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ABSTRACT

This paper re-examines the determinants of Net Interest Margin (NIM) in the banking industries of 15 developed and emerging economies. It presents three main contributions with respect to previous studies: first, we analyze the determinants of NIM in the years leading to the 2008 financial crisis; second, we account for the role of different accounting standards across countries; third, we use multi-way cluster estimation methodologies which control for cross-sectional and time-series dependence in macroeconomic and banking variables. We find that the introduction of International Financial Reporting Standards (IFRSs) contributed to lower NIM variations unexplained by standard accounting variables. Interest rate volatility is found to be positively and strongly related to NIM dynamics, whereas inflation risk is often found to be a relevant driver of NIM cross-country differences.

Keywords: Net Interest Margin, Efficiency, Accounting Standards, Macro-Accounting, IFRSs, Financial Stability.

JEL Classification: G12, M41.

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1. INTRODUCTION

As it is well-known, banks' intermediary role in the financial side of the economy involves borrowing and lending. These essential banking activities entail financial costs and benefits, and the difference between the lending interests and the borrowing costs is known as the net interest margin (hereafter NIM). High net interest margins are typically associated with a loss of efficiency in the financial system and lead to distortions in the saving and investment patterns of relevant economic agents. In turn, a reduced level of saving and investment slows down economic growth and employment creation. As a result, NIM determinants turn out to be key variables for the financial markets and the real economy. The present paper is an attempt to better understand these determinants from an empirical perspective.

This paper presents three main new contributions: first, we analyze NIM dynamics across a set of developed and emerging countries in the years leading to the 2008 financial and economic crisis, whereas most previous empirical research on NIM focuses on the 80s and 90s (see Brock and Rojas, 2000; Saunders and Schumacher, 2000; Maudos and Fernandez de Guevara, 2004 and Hawtrey and Liang, 2008 among others). The role of banks in the build-up of the financial crisis has been crucial (see The Economist, 2008, International Monetary Fund, 2008, and Bank for International Settlements, 2009) and our study sheds some light on the banking industry margins right before the financial crisis.

Second, in contrast to the vast majority of previous studies, this paper takes into account the impact of the accounting standards on NIM. Previous empirical research has not considered the different accounting standards across and within countries as well as their incidence on the value relevance of the accounting variables. The only exception is Demirgüç-Kunt *et al.* (2004), who examine the influence of bank regulations and institutional development on bank margins using data of 72 countries and over 1,400 banks. However, they do not control for the role of accounting standards, as they only focus on regulations concerning bank entry, reserve requirements, restrictions on bank activities, and an overall index of regulatory restrictions on banks, using the database developed by Barth *et al*. (2001b, 2004). In this paper, we consider the role of different accounting standard across and within countries. We indeed show that the introduction of International Financial Reporting Standards (hereafter, IFRSs) is an important determinant in lowering the part of NIM unexplained by accounting variables across several countries.

This can be explained by the fact that IFRSs accounting numbers are of higher quality than those of Local General Accounting Accepted Principles (hereafter Local GAAP), except for the US. Consistent with this hypothesis, Barth *et al.* (2008) find that firms applying IFRSs from 21 countries generally exhibit less earnings management, more timely loss recognition, and more value relevance of accounting numbers than do matched sample firms applying their Local GAAP (non-US domestic standards).

Third, following Saunders and Schumacher (2000), we use a two-step approach to estimate NIM determinants. This methodology is particularly appropriate for our analysis, since it takes into account both accounting and macro-finance variables as potential NIM drivers. In the first step, NIM is regressed on a comprehensive set of accounting variables for each country, such as size, loan loss provisions, market power and loan to total assets, among others. These variables have been proposed by a number of authors as drivers of NIM in the recent literature. In the second step the resulting pure spread is regressed on a set of macro-finance variables. In this second-step, we adopt the novel multi-way clustering econometric methodology outlined by Petersen (2009) –in a Finance context- and by Gow *et al.* (2009) –in Accounting- in order to control for cross-sectional and time-series dependence in macro-finance variables. In contrast, previous studies such as Hawtrey and Liang (2008) and Lepetit *et al.* (2008) analyze NIM determinants using panel data techniques, which do not appropriately correct for the data dependence in a Macro-Accounting setting, because they do not correct for cross-sectional and time-series dependence simultaneously.

We report four main results in the paper. First, banks following IFRSs commanded statistically significant lower NIMs in Germany (since 1999 to 2007), France, Netherlands, Poland, Spain and the UK (six of the eight countries with IFRSs banks in our sample). Second, we show that the developed countries' NIMs are lower than those in emerging markets and decreased during our sample period. Third, we also show that the reduction of interest rate volatility in the 2000s explains much of the cross-country NIM differences as well as NIM reduction in developed countries. Fourth, inflation risk is often found to be a relevant variable driving NIM differences among countries.

Several studies focus on NIM determinants across alternative sets of countries. For instance, some papers have analyzed the US and European banking systems (Saunders and Schumacher, 2000; Maudos and Fernandez Guevara, 2004; Carbó and Rodríguez, 2007), Eastern European economies (Goyeau *et al.,* 1999; Drakos, 2003; Claeys and Vander Vennet, 2008; Horvath, 2009); Latin American countries (Catao, 1998; Barajas *et al*.,

1999; Brock and Rojas, 2000; Afanasieff *et al*., 2002; Maudos and Solis, 2009); developed versus developing economies (Demirgüç-Kunt and Huizinga, 1999 and Hawtrey and Liang, 2008) and China (Zhou and Wong, 2008). Their results generally show that managerial efficiency and operating expenses to gross income ratio have a negative impact on NIM, while market power, operating cost, risk aversion, interest rate volatility, credit risk and implicit interest payments have a positive impact on NIM. None of these studies, however, analyzes the impact of different accounting standards between and within countries on NIM. We show that this is an important variable because the accounting numbers under IFRSs are of higher quality with respect to non-US Local GAAP, as explained in Leuz (2003) and Barth *et al*. (2006, 2008). Thus, standard accounting variables are more relevant under IFRSs and this implies that a higher portion of NIM can be explained by accounting variables. In agreement with Saunders and Schumacher (2000), we find that interest rate volatility is a key factor driving NIM dynamics and cross-country differences. We also show that the decrease in interest rate volatility explains the NIM decline in developed countries since 1999 to 2008.

The structure of the paper is the following. In the next section we include the rationale of Macro-Accounting variables and NIM. Section 3 outlines the database employed and the multi-way clustering econometric technique used in the analysis of NIM determinants. In section 4 we present and explain the empirical results. Finally, section 5 contains some concluding comments and policy recommendations.

2. MACRO-ACCOUNTING VARIABLES AND NIM

The main goal of our study is to identify the determinants of NIM in an international framework. In our analysis, we highlight the importance of accounting and macroeconomic factors, controlling for standard bank balance-sheet variables. To this end, we follow the theoretical and econometric framework proposed by Saunders and Schumacher (2000), who lay out a two-step process where bank balance sheet variables are employed in the first step while macroeconomic variables are used in the second.

2.1 IFRSs AND NIM

In the first step of our analysis, we perform a cross-sectional data regression analysis, where NIM of banks -pertaining to fifteen different countries, during the 1999-2008 period

with annual data- is regressed on a set of accounting variables –loan loss provision, equity to total assets, liquid assets to total asset ratio, size, loan to total assets ratio and market power- and on an additional dummy variable for the countries where there exist banks following IFRSs or Local GAAPs. In section 3.2, we describe each of these variables in detail.

In this paper, we propose accounting standards as a relevant variable determining NIM. The issue of the value relevance of different accounting standards has received a lot of attention in the recent literature on comparative accounting systems (Barth *et al.,* 2001a). In this literature, there is a consensus about the convenience, from the point of view of investment efficiency, of high-disclosure standards as value-relevant information. Financial accounting environments that lead to greater disclosure of value-relevant accounting information are associated with better forecasting, higher capital mobility and lower cost of capital, thus leading to better allocation of investment resources (see Bandyopadhyay *et al.,* 1994, Ashbaugh and Pincus, 2001, Young and Guenther, 2003, Hail and Leuz, 2006, Eaton *et al.,* 2007, among others). In this sense, both US GAAP and IFRSs tend to be preferred to other local domestic standards (see Cuijpers and Buijink, 2005, Samia and Zhou, 2004, Hung and Subramanyam, 2007, and Platikanova, 2007), although which of the former two should be preferred is still subject to some debate.[1]
This is in line with another strand of the accounting literature (Leuz, 2003 and Barth *et al.,* 2006, 2008, among others), which shows that accounting numbers under IFRSs are of high quality, implying more value relevance of the accounting variables. Kosi *et al.* (2010) investigate the credit relevance of accounting information and find a significant increase in the credit relevance of financial statement information for mandatory IFRS adopters. This effect is more pronounced in countries with strong enforcement regimes and higher discrepancies between local standards and IFRSs. They interpret higher credit relevance of IFRSs relative to Local GAAPs as an increase in accounting quality.

Our study focuses on the determinants of NIM, which measures the difference between the interest income generated by banks and the amount of interest paid out to their lenders divided by the amount of their (interest-earning) assets.

$$NIM = \frac{\text{Net interest income - Interest paid}}{\text{Average earnings assets}}$$

[1] See, for example, Amir *et al.* (1993), Leuz (2003) or the comment to the SEC addressed by T.S. Harris in http://sec.gov/rules/concept/s70400/harris1.htm.

Theoretically, interest paid should be a function of the solvency of the bank paying the interest. To estimate the specific level of solvency, creditors need accounting data and the quality of this data is crucial in order to correctly estimate the probability of default. As a result, the interest paid to creditors could be higher for the case of banks following Local GAAPs than banks following IFRSs. This, in turn, implies that accounting variables explain a higher part of NIM for banks following IFRSs than banks following Local GAAPs.

On a related vein, Kosi and Florou (2009) analyze whether IFRSs affect the cost of corporate debt. They find that mandatory IFRS adopters pay lower bond yield spreads, although they do not find significant differences on the cost of private loans. Kim *et al.* (2011) investigate the effect of voluntary adoption of IFRSs on price and non-price terms of loan contracts. They use a large sample of non-US borrowers from 40 countries and find that banks charge lower rates to IFRS adopters than to non-adopters.

These findings are thus consistent with IFRSs enhancing the quality of accounting data relative to Local GAAPs, both for banks and corporations. The present paper contains accounting information from countries where, for a specific year, some banks follow Local GAAPs and other ones follow IFRSs. As a result, we are able to control for the bank accounting standards and assess its impact on NIM differences across time and banks. In line with the preceding explanation, accounting variables will be more reliable under IFRS so that the explanatory power of accounting variables on the banks' NIM should be higher than under alternative accounting frameworks.

As we show in the next subsection, we follow the theoretical and empirical framework proposed by Saunders and Schumacher (2000), which is based on the dealer model initially proposed by Ho and Saunders (1981). In the first-step of their empirical specification, they account for the institutional imperfections, regulatory taxes and other relevant factors that distort the "pure" spread. Our hypothesis is that the accounting standards significantly influence the bank institutional imperfections and indeed matter for NIM dynamics in the first-step of the estimation procedure. These imperfections are thus treated separately from the second-step –where interest volatility and additional macro factors do enter-. Thus, our view is that specific accounting standards (IFRSs or Local GAAPS) for banks did not modify the optimisation program of the dealer model. Recent papers also using the Saunders and Schumacher (2000) theoretical optimization framework are: Demirgüç-Kunt et al. (2004), who investigate the impact of banks

regulations and institutional developments and Ben Naceur and Omran (2008), who also investigate the impact of bank regulation and institutions on NIM for a set of Middle East and North African economies.

2.2 MACRO VARIABLES AND NIM

In the second-step of our analysis, we regress the part of NIM unexplained by balance sheet / accounting variables on a set of macroeconomic variables: interest rate volatility, inflation and unemployment. We propose these three macro-financial variables because of its expected effect on NIM. In the Saunders and Schumacher (2000) model, NIM can be expressed as:

$$S = \frac{\alpha}{\beta} + \frac{1}{2} R \sigma_I^2 Q$$

where (α/β) provides some measure of the producer's surplus or monopoly rent element in bank margins, R is the bank management's coefficient of absolute risk aversion, Q, the size of bank transactions and σ^2_I is the interest rate volatility.

Interest rate volatility explicitly appears in NIM determination. We measure interest rate volatility as the standard deviation of the 3-month interbank lending rate during the previous year. Thus, this interest rate is a short-term rate very related to the monetary policy stance and especially linked to the borrowing policy of the bank. As a result, if monetary policy becomes volatile –as is the case in less developed economies due to higher macroeconomic instability-, so will the interbank lending market and banks will tend to adjust lending rates and thus raise the expected NIM in order to hedge against the increased interest rate volatility. This monetary policy instability will definitely affect the reinvesting and refinancing risk faced by banks as postulated by Ho and Saunders (1981), as well as Saunders and Schumacher (2000).

We see high inflation and high unemployment rate as variables influencing banks risk aversion, since they proxy for macro-finance instability. In terms of inflation, higher inflation rates bring about a rise in inflation expectations and thus the inflation risk premium on loans.[2] Since banks, as much as investors, care about real returns, they will

[2] There exists a long documented positive and robust relation between inflation and the volatility of inflation (Friedman, 1977 and Taylor, 1981) so that a higher inflation rate implies an increased inflation volatility, and vice-versa.

tend to increase their lending rates following an increase in inflation, as inflation has a clear positive autocorrelation. While the monetary policy authority is then likely to increase the target rate –intimately linked to the short-term interbank rate- in order to tame inflation fluctuations (see Taylor, 1993 and Woodford, 2003, among others), banks will tend to hedge against inflation risk with an increase in the expected NIM. This is especially the case in countries that have not managed to keep inflation under control. Thus, we should in principle observe a higher NIM following an increase in inflation.

Finally, a higher unemployment rate can increase the aggregate credit risk faced by banks and thus their risk aversion, since a higher unemployment rate can worsen business conditions –through a decline in consumption-, and both firms and private agents' balance sheets, thus increasing asymmetric information and the probability of borrower default (see Mishkin, 1990 and Hubbard, 1998, among others). As is well-known, this increased credit risk translates into higher loan rates and thus a higher expected net interest margin as long as the short rate stays constant. Even under an increased borrowing rate the lending rate tends to increase more than the short-rate in times of economic stress (see Mishkin, 1996). We note however that the ex-post NIM could actually decrease if there is a high level of borrowing defaults, which is positively related to the severity of the crisis. We also note that the bank loan loss provisions –accounted for in the first-step of our analysis- may be an alternative policy devised by banks to control for the increased credit risk induced by higher unemployment.

Therefore, we postulate a positive relation between NIM and our three proposed macroeconomic variables. In section 4 we show the empirical results with alternative econometric methodologies. But before we do so, the next section provides an analysis of the data and econometric methodology employed.

3. DATA AND METHODOLOGY

3.1. DATABASE

The dataset employed in our regression analysis consists of an unbalanced panel of accounting, financial and macroeconomic data from 1999 to 2008 for 15 economies: Argentina, Belgium, Brazil, France, Germany, Indonesia, Japan, Mexico, Netherlands,

Poland, Republic of Korea, Russia, Spain, the UK and the US.[3] These countries were selected based on availability of the relevant accounting, financial and macroeconomic variables needed in our study, as explained below.

Our sample contains annual accounting data from banks during ten years, yielding a total of 127,487 observations, i.e., data from 12,749 banks -both publicly and non-publicly traded- on average by year. The accounting information from banks in our analysis comes from the Orbis (Bureau Van Dijk) database. All accounting variables are expressed in thousands of US dollars. The data extracted from Orbis include the following variables: NIM, accounting practice (standards), loans, loans loss provision, shareholder's equity, total assets, liquid assets to total deposits and borrowings ratio, cost to income ratio, total capital and total capital ratio. Definitions of the explanatory variables and their construction are outlined in the next subsection.

The macroeconomic information was retrieved from the IMF database (International Financial Statistics and World Economic Outlook). We use the unemployment rate, interest rate and inflation in the analysis. Interest rate volatility was computed using the interest rate standard deviation in the previous twelve months.

Finally, we used the Factset-JCF database to compute annual market volatility using daily returns for the following indexes: Merval for Argentina, Bel 20 for Belgium, Bovespa for Brazil, CAC 40 for France, Dax for Germany, Jakarta Composite for Indonesia, Nikkei 225 for Japan, Inmex for Mexico, AEX for Netherlands, Kospi 200 for Korea, WIG 20 for Poland, RTX for Russia, Ibex35 for Spain, FTSE 100 for UK and S&P 500 for US.

3.2. METHODOLOGY

Following Saunders and Schumacher (2000), we analyze NIM determinants with a two-step process. This methodology is especially adequate for our analysis, since it controls for the country, accounting standards, and the bank specific effects on NIM. As we show below, in step 2 we can gauge the macro-financial effects on NIM. First, in step 1, we estimate the following cross-sectional regressions of the individual banks' NIMs for each country and year:

[3] Previous studies (see, for example, Saunders and Schumacher, 2000 and Hawtrey and Liang, 2008 among others) analyzed NIM determinants focusing on OECD economies. Our results show that there is a significant difference of spread between OECD and non-OECD countries, as OECD countries have on average a significantly lower NIM. The results are available upon request.

$$NIM_{ijt} = \alpha_{jt} + \beta_{1jt} LLPL_{ijt} + \beta_{2jt} ETA_{ijt} + \beta_{3jt} Size_{ijt} + \beta_{4jt} LATDB_{ijt} + \beta_{5jt} CIR_{ijt} + \beta_{6jt} LTA_{ijt} + \beta_{7jt} MP_{ijt} + \beta_{8jt} ACCSTD_{ijt} + \varepsilon_{ijt} \quad (1)$$

where the variables are the following:

- $LLPL_{ijt}$ is the loan loss provision deflated by loans of bank i in country j and year t. Following Angbazo (1997), this variable is a proxy for the credit risk of the bank. A higher loan loss provision is expected to have a positive influence on the interest margin, as higher risk should carry higher return.
- ETA_{ijt} is the equity to total assets ratio of bank i in country j and year t. This ratio is a proxy for the level of solvency of the bank and is used by McShane and Sharpe (1985) and Hawtrey and Liang (2008). We expect a positive coefficient of β_2 suggesting that a higher level of solvency should have a positive impact on interest margins, due to the relatively lower financing cost for banks.
- $SIZE_{ijt}$ is the natural logarithm of total assets of bank i in country j and year t. This variable is a proxy for the size of the bank, as proposed by Boyd *et al*. (2009). We expect a negative sign in the associated regression coefficient, as banks with large total assets tend to grow in credit markets with low margins.
- $LATDB_{ijt}$ is the liquid assets to total debt and borrowings ratio of bank i in country j and year t and it is a proxy of the opportunity cost of holding reserves. We expect a negative sign, as NIM should decline with the higher opportunity cost of holding reserves implied by higher liquid assets to total debt and borrowing.
- CIR_{ijt} is the cost to income ratio of bank i in country j and year t. Following Maudos and Fernández de Guevara (2004), this variable is a proxy for the technical efficiency and quality of management. We expect a negative sign for cost to income ratio and NIM. Maudos and Fernández de Guevara (2004) suggested that an increase in this ratio implies a decrease in the quality of management, which will translate into a lower interest margin.
- LTA_{ijt} is the loans to total assets ratio of bank i in country j and year *t*. Following Maudos and Solís (2009), this variable is considered a proxy for the specialization of the bank. We expect a positive sign between loan to total assets ratio and NIM showing that banks specialising in the granting of loans are more exposed to idiosyncratic credit risk.

- MP_{ijt} is the market power of the bank i in country j and year t and it is computed as the ratio of total loans of the bank i in country j and year t divided by the sum of total loans of country j in year t. Ho and Saunders (1981) and Boyd and De Nicoló (2005) highlight the importance of the market power in determining NIM. Banks tend to use their market power to become more profitable and we expect a positive sign between market power and NIM.
- $ACCSTD_{ijt}$ is a dummy which takes value 1 when the bank applies IFRSs and 0 if the bank applies Local GAAP. This variable controls for differences in accounting standards in countries where two different accounting standards are applied simultaneously. In Belgium, France, Netherlands, Poland, Spain and UK since 2004 there are listed banks following IFRSs coexisting with non-listed following Local GAAPs. In Germany and Russia there are banks following IFRSs for all the period, whereas other ones follow Local GAAP. The remaining countries (Argentina, Brazil, Indonesia, Japan, Mexico, Korea and the US) follow Local GAAP during all the sample period (see Tables 1 and 2). We expect a negative coefficient of β_8, implying that the part of NIM explained by accounting variables is higher for IFRS adopters given the differences in quality. Our hypothesis is that accounting differences can have an effect on the explanatory power of accounting variables explaining NIM. Indeed, Kosi and Florou (2009) and Kosi *et al.* (2010) show that the use of IFRSs is associated with a lower cost of debt for banks, due to the more accurate accounting statements. As a result, we expect a negative β_8 coefficient, implying that the part of NIM explained by accounting variables is higher for IFRS adopters.

(Insert Tables 1 and 2 About Here)

In equation (1), α_{jt} is the intercept of the model for country j in year t and it represents the pure spread, the part of NIM not explained by the key accounting variables, for the countries following only one accounting standard for the year analyzed. For the countries where there exist banks following IFRSs and banks following Local GAAPs, the pure spread is computed as follows:

$Spread_{jt} = \alpha_{jt}$ if all Banks of country j follow Local GAAP

$$Spread_{jt} = \frac{\alpha_{jt} \times n_{Local} + \left(\alpha_{jt} + \beta_{8\,jt}\right) \times n_{IFRS}}{n_{Local} + n_{IFRS}} \quad \text{(2)}$$

if n_{Local} Banks of country j follow Local GAAP and n_{IFRS} Banks of country j follow IFRSs.

Lastly, ε_{ijt} is the error term of country j in year t.

We are convinced that these first-stage regressions do not suffer from endogeneity problems. As reported in the description of the right-hand side variables, many of them had been used separately in related studies. The inclusion of the dummy variable is however new. Nevertheless, the choice of the accounting scheme by banks is not determined either by NIM level or its dynamics. There is no endogeneity problem because the adoption of IFRSs was mandatory from 2004 for the listed banks in Belgium, France, Germany, Netherlands, Poland, Spain and the UK. Only listed Russian and German banks adopted IFRSs voluntarily before 2004.

In the first step we do not use macroeconomic variables because they are constant for each country and year. In this step we use ranked independent variables instead of using the untransformed values to avoid problems with extreme observations. In this way, we maximized the number of observations in the set of independent variables. All independent variables are sorted into deciles (from 0 to 9) for each country and year and are assigned the decile rank divided by 9 minus 0.5. Thus, the independent variables rank ranges between -0.5 to 0.5 and the problem with extreme observations is avoided without deleting observations.

By repeating this cross-sectional regression for years 1999-2008, we obtain ten estimates of the pure spread for each country and year. Then, in the second-step regression we concentrate on the effects of interest volatility (financial instability risk), inflation and unemployment (macroeconomic risk, following Taylor, 1993) on the pure spread. Consequently, the second-step regression analyzes the following equation:

$$Spread_{jt} = \gamma_0 + \gamma_1 IVOL_{jt} + \gamma_2 INF_{jt} + \gamma_3 UN_{jt} + \varepsilon_{jt}, \quad \text{(3)}$$

where:

- $Spread_{jt}$ represents the pure spread of country j in year t,

- $IVOL_{jt}$ is the interest rate volatility of the monthly three-month interbank rate of country j in year t computed as the standard deviation over the previous twelve months. A similar interest rate is used in most monetary policy studies (Bekaert *et al*., 2010, and Gomez *et al*., 2009, among others).

- INF_{jt} is the inflation rate of country j in year t, computed as the annual rate of change in the Consumer Price Index (CPI). The inflation rate is also used as explanatory variable in Demirgüç-Kunt *et al*. (2004).

- UN_{jt} is the unemployment rate of country j in year t and is also used by Boyd *et al.* (2009).

Market volatility was also added to the model as a control variable, but it was never significant and the untabulated results are very similar to those reported below**.** It is also clear that the second stage regressions do not suffer from endogeneity problems, as macroeconomic developments are completely independent of NIM dynamics.

In the second step, equation (3) is estimated applying two-way cluster-robust standard errors developed in Gow *et al*. (2009), which correct for cross-sectional and time-series dependence simultaneously.[4] Given that the pure spread is an accounting measure affected in some sense by the accounting variables in step 1, it is necessary to control for cross-sectional dependence taking into account, each year, if the pure spread was calculated using Local GAAP or using both accounting standards (IFRSs and Local GAAPs). Our hypothesis is that accounting differences can have an effect on the explanatory power of accounting variables explaining NIM. Indeed, Kosi and Florou (2009) and Kosi *et al.* (2010) show that the use of IFRSs is associated with a lower cost of debt for banks, due to the more accurate accounting statements. As a result, we expect a negative coefficient of β_8, implying that the part of NIM explained by accounting variables is higher for IFRS adopters. With this in mind, a qualitative variable is computed taking different values if only the different Local GAAPs were applied and other value if different Local GAAPs and IFRSs were applied simultaneously for each country-year. Then we use this variable as cluster to correct for cross-sectional dependence. To correct for time-series dependence we use the year as cluster. This methodology is appropriate when accounting data is used and it is necessary to correct simultaneously for both types

[4] We use the SAS program developed by these authors, which estimates two-way cluster-robust standard errors. This program is available at the following website: http://www.stanford.edu/~igow/GOT/

of dependences (see Petersen, 2009). Two-way cluster-robust standard errors allow both for within-accounting standards (cross-sectional) and within-year (time-series) dependence (e.g., the observation of a specific Local GAAP in year *t* can be correlated with that Local GAAP in year *t+1* and with other Local GAAP or Local GAAP and IFRS in year *t*). In our benchmark estimation, accounting standards and years were used simultaneously as clusters because some banks belonging to different countries have changed to IFRSs during the sample period. The results are robust to using countries and years as clusters. We also report the results with three-way cluster-robust standard errors, following Cameron *et al.* (2009). This allows us to simultaneously correct for within-year (time-series) dependence, within-accounting standards (cross-sectional) dependence and within-countries (cross-sectional) dependence.

As a robustness check, we apply several alternative econometric methodologies. First, we added a dummy variable to distinguish between developed and emerging markets in the previous regression setting. As we show below, NIM behavior is quite different across these sets of countries. Second, following Saunders and Schumacher (2000) 14 country dummies, *n-1*, are added to the equation (3). This equation is estimated via two-way cluster-robust standard errors controlling for accounting standards (cross-section), years (time-series) and country-specific effects with 14 country dummies. Third, we also estimated this equation under fixed effects (panel data) controlling for country effects but not for accounting standards and years.[5] This set of regressions is shown in tables 8 and 9.

We also estimated alternative models, which we do not report to save space, since the results are very similar to those reported.[6] We estimated equation (3) under fixed effects controlling for countries (14 country dummies, *n-1*) and years (9 year dummies, *t-1*). Alternatively, Laeven and Majnoni (2003) and Bouvatier and Lepetit (2008) have convincingly shown the non-linearity of earnings with respect to Loan Loss Provisions for the banking industry. Therefore, in this case, to test the non-linearity of the earnings response to NIM we added two explanatory variables to equation (3):

$$\begin{aligned} NIM_{ijt} &= \alpha_{jt} + \beta_{1jt} LLPL_{ijt} + \beta_{2jt} ETA_{ijt} + \beta_{3jt} Size_{ijt} + \beta_{4jt} LATDB_{ijt} \\ &+ \beta_{5jt} CIR_{ijt} + \beta_{6jt} LTA_{ijt} + \beta_{7jt} MP_{ijt} + \beta_{8jt} ACCSTD_{ijt} + \\ &\beta_{9jt} Positive_{ijt} + \beta_{10jt} \text{interaction}_{ijt} + \varepsilon_{ijt} \end{aligned} \quad (4)$$

[5] We cannot apply a panel data fixed-effects methodology to simultaneously control for cross-sectional (accounting standards) and time series (year) dependence, because there are observations with the same values for the accounting standard-year pairs.

[6] All reported and unreported results are available from the authors upon request.

All variables are defined as in equation (1) except for:

- $Positive_{ijt}$ is a dummy that takes value equal to one when the Profit Before Tax and Loan Loss Provision deflated by Total Assets (hereafter, PBTLLPTA) of Bank i in country j and year t is positive and zero when PBTLLPTA is zero or negative.
- $interaction_{ijt} = Positive_{ijt}\, x\, PBTLLPTA_{ijt}$ is the interaction term between the dummy and PBTLLPTA of bank i in country j and year t.

4. RESULTS

We organize our description and interpretation of the results as follows: we first comment on the first-step regression results and highlight the role of the accounting standards in explaining NIM differences. [7]

Table 3 shows the 10-year medians of the variables employed in the first-step regressions across countries. We observe heterogeneity in NIM medians, with developed countries exhibiting clearly lower NIMs than emerging economies. Figure 1 plots NIM dynamics across our set of countries. Several facts are worth highlighting. In all developed countries, NIM has experienced a steady and economically significant decline from 1999 to 2008. Thus, the banking system has become more efficient over the last decade. With the exception of Poland –which also exhibits an important decline in NIM- emerging countries show no clear pattern in NIM dynamics. Argentina's NIM sharply declined in 2003, after their financial crisis, but it has increased since then. Brazil has experienced a decline since 2005, whereas Indonesia's NIM has increased in the last 10 years. In contrast, Mexico and Russia exhibit some volatility but no clear trend. The graphs confirm the fact that developed countries have lower medians than emerging economies. The US is really an exception, with its NIM similar to Poland and higher than the remaining developed countries.

(Insert Table 3 and Figure 1 About Here)

Emerging countries also have higher loan loss provisions than developed economies. In particular, it is noticeable the small loan loss provisions of the UK and Belgium, two

[7] Russia presents a high number of banks implementing IFRSs. Results remain unchanged when we eliminate Russia from the data set. In addition, Russia, Korea and Indonesia present high NIM values. When we excluded these 3 countries from our data set, the results remain unaltered. The detailed estimation results are available upon request.

countries who suffered especially in the financial crisis. The ratio of equity to total assets in emerging countries is around twice that of developed economies, essentially because of different capital requirements established by local regulators, whereas the size of the "average bank" in our sample is similar across countries. The ratio of liquid assets to total debt varies across countries, with the US having a very small median (the mean however is 24.80, thus suggesting that we have some bank observations with a very high liquidity ratio). The cost to income and loan to total assets ratios vary across countries with Indonesia, Korea, Brazil and Spain showing lower cost to income ratios. Finally, market power for our "average bank" is quite low in Germany, UK, US and Japan, whereas it is very high for Korea and relatively high for Poland and Indonesia.

Table 4 shows the 10-year mean coefficients of the first-step regressions. By and large, the signs are consistent with the expected ones, discussed in the explanation of each of the first-step right-hand side variables, in section 3.2. There is a positive relation across countries between loan loss provisions, equity to total assets and loans to total assets on the one hand and NIM on the other. Loan loss provisions are a measure of credit risk and it is thus sensible to find the tradeoff between risk and asset returns. This sensitivity is especially high in Brazil, Poland and Mexico. Brazil and Poland also exhibit a high sensitivity of NIM with respect to the equity to total assets ratio, whereas Argentina, Brazil, Belgium and the UK show a high positive reaction of NIM to the loans to total assets ratio. The size of the bank and NIM are in general conditionally negatively related, especially in the case of Argentina and Russia, whereas the relation between the liquid assets to total debt and borrowings ratio is negative for 11 of the 15 countries, as predicted by conventional economic wisdom. The higher the ratio, the lower the profitability of bank funds -as the opportunity cost of holding reserves increases- so that NIM declines. Market power is positively related to NIM in most of the countries, with a high coefficient in Russia. In other words, a less competitive banking industry tends to lead to higher NIMs, as predicted by Ho and Saunders (1981) and Boyd and De Nicoló (2005). The cost to income ratio coefficient is negative only in 6 of the 15 countries and is thus the only variable where results are not in agreement with our initial hypothesis. The relation between NIM and the cost to income ratio varies significantly in size and sign among countries.

(Insert Table 4 About Here)

Table 5 presents a summary of the statistical significance of the first-step regression coefficients across countries and years. It also shows the 10-year mean R^2 across countries. The R^2's are overall high, and the fit of the model is especially good for Argentina, France, Japan, Poland and Spain. The results differ across countries reflecting the idiosyncrasy of each banking system. However, loan loss provisions, equity to total assets and loan to total assets are robust predictors of NIM across developed and developing countries. Bank size and the liquid assets to total debt and borrowings ratio appear important for the US and Germany. Market power is a significant variable in Spain, Germany and the US. These results are consistent with previous international empirical evidence (see, for instance, Saunders and Schumacher, 2000, and, recently, Hawtrey and Liang, 2008).

(Insert Tables 5 and 6 About Here)

Table 6 shows the median/mean/standard deviation of the pure spread across countries and compares them with those of NIM. As in NIM, spread values vary widely across countries. For example, Brazil and Russia had the highest spread (mean and median) over the 1999 - 2008 period with mean values of 9.3 and 8.1 respectively (and median values of 9.5 and 8.5 respectively). On the other hand, Belgium, Japan and Netherlands present the lowest spreads with values close to 2. Finally, Argentina presents the highest standard deviation of the banks spread with a value of 2.35 followed by Russia with a standard deviation of 1.34. We also notice that, while not reported, the constant was significant in every single regression at the one percent significant level. Thus, there is some important information contained in NIM which is not captured in the banking-accounting information. As we show below in the second-step regressions, the macro-finance variables do capture a relevant part of this information.

We now discuss the role of the accounting standards in explaining NIM differences. Table 7 shows the sign and statistically significance of the coefficient on the accounting standard dummy. In order to account for representative accounting variability, we only report coefficients of regressions where there were at least 10 banks with IFRSs accounting standards and at least 10 banks following Local GAAPs in a given country. Thus, for instance, while Russia has banks following IRFSs across all years of the sample, we only report coefficients for three years, thus implying that in the other seven years, there were less than 10 banks following Local GAAP. Table 7 shows that the coefficients

are negative 85% of the times, which is in agreement with our initial hypothesis, that IFRSs should increase the role played by accounting variables in explaining NIM. Moreover, whenever they are significant they are negative, thus implying that IFRSs increases the part of NIM explained by accounting variables. This is in line with the accounting literature (Leuz, 2003 and Barth *et al.*, 2006, 2008, among others) showing that accounting numbers under IFRSs are of high quality, implying more value relevance of the accounting variables. Our results are also consistent with recent studies which show that IFRS adopters obtain better credit and loan conditions than non-IFRS counterparts (Kosi and Florou, 2009 and *et al.*, 2011), as lenders trust IFRSs more. This again justifies that a control for accounting standards between and within countries is crucial.

(Insert Table 7 About Here)

The results for Germany are remarkable: IFRSs has been statistically reducing the part of NIM unexplained by our set of accounting variables at the 5% level every year since 1999 to 2007. We also find significant negative relations between NIM and IFRSs for some years in France, Netherlands, Poland, Spain and the UK. Thus, we conclude that IFRSs imply a decrease in the unexplained part of NIM; in other words, IFRSs decrease the size of the spread (intercept) as their accounting quality increases the explanatory power of NIM.

We now focus on the second-step regressions analysis. Table 8 shows the second-step regression 10-year variable medians. As mentioned earlier, the spread (constant in the first regressions taking into account the value of the dummy coefficient) is clearly higher for emerging economies. Thus, the higher portion of the emerging economies NIM is explained by macro-finance variables. Financial volatility is also higher in emerging markets, as reflected by interest rate volatility. Finally, inflation and unemployment are again in general lower in developed economies during our sample period.

(Insert Table 8 About Here)

Table 9 shows the results of the double-cluster spread regressions on the macro-finance variables. In our benchmark regression (Panel A) all variables are statistically significant at the one percent confidence level except unemployment. The R^2 is 0.28, implying that our set of macro-finance variables is relevant in explaining the spread, and

thus NIM. As interest rate volatility increases, so does the spread, implying that financial stability is very important in lowering NIM. The macro variables –inflation and unemployment- are also positively related to the spread –inflation significantly-, implying that reducing macroeconomic risks improves banking efficiency. These results are consistent with previous studies by Demirgüç-Kunt and Huizinga (1999) and Drakos (2003).

(Insert Tables 9 and 10 About Here)

As explained above, Figure 1 shows a lower NIM for developed countries in our sample with respect to emerging economies. Thus, in Panel B of Table 9, we add a dummy to distinguish between developed (ones) and emerging (zeros) countries. The R^2 substantially increases to 0.54 and the coefficient on the dummy is negative and strongly significant, thus pointing at the negative conditional relation between NIM and the level of development.[8] The remaining coefficients remain unaltered with respect to Panel A. Panels C and D of Table 9 show that the results under three-way clustering are very similar to those obtained with double clustering. Notice that, apart from the strong impact of interest rate volatility on NIM, these second-step regressions also highlight a relevant relation between macro variables and NIM. As macroeconomic risks decreased in general from 1999 to 2008, NIM went down. The Great Moderation macroeconomic literature (see McConnell and Pérez Quirós, 2000, Blanchard and Simon, 2001, and Moreno, 2004, among many others) shows that inflation and unemployment dynamics were relatively stable and under control in the years leading to the financial crisis across developed countries. Graphs also confirm the fact that developed countries have lower medians than emerging economies.

Saunders and Schumacher (2000) include country dummies in their analysis. We also estimate our model with country dummies and report the results in Panels A and B in Table 10, which show the 2nd step regressions with country dummies (double-cluster and panel data, respectively). Results show that the use of two-way cluster errors or fixed effects and country dummies makes no difference for the results. Interestingly, in both regressions the R^2 jumps to 0.89, thus pointing at the idiosyncrasy of each banking

[8] Curdia and Woodford (2010) have recently shown in a New-Keynesian macro model that credit frictions increase lend-borrowing spreads, and these are more prevalent in undeveloped countries.

industry as a key variable driving NIM cross-country differences. As commented in the previous paragraphs, the introduction of the specific-country dummy variables substantially increases the R^2 of the regressions. This highlights the need to further understand both theoretically and empirically these country specific effects through specific variables. Despite this great explanatory power of cross-country differences in the second-step procedure, interest rate volatility remains robustly significant in all cases and inflation also does under the developed v/s undeveloped economy dummy. Therefore, our results confirm those of Saunders and Schumacher (2000) with an alternative and updated dataset, underscoring the impact short-term interest rate dynamics on NIM fluctuations. Across regressions, the interest rate volatility remains robustly significant whereas inflation now is not. Thus, the country dummies seem to be capturing the mean inflation differentials among countries.

5. CONCLUSIONS AND POLICY RECOMMENDATIONS

Our analysis provides several interesting policy implications. The first-step regressions show that the loans to total assets ratio as well as loan loss provisions are robust positive predictors of NIM, thus implying that banks increase their NIM internationally in response to higher asset risks.

A key implication of our study is that models used to estimate NIM must control for accounting differences. As it can be seen in our study, accounting numbers under IFRSs increase the part of NIM explained by accounting variables, contrary to what happens with Local GAAPs, with the exception of the US. This is consistent with the accounting literature, which shows that accounting numbers under IFRSs are of high quality compared to Local GAAP. Therefore, studies on NIM and on the efficiency in the banking system using accounting information should control for this important effect.

Financial market stability proved to be the most robust predictor of a lower NIM. This provides an additional reason for the monetary authority to set interest rate stability as a monetary policy goal. In particular, monetary policy management should take into account that interest rate volatility brings up a more costly and less efficient banking system. Thus, our results provide motivation for optimal monetary policy studies which include interest rate differences in the social loss function in order to smooth interest rate changes (see Rudebusch and Svensson, 1998). Developing countries exhibit higher

financial volatility and thus our paper makes a strong case for financial stability policies as a step towards increasing both their potential and actual economic growth.

We also show that lower inflation rates tend to lower NIM. This finding has important implications for monetary policy management, as it implies that a more efficient banking system is an important and positive by-product of effective monetary policy -which tends to focus on inflation as the main target (see, for instance, Bernanke and Mishkin, 1997)-, since some of the distortions and costs in financial intermediation are eliminated. Thus, both monetary policy practitioners and the associated academic literature should take into account this important relation. This finding again brings important lessons for developing countries, as it provides an additional reason to strive for the control of macroeconomic fundamentals. Achievement of inflation and unemployment stabilization triggers a more efficient financial system, which, in turn, enhances economic growth, thus creating a positive macro-finance virtuous circle.

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Table 1: Years when IFRSs where Implemented across Countries

Year Country	99	00	01	02	03	04	05	06	07	08
Argentina										
Belgium						X	X	X	X	X
Brazil										
France						X	X	X	X	X
Germany	X	X	X	X	X	X	X	X	X	X
Indonesia										
Japan										
Mexico										
Netherlands						X	X	X	X	X
Poland						X	X	X	X	X
Korea										
Russia	X	X	X	X	X	X	X	X	X	X
Spain						X	X	X	X	X
UK						X	X	X	X	X
US										

Note: This table shows the years when a given country had at least some banks following IFRSs.

Table 2: Number of Banks Implementing IFRSs across Countries

Year Country	99	00	01	02	03	04	05	06	07	08	TOTAL
Argentina											
Belgium						4	12	14	14	14	58
Brazil											
France						54	90	99	95	87	425
Germany	7	10	11	11	11	17	19	29	30	27	172
Indonesia											
Japan											
Mexico											
Netherlands						20	23	24	24	19	110
Poland						19	23	24	24	18	108
Korea											
Russia	37	57	62	76	109	143	151	158	148	74	1015
Spain						62	182	176	107	77	604
UK					1	59	91	91	88	67	397
US											
TOTAL	44	67	73	87	121	378	591	615	530	383	

Note: This table shows the number of banks in our sample following IFRSs across countries and years.

Table 3: Median Values for First-Step Regression Variables

Variable **Country**	*NIM*	*LLPL*	*ETA*	*SIZE*	*LATDB*	*CIR*	*LTA*	*MP*
Argentina	4.39	1.50	0.18	12.7	2.35	74.5	0.41	0.28
Belgium	1.70	0.13	0.06	14.0	14.8	66.4	0.39	0.07
Brazil	8.62	1.60	0.14	13.6	32.8	58.6	0.35	0.15
France	2.17	0.28	0.08	14.8	8.08	66.2	0.63	0.05
Germany	2.69	0.77	0.05	13.2	5.29	71.4	0.62	0.01
Indonesia	4.85	0.64	0.11	13.0	4.27	56.1	0.49	0.65
Japan	1.92	0.50	0.05	14.3	0.05	73.1	0.56	0.02
Mexico	5.29	1.29	0.12	13.9	6.67	68.4	0.59	0.42
Netherlands	1.35	0.12	0.07	15.3	26.4	57.1	0.58	0.16
Poland	3.46	0.50	0.10	13.6	11.1	67.6	0.52	0.71
Korea	2.47	0.97	0.06	16.0	3.75	57.4	0.58	1.10
Russia	6.49	1.19	0.15	11.5	14.6	69.2	0.58	0.02
Spain	2.39	0.44	0.07	14.9	3.68	59.3	0.69	0.15
UK	1.62	0.06	0.07	14.3	35.8	64.0	0.52	0.02
US	4.03	0.22	0.10	11.7	0.00	65.5	0.66	0.01

Note: This table shows the 10-year median values of the variables involved in the first-step regression. The definition of each of the variables can be found in section 2.2. The values for loan provisions (*LLPL*) and market power (*MP*) are in percentage points. We do not include here the values for the dummy of the accounting standards (*ACCSTD*).

Table 4: Mean First-Step Regression Coefficients

Coefficient / Country	β_1	β_2	β_3	β_4	β_5	β_6	β_7
Argentina	0.42	-1.26	-7.02	1.18	0.54	4.52	1.23
Belgium	1.15	2.63	3.50	-0.11	0.30	3.79	-2.87
Brazil	5.89	4.60	-0.05	0.21	0.50	4.62	-2.71
France	0.88	0.27	-1.77	-0.23	-0.27	1.99	0.32
Germany	0.86	0.64	-1.28	-0.01	0.14	0.51	0.80
Indonesia	0.85	2.38	0.27	-0.10	-0.67	0.18	0.69
Japan	0.17	0.25	-1.03	-0.40	0.01	0.89	0.12
Mexico	3.00	0.29	2.45	-0.43	-0.52	0.99	-3.03
Netherlands	2.09	1.20	-1.50	-0.36	0.13	-0.51	1.32
Poland	3.10	3.68	-0.74	-2.17	-0.77	1.97	1.73
Korea	0.90	0.10	-0.85	-0.07	0.35	0.53	1.27
Russia	2.35	0.95	-7.07	-0.34	-0.12	1.53	4.20
Spain	0.72	0.94	-1.09	0.12	0.17	1.27	1.06
UK	2.33	2.83	-0.68	0.24	0.49	4.21	-1.74
US	0.36	0.17	-0.56	-0.55	-0.65	0.87	0.35

Note: This table shows the 10-year-means of the coefficients in the first-step regression of NIM on a set of financial/accounting variables. We do not include the value of either the constant or of the dummy coefficient (β_8):

$$NIM_{ijt} = \alpha_{jt} + \beta_{1jt} LLPL_{ijt} + \beta_{2jt} ETA_{ijt} + \beta_{3jt} Size_{ijt} + \beta_{4jt} LATDB_{ijt}$$
$$+ \beta_{5jt} CIR_{ijt} + \beta_{6jt} LTA_{ijt} + \beta_{7jt} MP_{ijt} + \beta_{8jt} ACCSTD_{ijt} + \varepsilon_{ijt}$$

Table 5: Statistical Significance of First-Step Regression Coefficients

Coefficient / Country	β_1	β_2	β_3	β_4	β_5	β_6	β_7	R^2
Argentina	40	30	30	20	20	70	20	0.60
Belgium	40	60	40	10	10	80	10	0.32
Brazil	80	70	10	0	0	30	20	0.30
France	60	10	60	10	10	90	10	0.46
Germany	100	100	90	40	50	100	80	0.24
Indonesia	30	50	0	10	30	0	0	0.26
Japan	60	60	50	100	20	100	30	0.63
Mexico	20	0	10	20	10	0	20	0.32
Netherlands	70	40	20	20	20	30	10	0.41
Poland	60	40	0	10	30	10	0	0.48
Korea	30	0	0	0	0	0	0	0.12
Russia	50	20	20	10	10	50	10	0.20
Spain	80	90	40	0	0	90	50	0.52
UK	80	100	0	20	10	90	30	0.41
US	100	90	70	90	100	100	40	0.12
Average	60	51	29	24	21	56	22	0.36

Note: This table shows the proportion of statistically significant first-stet regression coefficients in percentage points at the 10 percent confidence level. It also shows the 10-year average R^2 across countries. The first-step regression is given by:

$$NIM_{ijt} = \alpha_{jt} + \beta_{1jt} LLPL_{ijt} + \beta_{2jt} ETA_{ijt} + \beta_{3jt} Size_{ijt} + \beta_{4jt} LATDB_{ijt}$$
$$+ \beta_{5jt} CIR_{ijt} + \beta_{6jt} LTA_{ijt} + \beta_{7jt} MP_{ijt} + \beta_{8jt} ACCSTD_{ijt} + \varepsilon_{ijt}$$

Table 6: Spreads and NIMs By Country

	Spreads			NIM		
Country	**Median**	**Mean**	**Std Dev**	**Median**	**Mean**	**Std Dev**
Argentina	5.06	4.97	2.35	4.39	5.57	4.87
Belgium	2.04	1.90	0.50	1.70	2.11	1.82
Brazil	9.49	9.32	0.83	8.62	9.39	5.58
France	2.47	2.35	0.27	2.17	2.34	1.71
Germany	2.74	2.67	0.18	2.69	2.69	1.05
Indonesia	5.16	5.04	0.37	4.85	5.19	2.53
Japan	1.74	1.84	0.23	1.92	1.91	0.77
Mexico	6.30	5.91	1.04	5.29	6.11	3.53
Netherlands	1.75	1.84	0.33	1.35	1.69	1.64
Poland	5.05	5.09	1.63	3.46	4.42	3.43
Republic of Korea	2.55	2.46	0.27	2.47	2.66	1.92
Russian Federation	8.45	8.05	1.34	6.49	6.84	3.25
Spain	2.64	2.59	0.53	2.39	2.50	1.37
UK	2.70	2.64	0.46	1.62	2.27	2.61
US	4.14	4.12	0.14	4.03	4.05	1.20

This table shows the median, mean and standard deviation of the country pure spreads identified in the first step of our econometric exercise (see equations 1 and 2), and compares them with the analogous moments of NIM.

Table 7: Sign and Statistical Significance of the Accounting Standard Dummy (β_8) in the First-Step Regression

Year / Country	99	00	01	02	03	04	05	06	07	08
Argentina										
Belgium							N	N	N	N
Brazil										
France						N	N	N	N	N**
Germany	N**	N**	N**	N**	N**	N**	N**	N**	N**	P
Indonesia										
Japan										
Mexico										
Netherlands						N*	N**	N	N	
Poland						N	N**	N	N**	
Korea										
Russia				P	P	P				
Spain						N**				
UK						N	N	N*	P	P
US										

Note: This table shows the sign and the statistical significance of the coefficient (β_8) on the accounting standard dummy in the first-step regression across countries and years:

$$NIM_{ijt} = \alpha_{jt} + \beta_{1jt} LLPL_{ijt} + \beta_{2jt} ETA_{ijt} + \beta_{3jt} Size_{ijt} + \beta_{4jt} LATDB_{ijt}$$
$$+ \beta_{5jt} CIR_{ijt} + \beta_{6jt} LTA_{ijt} + \beta_{7jt} MP_{ijt} + \beta_{8jt} ACCSTD_{ijt} + \varepsilon_{ijt}$$

N means a negative coefficient. N* is a negative coefficient statistically significant at the 10% confidence level, N** is a negative coefficient statistically significant at the 5% confidence level and P is a positive coefficient not statistically significant. We only selected the countries and years with at least 10 banks in each of the two categories (Local GAAPs and IFRSs). A negative coefficient implies that IFRSs contributed to lower NIM.

Table 8: Median Values for Second-Step Regression Variables

Variable **Country**	*Spread*	*IVOL*	*INF*	*UN*
Argentina	5.06	1.59	8.59	13.5
Belgium	2.04	0.28	1.86	11.6
Brazil	9.49	1.46	6.84	9.3
France	2.47	0.11	1.90	9.00
Germany	2.74	0.27	1.78	10.4
Indonesia	5.16	1.40	10.5	9.26
Japan	1.74	0.07	-0.30	4.70
Mexico	6.30	0.81	4.85	3.50
Netherlands	1.75	0.14	2.03	3.10
Poland	5.05	0.86	2.49	16.2
Korea	2.55	0.19	2.75	3.60
Russia	8.45	1.58	10.9	7.20
Spain	2.64	0.27	3.38	10.8
UK	2.70	0.38	1.34	5.30
US	4.14	0.37	2.82	5.20

Note: This table shows the 10-year median values of the variables involved in the second-step regression. *Spread* is the part of NIM unexplained by accounting variables, *IVOL* is the interest rate volatility, *INF* is the inflation rate and *UN* is the unemployment rate.

Table 9: Spread Regressions on Macro Variables

Panel A: Two-way cluster-robust standard errors controlling for accounting standards and years.				
R-square (%)	28.02			
Variables	Coefficient	Std. Dev.	t-stat	P-value
Intercept	2.90	0.60	4.80	0.00
IVOL	0.16	0.07	2.32	0.04
INF	0.11	0.04	3.21	0.01
UN	0.05	0.06	0.78	0.45

Panel B: Developed / Emerging countries. Two-way cluster-robust standard errors controlling for accounting standards and years.				
R-square (%)	53.61			
Variables	Coefficient	Std. Dev.	t-stat	P-value
Intercept	4.99	0.15	34.22	0.00
IVOL	0.09	0.03	2.78	0.02
INF	0.06	0.02	2.42	0.04
UN	0.01	0.03	0.41	0.68
DUM	-2.74	0.28	-9.79	0.00

Panel C: Three-way cluster-robust standard errors controlling for accounting standards, countries and years				
R-square (%)	28.02			
Variables	Coefficient	Std. Dev.	t-stat	P-value
Intercept	2.90	0.68	4.27	0.00
IVOL	0.16	0.07	2.23	0.04
INF	0.12	0.04	3.17	0.01
UN	0.05	0.07	0.67	0.52

Panel D: Developed / Emerging countries. Three-way cluster-robust standard errors controlling for accounting standards, countries and years				
R-square (%)	53.61			
Variables	Coefficient	Std. Dev.	t-stat	P-value
Intercept	4.99	1.32	3.80	0.00
IVOL	0.09	0.02	3.97	0.00
INF	0.06	0.02	3.14	0.01
UN	0.01	0.07	0.17	0.86
DUM	-2.74	0.95	-2.88	0.01

Note: This table shows the parameter estimates, standard errors, associated t-statistics and p-values of the coefficients of the second-step regressions: the spread on the macro variables (interest rate volatility, inflation rate, and unemployment) and an intercept. We employ alternative double/three way cluster data methodologies across panels to compute the standard errors. Panel B and D also include a dummy (*DUM*) for the developed countries. The regression is given by:

$$Spread_{jt} = \gamma_0 + \gamma_1 IVOL_{jt} + \gamma_2 INF_{jt} + \gamma_3 UN_{jt} + \varepsilon_{jt}$$

Table 10: Spread Regressions on Macro Variables with Country Dummies

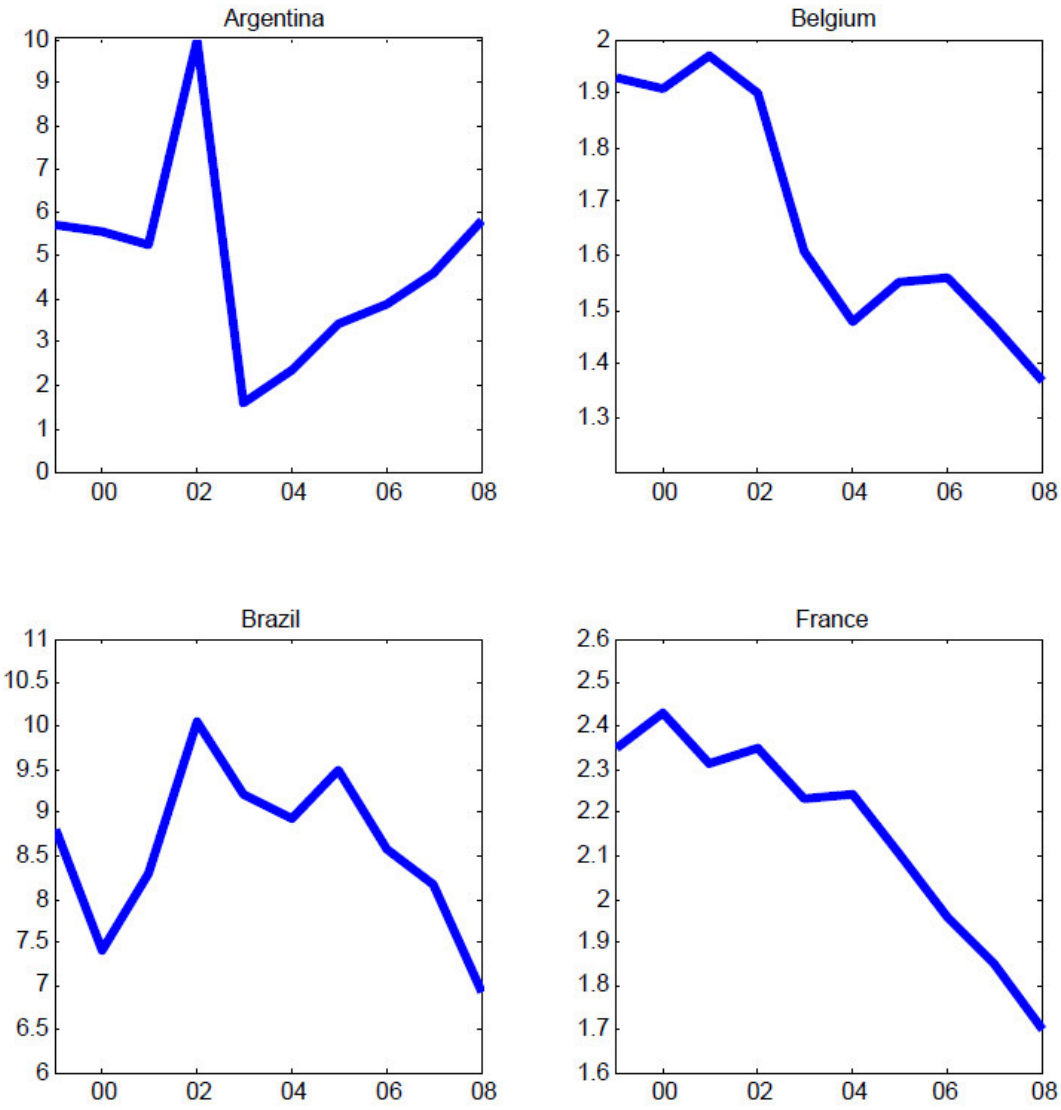
Panel A: Two-way cluster-robust standard errors controlling for accounting standards and years with 14 country dummies				
R-square (%)	88.55			
Variables	Coefficient	Std. Dev.	t-stat	P-value
Intercept	4.16	0.46	8.94	0.00
IVOL	0.11	0.05	2.36	0.04
INF	0.01	0.01	1.04	0.32
UN	-0.02	0.09	-0.24	0.81

Panel B: Panel data with fixed effects (14 country dummies)				
R-square (%)	88.55			
Variables	Coefficient	Std. Dev.	t-stat	P-value
Intercept	4.16	0.36	11.61	0.00
IVOL	0.11	0.03	4.21	0.00
INF	0.01	0.01	0.70	0.49
UN	-0.02	0.04	-0.51	0.61

Note: This table shows the parameter estimates, standard errors, associated t-statistics and p-values of the coefficients of the second-step regressions: the spread on the macro variables (interest rate volatility, inflation rate, and unemployment) and an intercept. We employ alternative double-cluster/panel data methodologies across panels. Both regressions include country dummies. The regression is given by:

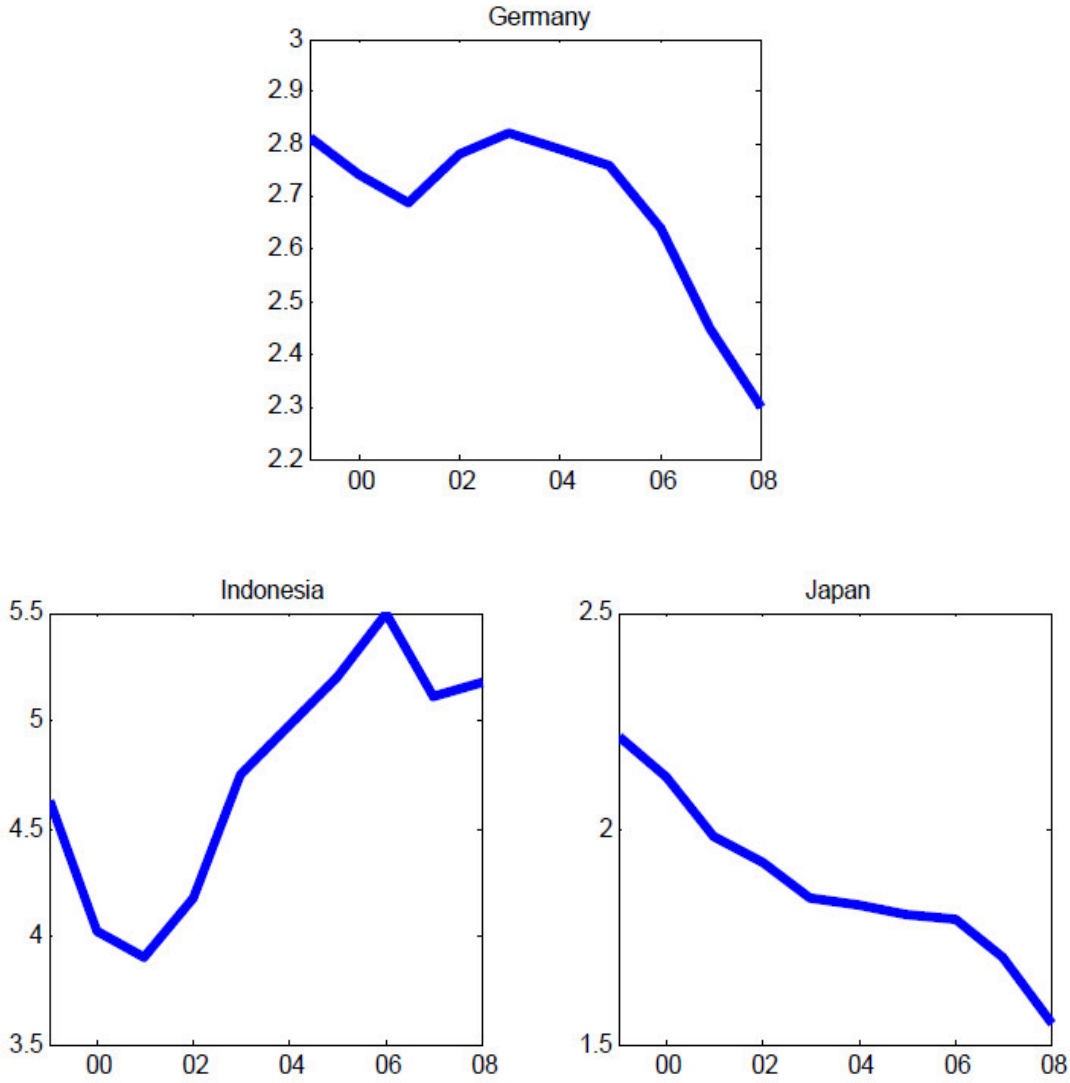
$$Spread_{jt} = \gamma_0 + \gamma_1 IVOL_{jt} + \gamma_2 INF_{jt} + \gamma_3 UN_{jt} + \varepsilon_{jt}$$

Figure1 : Median Net Interest Margin (NIM) Across Countries



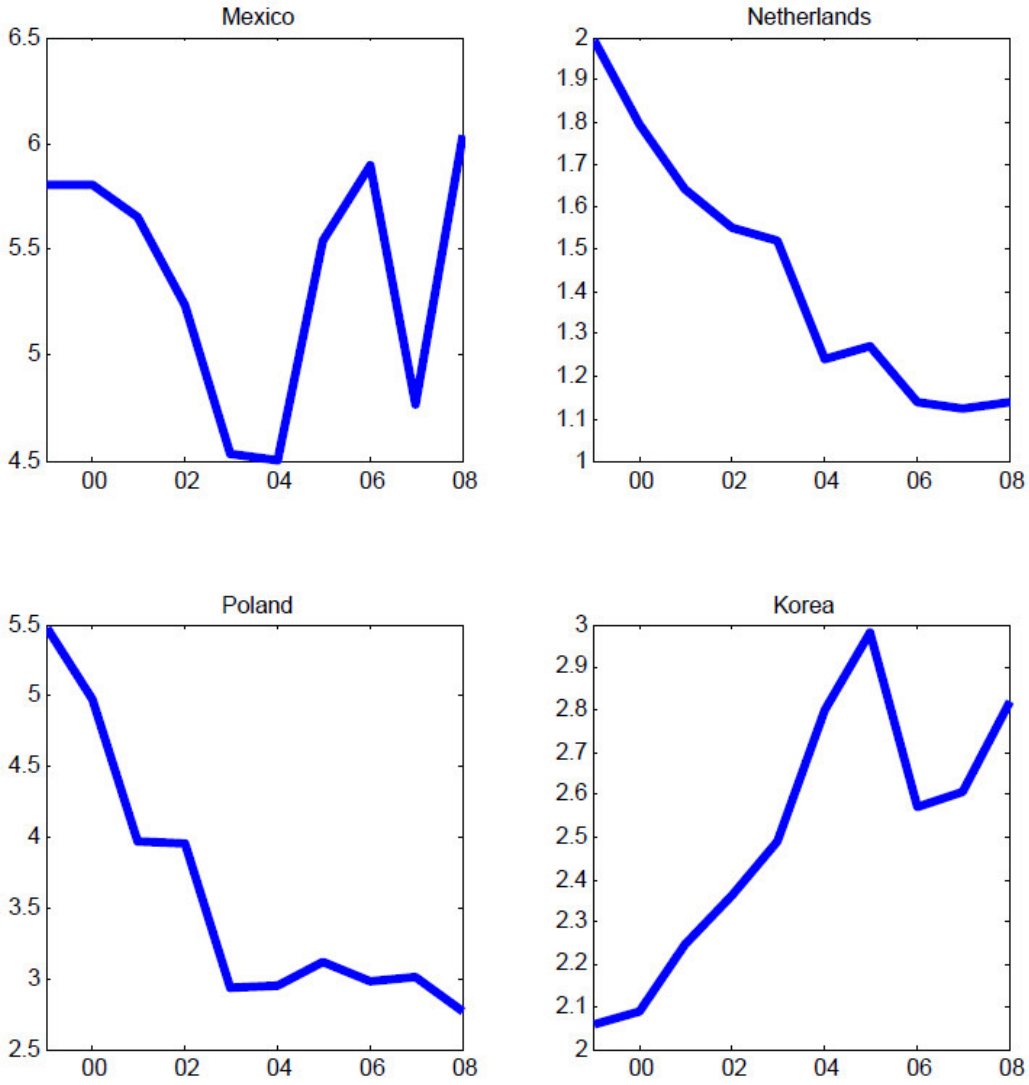
Note: This figure shows the time series of the Net Interest Margin across countries for our sample period 1999-2008.

Figure 1 Continued: Median Net Interest Margin (NIM) Across Countries



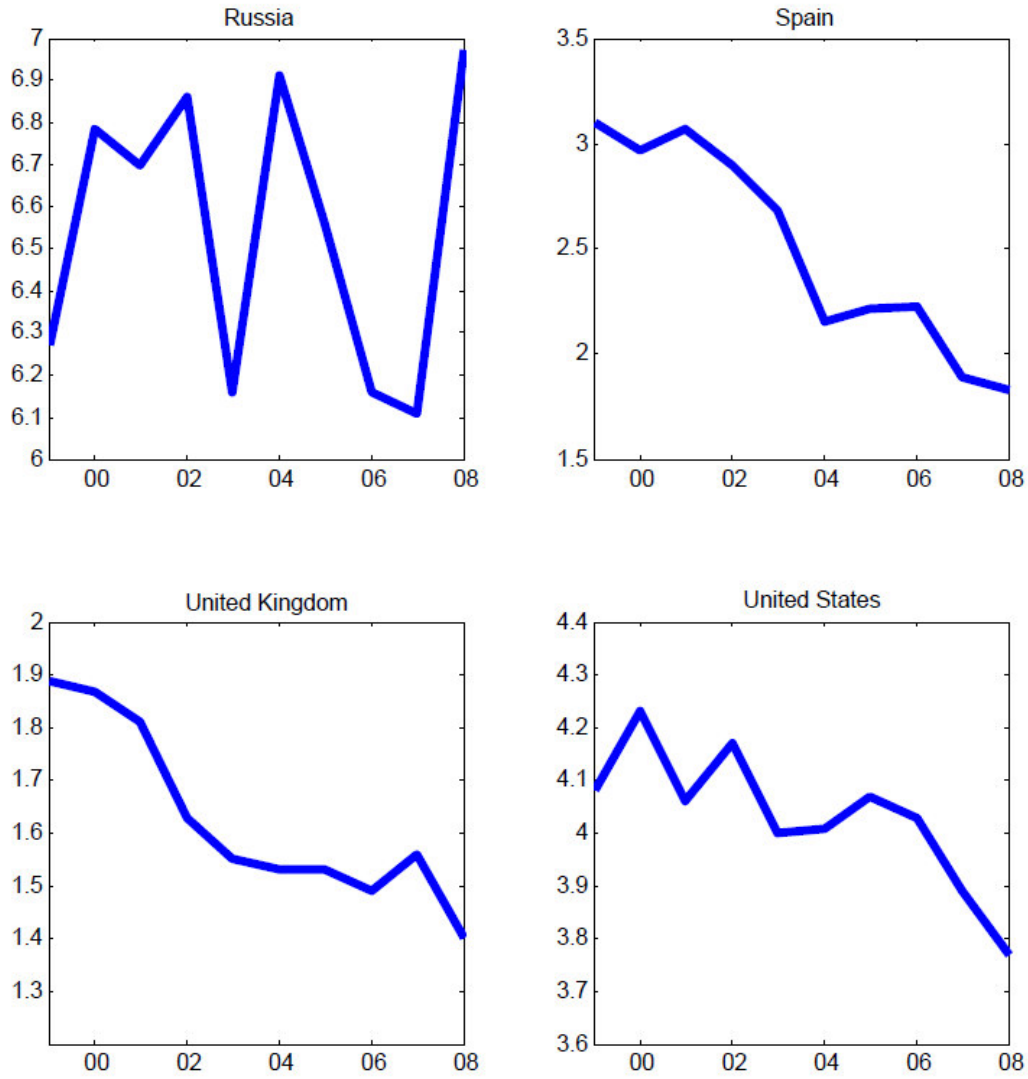
Note: This figure shows the time series of the Net Interest Margin across countries for our sample period 1999-2008.

Figure 1 Continued: Median Net Interest Margin (NIM) Across Countries



Note: This figure shows the time series of the Net Interest Margin across countries for our sample period 1999-2008.

Figure 1 Continued: Median Net Interest Margin (NIM) Across Countries



Note: This figure shows the time series of the Net Interest Margin across countries for our sample period 1999-2008.