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Abstract

This paper uses static and dynamic panel estimates in a sample including all 28 European Union countries during the last decade and provides empirical evidence on the important role that well-functioning EU banking institutions can play in promoting economic growth. The banking sector performance is *proxied* by the evolution of some relevant financial ratios and economic growth is represented by the annual Gross Domestic Product growth rate. In order to analyse the possible differences arising after the outbreak of the recent international financial crisis, the estimations consider two panels: one for the time period 1998–2012 and another for the subinterval 2007–2012. The results obtained allow us to draw conclusions not only on the importance of the variation of the different operational, capital, liquidity and assets quality financial ratios to economic growth but also on some differences evidenced in the two considered panels, reflecting the consequences of the recent financial crisis and the correspondent reactions of the European banking institutions.

Keywords: bank performance, economic growth, European Union, financial crisis, panel estimates

JEL Classification: F30, F40, G20, G30, O40.

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Financial crisis, banking sector performance and economic growth in the European Union

1. Introduction

During the last decade, and particularly after the outbreak of the recent international financial crisis, which deeply affected the European Union (EU) countries, concerns have mounted over the role of the financial institutions in dealing with the phenomena resulting from asymmetric information. It became more evident that the consequences of excessively risky credit supply can not only contribute to the possible collapse of some banking and other financial institutions, but also affect the process of financing the other economic sectors that contribute to economic growth.

To our knowledge, not many authors have analysed the possible contribution of the financial institutions to economic growth in the context of all current EU member states and in particular taking into account the consequences of the recent international financial crisis.This paper seeks to improve upon the existing literature by testing the contribution of the EU banking institutions' performance, *proxied* by some relevant financial ratios, to economic growth during the last decade and particularly after the recent financial crisis. Using static and dynamic panel estimation methods on a data set including all 28 current EU member states, we compare the results obtained for two panels: one considering the years between 1998 and 2012 and a second one for the subinterval spanning only from 2007 to 2012.

The results obtained reveal not only the importance of the variation of different operational, capital, liquidity and assets quality financial ratios to the Gross Domestic Product (GDP) growth rate but also some differences evidenced in the two considered panels, reflecting the consequences of the recent financial crisis and the European banking institutions' reactions to the crisis.

The remainder of the paper is structured as follows: Section 2 presents a review of some relevant literature; the used data and panel estimation methods are presented in Section 3; Section 4 reports the results obtained with the estimations; finally, Section 5 summarizes and concludes.

2. Review of some relevant literature

The importance of the banking sector's performance to economic growth has been the subject of intense theoretical debates and empirical studies, particularly after the publication of the renowned King and Levine papers (1993-a, 1993-b).

There is a strand of literature pointing to a general consensus that well-functioning banking institutions and financial markets contribute to economic growth by decreasing transaction costs and the problems connected to asymmetric information. Furthermore, banking institutions are supposed to facilitate trade and the diversification of risk, and also to increase the financial resources to assist economic growth, by mobilizing savings, identifying the best investment opportunities and selecting the most profitable projects.

Nevertheless, as already underlined by Khan and Senhadji (2000), while the general effects of financial development on the real outputs may be considered positive, the size of these effects varies not only with the different variables, namely with the chosen financial development indicators, but also with the estimation methods, data frequency or the defined functional forms of the relationships.

Included in this strand of literature, Levine and Zervos (1998) consider data for 49 countries for the time interval 1976–1990 and conclude that there is a strong correlation between the rates of real per-capita output growth and stock market liquidity. At the same time, Demirguç-Kunt and Levine (1999), using data for 150 countries spanning the 1990s, demonstrate that wealthy countries have better developed financial systems, and define this development in terms of the size and efficiency of the financial sector, measured by the assets, liabilities, overhead costs and interest rate margins. Beck et al. (2004) consider the ratio between credits from financial intermediaries to the private sector divided by GDP as a proxy of financial intermediation in a panel of 52 countries during the period 1960 to 1999 and conclude that financial development is clearly pro-growth but also pro-poor.

More recently, Greenwood et al. (2010, 2013) empirically analysed the effects of financial development on economic growth, deploying a state cost verification model, and concluded that as financial sector efficiency rises, financial resources get redirected from the less productive firms to their more productive peers. This analytical approach was applied to both U.S. and cross-country data (more precisely, to a 45-country sample, first applied in Beck et al., 2000) and one of the key findings points to the conclusion that world output could increase by 53 per cent if all countries adopted the best global financial practices.

Cecchetti and Kharroubi (2012) consider a sample of developed and emerging economies and study how financial development contributes to aggregate productivity growth and conclude in favour of an inverted U-shaped financial development effect, meaning that this development exerts a positive influence on productivity growth but only up to a certain point and after that point the influence on growth turns negative. Moreover, these authors focus also on advanced economies, showing that a fast-growing financial sector can be detrimental to aggregate productivity growth.

Other studies had already underlined that the contribution of the financial intermediaries to economic growth is far from consensual as the financial institutions can also be subject to adverse selection and moral hazard problems that will constrain real economic growth through non-adequate resource allocation, exaggerating the fluctuations in interest rates, or contributing to the decrease of the prevailing saving rates (among others, Bhide, 1993; Bencivenga et al., 1995; Rajan and Zingales, 1998; Shan, 2005).

Moreover, Gaytan and Rancière (2004) point out that, on the one hand, credit to the private sector and bank deposits contribute negatively to growth but, on the other hand, stock market size, liquidity and investment contribute positively to economic development. The same kind of conclusions were obtained by Ayadi et al. (2013) using a sample of northern and southern Mediterranean countries for the 1985–2009 time period: these authors confirm that there are deficiencies in bank credit allocation in the considered countries as credit to the private sector and bank deposits are negatively associated with economic growth; however, on the stock market side, their results indicate that stock market size and liquidity do contribute to growth.

There is also another strand of literature testing the causality relations between financial development and economic growth, including authors such as Berthelemy and Varoudakis (1996) and Greenwood and Bruce (1997), who believe that there may be a reverse causality between economic growth and financial development; others (like Demetriades and Hussein, 1996; Shan et al., 2001; Calderon and Liu, 2003; Bangake and Eggoh, 2011; Kar et al., 2011; Abdelhafidh, 2013) assume that there is a two-way causality relationship between financial development and economic growth.

Hassan et al. (2011) analyse how financial development links to economic growth applying Granger causality tests for a sample period between 1980 and 2007, and categorizing low- and middle-income countries into six geographic regions: East Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, South Asia and Sub-Saharan Africa; and also two groups of high-income countries: OECD and non-OECD countries. The conclusion to be drawn from their finding is that the evidence favours the contribution of financial development to economic growth, particularly in low- and middle-income countries.

Authors like Loayza and Rancière (2006) also underline the importance of the time horizon, agreeing that in the long term, the studies on economic growth find a positive relationship between financial development and real growth but, in the short term, the literature, and particularly that concerning bank crises, returns a negative relationship, revealing that monetary aggregates can represent good predictors of economic crisis. Furthermore, it is generally accepted that during banking crisis the credit provided to the private sector and the aggregate output decelerate (as empirically demonstrated, among others, by Kaminsky and Reinhart (1999), Laeven et al. (2002) and Dell'Ariccia et al. (2008)). Recently, Laeven and Valencia (2013) confirmed the important role of credit market frictions in the performance of the real economic activity during the recent crisis, using a sample including a large cross section of firms from 50 countries in both advanced and emerging market economies.

However, not many studies have empirically tested the relevance of the banking sector's performance to economic growth in the context of all the European Union member states.

In Ferreira (2008), quarterly data were used to analyse the possible influence of the financial systems on economic growth, in the context of the integration of new member states in the European Union. The real per-capita GDP growth was explained by the following variables: the real growth of domestic credit, the foreign liabilities, the sum of the bonds and money market instruments, the bank assets/bank liabilities ratio, and the domestic credit/bank deposits ratio. Two balanced panels were considered with subsets of EU countries: one including 11 "old" EU member countries (excluding Luxembourg, Denmark, Ireland and Sweden) for the period between Q2 1980 and Q4 1998, and another including 24 EU countries (excluding only Luxembourg) for the period between Q2 1999 and Q4 2002. The results obtained confirm the importance of the included financial variables to the real per-capita GDP growth and also the relatively more homogeneous behaviour in the panel considering only 11 of the "old" member states.

Koetter and Wedow (2010) analysed the relevance of banking financial intermediation to economic growth but in 97 German economic planning regions for the time period between 1993 and 2004 and concluded that the quality of these banks, defined by bank cost efficiency, robustly contributes to growth, while the quantity of bank credit provided does not clearly correlate with economic growth. The same kind of conclusions were also obtained by Hasan et al. (2009), who studied whether regional growth in 11 European countries was influenced by bank costs and profit efficiency over the time period 1996–2005. Their findings indicate how, in these countries, an increase in bank efficiency generates five times more influence on economic growth than the same rise in the level of bank credit provided.

Recently, Ferreira (2016) also analyses the effects of the performance of the banking institutions on GDP growth using panel estimations and considering 27 EU countries for the time period between 1996 and 2008. Bank performance is represented not only by the traditional Return on Assets (ROA) and Return on Equity (ROE) ratios but also by bank efficiency, measured through Data Envelopment Analysis (DEA) and taking into account the influence of bank market concentration represented by the percentage share of the total assets held by the three largest banking institutions (C3). The main findings point to the expected and statistically significant positive influence of the ROA and ROE ratios and also of the DEA bank cost efficiency, and, although less strongly, to a negative effect of the C3 bank market concentration measure on EU economic growth.

3. Data and estimation methodology

3.1. Data

In our estimations we use data sourced from the European Commission database, AMECO, more precisely the dependent variable, GDP and also the financial sector leverage, that is, the ratio of debt to equity. All the other financial ratios are sourced from the privately owned financial database maintained by the Bureau van Dijk, BankScope.

Taking into account the classifications and definitions proposed by the BankScope database we consider the banking sector (more precisely, all commercial and savings banks) of each of the 28 current EU member states and opt to use different kinds of financial ratios, more precisely:

Operational ratios:

- **Net Interest Margin**, which is the interest income minus interest expense divided by interest-bearing assets, representing the difference between what the bank receives from borrowers and what it pays to savers. So, the net interest margin focuses on the traditional borrowing and lending operations of the bank. The increase of the margins is usually considered as desirable but only as long as the asset quality is being maintained.
- **Return on Average Assets**, which is the ratio of the net income to the total assets of the banks and is useful in the assessment of the use of the banks' resources and their financial strength. This ratio is often considered to be the most important single ratio in comparing the efficiency and operational performance of banks as it takes into account the returns generated from the assets financed by the bank.
- **Cost to Income**, which is one of the most cited ratios as it measures the overheads or costs of operating the bank as the percentage of income generated before provisions. It is a useful measure of bank efficiency, although it can be distorted by high net income from associates or volatile trading income; moreover, if the lending margins in a particular country are comparatively very high then the cost-to-income ratio will improve as a result of this situation.

Capital ratios:

- **Equity to Total Assets**, which is one of the most important capital ratios, representing the book value of equity divided by the total assets. Taking into account that equity represents a cushion against asset malfunction, the equity-to-total-assets ratio measures the amount of protection afforded to the bank by the equity invested in the bank; the higher this ratio is, the more protected the bank is. Furthermore, this ratio measures the bank leverage levels and reflects the differences in risk preferences across banks.

- **Debt to Equity**, which also measures the leverage levels and particularly the solvency of the bank, as this ratio represents the percentage of the bank's equity that is owed by its creditors. It is a useful measure to evaluate the amount of risk that the bank creditors will be taking on by providing financial support to the bank.
- **Equity to Liabilities**, which is another bank leverage ratio, representing the percentage of the bank's liabilities covered by its equity or simply the bank's capital adequacy.

Liquidity ratios:

- **Net Loans to Total Assets Ratio**, which is a liquidity measure and also a credit risk measure, obtained through the percentage of the assets of the bank that is tied up in loans; the lower this ratio is, the more liquid the bank will be.
- **Net Loans to Total Deposits and Borrowings**, which is also a measure of bank liquidity, similar to the previous one, but its denominator includes the bank deposits and borrowings with the exception of capital instruments.

Assets quality ratio:

- **Impaired Loans to Gross Loans**, which is a measure of the amount of the total loans that is doubtful, representing the quality of the bank assets; the lower this ratio is, the better the bank asset quality is.

Different combinations of these ratios were included in the three estimated models in order to explain their influence on economic growth, here represented by the Gross Domestic Product, more precisely, the AMECO series "GDP total in national currency (including 'euro fixed' series for euro area countries), current prices – annual data".

We aim to analyse the bank performance contribution to the GDP growth (the natural logarithm of the GDP) of all the current EU member states as well as the possible differences after the outbreak of the recent financial crisis considering two panels of EU countries: one for the time period 1998–2012 and another for the shorter interval 2007–2012.

Before proceeding with the panel estimations we test the stationarity of the series. We opted to use panel unit root tests, which not only increase the power of unit root testing due to the observation span but also minimize the risks of structural breaks. From among the available panel unit root tests, we chose here to use the Levin, Lin and Chu (2002) test.

The Levin, Lin and Chu (2002) may be viewed as a pooled Dickey-Fuller test, or as an augmented Dickey-Fuller test, including lags and the null hypothesis stems from the existence of non-stationarity. This test is adequate for heterogeneous panels of moderate size, such as the panels included in this paper. The results, considering the first differences of the chosen series, are reported in Appendix A and enable us to reject the null hypothesis.

3.2. Estimation methodology

The use of a panel data approach in our estimations not only guarantees more observations for estimations, but also reduces the possibility of multicollinearity among the different variables.

Following, among others, Wooldridge (2010), we consider the general multiple linear panel regression model for the cross unit (in our case, the country's *i* bank sector, defined as the sample of all commercial and saving banks) $i = 1,\dots,N$, which is observed for several time periods $t = 1,\dots,T$:

$$y_{i,t} = \alpha + x'_{i,t}\,\beta + c_i + \varepsilon_{i,t}$$

where: $y_{i,t}$ is the dependent variable (that is, each country's *i* GDP growth rate at time *t*); α is the intercept; $x_{i,t}$ is a K-dimensional row vector of explanatory variables (here, the presented bank sector financial ratios) excluding the constant; β is a K-dimensional column vector of parameters; c_i is the individual country-specific effect; and $\varepsilon_{i,t}$ is an idiosyncratic error term.

As we are dealing with balanced panels, we guarantee that each individual, *i* (here each country's banking sector), is observed in all time periods, *t*. And one of the main advantages of using a panel data approach in this kind of cross-country regression is its ability to deal with the time-invariant individual effects (c_i).

In a panel random-effects model we believe that the individual specific effect is a random variable that is uncorrelated with the explanatory variables, while in a panel fixed-effects model we believe that this individual specific effect is a random variable that is allowed to be correlated with the explanatory variables. In order to decide either to use fixed- or random-effects estimates it is possible to implement the Hausman (1978) procedure, which tests the null hypothesis that the conditional mean of the disturbance residuals is zero. The fixed-effects model will be preferred over the random-effects one if the null hypothesis is rejected; in contrast, the random-effects approach will be more appropriate than the fixed-effects method if the null hypothesis is accepted.

However, neither fixed- nor random-effects models can deal with endogenous regressors, which may reveal an important concern in the context of the considered model. In order to deal with this limitation, we use dynamic panel estimates, developed by Arellano and Bover (1995) and Blundell and Bond (1998), which can not only address the endogeneity problems (although only for weak endogeneity and not for full endogeneity, as explained by Bond (2002)) but also reduce the potential bias in the estimated coefficients.

Here we chose the robust one-step and two-step system GMM (Generalized Method of Moments) estimates. The system GMM method uses cross-country information and jointly estimates the equations in first difference and in levels, with first differences instrumented by lagged levels of the dependent and independent variables and levels instrumented by first differences of the regressors.

In order to test the consistency of the GMM estimations, namely the validity of the additional instruments, we follow the tests proposed by Arellano and Bond (1991). They are used to test autocorrelation, that is, the assumption that the error term is not serially correlated using the differenced error term, so, by construction, the autocorrelation of the first order, AR(1), is supposed to be validated but not the autocorrelation of the second order, AR(2), or autocorrelation of a higher order. Additionally, the validity of the instruments is tested through the Hansen J statistic, which is robust to heteroskedasticity and autocorrelation; under the null hypothesis of the validity of the instruments, the Hansen test has a chi-squared distribution with J-K degrees of freedom, where J is the number of instruments and K the number of regressors.

To avoid the problems connected to the proliferation of instruments in relatively small samples, like the one we are using here, Roodman (2009) says that in these kinds of estimations the number of instruments should not approach or exceed the number of cross units (in our case, the number of EU countries).

4. Empirical results

Using different combinations of the presented financial ratios as instruments, we estimate three models, considering for each of them two time periods: a longer one, between 1998 and 2012 (Panel 1), and another one, for the interval spanning only from 2007 to 2013 (Panel 2), as we want to analyse the possible differences after the outbreak of the recent financial crisis. Appendix B reports the correlation matrices of these models.

We will analyse the results obtained for the considered models with robust panel random-effects estimates and also with robust dynamic panel-data one-step and two-step system GMM estimates. As the coefficients obtained with the used panel estimation methodologies are very stable across the different model specifications, we will comment on their economic meaning once for all.

We opt to present the results obtained with panel robust random-effects estimates, assuming that the unobserved variables are uncorrelated with the observed ones, as these results are completely in line with those obtained with robust fixed-effects estimates and the Hausman test did not validate the fixed-effects approach.

Table 1 around here

Table 1 reports the results obtained using robust panel random-effects estimates. In all situations, and particularly for the time period after the outbreak of the recent financial crisis (our Panel 2), the obtained Wald test results and the comparatively high, for panel data estimates, R-squared values allow us to conclude that our estimates are in general robust, meaning that the evolution (first differences) of the chosen financial ratios is statistically relevant to explain the GDP growth rate (first differences of natural logarithms). This relevance is also corroborated in Panel 1 (1998–2012) as the results obtained for all financial ratios included in each of the three models are statistically very robust.

In order to test the robustness of the results obtained with random-effects estimates we use robust dynamic panel-data system GMM estimates that reduce the potential bias in the estimated coefficients and control for the potential endogeneity of all explanatory variables.

Here we begin by using the robust one-step estimates of the standard errors, which are consistent in the presence of any pattern of heteroskedasticity and autocorrelation within panels, and we present the results obtained in Table 2.

Table 2 around here

In both panels, and more clearly in Panel 1, the Wald tests results reveal the overall fit of the considered models. The Roodman (2009) rule of thumb is respected in all estimations as in the models of Panel 1 the number of instruments is 27 and in the models of Panel 2 the number of instruments is 9, thereby never exceeding the current number of the EU countries.

The quality of these one-step estimates in Panel 1 is corroborated by the results obtained, in the three models, with the Arellano and Bond (1991) tests as they clearly reject the null hypothesis of no autocorrelation of the first order and do not reject the hypothesis of no autocorrelation of the second order. Moreover, the Hansen J statistic does not reject the overidentifying restrictions, allowing us to believe that all included instruments are valid.

With regard to the second panel, which includes only the years after the outbreak of the recent financial crisis (2007–2013), and still according to the results presented in Table 2, the Arellano and Bond (1991) tests in all models clearly reject the null hypothesis of no autocorrelation of the first order, and with the exception of model I these tests do not reject the hypothesis of no autocorrelation of the second order. At the same time, the Hansen J statistic validates all the internal and external instruments in models I and III but not so clearly in the model II.

In our estimations we also used the robust dynamic system GMM two-step estimates of the standard errors, which are considered asymptotically more efficient than the one-step estimates. However, as demonstrated by Arellano and Bond (1991) and by Blundell and Bond (1998), in a finite sample the standard errors reported with two-step estimates tend to be severely downward biased. In order to compensate this bias, Windmeijer (2005) recommends a finite-sample correction to the two-step covariance matrix, which could make the two-step estimates more efficient than the one-step ones, but unfortunately, here, the limited number of current EU countries (our cross-section units) did not allow us to apply the Windmeijer correction.

Nevertheless, the results obtained using robust dynamic two-step system GMM estimates, presented in Table 3, are completely in line with those obtained with the one-step estimates. In both panels and for the considered models, the Wald test results validate the estimations. As before, for Panel 1 (1998-–2012), in all models the Hansen test clearly does not reject the null that the instruments are valid and that they are not correlated with the errors, and, according to the results reported for the Arellano-Bond tests, the validity of the instruments is clearly supported as the residuals are always AR (1), but not AR (2).

Table 3 around here

Moreover, and still corroborating the results obtained with the one-step GMM estimates for Panel 2 (2007–2012), the Hansen J statistic clearly validates only models I and III; and with regard to the Arellano-Bond tests, Table 3 also shows that there is clear rejection of the null hypothesis of no autocorrelation of the first order and almost always (model I is again the exception) the Arellano-Bond tests validate the estimates and do not reject the hypothesis of no autocorrelation of the second order.

The results obtained for the considered models with the used panel estimation methodologies are summarized in Table 4 and clearly show that, although not always with the same statistical robustness, the coefficients are always very stable across the different model specifications and estimation methodologies.

Table 4 around here

With regard to Panel 1, as expected, the evolution of the **Return on Average Assets** (included as an instrument in the three considered models) always goes in line with the GDP growth rate, revealing that the increase in efficiency and operational performance of the banking sector will contribute to the economic growth of the EU member states.

Staying with the results reported in Table 4 for Panel 1, we can look at two other financial ratios that clearly go in line with the GDP growth rate, namely the **Equity-to-Total-Assets** ratio, indicating that more protected banks will be relevant to economic growth, and the **Debt-to-Equity** ratio, revealing that during this time period the bank sector leverage levels and the correspondent risks may have increased but they did not contradict economic growth. The **Equity-to-Liabilities** ratio, which is another bank leverage ratio, as well as the **Net-Loans-to-**

Total-Assets and **Net-Loans-to-Total-Deposits-and-Borrowings** ratios also grow in line with GDP.

Not surprisingly, the evolution of the **Impaired-Loans-to-Gross-Loans** ratio, representing the dubious provided bank loans, is negatively related to the GDP growth rate; and the same occurs with the **Cost-to-Income** ratio as the increase of the banking operational costs may be synonymous with less efficiency in providing the necessary bank financing of productive investments that will contribute to economic growth.

However, in this case (Panel 1), a relative surprise may be the negative influence on the GDP growth of the **Net Interest Margins**, defined as the interest income minus interest expense divided by interest-bearing assets, or simply the difference between what banks receive from borrowers and what they pay to savers, representing the traditional borrowing and lending bank operations. But a more attentive look at the evolution of the bank **Net Interest Margins** reveals that during the considered time period the margins were in many cases decreasing, so it is not a real surprise to find that their evolution was not in line with economic growth.

Most of these tendencies were kept after the outbreak of the recent financial crisis, as evidenced by the results still reported in Table 4 but for the years between 2007 and 2012 (Panel 2). Nevertheless, there are also some differences, due to the reactions of European banking to the financial crisis. More precisely, during this shorter time period the evolution of the **Equity-to-Liabilities** and **Equity-to-Total-Assets** ratios was opposite to the GDP growth rate, as a symptom of the decrease of the bank sector leverage levels after the outbreak of the crisis. At the same time, and revealing the tendency to the increase of the traditional bank activities that was another response to the crisis, in Panel 2 the evolution of **Net Interest Margins** is now in line with the economic growth.

5. Summary and conclusions

Using static and dynamic panel estimates in a sample of all 28 EU member states during the last decade this paper provides empirical evidence of the important role that well-functioning banking institutions can play in promoting economic growth, here represented by the annual GDP growth rate. The data were sourced from the AMECO database and mostly from the Bankscope database as the performance of the banking institutions was *proxied* by some relevant financial ratios, including operational, capital, liquidity and assets quality ratios. In order to analyse the possible differences arising after the outbreak of the recent international financial crisis, the estimations considered two panels: one for the time period 1998–2012 and another for the subinterval 2007-–2012.

Summarizing, the results obtained allow us to conclude that:

1. With regard to the included **operational ratios**:
    - For the first panel (1998–2012) there is clear and statistically strong evidence that the variation (mostly the decrease) of the **Net Interest Margins**, representing the traditional borrowing and lending operations, contrasts he GDP growth rate; but after the outbreak of the crisis (2007–2012) this variation is in line with economic growth, confirming that after the crisis many banking institutions decided to give emphasis to the traditional banking activities.
    - In both panels there is clear evidence that the variation of the **Return on Average Assets** of the EU banking institutions contributes positively to economic growth.
    - And although not with the same statistical strength, there is still evidence that before and after the crisis, the increase of the **Cost-to-Income** ratio, a *proxy* for less bank efficiency, does not contribute to the GDP growth rate.

2. With regard to the **capital ratios**:

- The contribution to economic growth of the **Equity-to-Total-Assets** ratio, one of the measures of the banking leverage levels and the correspondent risk preferences, also reveals the differences in the behaviour before and after the outbreak of the international crisis. In our first panel (1998–2012) this ratio increases in line with the GDP, but for the subinterval 2007-2012 it looks like it is opposite to the economic growth as a symptom of the decrease of the banking leverage levels.
- There is clear evidence that in both panels, the increase of the bank solvency, here represented by the evolution of the **Debt-to-Equity** ratio, contributes positively to the GDP growth rate.
- However, with regard to the **Equity-to-Liabilities** ratio, which is another measure of the bank leverage level, it is in line with the economic growth in our first panel (1998–2012) but it is in contrast to the GDP growth in the subinterval 2007–2012, confirming the tendency to increase the bank protection after the outbreak of the crisis.

3. As for the **<u>liquidity ratios</u>**:
    - There is clear evidence that in both panels more liquid banks, here represented by the **Net-Loans-to-Total-Assets ratio**, contribute positively to the GDP growth rate.
    - The same results were obtained when bank liquidity was *proxied* by the **Net-Loans-to-Total-Deposits-and-Borrowings** ratio.

4. Finally, for the **<u>assets-quality ratio</u>**:
    - As expected, the increase of the **Impaired-Loans-to-Gross-Loans** ratio, representing the fall of the quality of the bank assets, clearly contradicts the GDP growth rate, before and after the recent international financial crisis.

These results lead us to conclude that, although banking institutions were generally considered responsible for the recent financial crisis, their wealthy performance could also be a relevant contribution to economic growth, at least in the universe of all 28 EU member states during the last decade.

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APPENDIX A – PANEL UNIT ROOT TEST

PANEL 1 – (1998–2012)

Variables (*)	Coefficient	t-star	P > t	obs.
Δ Ln GDP	-0.45558	-5.56807	0.0000	351
Δ Net Interest Margin	-1.08930	-19.31776	0.0000	351
Δ Return on Average Assets	-1.11523	-23.67703	0.0000	351
Δ Cost to Income Ratio	-1.43582	-28.31398	0.0000	351
Δ Equity to Total Assets Ratio	-1.27586	-22.14069	0.0000	351
Δ Debt to Equity Ratio	-1.13918	-15.61671	0.0000	351
Δ Equity to Liabilities Ratio	-1.46836	-28.22642	0.0000	351
Δ Net Loans to Total Assets Ratio	-1.00437	-14.98206	0.0000	351
Δ Net Loans to Total Deposits and Borrowings Ratio	-1.05457	-16.26953	0.0000	351
Δ Impaired Loans to Gross Loans Ratio	-0.98484	-16.44459	0.0000	351

PANEL 2 – (2007–2012)

Variables(*)	Coefficient	t-star	P > t	obs.
Δ Ln GDP	-1.14952	-21.08455	0.0000	108
Δ Net Interest Margin	-1.29413	-10.66102	0.0000	108
Δ Return on Average Assets	-1.31640	-8.78615	0.0000	108
Δ Cost to Income Ratio	-1.45812	-46.31647	0.0000	108
Δ Equity to Total Assets Ratio	-1.18626	-12.72064	0.0000	108
Δ Debt to Equity Ratio	-1.48950	-14.40565	0.0000	108
Δ Equity to Liabilities Ratio	-0.59464	-5.28540	0.0000	108
Δ Net Loans to Total Assets Ratio	-1.30110	-18.89312	0.0000	108
Δ Net Loans to Total Deposits and Borrowings Ratio	-1.37850	-21.48547	0.0000	108
Δ Impaired Loans to Gross Loans Ratio	-1.28129	-12.44569	0.0000	108

(*) Δ = First difference; Ln = Natural logarithm

APPENDIX B – CORRELATION MATRICES

MODEL I
PANEL 1 – (1998–2012)

Variables(*)	Δ Ln GDP	Δ Net Interest Margin	Δ Return on Average Assets	Δ Cost to Income Ratio	Δ Equity to Total Assets Ratio	Δ Net Loans to Total Assets Ratio	Δ Impaired Loans to Gross Loans Ratio
Δ Ln GDP	1.0000						
Δ Net Interest							

Margin	-0.2095	1.0000					
Δ Return on Average Assets	0.1700	0.0089	1.0000				
Δ Cost to Income Ratio	-0.0346	-0.1465	0.1387	1.0000			
Δ Equity to Total Assets Ratio	-0.0007	0.2166	0.0170	-0.0116	1.0000		
Δ Net Loans to Total Assets Ratio	0.1657	0.1370	-0.0026	-0.0348	-0.1958	1.0000	
Δ Impaired Loan to Gross Loans Ratio	-0.2238	-0.0997	-0.1080	-0.0246	0.0150	-0.0357	1.0000

PANEL 2 – (2007–2012)

Variables(*)	Δ Ln GDP	Δ Net Interest Margin	Δ Return on Average Assets	Δ Cost to Income Ratio	Δ Equity to Total Assets Ratio	Δ Net Loans to Total Assets Ratio	Δ Impaired Loans to Gross Loans Ratio
Δ Ln GDP	1.0000						
Δ Net Interest Margin	0.3889	1.0000					
Δ Return on Average Assets	0.2357	0.0936	1.0000				
Δ Cost to Income Ratio	-0.0630	-0.1802	0.2992	1.0000			
Δ Equity to Total Assets Ratio	0.0647	0.0803	0.6027	0.3199	1.0000		
Δ Net Loans to Total Assets Ratio	0.2638	0.2413	-0.1153	-0.0022	-0.0897	1.0000	
Δ Impaired Loan to Gross Loans Ratio	-0.5928	-0.4376	-0.4146	0.0199	-0.2201	-0.1809	1.0000

MODEL II
PANEL 1 – (1998–2012)

Variables(*)	Δ Ln GDP	Δ Net Interest Margin	Δ Return on Average Assets	Δ Debt to Equity Ratio	Δ Equity to Liabilities Ratio	Δ Net Loans to Total Deposits and Borrowing Ratio	Δ Impaired Loans to Gross Loans Ratio
Δ Ln GDP	1.0000						
Δ Net Interest Margin	-0.2095	1.0000					
Δ Return on Average Assets	0.1700	0.0089	1.0000				
Δ Debt to Equity Ratio	0.0591	0.0328	-0.3586	1.0000			
Δ Equity to Liabilities Ratio	0.0085	0.2030	-0.0684	0.0010	1.0000		
Δ Net Loans to Total Deposits and Borrowing Ratio	0.1296	0.1689	0.0554	0.0058	-0.1800	1.0000	
Δ Impaired Loans to Gross Loans Ratio	-0.2238	-0.0997	-0.1080	0.0047	0.0028	-0.0315	1.0000

PANEL 2 – (2007–2012)

Variables(*)	Δ Ln GDP	Δ Net Interest Margin	Δ Return on Average Assets	Δ Debt to Equity Ratio	Δ Equity to Liabilities Ratio	Δ Net Loans to Total Deposits and Borrowing	Δ Impaired Loans to Gross Loans

						Ratio	Ratio
Δ Ln GDP	1.0000						
Δ Net Interest Margin	0.3889	1.0000					
Δ Return on Average Assets	0.2357	0.0936	1.0000				
Δ Debt to Equit Ratio	0.2350	0.1293	-0.4488	1.0000			
Δ Equity to Liabilities Ratio	0.0664	0.0834	0.6011	-0.3418	1.0000		
Δ Net Loans to Total Deposits and Borrowing Ratio	0.2530	0.2548	0.0495	-0.0193	0.1969	1.0000	
Δ Impaired Loans to Gross Loans Ratio	-0.5928	-0.4376	-0.4146	-0.0807	-0.2132	-0.2481	1.0000

MODEL III

PANEL 1 – (1998–2012)

Variables(*)	Δ Ln GDP	Δ Return on Average Assets	Δ Debt to Equity Ratio	Δ Impaired Loans to Gross Loans Ratio
Δ Ln GDP	1.0000			
Δ Return on Average Assets	0.1700	1.0000		
Δ Debt to Equity Ratio	0.0591	-0.3586	1.0000	
Δ Impaired Loans to Gross Loans Ratio	-0.2238	-0.1080	0.0047	1.0000

PANEL 2 – (2007–2012)

Variables(*)	Δ Ln GDP	Δ Return on Average Assets	Δ Debt to Equity Ratio	Δ Impaired Loans to Gross Loans Ratio
Δ Ln GDP	1.0000			
Δ Return on Average Assets	0.2357	1.0000		
Δ Debt to Equity Ratio	0.2350	-0.4488	1.0000	
Δ Impaired Loans to Gross Loans Ratio	-0.5928	-0.4146	-0.0807	1.0000

(*) Δ = First difference; Ln = Natural logarithm

TABLE 1 – RESULTS OBTAINED WITH ROBUST PANEL RANDOM-EFFECTS ESTIMATES
PANEL 1 – (1998–2012)

Variables (*)	MODEL I	MODEL II	MODEL III
Constant:			
Coefficient	.0522928	.052782	.0570513
Z	11.89	11.30	8.73
P>|z|	0.000	0.000	0.000
Δ Net Interest Margin			
Coefficient	-.020414	-.0197993	
Z	- 2.73	-2.58	
P>|z|	0.006	0.010	
Δ Return on Average Assets			
Coefficient	.0077313	.009462	.0088976
Z	1.92	2.41	2.07
P>|z|	0.054	0.016	0.038
Δ Cost to Income Ratio			
Coefficient	-.0001108		
Z	-2.59		
P>|z|	0.010		
Δ Equity to Total Assets Rati			
Coefficient	.0011713		
Z	2.94		
P>|z|	0.003		
Δ Debt to Equity Ratio			
Coefficient		.0000462	.0000479
Z		2.86	2.62
P>|z|		0.004	0.009
Δ Equity to Liabilities Ratio			
Coefficient		.0001745	
Z		3.25	
P>|z|		0.001	
Δ Net Loans to Total Assets Ratio			
Coefficient	.0025459		
Z	3.15		
P>|z|	0.002		
Δ Net Loans to Total Deposit and Borrowings Ratio			
Coefficient		.0017024	
Z		2.82	
P>|z|		0.005	
Δ Impaired Loans to Gross Loans Ratio			
Coefficient	-.0033026 .	-.0032209	-.0032348
Z	-2.08	-2.17	-1.93
P>|z|	0.038	0.030	0.053
Number of observations	392	392	392
R-squared: overall	0.1816	0.1779	0.0856
Wald	chi2(6)= 18.77 (Prob. > chi2 = 0.0046)	chi2(6)= 21.01 (Prob. > chi2 = 0.0018)	chi2(3)= 12.32 (Prob. > chi2 = 0.0064)

PANEL 2 – (2007–2012)

Variables(*)	MODEL I	MODEL II	MODEL III
Constant:	.0363955	.035119	.035386
Coefficient	6.99	6.24	6.67
Z	0.000	0.000	0.000
P>|z|			
Δ Net Interest Margin	.0248209	.0271866	
Coefficient	1.84	1.98	
Z	0.066	0.048	
P>|z|			
Δ Return on Average Assets	.0033513	.0073346	.0038298
Coefficient	0.81	1.76	0.79
Z	0.416	0.078	0.429
P>|z|			
Δ Cost to Income Ratio	-.0000155		
Coefficient	-0.58		
Z	0.562		
P>|z|			
Δ Equity to Total Assets Rati	-.0045794		
Coefficient	-1.57		
Z	0.116		
P>|z|			
Δ Debt to Equity Ratio		.000049	.0000505
Coefficient		2.24	2.10
Z		0.025	0.036
P>|z|			
Δ Equity to Liabilities Ratio		-.0051919	
Coefficient		-2.99	
Z		0.003	
P>|z|			
Δ Net Loans to Total Assets Ratio	.0023714		
Coefficient	1.57		
Z	0.117		
P>|z|			
Δ Net Loans to Total Deposit and Borrowings Ratio		.0017666	
Coefficient		1.33	
Z		0.185	
P>|z|			
Δ Impaired Loans to Gross Loans Ratio	-.0101189	-.0092901	-.0113432
Coefficient	-4.67	-4.03	-4.80
Z	0.000	0.000	0.000
Number of observations	140	140	140
R-squared: overall	0.3983	0.4316	0.3973
Wald	chi2(6)= 85.82 (Prob. > chi2 = 0.0000)	chi2(6)= 106.59 (Prob. > chi2 = 0.0000)	chi2(3)= 50.44 (Prob. > chi2 = 0.0000)

(*) Δ = First difference. (Dependent variable = First difference of the natural logarithm of the GDP)

TABLE 2 – RESULTS OBTAINED WITH GMM ONE-STEP SYSTEM ROBUST ESTIMATES

PANEL 1 – (1998–2012)

Variables(*)	MODEL I	MODEL II	MODEL III
Constant:			
Coefficient	.0493973	.0512404	.0594523
Z	8.23	8.73	9.38
P>|z|	0.000	0.000	0.000
Δ Net Interest Margin			
Coefficient	-.0482579	-.0459546	
Z	- 4.14	-4.80	
P>|z|	0.000	0.000	
Δ Return on Average Assets			
Coefficient	.0141178	.0203632	.0306129
Z	1.14	1.62	2.54
P>|z|	0.254	0.106	0.011
Δ Cost to Income Ratio			
Coefficient	-.0005741		
Z	-1.31		
P>|z|	0.191		
Δ Equity to Total Assets Ratio			
Coefficient	.0074547		
Z	0.87		
P>|z|	0.384		
Δ Debt to Equity Ratio			
Coefficient		.0000712	.000102
Z		1.16	1.68
P>|z|		0.247	0.093
Δ Equity to Liabilities Ratio			
Coefficient		.0013863	
Z		0.94	
P>|z|		0.349	
Δ Net Loans to Total Assets Ratio			
Coefficient	.0074346		
Z	2.42		
P>|z|	0.016		
Δ Net Loans to Total Deposits and Borrowings Ratio			
Coefficient		.0048514	
Z		1.88	
P>|z|		0.060	
Δ Impaired Loans to Gross Loans Ratio			
Coefficient	-.0200331	-.018912	-.0112152
Z	-3.69	-3.57	-2.86
P>|z|	0.000	0.000	0.004
Number of observations	392	392	392
Number of instruments	27	27	27
Wald	chi2(6)=345.70	chi2(6)=231.67	chi2(3)=129.61

	(Prob. > chi2 = 0.000)	(Prob. > chi2 = 0.000)	(Prob. > chi2 = 0.000)
Arellano-Bond test for AR(1) in first differences	z = -2.45 Pr > z = 0.014	z = -2.15 Pr > z = 0.031	z = -2.61 Pr > z = 0.009
Arellano-Bond test for AR(2) in first differences	z = -1.10 Pr > z = 0.273	z = -0.56 Pr > z = 0.574	z = -1.36 Pr > z = 0.173
Hansen test of overid. Restrictions	chi2(20) = 25.85 Prob > chi2 = 0.171	chi2(20) = 21.85 Prob > chi2 = 0.349	chi2(23) = 25.94 Prob > chi2 = 0.304

PANEL 2 – (2007–2012)

Variables(*)	MODEL I	MODEL II	MODEL III
Constant:			
Coefficient	.0395615	.0363696	.0336779
Z	5.58	3.58	3.74
P>|z|	0.000	0.000	0.000
Δ Net Interest Margin			
Coefficient	.0000378	-.0124893	
Z	0.00	-0.26	
P>|z|	0.999	0.797	
Δ Return on Average Assets			
Coefficient	.0237022	.0276092	.0272035
Z	1.82	2.24	2.92
P>|z|	0.069	0.025	0.004
Δ Cost to Income Ratio			
Coefficient	-.0011964		
Z	-1.25		
P>|z|	0.212		
Δ Equity to Total Assets Ratio			
Coefficient	-.002932		
Z	-0.19		
P>|z|	0.848		
Δ Debt to Equity Ratio			
Coefficient		.0001444	.0001847
Z		1.51	2.31
P>|z|		0.130	0.021
Δ Equity to Liabilities Ratio			
Coefficient		-.0055897	
Z		-0.57	
P>|z|		0.572	
Δ Net Loans to Total Assets Ratio			
Coefficient	.0092586		
Z	1.30		
P>|z|	0.194		
Δ Net Loans to Total Deposits and Borrowings Ratio			
Coefficient		.0036515	
Z		0.47	
P>|z|		0.636	
Δ Impaired Loans to Gross Loans Ratio			
Coefficient	-.0104036	-.0102903	-.009355
Z	-1.62	-1.62	-1.64
P>|z|	0.105	0.106	0.102
Number of observations	140	140	140
Number of instruments	9	9	9
Wald	chi2(6) =60.20 (Prob. > chi2 = 0.000)	chi2(6) = 160.54 (Prob. > chi2 = 0.000)	chi2(3) = 143.36 (Prob. > chi2 = 0.000)
Arellano-Bond test for AR(1) in first differences	z = -2.33 Pr > z = 0.020	z = -2.37 Pr > z = 0.018	z = -2.31 Pr > z = 0.021
Arellano-Bond test for AR(2) in first differences	z = -2.56 Pr > z = 0.010	z = 0.12 Pr > z = 0.906	z = -0.42 **Pr > z =** 0.671
Hansen test of overid. Restrictions	chi2(2) = 2.18 Prob > chi2 = 0.336	chi2(2) = 6.11 Prob > chi2 = 0.047	chi2(5) = 6.28 Prob > chi2 = 0.280

(*) Δ = First difference. (Dependent variable = First difference of the natural logarithm of the GDP)

TABLE 3 – RESULTS OBTAINED WITH GMM TWO-STEP SYSTEM ROBUST ESTIMATES

PANEL 1 – (1998–2012)

Variables(*)	MODEL I	MODEL II	MODEL III
Constant:			
Coefficient	.0495289	.0488487	.058415
Z	8.59	7.48	8.99
P>|z|	0.000	0.000	0.000
Δ Net Interest Margin			
Coefficient	-.0470439	-.0463135	
Z	-3.94	-4.81	
P>|z|	0.000	0.000	
Δ Return on Average Assets			
Coefficient	.0139477	.0228858	.0318669
Z	1.14	1.96	2.55
P>|z|	0.253	0.050	0.011
Δ Cost to Income Ratio			
Coefficient	-.0005776		
Z	-1.29		
P>|z|	0.196		
Δ Equity to Total Assets Ratio			
Coefficient	.0071458		
Z	0.92		
P>|z|	0.357		
Δ Debt to Equity Ratio			
Coefficient		.0000712	.000106
Z		1.30	1.83
P>|z|		0.193	0.068
Δ Equity to Liabilities Ratio			
Coefficient		.0008071	
Z		0.58	
P>|z|		0.562	
Δ Net Loans to Total Assets Ratio			
Coefficient	.0073507		
Z	2.74		
P>|z|	0.006		
Δ Net Loans to Total Deposits and Borrowings Ratio		.	
Coefficient		.0052782	
Z		1.65	
P>|z|		0.100	
Δ Impaired Loans to Gross Loans Ratio			
Coefficient	-.0199294	-.0183571	-.0110235
Z	-3.47	-4.26	-2.89
P>|z|	0.001	0.000	0.004
Number of observations	392	392	392
Number of instruments	27	27	27
Wald	chi2(6)=252.49	chi2(6)=193.45	chi2(3)= 125.04

	(Prob. > chi2 = 0.000)	(Prob. > chi2 = 0.000)	(Prob. > chi2 = 0.000)
Arellano-Bond test for AR(1) in first differences	z = -2.37 Pr > z = 0.018	z = -2.81 Pr > z = 0.005	z = -2.39 Pr > z = 0.017
Arellano-Bond test for AR(2) in first differences	z = -1.00 Pr > z = 0.315	z = -0.69 Pr > z = 0.491	z = -1.11 Pr > z = 0.266
Hansen test of overid. Restrictions	chi2(20) = 25.85 Prob > chi2 = 0.171	chi2(20) = 21.85 Prob > chi2 = 0.349	chi2(23) = 25.94 Prob > chi2 = 0.304

PANEL 2 – (2007–2012)

Variables(*)	MODEL I	MODEL II	MODEL III
Constant:			
Coefficient	.0364753	.0289431	.0249584
Z	4.70	2.67	3.53
P>|z|	0.000	0.007	0.000
Δ Net Interest Margin			
Coefficient	.0393553	-.0220063	
Z	0.94	-0.27	
P>|z|	0.349	0.790	
Δ Return on Average Assets			
Coefficient	.0274706	.0371236	.0304691
Z	2.36	1.60	2.53
P>|z|	0.018	0.110	0.012
Δ Cost to Income Ratio			
Coefficient	-.0005632		
Z	-1.14		
P>|z|	0.254		
Δ Equity to Total Assets Rati			
Coefficient	-.0079079		
Z	-0.56		
P>|z|	0.577		
Δ Debt to Equity Ratio			
Coefficient		.0001754	.0002182
Z		0.97	2.43
P>|z|		0.333	0.015
Δ Equity to Liabilities Ratio			
Coefficient		-.0097436	
Z		-1.01	
P>|z|		0.312	
Δ Net Loans to Total Assets Ratio			
Coefficient	.0048658		
Z	0.83		
P>|z|	0.408		
Δ Net Loans to Total Deposit and Borrowings Ratio			
Coefficient		.0019728	
Z		0.11	
P>|z|		0.913	
Δ Impaired Loans to Gross Loans Ratio			
Coefficient	-.0064817	-.0069015	-.0066715
Z	-1.12	-0.94	-1.07
P>|z|	0.261	0.346	0.283
Number of observations	140	140	140
Number of instruments	9	9	9
Wald	chi2(6)=43.70 (Prob chi2 = 0.000)	chi2(6)= 58.39 (Prob. > chi2 = 0.000)	chi2(3)= 88.19 (Prob. > chi2 = 0.000)
Arellano-Bond test for AR(1) in first differences	z = -1.52 Pr > z = 0.129	z = -1.66 Pr > z = 0.098	z = -2.00 Pr > z = 0.046
Arellano-Bond test for AR(2) in first differences	z = -2.05 Pr > z = 0.041	z = -0.05 Pr > z = 0.963	z = -0.77 Pr > z = 0.444
Hansen test of overid. Restrictions	chi2(2) = 2.18 Prob > chi2 = 0.336	chi2(2) = 6.11 Prob > chi2 = 0.047	chi2(5) = 6.28 Prob > chi2 = 0.280

(*) Δ = First difference. (Dependent variable = First difference of the natural logarithm of the GDP)

TABLE 4 – SUMMARY OF THE RESULTS OBTAINED WITH PANEL ROBUST ESTIMATES

PANEL 1 – (1998–2012)

Variables(*)	MODEL I	MODEL II	MODEL III
Constant:			
Random fixed effects	+ ***	+ ***	+ ***
GMM one-step system	+ ***	+ ***	+ ***
GMM two-step system	+ ***	+ ***	+ ***
Δ Net Interest Margin			
Random fixed effects	- ***	- ***	
GMM one-step system	- ***	- ***	
GMM two-step system	- ***	- ***	
Δ Return on Average Assets			
Random fixed effects	+ **	+ **	+ **
GMM one-step system	+	+	+ ***
GMM two-step system	+	+ **	+ ***
Δ Cost to Income Ratio			
Random fixed effects	- ***		
GMM one-step system	-		
GMM two-step system	-		
Δ Equity to Total Assets Ratio			
Random fixed effects	+ ***		
GMM one-step system	+		
GMM two-step system	+		
Δ Debt to Equity Ratio			
Random fixed effects		+ ***	+ ***
GMM one-step system		+	+ *
GMM two-step system		+	+ *
Δ Equity to Liabilities Ratio			
Random fixed effects		+ ***	
GMM one-step system		+	
GMM two-step system		+	
Δ Net Loans to Total Assets Ratio			
Random fixed effects	+ ***		
GMM one-step system	+ **		
GMM two-step system	+ ***		
Δ Net Loans to Total Deposits and Borrowings Ratio			
Random fixed effects		+ ***	
GMM one-step system		+ *	
GMM two-step system		+	
Δ Impaired Loans to Gross Loans Ratio			
Random fixed effects	- **	- **	- **
GMM one-step system	- ***	- ***	- ***
GMM two-step system	- ***	- ***	- ***
Number of observations	392	392	392

PANEL 2 – (2007–2012)

Variables(*)	MODEL I	MODEL II	MODEL III
Constant:			
Random fixed effects	+ ***	+ ***	+ ***
GMM one-step system	+ ***	+ ***	+ ***
GMM two-step system	+ ***	+ **	+ ***
Net Interest Margin			
Random fixed effects	+ *	+ **	
GMM one-step system	+	-	
GMM two-step system	+	-	
Δ Return on Average Assets			
Random fixed effects	+	+ *	+
GMM one-step system	+ *	+ **	+ ***
GMM two-step system	+ **	+ *	+ **
Δ Cost to Income Ratio			
Random fixed effects	-		
GMM one-step system	-		
GMM two-step system	-		
Δ Equity to Total Assets Ratio			
Random fixed effects	-		
GMM one-step system	-		
GMM two-step system	-		
Δ Debt to Equity Ratio			
Random fixed effects		+ **	+ **
GMM one-step system		+	+ **
GMM two-step system		+	+ **
Δ Equity to Liabilities Ratio			
Random fixed effects		- ***	
GMM one-step system		-	
GMM two-step system		-	
Δ Net Loans to Total Assets Ratio			
Random fixed effects	+		
GMM one-step system	+		
GMM two-step system	+		
Δ Net Loans to Total Deposits and Borrowings Ratio			
Random fixed effects		+	
GMM one-step system		+	
GMM two-step system		+	
Δ Impaired Loans to Gross Loans Ratio			
Random fixed effects	- ***	- ***	- ***
GMM one-step system	-	-	-
GMM two-step system	-	-	-
Number of observations	140	140	140

(*) Δ = First difference. (Dependent variable = First difference of the natural logarithm of the GDP)

+ Positive effect; - negative effect; * Statistically significant at 10%; ** statistically significant at 5%; *** statistically significant at 1%.

Source: Estimation results reported in Tables 1, 2 and 3.