	**Interaction between Foreign share and Lerner_KBL (PQRFE method)**								Dependent Variable: ΔNPL		
Variable	Quantile										
	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0478*** (0.0028)	-0.0263*** (0.0025)	-0.0203*** (0.0018)	-0.0157*** (0.0018)	-0.0085*** (0.0018)	-0.0061*** (0.0017)	-0.0016 (0.0018)	0.0058*** (0.0018)	0.0082*** (0.0024)	0.0149*** (0.0025)	0.0365*** (0.0039)
ΔNPL (-1)	-0.0544 (0.0402)	-0.0133 (0.0296)	-0.0029 (0.0293)	0.0131 (0.0324)	0.0228 (0.0327)	0.0647** (0.0329)	0.0540* (0.0314)	0.0634* (0.0329)	0.0755** (0.0380)	0.1020** (0.0413)	0.1937*** (0.0387)
GDP	-0.1932*** (0.0221)	-0.1531*** (0.0261)	-0.1592*** (0.0251)	-0.1697*** (0.0263)	-0.1633*** (0.0204)	-0.1658*** (0.0201)	-0.1978*** (0.0301)	-0.2399*** (0.0336)	-0.2658*** (0.0390)	-0.2780*** (0.0441)	-0.3993*** (0.0657)
Inflation	0.1352*** (0.0426)	0.0473 (0.0390)	0.0445 (0.0378)	0.0568* (0.0334)	0.0630** (0.0312)	0.0581* (0.0308)	0.0401 (0.0322)	0.0137 (0.0411)	0.0253 (0.0422)	0.0500 (0.0489)	0.0819 (0.0674)
LAR (-1)	0.0187*** (0.0018)	0.0128*** (0.0015)	0.0104*** (0.0014)	0.0080*** (0.0011)	0.0057*** (0.0012)	0.0049*** (0.0012)	0.0028** (0.0013)	0.0026* (0.0015)	0.0028 (0.0018)	0.0003 (0.0019)	-0.0030 (0.0028)
SIZE (-1)	0.0018*** (0.0002)	0.0009*** (0.0001)	0.0007*** (0.0001)	0.0005*** (0.0001)	0.0002* (0.0001)	0.0002* (0.0001)	0.0001 (0.0001)	-0.0002** (0.0001)	-0.0003** (0.0001)	-0.0005*** (0.0001)	-0.0015*** (0.0002)
Loans_growth (-1)	0.0033 (0.0029)	0.0026 (0.0025)	0.0026 (0.0020)	0.0017 (0.0022)	0.0012 (0.0016)	0.0009 (0.0015)	-0.0001 (0.0018)	-0.0009 (0.0016)	-0.0012 (0.0016)	-0.0015 (0.0017)	-0.0033 (0.0025)
LDR (-1)	0.0000 (0.0006)	0.0005 (0.0003)	0.0006* (0.0003)	0.0008*** (0.0003)	0.0011*** (0.0003)	0.0011*** (0.0003)	0.0008*** (0.0003)	0.0007* (0.0004)	0.0005 (0.0004)	0.0004 (0.0005)	0.0011 (0.0011)
ROA (-1)	0.0982 (0.1217)	-0.1254 (0.0992)	-0.1768* (0.0992)	-0.1934* (0.1004)	-0.2107** (0.0961)	-0.2352*** (0.0848)	-0.2470** (0.0960)	-0.3030*** (0.0860)	-0.3393*** (0.0900)	-0.3883*** (0.0888)	-0.3637*** (0.1028)
Lerner_KBL (-1)	-0.0127** (0.0050)	-0.0011 (0.0049)	0.0005 (0.0044)	0.0023 (0.0041)	0.0051 (0.0035)	0.0076** (0.0033)	0.0093** (0.0042)	0.0178*** (0.0041)	0.0230*** (0.0048)	0.0240*** (0.0052)	0.0419*** (0.0066)
Foreign (-1)	-0.0060 (0.0239)	-0.0134 (0.0248)	-0.0103 (0.0225)	-0.0097 (0.0215)	-0.0093 (0.0191)	-0.0204 (0.0173)	-0.0326* (0.0184)	-0.0316* (0.0184)	-0.0335* (0.0197)	-0.0400* (0.0208)	-0.0636** (0.0248)
Foreign (-1) **x** Lerner_KBL (-1)	-0.5568*** (0.1687)	-0.4691** (0.2024)	-0.4252* (0.2189)	-0.3745* (0.2245)	-0.2969 (0.2179)	-0.2024 (0.2082)	-0.3421 (0.2550)	-0.5585** (0.2738)	-0.7277** (0.2849)	-0.7792*** (0.2722)	-1.3305*** (0.4302)
Crisis	0.0005 (0.0009)	0.0014** (0.0007)	0.0015** (0.0007)	0.0016** (0.0007)	0.0015*** (0.0005)	0.0011** (0.0005)	0.0011* (0.0006)	0.0017** (0.0009)	0.0020** (0.0009)	0.0022** (0.0010)	0.0044*** (0.0014)
Diagnostics											
Nb. of observations	2,352	2,352	2,352	2,352	2,352	2,352	2,352	2,352	2,352	2,352	2,352
Goodness of fit	0.5623	0.4771	0.4544	0.4502	0.4575	0.4678	0.4952	0.5255	0.5495	0.5795	0.6647

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values and **x** denotes interaction. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Table 25	**Interaction between the Commercial dummy and Lerner_KBL (PIVQRFE method)**								Dependent Variable: ΔNPL		
	Quantile										
Variable	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0491*** (0.0032)	-0.0303*** (0.0025)	-0.0234*** (0.0024)	-0.0177*** (0.0022)	-0.0124*** (0.0017)	-0.0072*** (0.0015)	-0.0042** (0.0018)	0.0044** (0.0021)	0.0089*** (0.0021)	0.0141*** (0.0027)	0.0336*** (0.0036)
ΔNPL (-1)	-0.0600*** (0.0517)	-0.0100*** (0.0414)	0.0100*** (0.0385)	0.0100*** (0.0375)	0.0300*** (0.0407)	0.0600*** (0.0423)	0.0800*** (0.0526)	0.1300*** (0.0537)	0.1700*** (0.0601)	0.1900*** (0.0593)	0.2600*** (0.0664)
GDP	-0.1962*** (0.0230)	-0.1450*** (0.0248)	-0.1618*** (0.0239)	-0.1622*** (0.0234)	-0.1555*** (0.0210)	-0.1582*** (0.0199)	-0.1656*** (0.0251)	-0.2007*** (0.0332)	-0.2082*** (0.0382)	-0.2304*** (0.0379)	-0.2757*** (0.0637)
Inflation	0.1243*** (0.0333)	0.0457 (0.0315)	0.0607** (0.0280)	0.0560** (0.0269)	0.0565* (0.0290)	0.0562** (0.0283)	0.0626** (0.0288)	0.0559 (0.0366)	0.0686* (0.0363)	0.0745** (0.0330)	0.0585 (0.0435)
LAR (-1)	0.0179*** (0.0022)	0.0116*** (0.0014)	0.0096*** (0.0013)	0.0082*** (0.0015)	0.0074*** (0.0012)	0.0045*** (0.0012)	0.0039*** (0.0012)	0.0025 (0.0015)	0.0013 (0.0014)	0.0000 (0.0015)	0.0002 (0.0026)
SIZE (-1)	0.0020*** (0.0002)	0.0011*** (0.0001)	0.0008*** (0.0001)	0.0005*** (0.0001)	0.0003*** (0.0001)	0.0002** (0.0001)	0.0000 (0.0001)	-0.0003*** (0.0001)	-0.0006*** (0.0001)	-0.0008*** (0.0001)	-0.0021*** (0.0002)
Loans_growth (-1)	-0.0002 (0.0017)	0.0021 (0.0016)	0.0018 (0.0016)	0.0018 (0.0017)	0.0008 (0.0015)	-0.0001 (0.0013)	-0.0009 (0.0017)	-0.0013 (0.0018)	-0.0021 (0.0017)	-0.0027 (0.0021)	-0.0045 (0.0028)
LDR (-1)	0.0001 (0.0006)	0.0009*** (0.0003)	0.0009*** (0.0003)	0.0009*** (0.0003)	0.0008*** (0.0003)	0.0012*** (0.0003)	0.0011*** (0.0003)	0.0004 (0.0004)	0.0005* (0.0003)	0.0006** (0.0003)	0.0007 (0.0005)
ROA (-1)	0.0186 (0.1060)	-0.0456 (0.0908)	-0.1309 (0.0883)	-0.2103** (0.0828)	-0.2323*** (0.0876)	-0.2269*** (0.0758)	-0.2524*** (0.0864)	-0.1515 (0.0959)	-0.2217** (0.1121)	-0.2338** (0.1119)	-0.4351*** (0.1451)
Lerner_KBL (-1)	0.0073 (0.0065)	0.0101** (0.0048)	0.0132** (0.0052)	0.0120** (0.0052)	0.0137*** (0.0040)	0.0098** (0.0042)	0.0174*** (0.0059)	0.0146** (0.0057)	0.0186*** (0.0054)	0.0234*** (0.0063)	0.0499*** (0.0117)
Commercial	-0.0039** (0.0016)	-0.0008 (0.0016)	0.0006 (0.0015)	0.0013 (0.0014)	0.0029** (0.0012)	0.0022* (0.0013)	0.0056*** (0.0016)	0.0077*** (0.0020)	0.0093*** (0.0018)	0.0096*** (0.0021)	0.0163*** (0.0028)
Commercial **x** Lerner_KBL (-1)	-0.0073 (0.0083)	-0.0109 (0.0080)	-0.0141* (0.0084)	-0.0110 (0.0080)	-0.0139** (0.0059)	-0.0068 (0.0059)	-0.0195** (0.0076)	-0.0210** (0.0095)	-0.0214** (0.0091)	-0.0246** (0.0100)	-0.0401*** (0.0146)
Crisis	0.0014* (0.0008)	0.0016** (0.0007)	0.0015** (0.0006)	0.0016*** (0.0005)	0.0013** (0.0005)	0.0011** (0.0005)	0.0009* (0.0005)	0.0009 (0.0007)	0.0014* (0.0008)	0.0020*** (0.0007)	0.0033*** (0.0010)
Diagnostics											
Nb. of observations	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055
Goodness of fit	0.4613	0.3549	0.3338	0.3206	0.3280	0.3353	0.3648	0.3905	0.4068	0.4421	0.5345

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values and **x** denotes interaction. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Table 26	Interaction between the Commercial dummy and Lerner_KBL (PQRFE method)									Dependent Variable: ΔNPL
	Quantile										
Variable	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.70	0.75	0.80	0.90
Intercept	-0.0471*** (0.0026)	-0.0321*** (0.0031)	-0.0248*** (0.0024)	-0.0193*** (0.0022)	-0.0117*** (0.0019)	-0.0060*** (0.0017)	-0.0003 (0.0017)	0.0064*** (0.0021)	0.0101*** (0.0028)	0.0140*** (0.0026)	0.0302*** (0.0037)
ΔNPL (-1)	-0.0730** (0.0351)	-0.0277 (0.0320)	-0.0076 (0.0276)	-0.0006 (0.0263)	0.0182 (0.0218)	0.0562* (0.0291)	0.0784*** (0.0266)	0.1209*** (0.0304)	0.1375*** (0.0333)	0.1553*** (0.0386)	0.2338*** (0.0364)
GDP	-0.1777*** (0.0209)	-0.1518*** (0.0208)	-0.1617*** (0.0214)	-0.1530*** (0.0183)	-0.1510*** (0.0166)	-0.1488*** (0.0183)	-0.1470*** (0.0204)	-0.1674*** (0.0317)	-0.1879*** (0.0367)	-0.1886*** (0.0345)	-0.2572*** (0.0547)
Inflation	0.0980*** (0.0348)	0.0503* (0.0274)	0.0530* (0.0271)	0.0454* (0.0240)	0.0440** (0.0197)	0.0435 (0.0267)	0.0278 (0.0294)	0.0466 (0.0358)	0.0464 (0.0326)	0.0278 (0.0294)	0.0121 (0.0399)
LAR (-1)	0.0200*** (0.0019)	0.0132*** (0.0017)	0.0117*** (0.0015)	0.0105*** (0.0015)	0.0082*** (0.0013)	0.0069*** (0.0014)	0.0038*** (0.0013)	0.0030* (0.0016)	0.0033** (0.0015)	0.0029* (0.0018)	0.0011 (0.0027)
SIZE (-1)	0.0018*** (0.0002)	0.0011*** (0.0001)	0.0008*** (0.0001)	0.0005*** (0.0001)	0.0002* (0.0001)	0.0000 (0.0001)	-0.0002** (0.0001)	-0.0006*** (0.0001)	-0.0008*** (0.0001)	-0.0010*** (0.0001)	-0.0019*** (0.0002)
Loans_growth (-1)	0.0042*** (0.0013)	0.0026** (0.0011)	0.0028** (0.0012)	0.0026** (0.0012)	0.0019 (0.0013)	0.0009 (0.0015)	0.0007 (0.0019)	0.0002 (0.0020)	0.0000 (0.0022)	0.0004 (0.0025)	-0.0012 (0.0031)
LDR (-1)	-0.0006 (0.0004)	0.0010*** (0.0004)	0.0007*** (0.0003)	0.0008*** (0.0003)	0.0012*** (0.0003)	0.0012*** (0.0002)	0.0011*** (0.0003)	0.0011*** (0.0004)	0.0010*** (0.0004)	0.0009* (0.0005)	0.0011 (0.0008)
ROA (-1)	0.0111 (0.0802)	-0.1230 (0.0755)	-0.2329*** (0.0727)	-0.2379*** (0.0787)	-0.2530*** (0.0643)	-0.2764*** (0.0776)	-0.2925*** (0.0738)	-0.3335*** (0.0978)	-0.3201*** (0.0868)	-0.3152*** (0.0814)	-0.5667*** (0.1100)
Lerner_KBL (-1)	-0.0040 (0.0050)	0.0137** (0.0058)	0.0119*** (0.0045)	0.0109** (0.0044)	0.0098** (0.0042)	0.0065* (0.0038)	0.0095** (0.0041)	0.0153*** (0.0056)	0.0172*** (0.0057)	0.0190*** (0.0069)	0.0412*** (0.0089)
Commercial	-0.0033** (0.0013)	0.0016 (0.0013)	0.0015 (0.0013)	0.0030** (0.0012)	0.0037*** (0.0011)	0.0048*** (0.0012)	0.0054*** (0.0013)	0.0074*** (0.0019)	0.0092*** (0.0020)	0.0116*** (0.0020)	0.0184*** (0.0025)
Commercial **x** Lerner_KBL (-1)	0.0017 (0.0067)	-0.0162** (0.0071)	-0.0112 (0.0071)	-0.0116* (0.0069)	-0.0117** (0.0059)	-0.0101* (0.0057)	-0.0115* (0.0064)	-0.0138 (0.0090)	-0.0191** (0.0096)	-0.0247** (0.0106)	-0.0362*** (0.0135)
Crisis	0.0022*** (0.0006)	0.0012*** (0.0005)	0.0011** (0.0004)	0.0010*** (0.0004)	0.0009** (0.0004)	0.0008* (0.0005)	0.0012*** (0.0004)	0.0016*** (0.0005)	0.0018*** (0.0006)	0.0022*** (0.0006)	0.0026*** (0,0006)
Diagnostics											
Nb. of observations	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055	3,055
Goodness of fit	0.4304	0.3153	0.3144	0.3133	0.3080	0.3178	0.3506	0.4006	0.4250	0.4472	0.5445

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are reported in parentheses. (-1) denotes previous year's values and **x** denotes interaction. Goodness of Fit for a particular quantile is calculated as in Koenker and Machado (1999).

Figures

Figure 1: ΔNPL distribution

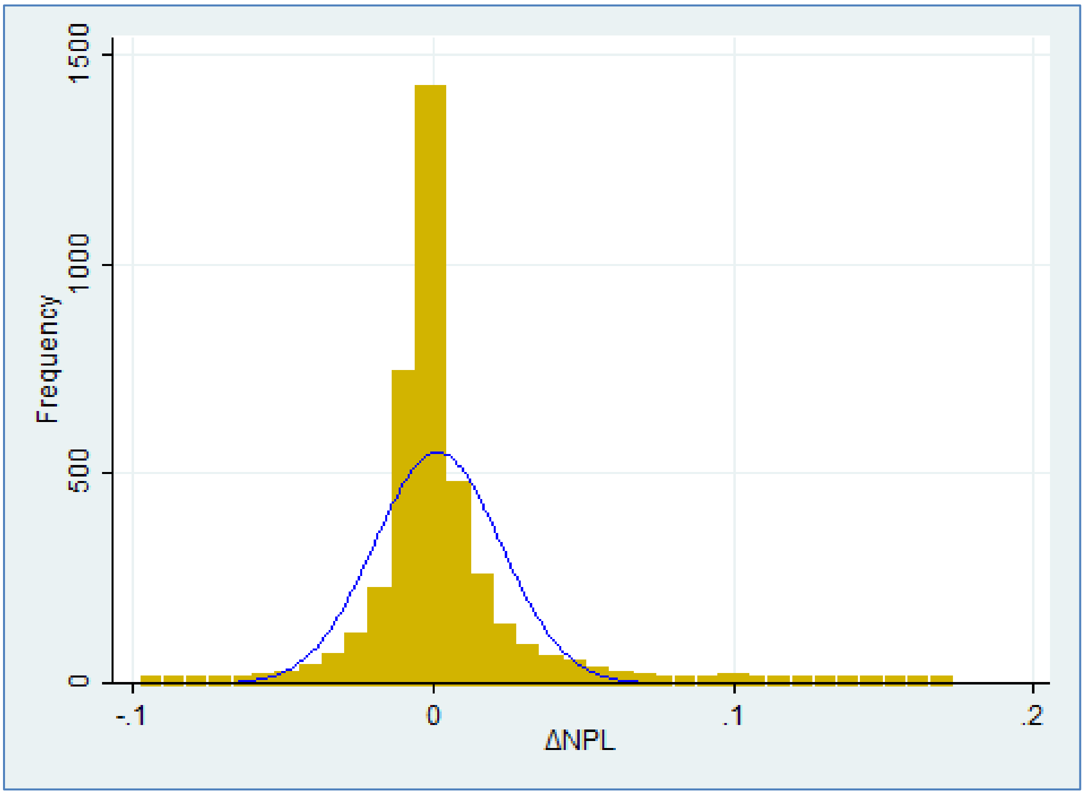


Figure 2: Impact of competition and concentration on ΔNPL (PIVQRFE method)

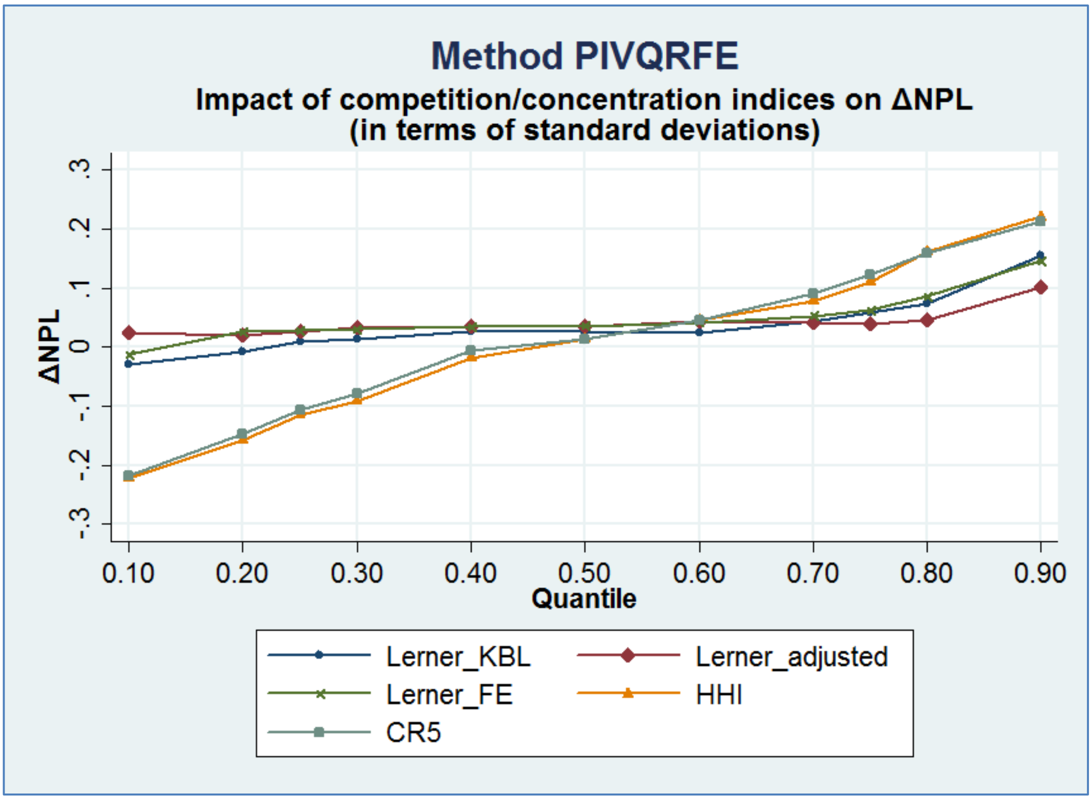
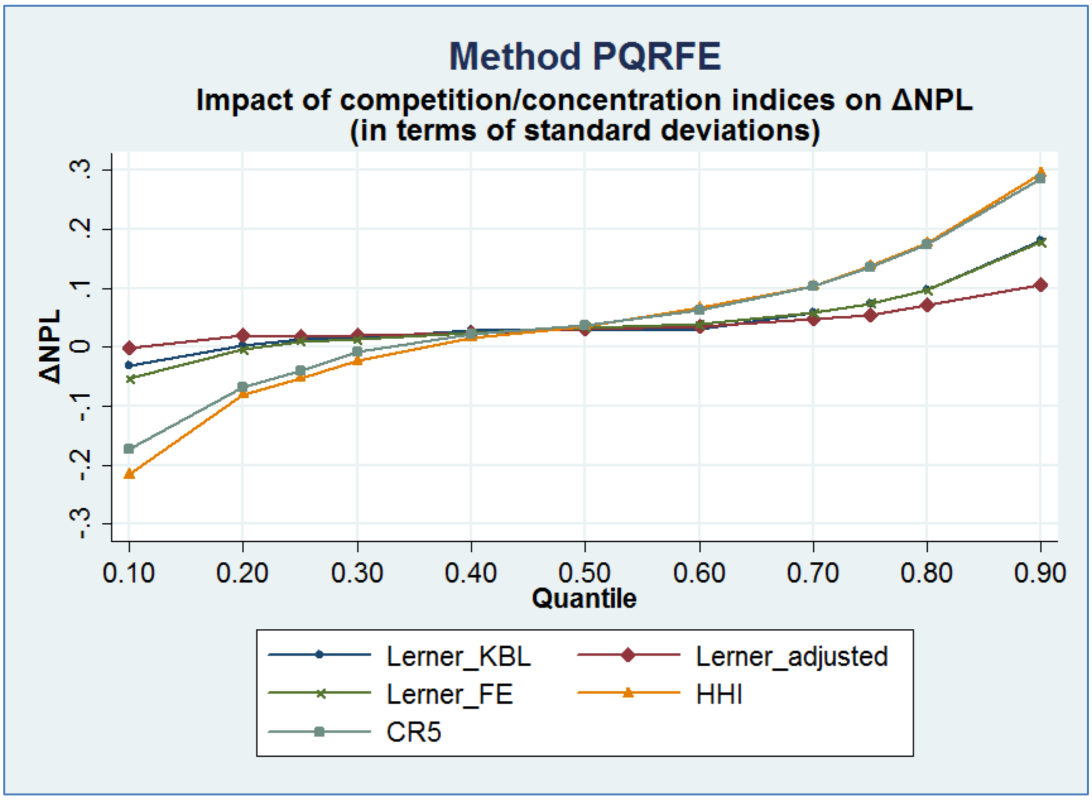


Figure 3: Impact of competition and concentration on ΔNPL (PQRFE method)



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