THE DETERMINANTS OF PORTUGUESE BANKS’ CAPITAL BUFFERS*

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1. INTRODUCTION

Until the mid-1980s, the Portuguese banking system was almost exclusively held by the State and several dimensions of its activity were strongly regulated, through credit ceilings and restrictions on the setting of interest rates, on the establishment of new banks, on the opening of branches, and on the undertaking of activities abroad. The process of accession to the European Economic Community implied the gradual lift of these regulations, reflecting the political commitment to achieve the economic and financial integration that paved the way for the creation of the Single Market.

In parallel, in the large majority of OECD countries, the set of measures implemented to achieve the liberalisation of financial markets and in particular a competitive operational environment for banks, was followed by the need to strengthen prudential supervision. In this context, in the early 1980s, regulations setting minimum levels for the ratio between banks’ capital and assets began to arise in countries such as the United Kingdom and United States (Jackson et al. (1999)). Throughout the 1980s, the countries represented in the Basel Committee on Banking Supervision (BCBS) tried to reach an agreement on the regulatory minimum own funds to be held by banks. This process led to the issuing of a document by this Committee in 1988, known as the Basel Capital Accord. In turn, this Accord was the cornerstone of the EC Directives on the capital adequacy as well as of several regulations in this field in more than a hundred countries.

The idea underlying banks’ prudential regulation is to ensure that banks hold an adequate level of capital in order to minimise insolvency risk. This concern (according to Jackson (2002)) is due to: (i) potential negative externalities stemming from banks’ failure, namely those resulting from risks of contagion to other institutions in the event of a widespread redemption of deposits from the banking system, as well as from the key role played by banks in financing the economy and in the payment system; (ii) asymmetry of information between banks and several categories of creditors, that lead to the protection of the interests of depositors and other retail clients; (iii) potential for moral hazard behaviour by limited liability stockholders, amplified by the existence of deposit insurance and by the lender of last resort function of central banks.

In Portugal, the philosophy and the precepts of the Capital Accord were only fully implemented in 1993, after the entry into force of the legislation that transposed into Portuguese law the Directive on the capital adequacy of investment firms and credit institutions. Under this framework, Portuguese banks’ own funds become subject to a minimum limit corresponding to 8 per cent of their assets, after applying weighting factors intended to reflect the risk of each exposure, as well as to a number of other restrictions on the composition of own funds.

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* The views expressed in this article are those of the authors and do not necessarily reflect those of Banco de Portugal.
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One of the aspects that has raised the interest of policy makers is the fact that although own funds and, in particular, equity are the most expensive source of funding, banks’ solvency ratios are usually kept well above the regulatory minimum level. This points to the fact that in general the level of banks’ own funds results from the interception between regulatory requirements and the amount actually envisaged by banks’ management and stockholders as a buffer to hedge for the economic risks incurred. Thus, studying the determinants of excess capital is particularly relevant in the context of the ongoing changes in supervisory practices, resulting from the overall revision of the Capital Accord and the release of a new document by the BCBS, known as Basel II. There have been fears that the regulations proposed in this document might increase the pro-cyclicality inherent in the functioning of the credit market, since they are more sensitive to the risks incurred by institutions.

In the same vein, as the regulatory capital defined in accordance with the rules of Basel I is generally understood as poorly sensitive to the risk actually assumed by institutions, banks that incur higher risk are expected to hold higher capital reserves. In addition, as mentioned above, the literature suggests that capital is a relatively expensive source of funding when compared to bonds or deposits. Thus, banks’ capital decisions should reflect the trade-off between the benefits and the costs of holding excess capital.

One of the main benefits of holding high capital reserves is linked to the decrease in the probability of incurring failure related costs. From the perspective of each institution, these costs will be higher the higher the economic rents banks achieve in the competitive environment in which they operate. Moreover, as the intervention of the supervisory authorities represents a cost for institutions, albeit not explicit, a reduction in the capital ratio to a value below the regulatory minimum level leads to intervention by these authorities, which in many jurisdictions strongly penalises both the management and the stockholders. With respect to the role played by capital reserves, stress should be laid on the incentives for the mitigation of moral hazard in the choice of assets and, as there are fixed costs in the issuance and placement of common stock, on the advantages of keeping a sufficiently large capital buffer to meet the requirements associated with unexpected investment opportunities. Furthermore, the issuance of common stock may represent an indirect cost for institutions, related to the timing of such an operation, combined with signals sent to market operators that its announcement may be related to the deterioration of the bank’s financial position.

The purpose of this article is to identify the factors underlying the choice of Portuguese banks’ capital buffers, through the estimation of a dynamic panel data model for the period between 1994 and 2004. Among the main findings of this study is the positive relationship between excess capital and a broad risk measure, as well as the fact that provisioning and high and stable profitability levels behave as substitutes for capital reserves. Business cycles are negatively related to excess capital, while this variable seems to be positively affected by the performance of stock markets. In addition, larger banks are associated with lower capital reserves.

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(1) Financial instruments eligible as own funds, offering payments to their owners that are subordinated to the other liabilities, have implicit an increased risk premium that increases with the degree of subordination. Moreover, it should be taken into account that a company has a tax advantage in holding debt, as its remuneration is recognised as a cost to this effect.

(2) Following the literature, we refer to the difference between capital de facto held by banking institutions and the regulatory minimum level of capital as a bank’s capital buffer, excess capital or capital reserves.


(4) See BCBS (1999), Section A.

(5) Demsetz et al. (1996) concluded that the banks for which the expected current value of future profits is higher tend to hold more capital and present a lower degree of asset risk.

(6) Cornett and Tehranian (1994) report negative share price reactions in the United States to the announcements of equity issues in the banking industry.
After the discussion of some findings documented in the relevant empirical literature (Section 2), Section 3 presents the data used and the model estimated. The results obtained are discussed in Section 4. Finally, Section 5 concludes.

2. PREVIOUS EMPIRICAL FINDINGS

Although there is an extensive literature regarding banks’ solvency, most studies are focused on US banks and on capital ratios rather than on the difference between capital requirements and the own funds actually held by banks. The literature on the determinants of European banks’ capital buffers includes Stolz and Wedow (2005) for German banks, Ayuso et al. (2002a) and Ayuso et al. (2002b) for Spanish banks and Lindquist (2003) for Norwegian banks. To our knowledge, this is the first study of the determinants of excess capital of Portuguese banks. The first three papers mentioned above resort to the estimation of dynamic models, whereas Lindquist (2003) does not explicitly model for the persistence of the dependent variable, which should capture the existence of adjustment costs.

As discussed in the previous section, banks that assume higher credit portfolio risk are a priori expected to have not only higher capital requirements, but also higher excess capital. However, the empirical literature exploring this relationship generally finds a negative relationship between the credit risk measures used and excess capital. Although the findings of Ayuso et al. (2002a) can be justified by the ex-post nature of the risk measure used, the same does not apply to the findings of Lindquist (2003), which uses an indicator envisaged to be an estimate of the credit risk assumed ex-ante by institutions (based on the probability of default foreseen by a credit risk model applied to sectors of activity and local markets). Ayuso et al. (2002b) also resort to other risk indicators that the authors argue to be a proxy for ex-ante risk (growth rate of loans granted and share of public debt in total assets) and have also concluded that there is a negative relationship between these variables and excess capital. This finding is particularly relevant from the point of view of the regulatory authorities and, if confirmed by other studies that address this issue for a more comprehensive set of markets, interest is drawn in exploring the factors that may be behind this relationship.

Both Ayuso et al. (2002a) and Ayuso et al. (2002b) find a negative effect of the price of insurance, proxied by the return on equity (ROE), on the quantity of the insurance (under the form of capital reserves). Lindquist (2003) finds the same result using the β coefficient for the Norwegian banking industry as a proxy for the cost of capital reserves, since it is a measure of the risk premium. However, being an aggregate industry level variable, this proxy has the obvious shortcoming of not reflecting the specificities of the risk assumed by each bank. Stolz and Wedow (2005) find a negative relationship between banks’ ROA and excess capital. This suggests that the most profitable banks, anticipating the possibility of covering for losses with current results may, in principle, have smaller capital reserve needs.

The four papers mentioned above agree in finding a negative relationship between the business cycle and capital reserves. This may reflect, on the one hand, an increase in the share of assets with lower risk weighting during recession periods, which derives from a precautionary effect, and, on the other hand, a mechanical effect resulting from the combination of credit market cycles with the existence of adjustment costs of the level of capital. This type of effect may have macroeconomic repercussions, namely through credit market cycles.

The findings of Stolz and Wedow (2005), Ayuso et al. (2002b) and Lindquist (2003) also support the “too big to fail” hypothesis. That is, larger banks tend to anticipate a higher probability of support by the authorities if they face financial difficulties, as the failure of a large institution may be negatively transmitted to the whole system, through several contagion channels. The main effect of this behaviour is a
lower capital level desired by the management of larger banks, as part of the role of insurance against failure attributable to capital is assumed by the safety net provided by public authorities. On the other hand, if portfolio diversification is positively correlated with bank size, the probability of experiencing major losses (with an impact on capital ratios) should be smaller for larger banks. Another factor to be taken into account is the existence of costs of screening and monitoring the behaviour of borrowers, to better assess the risk of operations involving them. If there are scale economies in screening and monitoring activities, larger banks are expected to exhibit smaller portfolio risk and, as such, they have implicit lower optimum capital levels. As Alfon et al. (2004) remark, larger banks may also be less liquidity constrained and have smaller costs in adjusting capital levels; therefore, it is more advantageous for these institutions to issue more frequently capital or debt on demand, rather than hold large capital reserves.

3. DATA AND MODEL

The dataset used in this study is an unbalanced panel of yearly data from banks’ consolidated financial statements reported by 17 Portuguese banking groups to Banco de Portugal ranging from 1994 to 2004. The choice of the sample period was made with the purpose of maximising the number of observations, while avoiding changes in the structure of the most relevant accounting and prudential data. In fact, the regulatory framework resulting from Basel I had already been in force since 1993, while in 2004 no significant changes had yet been observed in the behaviour of banks in anticipation of the Basel II rules. The observations referring to the first three years of activity of each new bank were excluded, so that the information used does not reflect the typical initial adjustment period. Small institutions and/or those specialised in investment banking were also excluded from the sample, as they have different features and behaviour.

The analysis conducted in this article resorts to panel data, which has the advantage of capturing both differences across banks and time-series variation, as well as of allowing for meaningful statistical inference even using a sample with a relatively small number of banks observed over an equally short time period. The explicit treatment of the model’s dynamic is relevant not only to infer on the persistence of the dependent variable, but also to ensure that the estimates for other parameters of the model are consistent. The estimation technique used was that proposed by Blundell and Bond (1998) and is known in literature as System GMM. The main advantages of this methodology consist in the possibility of obtaining consistent estimates for the parameters of interest when the persistence of the dependent variable needs to be explicitly modelled and not requiring strong hypotheses about the exogeneity of the regressors. For details on the estimation method and the motivation for its use, see Boucinha (2008).

Considering the small size of the available sample, the option was to estimate a parsimonious model and then test additional hypotheses on the initial specification. The models estimated have the following structure:

\[ y_{i,t} = \gamma y_{i,t-1} + \beta X_{i,t} + \delta + \eta_t + \epsilon_{i,t} \]  

(1)

(7) Except for banks that do not belong to any banking group and thus do not consolidate their accounts and variables for which data are only available on an individual basis. For these variables, group level data are obtained by adding data available for each of its members.

(8) With regard to profitability, data refer to the period between 1993 and 2004.

(9) Furthermore, in 2005 the International Accounting Standards (IAS) were introduced, and therefore there were changes in the definition of some of the aggregates required for the construction of the variables used.
where \( \delta \) is a constant term, \( \eta \) is an unobservable variable that captures idiosyncratic features of each institution that are constant over time and \( \varepsilon \) is a random shock. Matrix \( X \) is composed of the tested explanatory variables.

The variable under analysis (\( y \)) is defined as the ratio of excess capital to the regulatory minimum level. As argued by Ayuso et al. (2002a) and Ayuso et al. (2002b), the coefficient associated with the lagged value of that variable may be interpreted as a measure of adjustment costs and its expected sign is positive. The degree of coverage of non-performing loans by provisioning should be associated with smaller capital reserves, since provisions tend to be imperfect substitutes for capital.

The measure of non-performing loans used is a credit risk measure that intends to capture the flow rather than the stock of non-performing loans, thus decreasing (but not fully eliminating) the ex-post character of this variable. Thus, the sign of the coefficient associated with this variable in equation (1) is expected to be negative if the non-performing loan measure used is still an ex-post risk measure, as all other things being equal, banks with higher credit risk are expected to hold lower capital reserves. If on the other hand, the variable is an ex-ante risk measure, and since the regulatory framework of Basel I is characterised by poor risk sensitivity, a positive sign is expected, as banks with higher credit risk should, ceteris paribus, hold higher levels of economic capital in relative terms.

If banks had not anticipated the high growth of bank credit observed during the sample period, this development may have contributed through a relatively mechanical way to a decrease in excess capital. In turn, it should not be ruled out from the outset that banks have anticipated, albeit partially, high credit growth, responding to it with a precautionary increase in their capital reserves. Furthermore, since an increase in granted loans is not expected to materialise immediately in an increase in non-performing loans, it may be important to control for credit growth in order to correctly interpret of the non-performing loan coefficient.

Banks with a higher share of equity exposures in their asset portfolio are expected to hold higher capital reserves, as their assets should be more volatile. As argued above, both banks’ size and the output gap\(^{10}\) are expected to have a negative impact on excess capital.

The effect of mergers and acquisitions is controlled for through the inclusion in the model of a binary variable, equal to one in the years in which a specific bank has been involved in a merger. Obtaining a negative sign for the coefficient associated with this variable would suggest that the mergers that involved the banks in the sample consumed capital.

By including in the model banks’ return on assets (ROA) and its variance,\(^{11}\) it is possible to test the hypothesis that banks with higher and more stable earnings may more easily absorb potential losses and therefore need lower capital reserves. The hypothesis of a favourable performance of the stock market (as measured by the growth rate of the PSI Geral stock price index) being associated with a situation where investors are more receptive to accommodating capital increases, with a positive impact on capital reserves, is also considered. In addition, the value of banks’ capital should be positively affected by two facts, i.e. in periods of more favourable stock market performance, the equity portfolios of banks increase in value; and, in such periods, revenue from the provision of services associated with capital markets in general tends to be higher. Therefore, the hypothesis that the effect of stock markets is stronger for banks with a higher weight of shares in their portfolio of assets is also tested, through the introduction of an additional variable that results from the interaction of the two relevant variables.

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\(^{10}\) The measure of the output gap was obtained through the application of a Hodrick-Prescott filter to the real output series. The value of parameter \( \lambda \) used was 6.25, the value mentioned by Ravn and Uhlig (2002) as appropriate for yearly data.

\(^{11}\) The variance of profits was computed using data for ROA from the three previous years to the current year.
The return on equity is considered in so far as this variable intends to proxy the cost of capital, which should have a negative impact on capital reserves. Banks with a higher ratio of Tier I own funds to total own funds are expected to have lower capital reserves, as according to the eligibility rules of own funds, this ratio may not fall below 50 per cent. In fact, when a bank is close to this restriction, a negative shock in Tier I own funds will have a higher impact on the capital ratio, as the value of eligible Tier II own funds will also decrease. In addition, a bank with a low ratio of Tier I own funds to total own funds will have higher capital adjustment costs, as in this situation increasing own funds will imply increasing Tier I own funds and this type of operation is lengthier and more expensive than increasing Tier II own funds.

A higher weight of wholesale market debt in total liabilities is expected to positively influence excess capital as, on the one hand, banks should hedge for the increased exposure to liquidity risk and to changes in market sentiment and, on the other hand, banks with higher wholesale market debt should target higher credit ratings.

Table 1 presents some descriptive statistics of the variables considered in the analysis. With regard to the distribution of the capital buffer in the sample, it should be noted that its value for the largest banks (4th quartile of assets) is slightly above a third of the value observed for the smallest banks (1st quartile of assets).

As seen in Chart 1, the in-sample aggregate capital buffer tends to be lower than the banking system’s total. This difference is due to the fact that the banks that were eliminated from the sample – newly created banks with very specific activities – tend to have particularly high capital reserves.

From the beginning of the sample period to the end of the 1990s, aggregate excess capital declined sizably as the economy recovered progressively from the 1993 recession. Subsequently, in the second half of the 1990s, the marked rise in private sector indebtedness, largely due to the reduction in the level and volatility of interest rates associated with the catching-up process with a view to participation

### Table 1

<table>
<thead>
<tr>
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<tr>
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<td>46.297</td>
<td>37.591</td>
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<td>Provisions/Non-performing loans</td>
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<td>Stock holdings/Total Assets</td>
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<td>12.153</td>
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<td>Market debt/Total liabilities</td>
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<td>100.000</td>
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<td>32.791</td>
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<td>13.722</td>
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<td>Output Gap/Potential output</td>
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<td>-0.222</td>
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<td>-1.776</td>
<td>1.466</td>
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<td>Stock prices growth</td>
<td>187</td>
<td>11.627</td>
<td>23.895</td>
<td>-20.700</td>
<td>65.200</td>
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</tbody>
</table>

Source: Banco de Portugal.
Notes: Data used for the ROA variable covers the period 1993-2004. For the remaining variables the first year considered is 1994. All ratios and growth rates are defined in percentage.

(12) The wholesale market debt is defined as total liabilities excluding customer deposits.
in the euro area, seems to have led to an additional squeeze of excess capital in the banking system as a whole. Since 2000, following an approximation of capital ratios to the regulatory minimum level and the slowdown in economic activity, the aggregate capital buffer underwent a progressive recovery.

4. RESULTS

Table 2 presents the results of the estimation of the models through the application of the Blundell-Bond two-step estimator, applying to the covariance matrix the small sample correction developed in Windmeijer (2005).

The results obtained for Hansen’s J-test do not allow for the rejection of the null hypothesis of the validity of the instruments used in any of the specifications presented. AR(1) and AR(2) are the application of the autocorrelation tests developed in Arellano and Bond (1991) to check for first and second order autocorrelation in the residuals of the differenced equations. The fact that there is evidence of first but not of second order autocorrelation implies that the model is well specified in levels, as expected. Finally, the F-test for the null hypothesis that all coefficients equal zero is safely rejected in both models.

Since the coefficients in credit growth and in the default ratio were not found to be statistically different from zero, these variables were eliminated from the model and the analysis is focused on the reduced model (1.A).

Obtained results confirm the persistence of excess capital in Portuguese banks, since the coefficient associated with the lagged dependent variable is statistically significant and positive, thus presenting evidence in favour of the adjustment cost hypothesis. The fact that the coefficient associated with the measure of provisions is negative suggests that, as expected, this variable behaves as a substitute for excess capital. Banks with a higher weight of stocks in their total assets, all other things being equal,

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(13) The absence of effect of the default ratio measure on excess capital may suggest that this variable does not fully eliminate the ex-post nature of the stock of non-performing loans.

(14) Even though the coefficient on the lagged dependent variable is not significant when credit growth in controlled for, it is relevant in the models that do not include the credit growth variable. In turn, this variable was not found to be significant in models that do not include the lagged dependent variable.
Table 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model (1)</th>
<th>Model (1.A)</th>
<th>Model (2)</th>
<th>Model (3)</th>
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<td>Capital Buffer_{i,t-1}</td>
<td>0.294</td>
<td>0.450</td>
<td>0.508</td>
<td>0.588</td>
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<td>0.274</td>
<td>0.250</td>
<td>0.177</td>
<td>0.309</td>
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<tr>
<td>Provisions/Non-performing loans_{i,t-1}</td>
<td>-1.019</td>
<td>-0.847</td>
<td>-0.107</td>
<td>-1.068</td>
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<td>0.546</td>
<td>0.382</td>
<td>0.266</td>
<td>0.391</td>
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<td>Default ratio_{i,t}</td>
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<td>8.745</td>
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<td>Credit Growth_{i,t}</td>
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<td>0.323</td>
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<td>Stock holdings/Total Assets_{i,t}</td>
<td>12.261</td>
<td>18.415</td>
<td>11.133</td>
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<td>5.613</td>
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<td>Logarithm of assets_{i,t}</td>
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<td>-19.573</td>
<td>-16.212</td>
<td>-15.243</td>
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<td>9.545</td>
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<td>Output Gap/Potential output_{i,t}</td>
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<td>Merger_{i,t}</td>
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<td>Stock prices growth_{i,t}</td>
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Source: Authors’ calculations.
Note: Standard errors are reported in italic. For the Hansen, AR(1), AR(2) and F tests, p-values are reported.
hold higher capital buffers, suggesting that banks with higher exposure to market risk choose to hold larger capital reserves in order to cover for the additional risk. As expected, a negative and statistically significant effect of the size variable can be found. The coefficient concerning the dummy variable that identifies mergers and acquisitions, albeit with a negative sign, is not statistically significant in any of the econometric specifications.

Finally, as documented in the literature, a negative impact of the output gap on excess capital is found, not only suggesting that banks tend to cover the higher risks that arise in cycle downturns with higher capital reserves, but also that their lending behaviour may be pro-cyclical, in that it will tend to amplify economic cycles.

The results obtained in Model (2) are consistent with the hypothesis that banks with higher and less volatile profit tend to hold lower capital reserves. \(^{15}\) This is an intuitive result, as profit is the first line of defence against unexpected losses. Moreover, the variability of profits is a broad risk measure.

Given that stock market performance is strongly correlated with the business cycles, tests for the relevance of the growth of stock prices were conducted on a specification which does not include the output gap. The results of model (3) point to the existence of a positive effect of stock market performance on excess capital, suggesting that banks tend to issue new capital in times of more positive stock market performance, or the hypothesis that, during these periods, eligible capital for regulatory purposes is positively affected by an increase in earnings obtained from share portfolios and revenue from services associated with capital markets. These conclusions should, however, be interpreted with care, as obtained results may be spurious if changes in the growth rate of the stock prices do not cause changes in excess capital but, on the other hand, changes in the output gap cause changes both in excess capital and in stock market performance. \(^{16}\) If the relationship between the performance of the stock market index and the dependent variable is linked to the impact on the profit of banking institutions of the gains and losses from their share portfolio, one would expect the effect to be stronger in banks in which the share portfolio has a stronger weight in total assets. This hypothesis has been tested through the estimation of a more flexible version of model (3), generalised through the inclusion of an interaction between the variable that measures the performance of the stock market index and the one that mirrors the weight of the share portfolio of banks in their total assets. The results of this regression (not disclosed in this article, but available upon request) do not allow for the statistical rejection of the irrelevance of this hypothesis.

One of the other hypotheses for which no statistically relevant evidence was found (and whose results are not presented) is the effect of ROE, which was introduced as a measure of the cost of capital. However, it should be noted that, as this variable was built using accounting data, it may be a poor proxy for banks’ true economic cost of capital. Likewise, no conclusive results have been obtained for the hypotheses that banks with a lower ratio of Tier I own funds to total own funds and with a higher weight of wholesale market debt in total debt hold higher capital reserves. In addition, it was also tested without conclusive results for the hypothesis that the effect of the wholesale market debt on excess capital changes according to the size of the institution. Finally, the possible differences in the behaviour of domestic and foreign-owned banks were also investigated, through the inclusion of a dummy variable. However, this feature has not shown to be relevant.

\(^{15}\) The F-test for the null hypothesis that both the coefficient associated with the profitability measure and that corresponding to the profit volatility measure equal zero allows for the rejection of the null hypothesis for a significance level of 5 per cent in the model.

\(^{16}\) In fact, through an auxiliary regression of the growth of the PSIGeral index in a constant and in the lagged output gap, it can be seen that the coefficient associated with this variable is statistically significant; the same does not hold true when the impact of the stock market index growth on the output gap in the following period is estimated. These results suggest that the cyclical fluctuations tend to anticipate developments in the stock markets and not the opposite.
Given the small sample size, it is reassuring to see that both the sign and the significance of most of the estimated coefficients remain stable across a wide range of alternative specifications.\(^{17}\)

5. CONCLUSIONS

The main purpose of this study was to investigate which factors determine Portuguese banks’ capital buffers, through the estimation of a dynamic panel data model.

Observed persistence in banks’ excess capital suggests that there are relevant adjustment costs in this variable. On the other hand, high and stable profits, as well as the existence of more conservative provisioning policies, were found to be imperfect substitutes for stricter objectives regarding banks’ capital reserves.

Most of the previous empirical literature documented a negative and somewhat counter-intuitive relationship between credit risk measures and excess capital. In the analysis conducted in this study, for the sample of Portuguese banks used and during the period under review, it is not possible to identify any effect of the credit risk measure used. Conversely, banks’ exposure to stock market risk was identified as relevant in the definition of the optimum capital level of banks, a higher exposure to the stock market being associated with a correspondingly higher capital buffer. Taking into account that profitability variability is a risk measure in the broad sense, the positive relationship found between this variable and excess capital is also in line with the idea that capital has an insurance function against default. Thus, banks with higher risk tend to hold higher capital reserves.

The hypothesis that larger banks hold less excess capital was confirmed, as was a negative business cycle effect, which means that the optimal choice of capital by banks contributes to amplify the pro-cyclicality of their credit policy. Results are also consistent with the existence of a positive relationship between excess capital and the performance of stock markets.

These findings allow for a better understanding of the factors underlying changes in capital reserves of Portuguese banks and provide a better basis for the discussion about regulatory changes in this field. In particular, obtained results confirm the idea that banks adjust their capital reserves in response to changes in the risks they face, i.e. both those directly resulting from changes in the macroeconomic environment throughout the cycle, and those resulting from banks’ own decisions. However, it should be noted that with the analysis undertaken, it is not possible to identify the effects of the regulator’s explicit and implicit intervention to lead institutions to adopt corrective measures of a prudential nature.

Finally, the interpretation of the results obtained, namely in what concerns conclusions regarding the future, should be particularly cautious, as banks are expected to change their behaviour under the new regulatory framework of Basel II.

\(^{17}\) In fact, estimation by generalised least squares assuming random effects – the methodology used in Lindquist (2003) – provided the same qualitative results.
REFERENCES


