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Domestic and multinational determinants of foreign bank profits: The case of Greek banks operating abroad

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Abstract

This paper examines the determinants of profits of Greek banks operating abroad by developing an integrated model that includes a set of determinants informed by the literature on the profitability of both multinational and domestic banks. The basis for our econometric analysis is provided by an unbalanced panel dataset for 19 Greek bank subsidiaries operating in 11 nations, covering the period from 1995 to 2001. The results show that the profitability of the parent bank and the operating experience of its host nation subsidiaries have a robust and positive impact on the profits of Greek banks abroad, whereas subsidiary bank size has a negative effect. Domestic financial factors reflecting stock market developments, bank-specific factors such as liquidity, loan loss provisions or cost efficiency, and market specific factors like concentration or market share in the host nations, are all insignificant in explaining Greek subsidiary banks' profits.

JEL classification: G15; G21

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1. Introduction

Until recently the literature on the investigation of the determinants of foreign bank performance focused mainly on the case of foreign banks operating in the US, or on US banks operating abroad

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(e.g. Cho, 1985; Goldberg and Johnson, 1990; Seth, 1992). Extensions to the case of foreign banks operating in other countries include recent studies by Williams (1996, 1998a, 1998b, 2003) for Australia; Minh To and Tripe (2002) for New Zealand; Ursacki and Vertinsky (1992) for Japan and Korea; and Engwall et al. (2001) for the Nordic countries.

As for the determinants of profitability, Williams (2003) argues that there has been relatively a limited overlap between the set of factors informed by the domestic bank profits literature and those based on the multinational bank profits literature to explain foreign bank profits. Since a multinational bank typically influences participation of a foreign bank in a host market, failure to simultaneously include multinational determinants alongside host country factors will not adequately explain all aspects of a foreign bank's profitability. To overcome this shortcoming, Williams (2003) has proposed the use of an integrated model that combines both sets of factors to examine the determinants of foreign banks' profits in Australia.

The purpose of this paper is to develop such an integrated model to identify the determinants of profits of Greek banks operating abroad. In this context, we adopt the approach of Williams (2003) using a different dataset, although in principle our study differs from Williams (2003) in that we consider outward investment of Greek banks to a number of countries, as opposed to inward investment of foreign banks into a single nation. Furthermore, some of the banks in our sample operate in less developed countries (e.g. Albania, Bulgaria, Macedonia, Romania), which makes our study specifically important in the light of the fact that other studies have found evidence that foreign banks are more at a disadvantage compared to the domestic banks in developed countries (e.g. De Young and Nolle, 1996; Berger et al., 2000; Claessens et al., 2001; Sathye, 2001; Kosmidou et al., 2004), although not so in less developed countries (Claessens et al., 2001). In addition, as Williams (2002) points out, developing nations do not possess a highly sophisticated banking system and therefore the option of providing distant finance, via correspondent banking for example, is not a viable option as it is in developed nations. In fact, owing to the location of many Greek bank subsidiaries, we find that none of the domestic financial factors reflecting stock market developments and liquidity are significant in explaining Greek bank profitability abroad, the latter being determined mainly by multinational factors like parent bank profitability and the experience of Greek bank subsidiaries in host nation markets.

The remainder of this paper is structured as follows. Section 2 discusses the set of determinants used for estimating our integrated model. Section 3 presents some descriptive statistics based on the sample of data obtained. Section 4 outlines the model formulation and discusses the empirical results and, finally, Section 5 presents the concluding remarks.

2. Determinants and variables

This study uses return of assets (ROA) as the dependent variable, calculated as profit before taxes[1] divided by total assets to measure the overall profitability of the bank. As for the potential determinants of bank performance, the literature on multinational banking suggests several ownership-specific and location-specific factors while empirical studies on the profitability of domestic banks identify several internal (bank-specific) and external (market related) factors. In

[1] An initial version of the paper adopted ROA as a measure of profits after tax, but since cross border differences in taxes can be substantial we have re-estimated our model using ROA before taxes, thanks to the suggestion of an anonymous referee.

this section we discuss our chosen set of independent variables, considering the multinational and domestic factors in turn. Table 1 provides a description of all the variables, and also indicates their likely impact on foreign bank profits.

2.1. Multinational banking factors

Among the five multinational variables listed under this category (Table 1), three are location-specific (EXPORTS, GDPDIF, EXPER) and two are ownership-specific (PAROAA, PARSIZE).

EXPORTS correspond to the exports from the host nations to Greece. This variable is used to test the defensive expansion hypothesis, which argues that banks follow their clients abroad to retain their existing relationship (for a comprehensive review see Williams, 2002).[2] Defensive expansion effects have been measured using a number of empirical proxies which, according to Williams (2002), can be classified into two groups: (i) those that consider direct investment from the home nation to the host nation; (ii) those that consider trading relationships. The use of numerous empirical proxies in the literature owes to the fact that the defensive expansion theory does not clarify which client's activities result in multinational banking. The empirical support for this hypothesis is mixed. Williams (1996) found no evidence for Japanese banks following clients in Australia (as measured by FDI), whereas Williams (1998a) found limited support for the defensive expansion effect of foreign banks in Australia (using capital flows and exports). Minh To and Tripe (2002) also found similar results for New Zealand (using bilateral trade). In other studies for Australia, Williams (1998b) found some support for the defensive expansion hypothesis (using FDI and exports), although Williams (2003), using capital flow, lagged capital flow and exports, found all these effects insignificant.

GDPDIF is the difference between the GDP growth rates of the host country and Greece; its inclusion therefore tests the effect of the differential growth rates on the performance of foreign banks. Davidson (1980) and Goldberg and Saunders (1981) argue that banks offer their services in locations that provide better opportunities for growth and therefore these opportunities are usually greater in larger or rapidly developing nations. Previous studies have incorporated slightly different measures to test this hypothesis, such as home GDP growth (Williams, 1998b; Williams, 2003), host GDP (Demirgüç-Kunt and Huizinga, 2001), and GDP growth differential between the home and host nations (Minh To and Tripe, 2002), albeit with mixed results.

PAROAA is the parent bank's return on average asset measure that is used to test another multinational banking hypothesis, namely the existence of a relationship between the profits of the parent bank and the performance of the subsidiary bank in the host nation. When a bank enters a new market, it should consider the opportunity costs and the trade-off that arise (Williams, 1998a,b; Minh To and Tripe, 2002). It has to take into account, for example, the capital and management resources required to set up the business in the host nation. An allocation of more resources in the foreign country could potentially increase the profits and size of the subsidiary but this might come at the cost of lower profits and growth of the parent bank because fewer resources would be available to compete in the domestic market. On the other hand, Minh To and

[2] In his survey, Williams (2002) suggests the use of investment measures like FDI as preferred proxies for testing the defensive expansion hypothesis. However, due to data availability, we had to rely on exports instead. In an earlier version of the paper we used a measure of bilateral trade. Our choice of exports to replace this variable is thus a second best alternative following a suggestion by an anonymous referee to consider FDI, as suggested by Williams (2002). Williams (1998a,b, 2003) also uses exports as a proxy to measure defensive expansion effects, thus avoiding some of the pitfalls of the bilateral trade measure.

Table 1
Variables description

Variables	Description	Hypothesis (direction)
Dependent		
ROA	The return on average total assets of the subsidiaries operating abroad in year *t*	NA
Independent		
Multinational banks' literature		
EXPORTS	The exports from the host nation to Greece in year *t*, in US$	+
GDPDIF	The difference between the percentage GDP growth rates of the host country and Greece in year *t*	+
PAROAA	The return on average total assets of the parent banks in year *t*	+
PARSIZE	The accounting value of the total assets of the parents banks drawn from the consolidated statements in year *t*	+/−
EXPER	A measurement of experience in the host nation calculated as the difference between the year of establishment of the subsidiary and the year of observation *t*	+
Domestic banks' literature		
LOSSPROV	Loan loss provisions/net interest income. An indicator of asset quality, which shows how much a bank is provisioning in year *t* relative to its income	−
LIQUID	A measure of liquidity, calculated as net loans/total assets and business mix which indicates what percentage of the assets of the bank are tied up in loans in year *t*. The higher this ratio the less liquid the bank will be	+
EQAS	A measure of bank's capital strength in year *t*, calculated as equity/total assets. High capital-asset ratios are assumed to be indicators of low leverage and therefore lower risk	+
COST	COST is calculated as non interest expenses/average assets and provides information on the efficiency of the management regarding expenses relative to the assets invested in year *t*. Higher ratios imply a less efficient management	+
SIZE	The natural logarithm of the accounting value of the total assets of the subsidiary in year *t*	+
C5	The C5 concentration measure calculated by dividing the assets of the five largest banks with the assets of all banks operating in the market in year *t*	-
MACPASS	This variable, calculated as stock market capitalization/total assets of the deposit money banks[a] serves as a proxy of financial development as well as a measure of the size of financial market and the relationship between bank and market financing in year *t*	+/−
SHARE	The market share of the bank in terms of deposits calculated by dividing its deposits with the total deposits of the banking industry in which it operates in year *t*	+
TIME	A variable that takes the value of one for the first year (i.e. 1995), two for the second year (i.e. 1996), and so on, to control for the effects of time on the profits of subsidiaries	+/−

Notes: The data for the calculation of banks' specific variables and concentration were obtained from Bankscope Database. The data for market and country-specific variables were obtained from Euromonitor International Database, which uses sources such as International Monetary Fund's (IMF) International Financial Statistics (IFS), World Economic Outlook/UN/national statistics and World Bank.

[a] Total assets of the deposit money banks is the summation of IFS lines 22a–f. The stock market capitalization was obtained from Euromonitor International Database that collects data from World Bank for the specific variable.

Tripe (2002) argue that a more profitable bank could result in increased profitability in foreign markets because of ownership-specific advantages. Following Focarelli and Pozzolo (2001) and Williams (2003), we assume that efficient, profit maximising banks expand abroad to achieve higher profits. Hence, higher PAROAA will be reflected in higher profits of banks operating abroad.

PARSIZE is the logarithm of the accounting value of parent bank's total assets from the consolidated statements. This tests the significance of the effect of the size of the parent bank on the performance of the bank subsidiary operating abroad. Hirtle (1991) considered the size of a bank to be one of the main determinants of international competitive success. However, Williams (1998a,b) found no evidence to support this effect on foreign bank operations in Australia, although Williams (2003) reported a positive effect in one of his regressions.

EXPER is a measure of the operating experience of the foreign bank in the host market and is calculated as the difference between the year of observation and the year of the establishment of the subsidiary. According to this multinational hypothesis a relationship exists between the performance of a bank and the period of time during which the bank has been operating in the host nation. Several studies have noted that foreign banks might not have knowledge of the specific market at the time of entrance or that they might be otherwise disadvantaged compared with domestic banks (Berger et al., 2000; Kosmidou et al., 2004). Thus, to compete successfully in the host market, foreign banks require some degree of international experience. Some studies find evidence that the time in the host market affects performance (Williams, 1996; Engwall et al., 2001; Minh To and Tripe, 2002), while others find that it does not (Williams, 1998a,b, 2003).

2.2. *Domestic banking factors*

2.2.1. *Internal determinants*

The internal bank-specific characteristics that we include represent information about asset quality, liquidity, capital strength, expenses management, asset quality and size.

LOSSPROV is the ratio of loan loss provisions to net interest income and is a measure of asset quality[3] showing how much a bank is provisioning in a given year relative to its income. A more aggressive bank might lend to doubtful customers at high rates of interest, or make speculative investments that will temporarily inflate profits. However, such a policy may cause problems in the future if these customers default on their loans. Bad asset quality (i.e. high value of LOSSPROV) is expected to have a negative impact on bank profitability, by reducing interest income and by increasing the provisioning costs,[4] thus decreasing net profits.

LIQUID is the ratio of loans to total assets, which is a measure of liquidity indicating the percentage of bank assets that are tied up in loans. To avoid insolvency problems, banks often hold liquid assets that can be easily converted into cash. Hence, the higher the LIQUID ratio, the less liquid a bank is. However, liquid assets are usually associated with lower rates of return,

[3] Asset quality refers mainly to the quality of the bank's earning assets, the majority of which make up its loan portfolio (credit risk), although it also includes the securities portfolio (market risk) and off-balance sheet items.

[4] Loan loss provisions, which include general provisions applied on a statistical basis to all loans and specific provisions designed to account for the probability of losses among problem loans, are amounts set aside from earnings to adjust for the probable decline in the value of the bank's loan assets. Because provisions depend on the probability of loans becoming non-performing, higher provisions usually indicate higher probability of non-performing ratios and lower asset quality.

and therefore higher liquidity would be associated with lower profitability. As for the evidence, Molyneux and Thorton (1992) found a weak negative relationship, whereas Bourke (1989) found a strong positive relationship between liquidity and bank profitability.

EQAS is the equity to assets ratio and is used to measure the capital strength of a bank. Financial regulators require commercial banks to sustain a minimum capital adequacy ratio to ensure that banks hold a sufficient amount of equity to absorb any shocks they might experience. Under the 1988 Accord of the Basel Committee on Banking Supervision, the minimum capital requirement is specified as a percentage of the risk-weighted assets of the bank, measured by either Tier 1 or total capital ratio.[5] Under the New Accord (known as Basel II), the definition of capital and the minimum capital requirement of 8% remain unchanged although the current risk categories of credit risk and market risk are supplemented by a third risk category – operational risk – which in future will have to be explicitly backed by capital. Berger (1995), among others, found a positive relationship between bank profitability and capitalization for US banks, and supported the notion that well-capitalized banks enjoy access to cheaper sources of funds with subsequent improvement in profit rates.

COST is the ratio of non-interest expenses to average assets that is used to measure the efficiency of banks in managing expenses.[6] Recent reviews of the literature on bank efficiency can be found in Berger and Humphrey (1997), Berger and Mester (1997), Berger et al. (2000), and Goddard et al. (2001). Other studies have employed techniques comparing the efficiency of foreign and domestic banks for the US (Hasan and Hunter, 1996; Mahajan et al., 1996; Chang et al., 1998), EU (Berger et al., 2000) and post-communist countries (Fries and Taci, 2005) with mixed results. It is reasonable to expect that higher COST will reduce profits.

SIZE is used to capture the impact of bank size on performance, and is measured as the logarithm of a subsidiary's total assets. Large size might result in economies of scale that reduce the costs of gathering and processing information (Boyd and Runkle, 1993), or economies of scope that result in loan and product diversification, and provide access in markets that smaller banks cannot entry (Heggestad, 1977; Smirlock, 1985). The evidence about such economies in banking is not conclusive though. While some authors have found significant evidence of scale economies in the banking sectors in Europe (Cavallo and Rossi, 2001; Vander Vennet, 1994) and the US (Berger and Mester, 1997), others have found only limited evidence of such economies[7] (Allen and Rai, 1996; Altunbas and Molyneux, 1996). In general, most research on the existence of scale economies in retail commercial banking has found a relatively flat U-shaped average cost curve, with a minimum somewhere below $10 billion of assets, depending on the sample, country and time period analysed (Amel et al., 2004).

[5] Probably the use of risk weighted capital ratios such as Tier 1 or total capital ratios would be more appropriate, but due to many missing values of these measures in our dataset we had to rely on EQAS. EQAS is considered as one of the traditional ratios for capital strength whose use dates back to the 1900s (Golin, 2001), and is still being used in many recent studies in banking (e.g. Cyree et al., 2000; Wheelock and Wilson, 2000, 2004; Kocagil et al., 2002).

[6] Although Cobb-Douglas and translog functional forms have been used extensively in the cost literature, many studies that measure efficiency in expenses management follow the efficient frontier approach, the proper estimation of which requires the specification of some input and outputs. Owing to data unavailability for some key variables, such as the numbers of employees or branches that are used to estimate unit prices for these inputs, we could not estimate an efficiency frontier measure for the Greek banks operating abroad and, therefore, had to rely on the non-interest expenses to average assets ratio.

[7] Hughes et al. (2001) argue that most research finds no scale economies because it ignores differences in banks' capital structure and risk taking and demonstrate that scale economies exist but are elusive. They show that estimated scale economies depend critically on the way banks' capital structure and risk-taking are modelled.

2.2.2. External determinants

In addition to the internal factors mentioned above, the performance of banks is subject to the nation's economy, the financial market structure, and the legal and political environment in which they operate. We consider three external determinants, market concentration, stock market capitalization, and market share, discussed further below.[8]

C5 is a measure of concentration in the banking market, calculated by dividing the total assets of the five largest banks in the market with the total assets of all banks operating in the market.[9] Several studies have focused on explaining the impact of market structure (especially market concentration) on bank profitability. According to the structure-conduct-performance (SCP) hypothesis, banks in highly concentrated markets tend to collude and thus earn monopoly profits (Short, 1979; Gilbert, 1984; Molyneux et al., 1996). However, of the 45 studies reviewed by Gilbert (1984), only 27 provided evidence to support the SCP paradigm. A related paradigm is the Relative Market Power (RMP) hypothesis, which argues that only banks with large market shares and well-differentiated products can exercise market power in pricing their products and earn abnormal profits (Berger, 1995). On the one hand, concentration may act as a barrier to entry when entering markets where domestic banks are highly concentrated, implying a negative impact on profits (Williams, 2003). On the other hand, in a market dominated by foreign banks that have been found to be more efficient than domestic banks, such as in less developed countries, concentration may in fact be positively related to foreign banks' profitability.

MACPASS is the ratio of stock market capitalization to total assets of the deposit money banks for each nation where the Greek subsidiary operates.[10] This variable is used as a proxy for financial development to reveal the substitutability (or otherwise) between bank and stock market financing. Demirguc-Kunt and Huizinga (1999) found this variable to be negatively related to bank performance, and suggested that relative well-developed stock markets can substitute for bank finance.

SHARE is the bank's market share expressed as a ratio of its deposits relative to the total deposits of the banking market in which it operates. An alternative to the SCP hypothesis is the Efficient-Structure hypothesis (EFS), which suggests that higher efficiency results with dominant market share, implying a positive association between market concentration and bank profitability. The inclusion of SHARE thus resolves an identification issue associated with the SCP hypothesis, represented by C5, since both the hypotheses suggest a positive relationship between concentration and profits. However, while the effect of C5 might alternatively be negative, we expect SHARE to be positively related to ROA.

3. Data and descriptive statistics

We collected our data on bank-specific variables from the financial statements of 19 subsidiaries of Greek banks operating in 11 nations, available in the Bankscope database of Bureau van

[8] An additional external determinant reflecting the overall economic environment, typically represented by GDP, is ignored because of the inclusion of the GDP growth differential between the host nation and Greece, as a determinant arising from the multinational banking literature.

[9] The five largest banks are themselves defined in terms of their total assets, based on data available in Bankscope. Thus, this measure could itself be subject to bias, owing to data availability in Bankscope. However, since Bankscope is considered the most comprehensive and commonly used database for research in banking, we hope that this bias, if any, is quite small.

[10] The total assets of the deposit money banks in each nation are the summation of the International Monetary Fund's international financial statistics lines 22a–f.

Table 2
Number of observations by country and year

	1995	1996	1997	1998	1999	2000	2001	Total
Albania	0	0	0	0	1	1	1	3
Bulgaria	0	0	0	1	1	1	1	4
Canada	1	1	1	1	1	1	1	7
Cyprus	1	1	2	2	2	2	3	13
Germany	1	1	1	1	1	1	1	7
Luxembourg	0	1	1	1	1	1	1	6
FYROM[a]	1	1	1	1	2	2	2	10
Romania	0	1	1	3	5	5	5	20
South Africa	1	1	1	1	1	1	1	7
UK	0	1	1	1	2	2	2	8
US	1	1	1	1	1	1	1	7
Total	6	9	10	13	17	18	19	92

[a] FYROM is the acronym for Former Yugoslav Republic of Macedonia.

Dijk's company. Additional data for nation-specific and market-specific data were drawn from the Euromonitor International database. A sample of 92 observations on each variable made up an unbalanced panel covering the period 1995–2001. Table 2 shows the sample coverage by nation and year.

Our sample ensured that banks had met certain conditions, apart from the fact that they were subsidiaries of Greek banks, operating in a foreign nation. First, they had annual financial statements in Bankscope for at least 1 year between 1995 and 2001. Second, the parent bank of the subsidiary, which met the first condition, had annual financial statements in Bankscope for all the coverage years. Finally, Euromonitor had the relevant data for the nations in which the subsidiaries operate, such as exports, GDP, stock market capitalization, and total assets of deposit money banks.

Before we move on to estimation issues, it is useful to remark on some preliminary features of the data, as revealed by the descriptive statistics shown in Tables 3 and 4.[11] For example, the median return on assets (ROA) for Greek bank subsidiaries is 0.73%, while that of the parent banks (PAROAA) is 1.22%.

Also, not surprisingly, the volume of total assets for subsidiaries (SIZE) is considerably lower than for parent banks (PARSIZE) (a median of 350.5 million euros compared to the equivalent of 18,413.20 million euros). SIZE is negatively correlated with cost efficiency (COST). There is a fair bit of variability in the experience of the subsidiaries (EXPER), a measure that is also positively associated with PARSIZE and also with liquid assets (LIQUID), whose median value (43.25%) indicates that nearly half of the total assets of the subsidiaries consist of loans. The concentration in the foreign markets where subsidiaries operate (C5) is also relatively high (with mean and median of 73.40 and 75%, respectively). However, subsidiaries hold a relatively small market share (in terms of deposits) on average (SHARE) (with mean 3.01% and median 0.20%). Table 4 generally reveals low to moderate correlations among the independent variables, the exceptions being between COST and EQAS (0.635), SHARE and LOSSPROV (0.591), LIQUID and PARSIZE (0.511), and SIZE and COST (−0.468).

[11] Note that model estimation uses logarithms of both bank's total assets (SIZE) and parent bank's total assets (PARSIZE); however for ease of interpretation the descriptive statistics shown in Tables 3 and 4 use actual (untransformed) data.

Table 3
Descriptive statistics

Variable	Mean	Median	S.D.
ROA	0.81	0.73	5.14
EXPORTS (US$ million)	622.85	131.26	1096.56
GDPDIF	1.54	1.31	4.29
PAROA	1.62	1.22	1.24
PARSIZE (million Euro)	23792.00	18143.20	15638.40
EXPER	22.72	12.50	22.62
LOSSPROV	22.45	17.57	31.41
LIQUID	41.74	43.25	21.85
EQAS	17.75	9.22	18.36
COST	6.94	5.12	6.27
SIZE (million Euro)	439.04	350.50	507.37
C5	73.40	75.00	21.28
MACPASS	13.99	2.15	43.54
SHARE	3.01	0.20	8.61
TIME	4.66	5.00	1.89

Notes: Variables are defined in Table 1.

4. Methodology and results

4.1. Model formulation

To examine the determinants of the profits of Greek bank subsidiaries, we adapt the following fixed effects formulation, distinguishing between the multinational and domestic factors:

$$y_{it} = \mu_i + \delta_t + \alpha'_m X_{m_{it}} + \alpha'_d X_{d_{it}} + \varepsilon_{it} \quad (1)$$

where y is the dependent variable, the vector X_m represents the set of variables from the multinational banking literature, and X_d includes the set of variables from the domestic banking literature. It is assumed that ε_{it} is a normally distributed random variable, whereas the parameters μ_i and δ_t constitute the fixed effects.[12]

The model was estimated using fixed-effects regression, where we eliminated the firm-level heterogeneity through the use of mean deviation data. However, we included a linear time trend (TIME) to take account for the impact of industry level effects over time, as well as other time period dummies in the regression.[13] The preference for a fixed effects model over a random effects model was based on the use of Breusch-Pagan and Hausman tests[14] (Baltagi, 2001). The model was estimated using White's transformation to control for cross-section heteroskedasticity.[15]

[12] In a random effects model, by contrast, these effects are random as apposed to fixed, and thus further assumption about their underlying distribution is made.

[13] With the inclusion of TIME, only six other year dummies were included, and the cross-section dummies were automatically eliminated by the use of the LSDV estimation method for an unbalanced panel.

[14] The Hausman test statistic gave a value of 2.975, against the chi-square critical value of $x^2_{0.95,n} = 1.635$, n refers to the number of variables, at 5% level and thus a fixed-effects model is appropriate.

[15] An LM statistic of 7.75, against a 5% critical value of 13.339 meant that we could not reject the null hypothesis of no residual heteroskedasticity.

Table 4
Correlation matrix of independent variables

	EXPORTS	GDPDIF	PAROA	PARASS	EXPER	LOSSPROV	LIQUID	EQAS	COST	SIZE	CAPIT	SHARE	TIME
EXPORTS	1.000												
GDPDIF	−0.167	1.000											
PAROA	0.043	0.026	1.000										
PARASS	−0.095	−0.022	−0.252*	1.000									
EXPER	0.266*	0.045	−0.057	0.343**	1.000								
LOSSPROV	−0.213*	0.049	0.035	0.232*	0.122	1.000							
LIQUID	−0.138	0.101	−0.204	0.511**	0.289**	−0.085	1.000						
EQAS	−0.114	−0.086	0.090	−0.135	−0.399**	0.206*	−0.348**	1.000					
COST	−0.199	−0.132	0.077	−0.012	−0.259*	0.330**	−0.284**	0.635**	1.000				
SIZE	0.091	0.050	−0.100	0.264*	0.371**	−0.161	0.171	−0.459**	−0.468**	1.000			
CAPIT	−0.122	0.054	−0.170	0.152	0.224*	−0.016	0.284**	−0.113	0.028	−0.129	1.000		
SHARE	−0.172	0.141	0.010	0.187	0.168	0.591**	−0.190	−0.118	0.067	0.000	−0.081	1.000	
TIME	−0.088	−0.220*	0.018	0.293**	−0.068	0.238*	0.051	0.180	0.162	0.114	−0.226*	0.190	1.000

* Statistically significant at the 5% level.
** Statistically significant at the 1% level.

Table 5
Unbalanced pooled profits models

	Multinational model (dependent variable: ROA)	Integrated model (dependent variable: ROA)
EXPORTS	0.010 (0.265)	−0.005 (−0.609)
GDPDIF	−0.005 (−0.481)	−0.046 (−1.898)
PAROAA	0.023 (2.659)**	0.0452* (2.320)
PARSIZE	0.004 (0.090)	−0.116 (−0.862)
EXPER	0.041 (5.228)**	0.095 (5.244)**
LOSSPROV	–	−0.090 (−1.805)
LIQUID	–	0.034 (1.149)
EQAS	–	−0.091 (−0.403)
COST	–	−0.362 (−1.917)
SIZE	–	−0.014 (−2.093)*
C5	–	−0.160 (−1.077)
MACPASS	–	0.019 (0.442)
SHARE	–	−0.296 (−1.393)
TIME	−0.018 (−0.948)	0.002 (0.034)
Adjusted R^2	0.732	0.811
Prob (F-statistic)	0.000	0.000

Notes: 19 banks, period 1995–2001, $N = 92$, t-values in parentheses.
* Statistically significant at the 5% level.
** Statistically significant at the 1% level.

4.2. Results

Table 5 presents the results of two regression models. The first depicts the estimates of the multinational model, and the second adds the domestic determinants to give the integrated model estimates. None of the time dummies are significant, and so their estimates are not shown.

It is apparent that the overall explanatory power (in terms of adjusted R^2) of the integrated model is higher than that of the multinational model. The multinational model explains 73% of ROA, whereas the integrated model explains 81%. This improvement in the explanatory power is attributed mainly to the significant effect of SIZE on profits (explained further below). The adjusted R^2 is considerably higher than obtained by Williams (1998b, 2003), although several other studies report similar high values, including Williams (1998a), Minh To and Tripe (2002) and Staikouras and Wood (2003).[16]

Among the multinational determinants, the influences of parent bank profitability (PAROAA) and their experience of operating in the host nations (EXPER) are significant on the profits of subsidiary Greek banks. Both these effects are positive, as expected. A positive effect of PAROAA may suggest the influence of ownership specific advantages (Minh To and Tripe, 2002) or that efficient banks are more likely to expand abroad to seek new profit opportunities (Focarelli and Pozzolo, 2001). A positive effect of EXPER indicates that Greek subsidiary banks are capable of acquiring knowledge of the host market over the years and improve their performance through experience. This finding may contradict that of Williams (1998a,b, 2003) who found no evidence

[16] Williams (1998b) reports an R^2 as low as 0.05, while Williams (2003) reports between 0.19 and 0.3540. Williams (1998a) finds a range between 0.2459 and 0.7856, while Minh To and Tripe (2002) report Buse R^2 between 0.56 and 0.98. Staikouras and Wood (2003) examined the profitability of EU banks and reported adjusted R^2 between 0.5064 and 0.8260.

of experience affecting either profits or size of foreign banks in Australia, but it is consistent with Williams (1996) who found size to be a positive and non-linear function of time in the host market. It is also consistent with Engwall et al. (2001) who found that the market share of foreign banks in Nordic countries increased over time, and Minh To and Tripe (2002) who found that the duration of foreign banks operating in New Zealand was the most important factor affecting the performance of foreign banks.

Neither the multinational model nor the integrated model provides any support for the effect of parent bank size (PARSIZE), consistent with the results of Williams (1998a,b), and to some extent Williams (2003).[17] Apart from being insignificant, the effect of PARSIZE is clearly not robust as it changes sign from positive to negative (when combined with domestic factors). Neither are the effects of two location-specific multinational factors (EXPORTS and GDPDIF) significant. Hence there is no support for the defensive expansion hypothesis, implying that Greek banks follow clients abroad, a finding Williams (1996, 2003) also confirms for the case of foreign bank subsidiaries in Australia. There is no evidence also to support that Greek banks profit abroad by offering their services in countries with better growth opportunities, in contrast to Williams (2003) who found a positively significant growth differential effect (between host and home GDP) on foreign bank profits in Australia. The fact that most Greek bank subsidiaries are located in the neighbouring states (see Table 2), which have not benefited from higher growth opportunities, might explain this insignificant effect.

Amongst the domestic bank-related factors, the size of the bank subsidiary (measured by the logarithm of total assets) appears to be the only significant factor, albeit with a negative effect on the profits of Greek bank abroad. This might suggest that smaller Greek bank subsidiaries are more profitable than larger ones, although this interpretation has to be treated with caution since cost efficiency (COST) also has a negative (albeit insignificant) impact on profits, and the negative effect of SIZE (as well as PARSIZE) might be due to collinearity among these variables. However, apart from SIZE, none of the other variables with contradictory signs (e.g. EQAS, SHARE, and EXPORTS) are significant.

5. Concluding remarks

This paper estimates an integrated empirical model to identify the determinants of the profits of Greek banks operating in 11 nations over the period 1995–2001, using an unbalanced panel dataset. The aim was to combine, as in Williams (2003), a set of determinants from both the literature on multinational bank profitability and the literature on domestic bank profitability, in order to examine their influence on the profits of the Greek bank subsidiaries. In doing so, we considered several ownership-specific and location-specific factors arising from the multinational banks literature, and several internal (bank-specific) and external (market related) determinants from the domestic banks literature. In this sense, the paper uses the approach of Williams (2003) but addresses the question of outward investment, as opposed to inward investment, in multinational banking.

Our results showed that the combined set of variables leads to an improvement in the overall explanatory power of the integrated model, compared to a model estimated only with the multinational determinants of Greek bank profitability. However, the improvement in the explanatory

[17] As noted earlier Williams (2003) reports a positive and statistically significant effect of log parent assets on foreign bank return on assets after tax, but in only one of the five models he estimated.

power of the integrated model owes mainly to a significant influence of one variable, namely the size of the bank subsidiary, over a range of other bank-specific and market related factors considered. Apart from this effect, the two main multinational determinants of Greek subsidiary banks' profits are parent bank profitability and the operating experience of the subsidiary banks (as revealed by the years of operation of the subsidiary in the host nation). The positive impact of parent bank profitability is consistent with the ownership effect of Minh To and Tripe (2002), while that of the operating experience supports Williams (1996), although not Williams (1998a,b, 2003).

None of the other factors, including financial factors reflecting stock market development, bank-specific factors such as liquidity, loan loss provisions or cost-efficiency, and market related factors such as concentration or market share of subsidiaries in the host nations, are significant in affecting the profit margins of Greek banks abroad. As in Williams (1996, 2003), we find no evidence to support the defensive expansion hypothesis, which suggests that banks chase clients abroad. However, Williams (2003) reported a significant effect of differential GDP growth rates on the profitability of foreign banks in Australia, whereas we find such effects insignificant on the profits of Greek banks abroad.

Although our study differs from Williams (2003) in terms of addressing the direction and flow of multinational investment in banking, it is helpful to explain some of the differences in the findings. The differential growth impact noted above could be explained by the fact that many of the Greek bank subsidiaries operate in neighbouring states (e.g. Albania, Bulgaria, Macedonia, Romania), which are less well developed. The less developed nature of these markets may also explain why the effect of operating experience, as represented by the length of the operation of bank subsidiaries, is significant in our study, and not in Williams (2003). Obviously, differences in the nature and measurement of the variables, as well as the differences in the sample sizes and estimation methodologies, would account for quantitative differences in the results. To highlight the contrast in the estimation methodology, for example, our study employs fixed effects regression, whereas Williams (2003) used a random effects model.

It should also be borne in mind that our study considers numerous other domestic bank related factors, internal and external determinants, whereas Williams considers other macroeconomic influences, such as exchange rates, banks assets to GDP, foreign direct investment, productivity growth of bank assets, and so on. Consideration of some of these influences, in particular that of foreign banks' off balance sheet activity on the profits of Greek banks abroad, would be a worthwhile extension of our study.

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