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Relevance of the EU Banking Sector to Economic Growth

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Abstract Using panel estimates and a sample including all 28 European Union (EU) countries, this paper seeks to improve upon the existing literature with empirical evidence on the role that banking institutions can play in promoting economic growth. Banking sector performance is proxied by relevant operational, capital, liquidity and asset quality financial ratios. Economic growth is represented by the annual gross domestic product (GDP) growth rate. The estimations take into account the recent international financial crisis and consider three panels: one for the time period 1998–2012, a second one for the years before the crisis (1998–2006) and another for the subinterval 2007–2012. The results allow us to draw conclusions not only about the importance of the various financial ratios to economic growth but also regarding reactions to the recent crisis.

Keywords Bank performance · Economic growth · European Union · Financial crisis · Panel estimates

JEL Classification F30 · F39 · G20 · O40

Introduction

After the outbreak of the recent international financial crisis, analysis of banking sector performance contribution to economic growth became particularly relevant. The issue has been the object of theoretical debates and empirical studies over recent

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decades, mostly after the publication of the renowned King and Levine papers (1993a, 1993b). Among the authors examining well-functioning banking institutions and financial market contributions to economic growth, Demirgüç-Kunt and Levine (1999) 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 assets, liabilities, overhead costs and interest rate margins. 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 world output could increase by 53% if all countries adopted the best global financial practices. However, other studies are less clear in defense of the positive contribution of the financial sector to economic growth. For instance, Rajan and Zingales (1998) have argued that there is no clear causality between financial development and economic growth. 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.

Similar conclusions were drawn by Ayadi et al. (2013), confirming that there are deficiencies in bank credit allocation in some countries as credit to the private sector and bank deposits are negatively associated with economic growth. However, their results indicate that stock market size and liquidity do contribute to growth. Laeven and Valencia (2013) also confirmed the important role of credit market frictions in the performance of the real economic activity during the recent crisis.

Many of these studies opt for panel data approaches, which provide more observations for estimations and reduce the possibility of multicollinearity among the different variables. For instance, with data for 19 Organisation for Economic Co-operation and Development (OECD) countries for the years between 1970 and 1997, Leahy et al. (2001) demonstrate the influence of financial variables on the real per capita output growth. Bassanini et al. (2001) also apply panel regressions to data for 24 OECD countries (1971–1998), obtaining better results for stock markets than for bank variables.

Beck and Levine (2004) find that stock markets and banks positively influence economic growth using a panel data set for the time period 1976–1998 and generalised method of moments (GMM) techniques developed for dynamic panels. At the same time, Beck et al. (2004) use a panel of 52 countries over the period 1960 to 1999 and conclude that financial development is not only clearly pro-growth but also pro-poor, that is, in countries with better developed financial intermediation, income inequality declines more rapidly.

Specifically in the context of the European Union (EU), Romero de Ávila (2003) analyses the link between finance and growth, estimating an ANOVA model, and concludes that there is a positive long-run growth impact from the liberalisation of capital controls and the harmonisation of banking legislation. Masten et al. (2008) study the effects of financial development and international financial integration in the EU and confirm the positive effect on growth both from the development of national financial markets and financial integration.

More recently, Creel et al. (2015) closely follow the seminal framework of Beck and Levine (2004), including application of panel GMM estimations, to analyse the link between economic performance and financial stability in the EU and conclude that financial instability has a negative effect on economic growth. Ferreira (2016) considers 27 EU countries for the time period between 1996 and 2008 and concludes that there is a statistically significant positive influence of the return on assets ratio (ROA), the return on equity ratio (ROE) and Data Envelopment Analysis (DEA) bank cost efficiency, as well as a less pronounced negative effect of the C3 bank market concentration measure on EU economic growth.

This paper contributes to the literature, specifically testing whether well-functioning banking sectors influenced economic growth in the EU during the last decade, also considering in particular the periods before and after the international financial crisis. While still recognising country diversity, we expect that financial integration tendencies and the coordinated responses to the crisis will validate the option to use static and dynamic panel estimates to test the importance of the EU banking sector's performance with respect to economic growth. It is worth noting that one of the controversial issues related to this strand of literature is the choice of variables to represent financial development, either more related to financial market performance, like stock market size, or more closely related to bank performance, such as the bank credit to the private sector or bank deposits.

Taking into account the dominant role of the banking institutions in the EU financial markets, in this paper we concentrate on bank performance, which is proxied by some of the most relevant financial ratios. We place particular emphasis on the situation of the countries' banking sectors in terms of their operational capacity (measured through the net interest margin and the return on average assets), to capital protection and bank leverage levels (proxied by two capital ratios: equity to total assets and debt to equity), to bank liquidity (measured through the ratio of net loans to total deposits and borrowings), and also to the assets quality ratio of impaired loans to gross loans. Thus, following the strand of literature that considers financial development to be relevant to economic growth and keeping in mind that banking institutions have often been accused of being responsible for the recent financial crisis, we test whether their performance is an important contribution to economic growth, at least in all 28 EU member states during the last decade.

Data and Estimation Methodology

Data

In our estimations we use data from the Annual Macroeconomic Database of the European Commission (AMECO) (2016). The dependent variable is GDP growth (the natural logarithm of the series "GDP total in national currency, including the euro-fixed series for euro area countries, current prices and annual data") of all the current EU member states and also the financial sector leverage, that is, the ratio of debt to equity. All the other financial ratios are from the privately owned financial database maintained by the Bureau van Dijk, BankScope (2016).

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, specifically:

- *Operational ratios*:

– Net interest margin, which is the interest income minus interest expense divided by interest-bearing assets, represents the difference between what the bank receives from borrowers and what it pays to savers. The net interest margin focuses on traditional borrowing and lending operations of banks. An increase in the margins is usually considered desirable but only as long as asset quality is maintained.
– Return on average assets, which is the ratio of net income to total assets of the banks, is useful in assessing bank resource use and 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.

- *Capital ratios*:

– Equity to total assets, one of the most important capital ratios, represents book value of equity divided by 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, the more protected the bank. Furthermore, this ratio measures bank leverage levels and reflects the differences in risk preferences across banks.
– Debt to equity mostly measures bank solvency, 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 bank creditors will be taking on by providing financial support to the bank.

- *Liquidity ratio*:

– Net loans to total deposits and borrowings, a measure of bank liquidity, is the percentage of bank deposits and borrowings (with the exception of capital instruments) that is tied up in loans. The lower this ratio, the more liquid the bank.

- *Asset quality ratio*:

– Impaired loans to gross loans, a measure of the amount of total loans that is doubtful, represents the quality of the bank assets; the lower this ratio, the better the bank asset quality.

As we analyse the contribution of bank performance to GDP growth (the natural logarithm of GDP) for all the current EU member states, as well as the possible differences after the outbreak of the recent financial crisis, we consider three panels including all EU countries for the following time periods: Panel A for the time period 1998–2012, Panel B for 1998–2006, and Panel C for 2007–2012. Before proceeding with the panel estimations, we test the stationarity of the series using the Levin et al. (2002) test. The results, for the first differences of the chosen series are not reported here but are available upon request and enable rejection of the existence of non-stationarity.

Estimation Methodology

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) $i = 1,\ldots,N$, which is observed for the considered time periods $t = 1,\ldots,T$:

$$y_{i,t} = \alpha + x_{i,t}^{'}\beta + c_i + \varepsilon_{i,t}$$

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 (each EU country banking sector), is observed in all time periods, t. 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 whether 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. 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 estimation. The system GMM method uses cross-country information and jointly estimates the equations in first differences 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. In order 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).

Empirical Results

The empirical results were obtained using robust panel random-effects estimates and also robust dynamic panel-data one-step and two-step system GMM estimates. Not surprisingly, due to the relatively high number of observations, the results obtained for Panel A (considering the entire time interval, 1998–2012) are statistically much stronger than those obtained for the other two panels and allow us to validate the chosen panel-data estimates.

Table 1 reports the results obtained using robust panel random-effects estimates. 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 clearly validate the fixed-effects approach.

For all panels, and particularly for Panel C, corresponding to the time period after the outbreak of the recent financial crisis, the obtained Wald test results and the acceptable, 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 mostly corroborated in Panel A as the results obtained for all financial ratios 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. We present the results obtained in Table 2.

The Wald test results obtained for Panel A and Panel C clearly reveal the overall fit of the considered model, and although not so strongly, the model can also be accepted for Panel B. The Roodman (2009) rule of thumb is respected in all estimations as in Panel A the number of instruments is 27 and in the other two panels the number of instruments is nine, thereby never exceeding the current number of the EU countries.

The quality of these one-step estimates in Panel A and Panel C is corroborated by the results obtained 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. With regard to Panel B, which includes only the years before the outbreak of the recent financial crisis (1998–2006), the rejection of the null hypothesis of no autocorrelation of the first order is not so evident but the hypothesis of no autocorrelation of the second order is not rejected. Furthermore, the Hansen J statistic does not reject the overidentifying restrictions, particularly in Panel A and B but also to some extent in Panel C, allowing us to believe that the included instruments are valid.

In our estimations, we also used the robust dynamic system GMM two-step estimates of the standard errors, which are considered asymptotically more efficient

Table 1 Results obtained with robust panel random-effects estimates

Variables	Panel A (1998–2012)	Panel B (1998–2006)	Panel C (2007–2012)
Constant:			
Coefficient	0.0528509	0.0735152	0.0353325
Z	11.24	9.42	6.26
P > |z|	0.000	0.000	0.000
Net interest margin			
Coefficient	- 0.0194422	- 0.0095152	0.027126
Z	-2.52	-1.92	1.98
P > |z|	0.012	0.055	0.048
Return on average assets			
Coefficient	0.0090373	- 0.0013124	0.0078133
Z	2.33	-0.41	1.85
P > |z|	0.020	0.683	0.064
Equity to total assets ratio			
Coefficient	0.0009857	0.0004923	- 0.0073134
Z	2.11	1.84	-3.64
P > |z|	0.035	0.066	0.000
Debt to equity ratio			
Coefficient	0.0000465	7.02e-06	0.00005
Z	2.80	0.53	2.38
P > |z|	0.005	0.598	0.017
Net loans to total deposits and borrowings ratio			
Coefficient	0.0016124	0.000259	0.001808
Z	2.79	1.05	1.35
P > |z|	0.005	0.292	0.178
Impaired loans to gross loans ratio			
Coefficient	- 0.0032458	- 0.0004171	- 0.0092821
Z	-2.18	-0.95	-3.95
P > |z|	0.029	0.341	0.000
Number of observations	392	224	140
R-squared: overall	0.1734	0.1252	0.4338
Wald	chi2(6) = 15.41 (Prob. > chi2 = 0.0173)	chi2(6) = 15.96 (Prob. > chi2 = 0.0140)	chi2(6) = 110.40 (Prob. > chi2 = 0.0000)

Source: Author's calculations using the STATA econometric program

The variables were sourced from the European Commission's AMECO database (2016) (GDP and the ratio debt to equity) and from the Bureau van Dijk's BankScope database (2016) (all the other financial ratios)

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 co-variance 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.

The results obtained using robust dynamic two-step system GMM estimates, presented in Table 3, are generally in line with those obtained with the one-step estimates. The Wald test results go on validating the estimations, particularly in Panels A and C. As before, for Panels A and B the Hansen test clearly does not reject the null hypothesis that the instruments are valid and that they are not correlated with the errors. Moreover, according to the results reported for the Arellano-Bond tests, the validity of the instruments is strongly

Table 2 Results obtained with GMM one-step system robust estimates

Variables	Panel A (1998–2012)	Panel B (1998–2006)	Panel C (2007–2012)
Constant:			
Coefficient	0.0505405	0.0719429	0.036474
Z	9.19	7.61	3.53
P > |z|	0.000	0.000	0.000
Net interest margin			
Coefficient	- 0.0451795	- 0.0125338	- 0.0130854
Z	-4.36	-1.22	-0.27
P > |z|	0.000	0.222	0.787
Return on average assets			
Coefficient	0.0184421	0.0184633	0.0273611
Z	1.30	1.25	2.25
P > |z|	0.194	0.210	0.025
Equity to total assets ratio			
Coefficient	0.0057554	0.0154368	- 0.0065448
Z	0.69	0.82	-0.55
P > |z|	0.492	0.413	0.583
Debt to equity ratio			
Coefficient	0.0000765	0.0002202	0.0001455
Z	1.18	1.42	1.52
P > |z|	0.236	0.156	0.128
Net loans to total deposits and borrowings ratio			
Coefficient	0.0053426	-.002698	0.0035677
Z	2.14	-1.24	0.46
P > |z|	0.033	0.216	0.649
Impaired loans to gross loans ratio			
Coefficient	- 0.0190542	- 0.0107285	- 0.0104932
Z	-3.15	-1.76	-1.65
P > |z|	0.002	0.078	0.098
Number of observations	392	224	140
Number of instruments	27	15	9
Wald	chi2(6) = 214.29 (Prob. > chi2 = 0.000)	chi2(6) = 9.82 (Prob. > chi2 = 0.132)	chi2(6) =164.25 (Prob. > chi2 = 0.000)
Arellano-Bond test for AR(1) in first differences	z = −3.03 Pr > z = 0.002	z = −1.29 Pr > z = 0.198	z = −2.47 Pr > z = 0.013
Arellano-Bond test for AR(2) in first differences	z = −0.88 Pr > z = 0.378	z = 0.93 Pr > z = 0.352	z = 0.05 Pr > z = 0.962
Hansen test of overidentifying restrictions	chi2(20) = 19.76 Prob > chi2 = 0.473	chi2(8) = 10.35 Prob > chi2 = 0.241	chi2(2) = 6.09 Prob > chi2 = 0.048

Source: Author's calculations using the STATA econometric program

The variables were sourced from the European Commission's AMECO database (2016) (GDP and the ratio debt to equity) and from the Bureau van Dijk's BankScope database (2016) (all the other financial ratios)

supported in Panel A as the residuals are always AR (1), but not AR (2). For the other two panels, again, the rejection of the null hypothesis of no autocorrelation of the first order is not so evident but the hypothesis of no autocorrelation of the second order is not rejected.

The results obtained for the considered models with the used panel-data estimations are summarized in Table 4 and clearly show that, although not always with the same statistical robustness, the coefficients are in general very stable across the chosen estimation methodologies. Looking at the influence of the variation of considered financial ratios in the GDP growth rate, our estimations reveal that in most situations, there is a negative influence

Table 3 Results obtained with GMM two-step system robust estimates

Variables	Panel A (1998–2012)	Panel B (1998–2006)	Panel C (2007–2012)
Constant:			
Coefficient	0.0472125	0.0648217	0.0291311
Z	6.76	7.23	2.64
P > |z|	0.000	0.000	0.008
Net interest margin			
Coefficient	- 0.047058	- 0.0114541	- 0.0241139
Z	-4.33	-0.92	-0.30
P > |z|	0.000	0.356	0.767
Return on average assets			
Coefficient	0.0220348	0.0321458	0.036514
Z	1.28	1.55	1.61
P > |z|	0.200	0.122	0.108
Equity to total assets ratio			
Coefficient	0.0038635	0.0185928	- 0.0114652
Z	0.62	1.48	-0.97
P > |z|	0.537	0.138	0.334
Debt to equity ratio			
Coefficient	0.0000733	0.0002899	0.0001749
Z	1.25	1.70	0.95
P > |z|	0.212	0.089	0.342
Net loans to total deposits and borrowings ratio			
Coefficient	0.0060862	- 0.0034586	0.0020911
Z	2.13	-1.01	0.11
P > |z|	0.033	0.312	0.909
Impaired loans to gross loans ratio			
Coefficient	- 0.0185143	-0.0093121	- 0.0073162
Z	-3.51	-1.77	-1.02
P > |z|	0.000	0.078	0.306
Number of observations	392	224	140
Number of instruments	27	15	9
Wald	chi2(6) = 181.07 (Prob. > chi2 = 0.000)	chi2(6) = 9.72 (Prob. > chi2 = 0.137)	chi2(6) = 59.90 (Prob. > chi2 = 0.000)
Arellano–Bond test for AR(1) in first differences	z = −2.60 Pr > z = 0.009	z = −0.95 Pr > z = 0.343	z = −1.62 Pr > z = 0.105
Arellano–Bond test for AR(2) in first differences	z = −0.70 Pr > z = 0.487	z = 0.78 Pr > z = 0.434	z = −0.13 Pr > z = 0.898
Hansen test of overidentifying restrictions	chi2(20) = 19.76 Prob > chi2 = 0.473	chi2(8) = 10.35 Prob > chi2 = 0.241	chi2(2) = 6.09 Prob > chi2 = 0.048

Source: Author's calculations using the STATA econometric program

The variables were sourced from the European Commission's AMECO database (2016) (GDP and the ratio debt to equity) and from the Bureau van Dijk's BankScope database (2016) (all the other financial ratios)

on GDP growth of the net interest margins, defined as the interest income minus interest expense divided by interest-bearing assets, or put simply the difference between what the bank receives from borrowers and what it pays to savers, representing the traditional borrowing and lending bank operations. This result is not surprising taking into account the evolution of the bank net interest margins during the considered time period as they were in many cases decreasing. However, according to the robust results obtained with the panel random-effects estimates, after the outbreak of the financial crisis, our Panel C, the net interest margins are in line with economic growth, which may be considered as

Table 4 Summary of the results obtained

Variables	Panel A (1998–2012)	Panel B (1998–2006)	Panel C (2007–2012)
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	-***	−	−
Return on average assets			
Random fixed effects	+**	−	+*
GMM one-step system	+	+	+**
GMM two-step system	+	+	+
Equity to total assets ratio			
Random fixed effects	+**	+*	-***
GMM one-step system	+	+	−
GMM two-step system	+	+	−
Debt to equity ratio			
Random fixed effects	+***	+	+*
GMM one-step system	+	+	+
GMM two-step system	+	+*	+
Net loans to total deposits and borrowings ratio			
Random fixed effects	+***	+	+
GMM one-step system	+**	−	+
GMM two-step system	+**	−	+
Impaired loans to gross loans ratio			
Random fixed effects	-**	−	-***
GMM one-step system	-***	-*	-*
GMM two-step system	-***	-*	−
Number of observations	392	224	140

Source: Estimation results reported in Tables 1, 2 and 3 using data from the European Commission's AMECO database (2016) and from the Bureau van Dijk's BankScope database (2016)

+ Positive effect; − negative effect

* Statistically significant at 10%; ** statistically significant at 5%; *** statistically significant at 1%

an indication of the tendency to increase the traditional banking activities as a response to the crisis.

The evolution of the return on average assets almost always is in line with the GDP growth rate, revealing that, as expected, the increase in efficiency and operational performance of the banking sector will contribute to the economic growth of the EU member states. With regard to the equity to total assets, our results indicate that in general more protected banks will be relevant to economic growth as the evolution of this ratio was in line with the GDP growth rate, although mostly before the international financial crisis. After that, according to the results obtained for panel C, the evolution of the equity to total assets ratio was the opposite of that for GDP, which can be interpreted as a sign of the decrease of the bank sector leverage levels after the outbreak of the crisis. There is also clear evidence that in all situations, the increase of bank solvency, here represented by the evolution of the debt-to-equity ratio, contributes positively to the GDP growth rate.

The results obtained for the net loans to total deposits and borrowings ratio show that in almost all situations this ratio was in line with the GDP growth rate, revealing that in general the evolution of the bank loans was favourable to economic growth. As expected, the increase of the impaired loans to gross loans ratio, representing the fall in the quality of the bank assets, clearly contradicts the GDP growth rate, before and after the recent international financial crisis. The obtained results lead us to conclude that, although banking institutions have generally been considered responsible for the recent financial crisis, their good 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.

Concluding Remarks

This study uses panel estimates to analyse the potential contribution of bank performance to economic growth in the context of the EU during the last decade. The estimations take into account the recent international financial crisis and consider three panels: one for the time period 1998–2012, a second one only for the years before the crisis (1998–2006) and another for the subinterval 2007–2012.

The results are in line with the strand of literature that considers that well-functioning banking institutions will positively contribute to economic growth (King and Levine 1993a, 1993b; Greenwood et al. 2010, 2013; specifically for the universe of the EU member states, Masten et al. 2008 and Creel et al. 2015). As expected, with quite robust results for Panel A (considering the whole time interval) and, although not as robust when we consider the subintervals before and after the crisis (Panel B and Panel C, respectively), good operational results in bank performance were in line with economic growth.

Moreover, and not surprisingly, the opposite occurs with the impaired loans to the gross loans ratio, meaning that the fall in the quality of the banks assets clearly contradicts the GDP growth rate. The influence of the financial crisis is particularly evident in the results obtained for the net interest margin and the equity to total assets.

Regarding the net interest margin, there is clear and statistically strong evidence that the variation (mostly the decrease) of the net interest margin, representing the traditional borrowing and lending operations, contrasts with the GDP growth rate. But after the outbreak of the crisis, this variation can be considered to be in line with economic growth, confirming the idea that after the crisis many banking institutions gave increased emphasis to traditional banking activities.

With regard to the influence of the capital ratio of equity to total assets, our results indicate that for the entire period and for the years before the crisis, the evolution of this ratio was in line with GDP growth, but the opposite occurs when we consider only the years after the crisis. This result can be seen as an indication of the banking sector's response to the specific requirements targeting the reinforcement of bank protection, namely through the increase in bank equities, following the indications and recommendations of the public authorities (European Central Bank 2010; European Commission 2014).

Our results are generally in line with the public authorities' recommendations, suggesting that going back to the traditional borrowing and lending activities may benefit not only the bank operation capacity but also contribute to economic growth. In spite of the crisis, bank loans are likely to be in line with economic growth. Bank protection is desirable but only as far as it does not prevent bank lending and the financing of productive investment, which contributes to economic growth.

We add that the recent financial crisis also revealed that public authorities' regulation and surveillance of banking activities are desirable in order to prevent instability in bank sectors and guarantee the financing of economic activities. In addition, in spite of the relevance of the results, the study's limitations include the lack of ideal measures to represent financial development. Here, the use of some well-known financial ratios allowed us to confirm that bank performance matters to economic growth but further research is surely needed, using realistic representations of the banking performance and also taking into account the countries' diversity and heterogeneous behaviour.

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