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ABSTRACT

Greek Banking at the Dawn of the New Millennium*

In this Paper we analyse the current state, past performance, and future prospects of the Greek banking system. Greek banking is in a period of rapid transformation, reflecting the impact of national, European and international forces. Deregulation and European integration are already intensifying competition. The most revolutionary transformation will follow from the privatization of Greece's public banks. We focus on two challenges for policy makers: the need to strengthen prudential supervision, and the need to manage the process of restructuring so as to deliver a more efficient, competitive banking system.

JEL Classification: F30, G20
Keywords: banking, European integration, Greece

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Submitted 11 February 2001

NON-TECHNICAL SUMMARY

Greek banking at the dawn of the new millennium is being reshaped by three powerful drivers: catch-up, competition, and privatization. By catch-up we mean that, in banking as in other aspects of its development, Greece started out behind the rest of the European Union. In 1997, for example, the country had only 24 bank branches per 100,000 residents, the fewest of any EU member state, only half the unweighted EU average, and less than a third of the branches *per capita* of heavily banked member states like Belgium. Its 15 ATMs per 100,000 residents were barely a third of the EU average and a sixth the density of Spain. But as *per capita* incomes and economic development generally converge with the rest of the EU (as has been occurring since the mid-1990s), so the level of banking services will continue to converge as well. How incumbents and entrants are managing this transformation will determine the shape of Greek banking for years to come.

Normally, a rapidly growing market should create rosy prospects for profitability. In the case of Greek banking, however, the rosy prospects need not follow, for competition is intensifying as the market grows. Interest rate ceilings have been lifted. Restrictions have been relaxed on the financial activities in which banks and other financial institutions can engage. In little more than a decade, Greece has moved from one of the most restrictive financial environments in the Western world to a largely deregulated market.

European integration will further intensify competition. The Single European Act and the First and Second Banking Directives have already made it easier for banks from other member states to do business in Greece. Barclays, ABN-AMRO Bank, Credit Commercial de France, and Midland Bank plc are only a sampling of the credit institutions already operating in Athens. Consumer credit, mortgage lending, commercial financing, leasing, credit cards, travellers' cheques, bankers' drafts, trading for own account or the account of customers, participation in share issues, portfolio management, and custody services are all subject to mutual recognition. In other words, no segment of the market will be immune from cross-border competition.

Competition will come not just from foreign banks, of course, but also from the markets. With the growth of securities exchanges and derivative financial instruments, corporate and other clients will be able to choose among various sources of finance. Individuals once forced to park their savings in deposit accounts will be able to choose among money market mutual funds and other financial instruments. And Europe's monetary union, of which Greece became a member in January 2001, will further accelerate securitization and disintermediation by stimulating the growth of deep and liquid bond and equity markets continent wide.

We assess the likely impact of these trends by analysing the determinants of bank profitability using a panel of data for Greek banks. We include both bank-specific effects that control for possible proprietary advantages and time-fixed effects that control for aggregate factors such as the business cycle. We consider three measures of profitability: the return on assets, the return on assets plus off-balance-sheet items, and the return on equity.

The results indicate that profitability is a non-linear function of bank size, such that smaller Greek banks will reap scale economies and raise profits if they grow larger, but that some of the larger banks have already exhausted their scale economies and will have to downsize in order to reduce costs. While there is some evidence that banks that engage in more progressive asset management practices, such as off-balance-sheet business, are more profitable, there is no indication that simply making more loans enhances profitability. We find only a weak relationship between market concentration and profitability. The evidence suggests that the explanation lies in the tendency for banks with market power to accrue it in the form of less risk (the risk aversion hypothesis). An important implication is that the riskiness of bank portfolios may rise as competition continues to intensify.

Going forward, the most revolutionary transformation will follow from the privatization of Greece's public banks. After World War II, most banks came under state ownership and control. This trend towards public ownership is now being reversed. The government privatized four small state controlled banks in 1998 and the larger Ionian Bank and 30% of ETBA (the state development bank) in 1999 and has announced the intention of privatizing still others.

Public banks are different from private banks. They face softer budget constraints. Their management is protected from hostile takeovers. Their loan portfolios, staffing, and technical efficiency differ. There is no question, then, that privatization, together with the other trends identified above, will alter the face of Greek banking. Ensuring that this transformation is completed without jeopardizing stability is the challenge for policy makers going forward.

Greek Banking at the Dawn of the New Millennium[1]

Barry Eichengreen and Heather D. Gibson

January 2001

1. Introduction

Greek banking at the dawn of the new millennium is being reshaped by three powerful drivers: catch-up, competition, and privatization. By catch-up we mean that, in banking as in other aspects of its development, Greece started out behind the rest of the European Union. In 1997, for example, the country had only 24 bank branches per 100,000 residents, the fewest of any EU member state, only half the unweighted EU average, and less than a third the branches *per capita* of heavily-banked member states like Belgium. Its 15 ATMs per 100,000 residents were barely a third the EU average and a sixth the density of Spain. But as *per capita* incomes and economic development generally converge with the rest of the EU (as has been occurring since the mid-1990s), so the level of banking services will continue to converge as well. How incumbents and entrants are managing this transformation will determine the shape of Greek banking for years to come.

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Competition will come not just from foreign banks, of course, but also from the markets. With the growth of securities exchanges and derivative financial instruments, corporate and other clients will be able to choose among alternative sources of finance. Individuals once forced to park their savings in deposit accounts will be able to choose among money-market mutual funds and other financial instruments. And Europe's monetary union, of which Greece became a member in January 2001, will further accelerate securitization and disintermediation by stimulating the growth of deep and liquid bond and equity markets continent wide.

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[2] On the determinants of foreign entry into Greek banking, see Galiatsos and Papapetrou (1995) and Hondroyiannis and Papapetrou (1996). Of course, the idea that foreign entry will increase with the creation of the euro area has been disputed, not least because the introduction of the Second Banking Directive did not appear to lead to a decline in market segmentation in the EU. Danthine *et al* (1999) provide a comprehensive analysis of the likely effects of the creation of the euro area on European banking. See also Gibson and Tsakalotos (1993) on the impact of the Second Banking Directive on southern European countries.

public banks. After World War II, most banks came under state ownership and control.[3] This trend towards public ownership is now being reversed. The government privatized four small state-controlled banks in 1998 and the larger Ionian Bank and 30 per cent of ETBA (the state development bank) in 1999 and has announced the intention of privatizing still others.

Public banks are different from private banks. They face softer budget constraints. Their management is protected from hostile takeovers. Their loan portfolios, staffing, and technical efficiency differ.[4] There is no question, then, that privatization, together with the other trends identified above, will alter the face of Greek banking. Ensuring that this transformation is completed without jeopardizing stability is the challenge for policy makers going forward.

2. Historical Background and Comparative Context

The modern Greek banking system emerged in the 1920s when the Bank of Greece was vested with central banking functions and two major state-run credit institutions (the Agricultural Bank of Greece and the National Mortgage Bank of Greece) were established. After World War II, the largest banks and affiliates were all brought under state ownership or control, and in the 1960s the authorities established a trio of development banks. Regulatory obstacles limited entry by new banks, and the government merged and consolidated the institutions under its control, leading to the creation of a concentrated banking system.

The authorities used this system to direct resources to activities and enterprises to which they attached priority: state-owned firms, export-oriented activities, small enterprises, agriculture, urban housing, and infrastructure investment, especially in the south. The

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[3] As late as 1998, nine commercial banks were controlled by the government, directly or through public pension funds and municipalities.

[4] Or so the international evidence suggests. See Altunbas, Evans and Molyneux (1997) and Barth, Caprio, and Levine (1999).

development banks supplied long-term credit at subsidized rates to favored sectors, while commercial banks were required to invest 40 per cent of their deposits in Treasury bills to finance the public sector deficit. The Currency Committee, composed of ministers with economic portfolios, together with the Governor of the Bank of Greece, provided detailed instructions to each bank.

The private sector, for its part, had few alternative sources of finance. Capitalization and turnover on the Athens stock exchange remained negligible before the 1980s. Bond issues were limited to flotations by the state and public enterprises.

Accession to the European Community in 1981 forced Greece to bring financial supervision and regulation into conformance with European practice. In the second half of the 1980s, controls on the operation of financial markets and institutions were relaxed.[5] The requirement that banks invest 40 per cent of deposits in Treasury bills was removed in 1993.[6] Inward and outward capital flows were liberalized (long-term flows in 1993, short-term flows in 1994). Commercial banks were permitted to offer the entire range of commercial and investment banking services. The development banks, to compete, were permitted to accept deposits, borrow on the interbank market, grant short-term loans, and invest in corporate securities.

These measures notwithstanding, the Greek financial system is still underdeveloped by most measures. Loans to nonbanks by credit institutions as a share of GDP are the lowest of any EU country, while bank claims on the government sector as a share of their assets are higher than

[5] The last regulatory ceilings on deposit and lending rates were removed in 1993.

[6] Although unusually high reserve requirements remained and were lowered to European levels only on entry into the euro area. Also eliminated was the requirement that credit institutions devote ten per cent of their deposits to credit for small and medium-size enterprises and nine per cent to financing public enterprises.

in any country except Belgium.[7] The contrast is evident for financial markets as for financial institutions. The value of bonds outstanding as a share of GDP is low by EU standards and there is no commercial paper market.

Catch-Up and Convergence. Financial development goes hand in hand with economic development**.** That is to say, the low level of financial intermediation is a corollary, at least in part, of the country's economic underdevelopment relative to the rest of the EU**.** As *per capita* incomes rise, so will intermediation**.** The question is by how much. Figure 1 provides a picture of the level of financial intermediation in 1995, just after the completion of most liberalisation measures. It juxtaposes three measures of financial intermediation against *per capita* GDP for each EU country.[8] Greece stands out in the top panel, which shows the assets of credit institutions as a share of GDP. While its low *per capita* income helps to explain the low level of bank assets as a share of GDP, Greece is still an outlier.[9] The same is true for investment in mutual funds as a share of GDP (middle panel), although there the divergence is less pronounced.[10]

The implication is that two distinct catch-up dynamics will be at work in the future. The supply of financial intermediation services will approach the levels of the rest of the European

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[7] Whose unusually high public debt explains the exception.

[8] And superimposes the corresponding regression line. The *per capita* GDP figures are in ECUs, from Resource Centre for Access to Data on Europe (http://www-rcade.dur.ac.uk). We exclude Luxembourg, since it is an outlier (for obvious reasons) in terms of assets of both credit institutions and investment funds.

[9] In other words, it is below the regression line. The difference is not statistically significant at standard confidence levels (it just misses significance at the ten per cent level). This is not surprising given the small number of observations. The other country that is noticeably below the regression line is Finland, which in 1995 was still recovering from its banking crisis.

[10] And Greece has plenty of company; the GDP share of mutual funds in 1995 was even lower in both Finland and Denmark. In contrast, while the assets under management of insurance companies and pension funds are the lower in Greece than in any other EU country (bottom panel), this differential is explained entirely by the country's relatively low *per capita* income. In any case, it is the assets of credit institutions that matter in the aggregate, since they account for more than 80 per cent of the assets of financial intermediaries in Greece.

Union, if experience elsewhere is a guide, as Greece's *per capita* incomes converge with those of the rest of the EU. But, assuming that convergence more broadly is the rule, we should expect Greek financial markets to converge even faster than *per capita* incomes, since the country's financial sector started out further behind than predicted by the differential in living standards. Once Greece overcomes the legacy of entry barriers, tight regulation, and other restraints on competition, in other words, the supply of intermediation services should expand to match that in countries like Portugal, for example, where *per capita* incomes are similar but the assets of financial intermediaries as a share of GDP are double. Both arguments lead us to expect the supply of intermediation services to expand rapidly in coming years.

3. Structure, Conduct and Performance

What is the structure of the industry providing these services? We analyze this question using two sources of information. One is the OECD publication *Bank Profitability*, which enables us to further compare Greece with other EU countries. The other is individual bank reports and accounts, which we collect for both commercial banks and specialized credit institutions for 1980-98.[11] Table 1 lists the banks in the sample, which includes the vast majority of banks operating in Greece, public and private, large and small.[12] Figures 2 and 3 plot Herfindahl-Hirschman indices of market structure, together with three- and four-firm

[11] Before 1993 this information is limited to major accounting aggregates (total loans, total assets, off balance sheet items, own capital, total deposits, and profits), while for subsequent years we also have more disaggregated information. The system of presenting the accounts changed in 1994. Since in each year banks publish information for the previous year, we also have 1993 accounts using the new system. It was not possible to derive the aggregates in the new accounts from information published using the old accounting methods.

[12] We do not include branches of foreign banks operating in Greece but their business is still limited. For example, in 1997 they accounted for 15 per cent of total assets (Hellenic Banking Association, *1997 Banks in Greece*, 1998).

concentration ratios measuring the extent to which the largest banks dominate the industry.[13] The Herfindahl-Hirschman index indicates high levels of overall market concentration but a downward trend since 1985, notwithstanding interruptions in 1993 and 1998.[14] The three- and four-firm concentration ratios, measuring the share of the market controlled by the largest banks, again suggest high levels of concentration but also show a declining trend since 1985.[15]

High concentration but a large number of banks implies many banks with small market shares. Before liberalization, this group was made up of specialized credit institutions and regional banks, often owned by the large state banks. Since liberalization it has also included a number of small private banks and several recently-privatized regional/specialized banks. Figure 4 plots market shares for all Greek banks over the period, revealing the dominance of the National Bank of Greece, with some 40 per cent of the market. The number of observations for banks with market shares below three per cent is clear, as is the fact that some banks in this

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[13] We calculate market shares on the basis of total assets and, alternatively, using total assets plus off-balance sheet (OBS) items. The Herfindahl-Hirschman index is calculated as:

$$HH = \sum_i MS_i^2$$

where MS_i is the market share of bank i. This index, which measures the size dispersion of firms in a particular market, can vary from zero for an atomistically competitive market to 10,000 for a monopolized market.

[14] The index using total assets plus OBS items to measure market share shows greater dispersion. This is not surprising since, as we shall see later, it is the smaller (private) banks that have specialized more in OBS activities compared to the larger (state-owned) banks. The increase in 1998 reflects the takeover by the National Bank of the National Mortgage Bank, which had a market share of around eight per cent.

[15] Between 1980 and 1996, the top three banks were the National Bank of Greece, the Agricultural Bank and the Commercial Bank. In 1997, Alpha Credit Bank, took over third place from the Commercial Bank, and by 1999 it had taken over second place from the Agricultural Bank. Until 1995, the fourth largest bank was the National Mortgage Bank. Alpha Credit Bank became fourth largest in 1995. Eurobank, another private institution, is now fifth on the list.

group sharply increased their market shares in the 1990s.[16] On this basis it tempting to characterize the industry as an oligopoly with a competitive fringe that has been gaining share over time.

Table 2 is made up of snapshots of market positions in 1980 (when liberalization was just beginning), 1993 (when the number of banks was at its peak), and 1998 (the most recent year for which we have data). It shows that the development banks (ETBA and ETEBA) have lost considerable market share[17], while Alpha Bank (the former Alpha Credit Bank), the largest private bank, has gained share following liberalization. Several small private banks (Ergo Bank, Eurobank and the Bank of Piraeus) have also been gaining market share.[18]

One has to squint to detect an acceleration in growth rates following liberalization.[19] The reason, evident in Table 3 (whose Group 1 denotes the smallest third of banks in a given year, Group 2 the middle third, and Group 3 the largest third), is that most of the acceleration was concentrated among small banks.[20] Private banks have also grown much faster than public banks (Table 4).[21]

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[16] Two new banks started operations in 2000 – Nova Bank (which is owned by the Interamerican Group and Banco Commercial Portuguese) and the Hellenic Investment Bank. The former is concentrating on retail banking and already has some 45 branches (mainly in and around Athens), internet and phone banking services; the latter is focusing primarily on investment banking.

[17] And, in the case of ETEBA, have failed to keep up with other top banks in the rankings.

[18] Often through acquisitions. See also footnote 16.

[19] Pre-1988, the average growth of total assets was 37% per annum compared with 26% post-1987. Figures for the growth of total assets plus OBS items tell a similar story, although, the difference (41 per cent vs. 38 per cent) is not great. This is not surprising since growth of off-balance-sheet items in the 1990s has generally been higher than in the 1980s.

[20] Their small initial size is why the change does not show up strongly in the overall growth rate. And the relatively rapid growth of small banks is of course what accounts for the declining concentration ratios and Herfindahl-Hirschman indices reported above.

[21] We assign banks to publicly- and privately-owned *in each year* in order to take into account changes in the way banks operate following their privatisation. In other words, banks are not placed into one ownership category for the whole period. This affects some smaller banks that were privatised in the 1990s. See below for further discussion.

These patterns suggest that liberalization has intensified competition. What has this implied for profitability? As shown in Figure 5, Greek banks remain rather profitable by the standards of other EU countries. (Here profitability is measured by the pre-tax rate of return on assets.) This is confirmed by our sample of balance-sheet accounts, in Figures 6 and 7, which show the return on assets and equity (again using pre-tax profits). At the same time, profitability appears to have trended downward in the 1990s.[22] Tables 3 and 4 suggest that medium-sized banks have been more profitable than their smaller and larger rivals and that private banks have been more profitable than their publicly-owned counterparts.[23]

Throughout the 1990s Greek banks parked many of their funds in government securities. Their loan-to-asset ratios were low by the standards of other EU countries, while their securities-to-asset ratios were high. With the convergence of Greek interest rates to European levels, public issues have been rendered less attractive, and with the relaxation of regulations requiring banks to hold government securities their weight in portfolios has fallen (Figure 8). But large publicly-owned banks continue to hold more bonds in general, and government bonds in particular, than their smaller, privately-owned rivals.

Compared to other EU countries, banks in Greece derive a higher proportion of gross income from noninterest sources. This suggests that fees and commissions are relatively high, reflecting historically limited competition.[24] But there has been a decline in noninterest income since the mid-1990s, again suggesting rising competition.

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[22] Note that the rate of return on assets in 1998 is something of an outlier in this respect.
[23] Although the multivariate analysis we report later in the paper suggests that the first of these regularities is more robust than the second.
[24] On this, see Moschos and Frangetis (1997). They note that off-balance-sheet business is another source of noninterest income, but they argue that this is still relatively underdeveloped in Greece.

Figures 9 and 10 document the limited importance of the interbank market as a source of funds. Small banks use the interbank market more (Table 3), since they have smaller branch networks and less name recognition with which to attract nonbank deposits. This is widely viewed as an advantage for larger banks, since nonbank deposits are a cheaper source of funds, and in turn suggests that smaller banks will gain competitive advantage and market share as they develop better access to this source of funding.[25]

Operating costs as a share of gross income are comparable to other EU countries. But Greek banks tend to have significantly higher staff costs (Figure 11); in other words, operating cost ratios are respectable because the denominator of this ratio -- gross income -- has been large, reflecting limited competition. Greek banks' high staff costs are particularly striking in light of the fact that the banks are underbranched.[26] Greek banks have lower loans per employee, lower nonbank deposits per employee, and lower total assets per employee.[27] Productivity measures such as loans, deposits and profits per worker all favor the larger banks, although this is not reflected in the bottom line.[28]

Finally, we consider service quality, measured by the number of ATMs and geographical coverage. Older, larger, publicly-owned banks have greater geographical scope, indicating a probable source of competitive advantage, whereas newer, privately-owned banks are largely

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[25] Our multivariate analysis below casts some doubt on the importance of this effect. We already see a hint of this in the raw data, in that the finding that publicly-owned banks rely more on the interbank market is sensitive to outliers. There is very little difference between the two groups of banks if we rely on medians rather than mean figures. The outliers are ETBA and ETEBA. These banks do not rely on nonbank deposits. Pre-liberalisation, other banks were obliged to invest in bonds issued by these SCIs; since liberalisation their means of funding has become more market oriented, but still largely excludes traditional nonbank deposits.

[26] There, staff costs are normalized by gross income. We can note that following a surge in branch openings, underbranching is now less of an issue.

[27] Moreover, each of these ratios has been rising more slowly than in other EU countries in the 1990s.

[28] Profits per worker figures for large banks and for publicly-owned banks are affected by outliers. However, the same picture is shown if medians rather than average figures are taken.

confined to the Athens, Piraeus, and Thessaloniki conurbations. Older, publicly-owned banks similarly have larger ATM networks, although this is less of an advantage with the formation of DIAS (the interbank system for the transfers of small sums between banks), which enables customers to withdraw money from any bank through any ATM machine, albeit for a fee.

It is important to acknowledge that there may not exist distinct size and ownership effects. Table 5 tabulates our 371 bank-year observations for 26 banks by size category.[29] Banks are categorized by size and ownership in each year, allowing them to shift categories over time.[30] The table confirms that larger banks are more likely to be publicly-owned. This is a caution that univariate analysis of the type considered above provides only a crude impression of the Greek banking system. Developing a more accurate picture requires moving to multivariate analysis (as we now proceed to do).

4. Determinants of Bank Profitability: Hypotheses

As noted above, the profitability of Greek banks fell somewhat in the 1990s, although this trend hides considerable inter-bank variation. Can we identify the factors that determine profitability and thereby identify the strategies that banks may adopt to cope with their more competitive environment?

Previous Literature. There has been considerable work on bank profitability in the United States and the major European countries. (Table 6 summarizes the explanatory variables and hypotheses that have been examined in this literature.) Research on the profitability of Greek banks is more limited; the main contributors are Vasiliou (1996), who analyzes a sample of eight banks over the period 1977-86, and Hondroyiannis, Lolos and Papapetrou (1998), who

[29] Recall that the panel is unbalanced.
[30] For example, we have 42 bank-year observations where the bank was small and privately-owned.

study 19 banks in the period 1993-95. Vasiliou finds that more profitable banks have more capital, more liquidity, less leverage, and fewer deposits, concluding on this basis that profitability depends more liability than asset management.[31] Hondroyiannis, Lolos and Papapetrou (1998) find some evidence that greater concentration and market share have translated into higher profits.

Our own analysis distinguishes two categories of determinants of profitability: bank characteristics and market characteristics.

Bank Characteristics. Profitability may depend on bank size, for example, if there are economies of scale.[32] Nonlinear effects may be present if economies of scale are present at small sizes but disappear as banks grow. We therefore include the log of total assets (in real terms, alternatively including and excluding off-balance-sheet business) in levels and squared.[33]

Normally, a growing bank will be more profitable.[34] If a negative relationship obtains, this might be evidence for the managerial theory of the firm, in that this theory suggests that managers pursue growth at the expense of profits. This hypothesis can be tested more directly by using bank-specific rather than macroeconomic measures of market growth.

The extent to which banks manage their assets with a view to influencing profitability can be captured by variables describing the asset side of the balance sheet.[35] Among the

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[31] This result is to be expected, of course, for a period in which banks were tightly regulated, limiting their ability to control the asset side of their balance sheets.
[32] Diseconomies of scale are also conceivable.
[33] Use of the logarithm of bank size is justified by Gibrat's Law, which states that growth is essentially a normally distributed stochastic process. This generates a distribution of firm sizes which will approximate a log normal distribution (Dickerson, Gibson and Tsakalotos, 1998).
[34] See Barth, Nolle and Rice (1997), Claessens *et al*. (1998), Bourke (1989), Thornton and Molyneux (1992) and Molyneux (1993). If a bank-specific measure of growth is used, then care must be taken to instrument it, since it is likely to be endogenous – that is, banks with higher profits can probably grow more quickly since profits make more internal funds available for investment and also facilitate access to external funds.
[35] See Haslem (1969), Molyneux (1993), Vasiliou (1996), Miller and Noulas (1997), and Hondroyiannis, Lolos and Papapetrou (1998).

measures we consider are off-balance-sheet business, the loan/deposit ratio, and the extent to which the bank invests in securities and other fixed-income assets.[36] Banks can also use liability management to influence their profitability; we therefore investigate the significance of leverage and sources of funds (bank versus nonbank deposits).[37]

Differences in profitability may reflect ability to control operating expenses. Insofar as these effects measure efficiency, we expect a negative impact on profits.[38] However, higher operating expenses could also signal higher quality and hence lead to higher profitability. A similar argument could be made for staff costs, but a positive sign on this variable could also be evidence for the expense-preference hypothesis (that firms in concentrated industries make higher profits which staff then appropriate).[39] Molyneux and Thornton (1992) suggest that it may be possible to discriminate between these interpretations by alternatively specifying the dependent variable as profits plus staff expenses (a measure of value added); if industry concentration enters positively and significantly in regressions using this dependent variable, then there is evidence for the expense-preference interpretation.

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[36] *A priori*, we do not anticipate any particular sign for these variables. Unfortunately, the accounts do not permit a division of loans into various sub-categories (e.g. consumer loans, industrial loans, mortgages, etc). Evidence from the US suggests that these different categories do have different effects on profitability (Miller and Noulas, 1997).

[37] As noted above, it is argued that nonbank deposits are a cheaper source of funds than bank deposits (ECB, 1999). Consequently banks which rely to a greater extent on the interbank market should have lower profitability, *ceteris paribus*.

[38] Haslem (1969), Bourke (1989), Molyneux (1993), Hondroyiannis, Lolos and Papapetrou (1998).

[39] See Edwards (1977). A further implication of the expense preference theory (Edwards, 1977) is that the proportion of excess profits is captured by staff in the form of higher wages and salaries should be higher in concentrated markets. Bourke (1989) tests this hypothesis on some 90 banks over the period 1972-81 in 12 countries/territories. He finds a moderate positive effect on profitability from concentration. He argues that a test of the expense preference theory is to run the same regression with a measure of value added (profits plus staff expenses) as the dependent variable. If the expense preference theory has some validity, then the positive effect of concentration should become even stronger. However, his results do not provide support for this. Rather the coefficient on concentration turns negative.

Insofar as theory predicts a positive relationship between risk and return, the fewer the funds tied up in liquid investments or the lower the level of own capital, the higher we might expect profitability to be.[40] Bourke (1989) highlights an offsetting effect: the safer a bank, the lower its cost of funds, implying that liquid, well-capitalized banks will have higher profits. This suggests attempting to measure risk more directly, for example with a measure of provisioning.

Given Greek banking's high levels of state ownership, this case provides an interesting test of the effect of ownership on profitability. Descriptive evidence on this question has provided by Barth, Caprio and Levine (1999) and Arnold (1999) for a cross-section of countries. Barth, Caprio and Levine find that public ownership is associated with poorly-developed banks and securities markets. Arnold reports a negative correlation between profitability and public ownership. These are simple correlations, however; multivariate tests of the effect of ownership on profitability (Bourke 1989, Thornton and Molyneux 1993, Molyneux 1993) do not suggest that ownership matters.

Inflation might be expected to have a positive impact on profitability insofar as it is associated with a higher spread between lending and deposit rates. Evidence for this is reported by Barth, Nolle and Rice (1997) in a study of banking in 19 industrial countries. In contrast, Molyneux and Thornton (1992) find inflation to be insignificant in a sample of 18 European countries.

Another potential determinant of profitability is foreign entry, which will tend to intensify competition. Claessens, Demirguc-Kunt and Huizinga (1998) examine foreign entry

[40] See Bourke (1989), Molyneux and Thornton (1992), Molyneux (1993) Vasiliou (1996).

for 80 countries using bank level data between 1988 and 1995 and confirm that foreign entry tends to reduce profitability.[41]

Market Characteristics. One of the longest-running debates in industrial economics is the extent to which profitability is affected by market power. The *structure, conduct and performance* literature argues that concentration should raise profits, since banks in concentrated markets can raise prices and limit quantities. *Contestable markets theory*, on the other hand, argues that concentration in and of itself need not imply a non-competitive market.[42] What matters is ease of entry: low-cost entry constrains incumbents to act as if the market is competitive.[43]

A positive relationship between concentration and profits is equally consistent with other hypotheses. The *efficient structure hypothesis* holds that concentration may reflect firm-specific efficiencies. Firms in concentrated markets may earn higher profits simply because they are more efficient, not because they are exploiting the market power that concentration brings.[44] Here we use two measures of efficiency: loans and deposits per worker, and loans and deposits per branch.[45] Since more efficient firms might be expected to capture a higher market share, one way

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[41] A worry with this paper is the quality of the data. They have data on 16 banks for Greece and report that 58 per cent are foreign owned and that foreign ownership accounts for around 77 per cent of total assets. These figures suggest that they have an unrepresentative sample due to the over-representation of foreign banks.

[42] See Dickens (1996).

[43] Clark and Speaker (1992) provide some evidence that the effects of concentration on profits are larger when entry barriers are higher. However, this is some way from showing that banking can be described as a contestable industry and hence that market power is not a problem.

[44] See Berger (1995).

[45] Once branches have been opened and workers hired, they incur certain fixed costs for the bank. Hence the more loans or deposits which can be attracted by each worker or branch, the more these costs are spread and hence the higher profitability. Vasiliou (1996) uses income per employee as a further measure of productivity.

of distinguishing between the market power and efficient structure theories is to include both market share and concentration.[46]

Finally, there is the *risk aversion hypothesis*, which states that banks with market power use it to limit risk.[47] This implies a negative relationship between concentration and risk but little relationship between concentration and profitability. Molyneux and Thornton (1992), in their study of European banks between 1986 and 1989, test this hypothesis using the sum of profits, staff expenses and provisions as the dependent variable. They obtain a negative impact of concentration on this measure of value added, lending some support to the risk aversion hypothesis, insofar as concentration lowers not only returns and profits but also provisions.

When banks act strategically, profitability may be affected not just by own market share but also by the market shares of a bank's major competitors.[48] Molyneux (1993) suggests using interaction terms between the market share of leading banks and the market shares of the bank under consideration. For example, a positive interaction term between the market shares of the largest bank and the current bank would imply collusion with this dominant partner, while a negative coefficient would indicate especially intense rivalry and competition.

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[46] If concentration continues to have a significant positive impact on profitability, controlling for market share, then this provides support for the SCP hypothesis (Molyneux, 1993). This is the approach taken by Hondroyiannis, Lolos and Papapetrou (1998) in their study of Greek banks over the period 1993-5, where they find support for the structure-conduct-performance hypothesis. Berger (1995) provides a more sophisticated test of the ESH, distinguishing two versions of the theory. The X-efficiency version states that the source of the higher profits and greater efficiency is superior management, while the scale-efficiency version locates the source of the greater efficiency in different scales of production (that is, some firms produce at more efficient scales than others and hence have lower unit costs and higher profits). Berger provides estimates of these two dimensions of efficiency from cost functions and uses them in a profit function. The results provide some support for the X-efficiency version of the ESH and much less for the scale-efficiency version. However, he notes that the economic significance of both concentration and the efficiency measures in explaining profits is very small.

[47] See Heggestad and Mingo (1976) and Edwards (1977).

[48] Especially the largest competitors.

5. Determinants of Bank Profitability: Results

We start with a model of the persistence of profits, which provides evidence about the timing and extent of structural change.[49] Using panel data, one can test for persistence by including lagged profits in a regression of the form:

$$\pi_{it} - \pi^*_i = \alpha + \beta(\pi_{it-1} - \pi^*_i) + \Sigma\lambda_t D_t + \mu_t \quad (1)$$

where π_{it} is the profitability of bank i at time t; π^*_i is the average profitability of bank i over the whole time period and $\Sigma\lambda_t D_t$ are time dummies capturing environmental factors which are the same for all banks but vary through time. A value of β between 0 and 1 implies that a shock will persist but that profits eventually return to their normal level. In competitive industries, we expect this to occur quickly, while in less competitive industries we might anticipate high persistence and a value of β closer to 1. If β lies between 0 and –1, then profits revert to normal in an oscillating manner. This might occur in periods of rapid change in the structure of the financial system which can cause bank profitability to become highly volatile.[50]

We estimate equation (1), supplemented by various factors which might explain profitability as highlighted by the existing literature, using a panel of Greek banks over the

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[49] For applications of this approach to other industries, see Geroski (1988), Geroski and Jacquemin (1988) and Dickerson, Gibson and Tsakalotos (1997). For the banking sector, the question of persistence has received much less attention. Fraser and Richards (1978) calculated the autocorrelation coefficient on the profitability of some 70 US banks for the period 1965 to 1974 and found evidence of persistence. Levonian (1994) uses stock market values to infer adjustment speeds for 83 US banks over the period 1986 to 1991. He concludes that adjustment does occur following an exogenous shock, but it occurs slowly (that is, there is persistence). Moreover, he finds asymmetry in that profitable firms show slower adjustment speeds than nonprofitable ones. Work on persistence in European banking is nonexistent (to our knowledge). However, since studies of European company performance across various industries suggest that persistence is an issue feature of European company profitability, we provide a test of the hypothesis here.

[50] If β is greater than 1, then this implies that a positive shock to profits will cause profits to increase (exponentially) in future periods. In other words, the system becomes unstable. The system will also be unstable with $\beta < -1$.

period 1993-98.[51] We include both bank-specific effects to capture any unobserved bank heterogeneity (eg persistence could result from the quality of management)[52] and time-fixed effects which control for the aggregate impact of factors such as the business cycle on bank profitability. The bank-specific effects are eliminated by subtracting bank means from each variable as in equation (1).[53]

Results. Results are presented in Tables 7, 8 and 9 for three measures of profitability: the return on assets; the return on assets plus off-balance sheet (OBS) items; and the return on equity. They suggest that profits are persistent and return to normal in oscillating fashion following a shock. In Table 7 the coefficient on lagged profitability is around –0.55; it is negative but smaller and insignificant in Tables 8 and 9. The interpretation of this negative coefficient is that it reflects the rapid structural change that the Greek banking system has been undergoing in this period.

To pinpoint this structural change, we examine the persistence of profits over a longer period, using equation (1) above. Table 10 presents the results for various periods for each of our profitability measures. For the entire period 1982 to 1998, we obtain a coefficient for lagged profitability of about a half, indicating a fairly high level of persistence. But as we reduce the period from 1982-1998 to 1983-98, 1984-98 and so forth, the coefficient on the lagged dependent variable begins to shrink. The sharpest fall is in at the end of the 1980s and the beginning of the

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[51] A detailed description of the sample was given in section 3.

[52] In this way, we control for all factors which might affect profitability which vary across banks and are constant through time or which very over time. Recall we have profits, total assets, total assets plus OBS business and own capital for Greek banks over the period 1981 to 1998.

[53] Variables which were uniformly insignificant were also deleted from the equations. One aspect which arises with the estimation of a dynamic panel model is that there is a bias (Nickell, 1981) because of the presence of a lagged dependent variable. This bias is proportional to 1/T where T is the average number of years. In our case the mean T is 4.55 years. Anderson and Hsiao (1982) suggest removing this bias by estimating the equation in first differences and using the second lag of profits as an instrument for the first lag of profits.

1990s. This supports the view that liberalization in 1987 was an important structural break: past profits became a less accurate guide to future profits as the structure of the market began to change.[54]

Tables 7-9 confirm that profitability is a nonlinear function of bank size.[55] The relationship is bell-shaped, implying that profitability increases and then declines. The turning point is close to mean size. This implication is that smaller Greek banks will reap scale economies and raise profits if they grow larger, but that some of the larger banks have already exhausted their scale economies and will have to downsize in order to reduce costs.

There is some evidence that banks that engage in progressive asset management practices, such as off-balance-sheet business, are more profitable.[56] But simply making more loans (presumably as an alternative to holding government bonds) does not enhance profitability. In Table 7 the loan ratio even has a negative coefficient, although the effect is not large.[57]

Leverage has a positive impact on profitability in all three specifications, although the elasticity is small (a 10 per cent increase in leverage increases profitability by 1-1.5 per cent). Interestingly, the extent to which banks fund themselves on the interbank market does not appear to have affected profitability significantly over the period, contrary to assertions that access to other sources of funds has favored certain (typically larger) banks.

Operating costs are negatively associated with profitability, but staff costs are positively associated. This may indicate that banks with more and/or better-paid staff offer better quality

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[54] If we run the regression over fixed time periods of 4 years (1982-85; 1983-86; 1984-87 etc), then the coefficients on lagged profitability become more variable. They show a sharp fall both in the late 1980s and again in the mid to late 1990s. Thus the length of time period over which persistence is estimated may also play some role.

[55] Only in the rate-of-return-on-equity equation is size insignificant.

[56] Although OBS business is significant in only the rate of return on equity equation.

[57] In Tables 8-9 it is not significant. The Table 7 elasticity (calculated at the mean) suggests that a 10 per cent increase in the loan/deposit ratio causes profitability to fall in the short run by 3 per cent and in the long run by 2 per cent.

service and are rewarded with higher profits. On the other hand, this pattern could simply reflect expense preference behavior (more profitable banks share their rents with their employees).[58]

We find no evidence that banks that maintain more liquidity and capital sacrifice profits.[59] On the contrary, both variables are positively associated with profitability, as if these presumably sounder banks can access cheaper sources of funds.[60]

The per-worker productivity measures suggest, not surprisingly, that higher productivity improves profitability. Where the measures are significant, the elasticities are high: in Table 7 a one per cent increase in loans per hundred workers is associated with a 4.2 per cent increase in profitability in the short run and a 2.7 per cent increase in the long run.

We measure market structure using three- and four-firm concentration ratios along with the Herfindahl index.[61] While a higher Herfindahl index tends to be associated with higher profitability, the effect is significant only in the return-on-equity equation. Thus, we conclude that there is weak support for the SCP hypothesis.[62] Including market share along with the Herfindahl index allows us to reject the possibility that the positive relationship between concentration and profitability simply reflects the fact that some firms are more efficient than others (the efficient structure hypothesis).[63]

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[58] We investigate this below when we examine the impact of market structure.

[59] The results presented in Tables 7-9 for the liquidity variable are cash, reserves and securities eligible for rediscounting at the central bank as a proportion of total assets (Tables 7 and 9) or total assets plus OBS business (Table 8). Capital is own capital over total assets (table 7) and own capital as a proportion of total assets plus OBS business (table 8). We omit own capital from equation 3 since the dependent variable includes own capital as the denominator. The results are not affected by this omission. Finally, it should be noted that similar results are found for the other measures of liquidity and capital.

[60] An alternative measure of risk, provisions as a proportion of total assets, is highly correlated with the loan deposit rate (correlation coefficient of 0.79) and is never significant.

[61] The results present in Tables 7-9 are for the Herfindahl index and do not differ much from those with the concentration ratios.

[62] Hondroyiannis, Lolos and Papapetrou (1998) find somewhat stronger evidence in favour of this hypothesis, as noted above.

[63] The measure of market share included here is based on total assets and OBS business.

One possible explanation for the relatively weak relationship of concentration to profitability is that staff are creaming off rents (the expense preference interpretation).[64] To test this, we replace the dependent variable with profits plus staff costs (a measure of value added). If the expense-preference interpretation is correct, then we should see a stronger effect of concentration. In fact, the results (not reported) are not supportive: in the specifications of Tables 7 and 8, the coefficients on concentration fall slightly, while in the specification of Table 9 the coefficient becomes negative and insignificant.

An alternative explanation for the weak relationship between concentration and profitability, for which we find somewhat more support, is that banks with market power prefer to accrue it in the form of less risk (the risk aversion hypothesis). We test this by replacing the dependent variable with the sum of value added plus provisions. If this interpretation is correct, then the coefficient on the Herfindahl index should fall and perhaps turn negative. Indeed, in Table 7 the coefficient on concentration falls, although it remains positive, while in Tables 8 and 9 the effect becomes negative.[65] These results provide some support for the hypothesis that Greek banks have used the shelter of their concentrated market to limit risk as well as, if not necessarily instead of, to increase profitability.

Interestingly, bank ownership appears to play no independent role in explaining profitability.[66] In Section 3 we noted that private banks have been twice as profitable as public banks on average. The results of the multivariate analysis suggest that this difference is accounted for entirely by more appropriate size (more private banks are medium sized), more sophisticated asset management (private banks have more OBS business), and higher

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[64] The positive relationship between staff costs and profitability also points in this direction.
[65] Although in neither equation is the index significant.
[66] Other negative results include no evidence in any equation of strategic interaction between banks or that inflation, foreign entry or growth played a role in influencing profitability.

productivity (private banks have more deposits per worker). These results point to the improvements in the performance of the Greek banking system that should flow from further privatization (as formerly public banks begin to behave more like their already private counterparts). Put another way, they point to specific steps that Greek banks, public banks in particular, need to take to maintain profitability as the competitive environment grows increasingly intense.

6. Future Trends

In this section we consider developments that promise to transform further the Greek banking going forward, in particular deregulation, privatization, internationalization and securitization.

Deregulation. The relaxation of regulatory restrictions has already ratcheted up the pressure on financial institutions previously accustomed to a sheltered environment. Prior to liberalization, regulatory restraints were extensive. Three-quarters of the funds available to commercial banks were earmarked for activities favored by the government. Two thirds of this was allocated to the public sector, the rest to "priority" activities (mainly industry, including loss-making public and quasi-public enterprises, but also to small scale units and handicraft enterprises). Loans equal to ten per cent of deposits had to be allocated to small firms, while 15 per cent had to be extended to industry. By implication, there were ceilings on credit to other domestic industries, the import trade, and households.

This system of credit allocation was made possible by compartmentalizing the activities of different financial institutions. Commercial banks were limited to deposit taking, commercial lending, and trade finance. Mortgage banks were permitted to lend only for housing. The Agricultural Bank could lend only to agriculture. Issuing credit cards, underwriting securities

issues, and operating in swap and forward markets were prohibited or subject to prior approval. Capital controls were extensive. Interest rates were controlled at levels implying negative real rates. Bank profitability was maintained by capping deposit rates and giving small savers few alternative outlets for their funds, and by relating commercial banks' obligatory deposits at the central bank to their lending to privileged borrowers.

This system of credit allocation was sustained by limiting entry. There was some entry by foreign banks in the 1960s and 1970s, reflecting the internationalization of the industry worldwide and Greece's ambition to join the European Community, but the impact was limited, reflecting the continued prevalence of controls.

The turning point was 1981-2, with EC accession and the abolition of the Currency Committee. While the government retained considerable influence over credit allocation, arbitrary instructions to individual banks regarding the extension of credit were replaced by general rules. Rate ceilings on loans to the public sector and to export industries were relaxed in 1983 and abolished in 1987. Deposit rate ceilings were raised in 1983.[67] The last obligatory investment ratios (for loans to small firms and investments in Treasury bills) were removed in 1993.

In the second half of the 1980s, this segmentation began to break down. Commercial banks were permitted to extend credit for housing and to set commissions and fees. Rules preventing specialized credit institutions from engaging in retail banking were dismantled: the Agricultural Bank was no longer limited to agricultural lending, mortgage banks were allowed to open deposit accounts, and the development banks were allowed to accept current accounts and grant loans for working capital as well as make long-term investments. Restrictions on the

[67] Although the last remaining deposit-rate restrictions, those on savings accounts, were only abolished ten years later.

ability of domestic residents to borrow abroad were relaxed starting in 1987. Direct investment in other EU countries was freed in 1990. Exchange controls on current-account-related transactions were abolished in 1991-2. All remaining capital controls were removed in 1994.

The elimination of these line-of-business and portfolio restrictions has encouraged noncompeting institutions to enter one another's markets. The grey market in which firms with favorable access to credit onlent to other enterprises has essentially disappeared. Less reassuringly, the removal of interest rate ceilings has allowed the spread between lending and deposit rates to widen, reflecting the market power associated with high regional and national concentration. Spreads are at least twice the OECD average.[68] Public ownership and the perception that both public and large private banks enjoy implicit guarantees have weakened market discipline on banks newly freed from regulatory restraints. The results are predictable. Institutions like as the Hellenic Bank for Industrial Development (ETBA, which has large claims on loss-making enterprises in the steel, aluminum and shipping industries) and the Greek Agricultural Bank (with large loans outstanding to loss-making farm collectives) suffered heavy loan losses in the 1990s.

Privatization. State-controlled banks still account for the majority of deposits and credits. This is changing, however, as Table 11 shows with the government's privatization of four relatively small state-owned banks in 1998, the privatization in 1999 of the much larger Ionian Bank (which was acquired by Alpha Credit Bank) and the flotation on the Athens Stock Exchange in December of 1999 of a 30 per cent stake in ETBA (the state development bank) and in January 2001 of a 12.5 per cent stake in the Agricultural Bank.

One can foresee a not-too-distant future in which only the National Bank of Greece remains in government hands. An effort to privatize this institution would have to overcome the

[68] OECD (1998, p.88) estimates that spreads of 7 ½ to 8 percentage points are 2 to 4 times those

opposition of the banking trade union, which fears the consequences for staffing.[69] The government has already attempted to commercialize the NBG by installing professional management and delegating control to state-owned pension funds. But professional management is not the same as private ownership. The evidence presented above suggests that private banks control their size more efficiently, manage their assets more efficiently, and raise staff productivity. In addition, the experience of other countries points to the danger that a public or semi-public financial institution encountering an intensification of private-sector competition may perceive itself as possessing a soft budget constraint and ratchet up its risk-taking in response. The viability of an equilibrium in which a quarter of the market is controlled by a state-owned institution competing head-to-head with private intermediaries is questionable. Moreover, there are also strong pressures from the EU encouraging the privatisation of the Greek banking system as part of a wider set of structural measures designed to improve real economic performance. The implication is that the steps already taken by the government to privatize some of the smaller public-sector banks will likely culminate in eventual privatization of the National Bank and the other banks still in public hands.

Internationalization. At last count, 13 banks that make their home in other EU member states have branches in Greece. Nine non-EU commercial banks also operate branches. Table 12 compares the inward internationalization of banking in Greece with other EU countries. Greece ranks fifth in terms of the extent of foreign bank penetration. Predictably, the majority of foreign branches and subsidiaries with assets in Greece are from other European countries, although this is not exclusively the case, reflecting implementation of the EU's Second Banking Directive (via the Basic Banking Law of 1992), which guarantees freedom of establishment for foreign banks,

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prevailing in other OECD countries.

[69] On the consequences for employment of structural changes in banking, see Kanellopoulos, Tsatiris and Mitrakos (1999).

allows for mutual recognition of domestic banking licenses, and permits banks to operate throughout the EU on the basis of a single banking license.[70]

Merger is the main mechanism by which Greek banks have responded to foreign competition — both strategic mergers in which large banks seek to reposition themselves in domestic and foreign markets and defensive mergers designed to rationalize back-office operations and branch networks (Table 13). As in other EU countries (Austria, Belgium, Italy and Portugal, for example) mergers have been associated with privatization, as private banks have sought to acquire formerly public institutions. Thus, Alpha Credit Bank narrowly outbid its rival, Piraeus Bank, for Ionian Bank, previously part of the publicly-owned Commercial Bank; as a result Alpha Credit is now the second largest Greek bank, surpassed only by the National Bank. Piraeus Bank absorbed Xiosbank and the Macedonia-Thrace Bank in 1998 as well as acquiring the Greek branches of Chase Manhattan and Credit Lyonnais. In 1999, EFG Eurobank completed Greece's first hostile takeover, acquiring a controlling stake in Ergobank, a recently-founded bank that had built market share by acquiring and restructuring small loss-making banks.

This consolidation through merger parallels trends underway in other EU countries. The Danish, Dutch and Spanish banking markets, for example, have undergone radical consolidation.[71] Recent examples of M&A activity in European banking[72] include the announcement that Banco Bilbao Vizcaya will acquire Argentaria Caja Posal y Banco Hipotecario, that the Bank of Scotland has launched a hostile takeover bid for National Westminster Bank, that Banca Intesa plans to take over Banca Commerciale Italiana, and that

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[70] See Gortsos (1998).
[71] To the point where in Denmark and the Netherlands the banking system is now essentially dominated by two players.
[72] See Gibson and Tsakalotos (1993) for mergers, acquisitions and minority shareholdings both within and across EU countries which occurred in the late 1980s and early 1990s.

Dresdner Bank may merge with Deutsche Bank. But these are all within-country mergers. To date, cross-border merger and consolidation remain rare, reflecting differences in corporate culture and the resistance of governments. There are signs that this resistance is changing: in September of 1999, Sweden's Sparbanken attempted to acquire Denmark's FIH (proving that the world's longest fixed link isn't the only thing that can be built between the two Scandinavian countries), and Enskilda Securities of Sweden announced an alliance with Drueker & Co. of Germany. In Greece, such cross-border activity is currently confined to minority participations or simple co-operative agreements (Table 13), although as we write Piraeus Bank is reportedly in talks with ING, the Dutch financial group, about a strategic alliance.[73]

One can expect this process to accelerate. Cross-border branching allows management to insulate the bank's revenue stream from local market fluctuations. In addition, some assets that are useful for portfolio diversification purposes -- home mortgages, for example -- can only be obtained in significant numbers through local branch networks. More generally, minimum efficient scale will rise as national financial markets are superseded by a continent-wide European market.[74]

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[73] Another interesting development is the expansion of Greek banks into other Balkan countries (and potential future EU members). Thus, the National Bank has opened 2 branches in Bulgaria (January 1999) and one in Cyprus (February 2000), bought the Chase Manhattan branch in Bucharest (Romania, January 1999) and opened an office in Istanbul (Turkey, February 2000). Alpha Bank opened 4 branches in Albania and bought 65% of Kreditna Banka A D Skopje in the Former Yugoslavian Republic of Macedonia (FYROM). The Commercial Bank opened 2 branches in Cyprus in March 2000. Finally, Piraeus Bank bought 65% of Stopanska Bank A D Skopje in FYROM in March 2000.

[74] And if Europe's more mature economies continue to grow relatively slowly, it will make sense for their banks to acquire counterpart institutions in more rapidly growing parts of the world. The expansion of Spanish banks into Latin America illustrates this tendency. The consolidation of banking in the United States following the elimination of restrictions on cross-state branching is another instance of the phenomenon.

In practice, this raises the prospect of foreign banks acquiring Greek banks, since foreign banks are larger, better capitalized, and enjoy easier access to securities markets.[75] Management has sought to head off this eventuality by seeking partners interested in forming strategic alliances by taking 10 to 20 per cent stakes in their operations. But foreign institutions are sometimes reluctant to settle for being minority partners, preferring a more active voice in management (Hope 1999). This makes cross-border takeovers, hostile or otherwise, the impending scenario.

Should our Greek readers care? The economist's answer is usually no. Unlike the past, Greek financial institutions will no longer be used to allocate capital with political ends in mind. In an increasingly competitive financial environment, there is no reason to think that the Greek branches of foreign banks will be less inclined to lend for attractive investment projects than the Greek branches of Greek banks. And given the fungibility of finance, there already exist channels through which Greek investors, institutional and individual, can invest abroad if they find the returns more attractive.

Allowing foreign banks to acquire Greek banks is an obvious way of speeding the privatization of the remaining public banks, which are large relative to their domestic private-sector competitors but not relative to banks in other countries. It is an obvious way of upgrading domestic management practices, insofar as foreign banks have more experience in the private sector. It is an obvious way of upgrading prudential supervision insofar as regulation is home-country based and other EU countries have more experience with regulating private-sector banks.

Securitization. Further pressure is being applied to the Greek banking system by the forward march of securitization, which results in disintermediation and the loss of reliable revenue streams. Large companies are increasingly able to obtain external finance on the

[75] Bond flotations often being necessary to finance mergers and acquisitions.

securities market. Firms and households are increasingly able to place their savings in other instruments that are substitutes for bank deposits. In particular, mutual funds (which invest heavily in government bonds) are in increasingly direct competition with the banks for funds. By the end of 1996 mutual fund asset amounted to a fifth of bank deposits; by 1999 this ratio had risen to 52 per cent.[76]

The scope for disintermediation is reflected in the development of the Athens Stock Exchange, valuations on which shot up in 1999 as investors bet on an increase in growth and profitability as a result of Greece's adoption of the euro. This increase in capitalization was possible only because reforms had already enhanced market transparency and reduced fears of insider trading, market cornering, and other forms of share-price manipulation. The authorities adopted EU directives regarding stock exchange legislation, introduced an automated (screen-based) trading system in 1992, and encouraged the establishment of brokerage firms.[77] Partly as a result of these changes, equity capitalization rose from 2 per cent of GDP in 1985 to 15 per cent in 1993 and 89 per cent at end-2000.[78]

The growth of the corporate bond market has been stimulated by the development of a relatively deep and liquid market in benchmark government bonds. The central bank introduced an electronic book-entry bond trading system in 1995, eliminating the need for the physical transfer of security certificates, and established a system of primary dealers to facilitate secondary-market trading. But because high fixed costs and unfavorable tax treatment continue to prevent small corporations from raising significant finance through bond issues, government bonds still account for over 90 per cent of bond-market capitalization (as at end-2000).

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[76] Although many of these funds are bank subsidiaries, this is not exclusively the case, and it is likely to grow less true over time.
[77] Most of which are in fact owned by the banks. Thus, liberalization of the banking system was, effectively, a precondition for stimulating the growth of the stock market.
[78] In 1999, equity capitalization had reached 160% of GDP.

Euroization will force the pace. The elimination of currency risk within the euro area has already led what were once 11 (and now 12) nationally-segmented bond markets to be superseded by an integrated single market. The greater breadth and liquidity of the European corporate bond market has reduced bid-ask spreads and encouraged both secondary-market trading and originations. Euro-denominated corporate bond issuance by euro and non-euro area companies rose from E30 billion in the first three quarters of 1998 to E117 billion in the first three quarters of 1999.[79] While financial institutions continue to dominate this market, the share of non-government euro-denominated issuance accounted for by nonfinancial private corporations rose from 7 per cent of the total in 1998 to 18 per cent in 1999.[80] Meanwhile, the average size of non-governmental issues has risen by 50 per cent. The elimination of currency risk has allowed borrowers to arrange exceptionally large transactions, while investors' reorientation from strategies focusing on interest rate convergence to a search for yield has allowed lower-rated borrowers to access the market. Thus, between the first nine months of 1998 and the first nine months of 1999, the share of corporate bond issuance accounted for by Baa issues rose from 4 per cent to 15 per cent.

The implications for Greek banks, which have long been the sole source of funding for wide swaths of industry, will be profound. Large companies with good credit have already fled the banking system, and smaller firms of less certain credit worthiness will follow in considerable numbers with the adoption of the euro. So long as they are perceived as having superior information about potential borrowers, Greek banks will retain an advantage in the provision of underwriting services, but this cannot be taken for granted.

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[79] Recovery from Russia's default and from the LTCM debacle, which had a depressing effect on the market in the third quarter of 1998, had something to do with this, but the role of the euro is undeniable.

[80] First three quarters in each case.

7. Challenges for Prudential Supervision

International experience suggests that liberalisation of the financial system is frequently followed by crisis. Cases as diverse as Latin America in the early 1980s (Diaz-Alejandro, 1985), Scandinavian countries in the later 1980s (Benink and Llewellyn, 1994; Drees and Pazarbasioglu, 1995), the US Savings and Loan crisis (White, 1991) and, most recently, the East Asian crisis (Goldstein, 1998; Miller and Luangaram, 1998) all suggest that, *inter alia*, increased competitive pressures can contribute to banks and other financial institutions taking greater risks. At the same time, the supervisory authorities are often still learning the necessary new supervisory techniques for the new liberalised regime. The result is an increase in financial fragility and the propensity for financial crisis. For these reasons, the role of prudential supervision is of paramount importance in determining the success of liberalisation.

In the age of state ownership and direction, supervision and regulation in Greece took a back seat to other forms of government control. Up until the beginning of the 1990s, as the OECD (1995, p.49) observed, "prudential controls remained consistent with the logic of the pre-reform system and essentially directed to the checking of a correct application of credit rules." The OECD went on to write that "[I]n the past, bank auditing has been hampered by the lack of reliable data. Accounting practices have sometimes rendered interpretation of banks' financial statements difficult. Until 1992, for example, some state-controlled banks would accrue income on unpaid interest or 'arrears' and then grant new loans to cover interest arrears. Assets were often overvalued, since many state-controlled banks had lent considerable sums to or bought large stakes in 'ailing' firms."[81]

[81] OECD (1995), p.42.

Upgrading prudential supervision is essential for stability as the financial environment grows more intensely competitive. The Bank of Greece began tightening up supervisory arrangements in 1992, when the Basic Banking Law enacting the provisions of the EU's Second Banking Directive was adopted. It began keeping closer tabs on the banks, which were required to report their asset and liability positions semi-annually, their liquidity positions quarterly (for the calculation of maturity mismatch), and their foreign exchange positions monthly. Banks were required to hold a capital ratio of 8 per cent, the Basle norm.[82] They were prohibited from booking interest on loans not serviced for more than 12 months and from granting new loans to finance overdue interest. They were required to report large exposures (equal or exceeding 10 per cent of own funds). A modern deposit insurance scheme was adopted in 1995, and since 1996 all credit institutions have been supervised on a consolidated basis.

More recent changes include the introduction of various EU Directives (98/31/EC, 98/32/EC and 98/33/EC) relating to capital requirements on open positions, the calculation of risk associated with OBS business and mortgages on commercial properties as well as the introduction, in certain circumstances, of the self-assessment of risk. At the same time, the Bank of Greece itself has taken a series of measures designed to improve the quality of banks' balance sheets (Bank of Greece, 1999). In particular, a series of principles concerning internal control systems and risk management were adopted in 1998, reflecting best practice internationally. Additionally, a general framework for provisions on different kinds of loans was introduced in

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[82] At end-1996, the average capital ratio was 9.7% and it rose to 11.3% at end 1998. Favorable conditions on the stock market in 1999 allowed banks to raise more capital and the average ratio reached 16.2% at end-1999. It currently stands at 15.7% (end June 2000 figures), well above the 8% requirement. The Agricultural Bank was given an exemption from the 8 per cent capital requirement until end-1999 and it embarked on a three-year restructuring program. Its exceptional bad-loan problem reflects the practice of lending to farmers and farm cooperatives without requiring adequate collateral, in conjunction with a series of loan restructuring programs (including partial write-offs) which have undermined repayment incentives. OECD (1998), p.87.

1999. This specifies certain minimum amounts for provisions. Thus, for example, consumer loans have a minimum 30% higher than the normal provision (which stands at 1%), reflecting their greater risk. Similarly, banks are also required to hold higher levels of provisions on loans with interest arrears.

Is this framework capable of coping with the additional risks that will be associated with the reallocation of funds from governments bonds to other assets and with the growth of off-balance-sheet business? Will it be able to limit the risk taking that will be associated with growing domestic and international competition , given the existence of a residual sector of state-owned banks? To some extent, answers to these questions depend on the extent to which one believes that the prudential framework emerging from both the Basle Committee and the EU/ECB is adequate to meet the challenges of increased financial liberalisation and integration. In this respect, doubts have been raised (see, for example, the discussion in Danthine *et al*, 1999). But the domestic prudential framework is also important and here there remain some obvious weaknesses: for instance, on-site inspections are limited to every two years, and enforcement actions are not disclosed to the public. Above all, there is the fact that some banks (eg the Agricultural Bank) are still in public hands, which means that they are likely to face soft budget constraints and have noncommercial motives that create conflicts of interest for the regulatory authorities.

8. Conclusion

The Greek banking system is in a period of rapid transformation. To some extent the forces driving this process are the same as in other parts of the world: deregulation, securitization, and internationalization. But the pace is being forced by Greece's membership of the European Union and its accession to the monetary union, with its explosively-growing corporate bond market. EU membership will hasten the internationalization of Greek banking,

while accession to the monetary union will further broaden the access of Greek companies, traditionally dependent on the banking system for finance, to securitized funding. For all these reasons, the pressure on incumbent banks will be intense.

This turbulence will be all the more severe insofar as most remaining public banks are likely to be privatized even while these other changes are taking place. Newly privatized banks will have to rescale their branch networks, implement more progressive asset management techniques and reduce staff costs if they are to maintain the respectable rates of profit that they enjoyed when they operated in a more cloistered regulatory environment. For some, merger or acquisition by a foreign financial institution will be the obvious way of implementing new asset- and personnel-management techniques, assuming (as seems likely sooner or later) that the authorities permit this.

This scenario points to two challenges for policy makers. One is to strengthen prudential supervision. Historically, Greek banks have used their rents to reduce risk, as we have shown above. As competition intensifies and they are less able to do so, bank portfolios will become riskier. Moreover, increased competition leading to consolidation implies that not all banks will survive. As the pressure intensifies, less competitive intermediaries will find it tempting to gamble for redemption. In addition, the adoption of more sophisticated asset-management practices (the increasing use of off-balance-sheet transactions, for example) implies that risk may be harder for management to control and regulators to monitor.

The second challenge for policy makers is their handling of restructuring in the banking system, a necessary process given the relatively small size of Greek banks compared with their European competitors. Until now, restructuring has occurred mainly via privatization and mergers/acquisitions, with ownership remaining in domestic hands. These developments are likely to continue, especially as some question whether having around 50 per cent of banking system assets (including OBS business) in public hands is compatible with the desire to

restructure the Greek banking system along more efficient, competitive lines. In addition, however, it is probable that restructuring will involve a greater role for foreign institutions either via ownership of banks in Greece or through the formation of strategic alliances.

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Table 1: Banks in Sample and their status between 1980 and 1998

			Bank no.**
Agricultural Bank of Greece	1980-98	Publicly-owned; SCI until 1991; since then, commercial bank.	1
Alpha Credit Bank	1980-98	Privately-owned commercial bank.	2
Bank of Attica	1980-98	Majority owned by Commercial Bank until 1996 when privatised.	5
Bank of Central Greece	1980-98	Majority owned by Agricultural Bank until 51% privatised in 1998 and sold to Egnatia Bank.	6
Bank of Crete	1980-98	Publicly-owned commercial bank; in hands of Bank of Greece between 1988 and 1998; privatised 1998 and bought by Eurobank.	7
Bank of Macedonia-Thrace	1980-98	Publicly-owned commercial bank; based in Thessaloniki; 37% purchased in 1998 by Bank of Piraeus.	8
Bank of Piraeus	1980-98	Owned by Commercial Bank until December 1991 when 2/3 sold; since then, privately-owned commercial bank.	9
Commercial Bank of Greece	1980-98	Publicly-owned commercial bank.	10
ETBA	1980-98	Publicly-owned development bank; become more of an investment bank since early 90s.	13
ETEBA	1980-98	Founded by National Bank of Greece (1963) to undertake investment banking activities.	14
Ergo Bank	1980-98	Privately-owned commercial bank.	16
General Bank	1980-98	Owned by Army Pension Fund (management appointed by government) until privatised in 1998; bought by Interamerican Insurance Group.	19
Ionian Bank	1980-98	Commercial bank; majority owned by Commercial Bank.	22
National Bank of Greece	1980-98	Publicly-owned commercial bank.	23

Table 1 continued: Banks in Sample and their status between 1980 and 1998

Bank of Athens	1980-97	Originally Traders' Credit Bank, part of National Bank of Greece Group; changed its name in 1992; privatised in 1993; taken over by Eurobank in 1998.	4
National Mortgage Bank	1980-97	SCI, Majority-owned by state pension funds until taken over by National Bank of Greece in 1998.	25
National Housing Bank of Greece	1980-96	SCI in National Bank of Greece Group until merged with National Mortgage Bank in 1997.	24
Investment Bank	1980-92	Absorbed by its majority shareholder, the Commercial Bank of Greece in 1992.	21
Credit Lyonnais Grece	1982-98	Owned half by ETEBA and half by Credit Lyonnais SA; latter increased shareholding in 1993 and again in 1994; in August 1997 sold retail banking section to Eurobank.	11
Dorian Bank	1991-98	Privately-owned commercial bank.	12
Eurobank	1991-98	Privately-owned commercial bank.	17
Interbank	1991-96	Privately-owned commercial bank ; taken over by Eurobank in 1997.	20
Xiosbank	1991-98	Privately-owned commercial bank.	26
Aspis Bank	1993-98	Privately-owned specialised mortgage bank.	3
Egnatia Bank	1993-98	Privately-owned commercial bank.	15
European and Popular Bank	1993-98	Privately-owned commercial bank (majority shareholder is the Popular Bank of Cyprus Ltd.	18

* SCI is a specialised credit institution
** These numbers will be used later to identify banks more easily in the figures.
Note: a number of developments occurred in 1999, in particular privatisations and takeovers and acquisitions. We discuss above only the status of each bank between 1980 and 1998. Further developments are taken up later in the paper.

Table 2: Market shares of individual banks at selected dates

	1980		1993		1998	
	rank	%	rank	%	rank	%
National Bank of Greece	1	41.6	1	42.3	1	36
Agricultural Bank of Greece	2	16.6	2	12.2	2	13.1
Commercial Bank of Greece	3	12	3	10.5	4	9.8
National Mortgage Bank	4	8.1	4	7	-	-
Ionian Bank	5	5.3	7	4.6	5	5.6
ETBA	6	4.7	6	5.6	10	1.8
Alpha Credit Bank	7	4.6	5	6.2	3	12.5
General Bank	8	2	9	1.4	11	1.6
ETEBA	9	1.6	13	0.6	14	1
Ergo Bank	10	1	8	3.1	6	5.2
Investment Bank	11	0.6	-	-	-	-
Bank of Crete	12	0.6	10	1.3	13	1.2
Bank of Athens	13	0.3	20	0.3	-	-
Bank of Piraeus	14	0.3	17	0.4	8	2
Bank of Macedonia-Thrace	15	0.3	11	1	9	1.9
National Housing Bank of Greece	16	0.2	19	0.3	-	-
Bank of Attica	17	0.2	21	0.3	17	0.6
Bank of Central Greece	18	0	15	0.4	18	0.5
Eurobank	-	-	12	0.6	7	3.8
Xiosbank	-	-	14	0.5	12	1.5
Interbank	-	-	16	0.4	-	-
Credit Lyonnais Greece	-	-	18	0.4	NA	NA
Egnatia Bank	-	-	22	0.2	15	0.8
Dorian Bank	-	-	23	0.2	20	0.3
European and Popular Bank	-	-	24	0.1	16	0.6
Aspis Bank	-	-	25	0.1	19	0.3
Note: NA data not available. - bank not in existence as independent entity						
Source: own calculations using sample collected (see text)						

Table 3: The impact of size on bank characteristics

	Size 1	Size 2	Size 3
Growth of total assets	0.43	0.26	0.2
Growth of total assets plus OBS items	0.58	0.36	0.24
Rate of return on assets	0.01	0.012	0.005
Rate of return on equity	0.059	0.206	0.154
Proportion of OBS business	0.38	0.45	0.28
Investment in bonds	0.05	0.05	0.08
Reliance on interbank market for funds	0.17	0.2	0.14
Operating costs/total assets	0.04	0.03	0.02
Staff costs/total operating costs	0.02	0.02	0.02
Loans per worker	127	135	201
Deposits per worker	159	205	288
Profits per worker	2.27	3.14	-2.29

Note: the numbers are means for each size category. We discuss the picture shown by median values for each variable in the text where they show a different picture from the means because of outliers.

Source: own calculations using sample collected (see text)

Table 4: The impact of ownership on bank characteristics		
	Privately-owned	Publicly-owned
Growth of total assets	0.41	0.25
Growth of total assets plus OBS items	0.57	0.31
Rate of return on assets	0.015	0.006
Rate of return on equity	0.216	0.106
Proportion of OBS business	0.48	0.31
Investment in bonds	0.04	0.08
Reliance on interbank market for funds	0.16	0.18
Operating costs/total assets	0.032	0.028
Staff costs/total operating costs	0.02	0.02
Loans per worker	153	148
Deposits per worker	287	174
Profits per worker	5.85	-1.10
Note: the numbers are means by ownership category. We discuss the picture shown by median values for each variable in the text where they show a different picture from the means because of outliers.		
Source: own calculations using sample collected (see text)		

Table 5: The relationship between size and ownership
(number of bank years in each category)

	Privately-owned	**Publicly-owned**
Small	**42**	**82**
Medium	**46**	**78**
Large	**22**	**101**

Source: own calculations using sample collected (see text)

Table 6: Profitability Equations

A. Summary of explanatory variables and hypotheses

Hypothesis	Variables used	Expected signs	Observations
1. lagged profits – persistence	net pretax profits/total assets; net pretax profits/total assets plus OBS business; net pretax profits/total equity.	Between 0 and 1	
2. size – some measure of economies of scale / diseconomies of scale	log or real total assets; log of real total assets plus OBS business; and both these squared.	+ve (economies of scale) or –ve (diseconomies)	Take start of period
1. growth			
- managerial theories or growing industry argument	- growth total assets; growth total assets plus OBS business; growth deposits; growth of loans.	-ve or +ve	Endogenous
- market growth	- GDP growth; Money growth.	+ve	Fixed by bank, varies over time
4. asset management			For stocks, take start of period values
- proportion of OBS business	OBS business/total assets plus OBS business.	?	Idea is with this situation, what can co. do?
- propensity to make loans	Loans/deposits.	?	
- profits from financial activities	net profits from financial operations/net pretax profits.	?	
- income sources	net interest income; net noninterest income; interest income; noninterest income.	?	
- investment in securities/bonds	investment in securities/total assets; investment in securities/total assets plus OBS business.	?	
5. liability management			
- source of funds	bank deposits/total deposits.	-ve	
- leverage	borrowed funds (deposits)/own capital.	?	
6. operating costs/expenses			
- operating expenses	operating expenses/total assets; operating expenses/total assets plus OBS business.	?	
- staff expenses	staff costs/total assets; staff costs/total assets plus OBS business; staff costs/total expenses.	?	see changed dependent var.
7. 'riskiness' of bank			use start of period stocks
- liquidity	cash, reserves at the central bank and securities eligible for discounting at the central bank as a proportion of (i) total assets; (ii) total assets plus OBS business; (iii) total deposits; (iv) total loans.	-ve	NB safer banks could get cheaper funds.
- capital	own capital as a proportion of (i) total assets; (ii) total assets plus OBS business; (iii) total deposits; (iv) total loans.	-ve	risk is highly correlated with LDrat (0.79).
- risk	provisions/total assets or total assets plus OBS business	+ve	

Table 6 continued

Hypothesis	Variables used	Expected signs	Observations
8. productivity - per workers - per branch	 loans per 100 workers; deposits per 100 workers. loans per branch; deposits per branch.	 +ve +ve	
9. market power - concentration - market share	 three-firm and four-firm concentration ratios; Herfindahl index using total assets and total assets plus OBS business. market shares based on total assets, total assets plus OBS business, deposits and loans.	 ? ?	cf SCP versus efficient scale hypotheses
10. strategic interaction	interactive terms using market share of largest bank and all other banks.		
11. ownership (varies over time and banks)	own (=1 if private)	?	
12. uncertain environment – inflation	consumer price inflation.	-ve	fixed over bank, varies over time
13. foreign entry (source: Hellenic Banking Association, 1995-98)	total assets of foreign banks/total assets of domestic and foreign banks.	-ve	fixed over bank, varies over time
B. Dependent variables			
		Explanation for change in dependent variable	
1. profitability	net pretax profits/total assets; net pretax profits/total assets plus OBS business; net pretax profits/total equity.		
2. measure of value added	net pretax profits plus staff expenses/total assets; net pretax profits plus staff expenses/total assets plus OBS business; net pretax profits plus staff expenses/total equity.	aim to test expense preference theory – if this hypothesis has validity, then concentration ratio should become even more positive when we use the value added measure as a dependent variable.	
3. value added (as in 2) adjusted for provisions	net pretax profits plus staff expenses plus provisions /total assets; net pretax profits plus staff expenses plus provisions /total assets plus OBS business; net pretax profits plus staff expenses plus provisions /total equity.	tests risk aversion theory – concentration ratio should turn negative if this hypothesis has validity.	

Table 7: Rate of return on total assets (excluding OBS business)							
Variable	coefficient	standard error	t-statistic	significance	Short-run elasticity	Long-run elasticity	mean
lagged profitability	-0.5506	0.1164	-4.7302	***			0.007
ownership	0.0010	0.0089	0.1129		0.100	0.065	
size	0.1371	0.0676	2.0282	**	-0.701	-0.452	12.049
size squared	-0.0059	0.0029	-2.0484	**			
proportion of OBS business	0.0095	0.0199	0.4744		0.652	0.420	0.517
loan/deposit ratio	-0.0012	0.0004	-3.0432	***	-0.313	-0.202	1.978
operating expenses	-0.2584	0.3775	-0.6845		-1.143	-0.737	0.033
staff expenses	0.0609	0.0383	1.5894		5.307	3.422	0.653
deposits per 100 workers	-0.0031	0.0028	-1.1107		-1.468	-0.947	3.537
loans per 100 workers	0.0132	0.0036	3.6446	***	4.235	2.731	2.398
interbank deposits/total deposits	0.0017	0.0212	0.0819		0.042	0.027	0.180
leverage (x1,000)	0.0647	0.0197	3.2843	***	0.141	0.091	0.016
own capital	0.2858	0.0615	4.6477	***	3.030	1.954	0.079
liquidity	0.0225	0.0039	5.8293	***	1.027	0.662	0.342
Herfindahl index (x10,000)	0.0939	0.1110	0.8459		1.805	1.164	0.144
market share	0.0006	0.0011	0.5864		0.350	0.226	4.237
constant	-0.8705	0.4149	-2.0982	**			
year dummies	F(4, 73) = 1.23 (0.31)						
fixed effects	F(24, 73) = 4.40 (0.00)						
number of observations	118						
number of banks	25						
Hausman test	$\chi^2(20) = 760.38$ (0.00)						
Note:							
Size effect is bell-shaped with a turning point (maximum) at 11.604 compared to mean of log size of 12.049							

Table 8: Rate of return on total assets plus OBS business							
Variable	coefficient	standard error	t-statistic	significance	Short-run elasticity	Long-run elasticity	mean
lagged profitability	-0.0091	0.0889	-0.1027				0.004
ownership	-0.0066	0.0041	-1.6019		-0.662	-0.656	
size	0.0441	0.0186	2.3705	**	0.529	0.524	12.765
size squared	-0.0017	0.0007	-2.3877	**			
proportion of OBS business	0.0063	0.0097	0.6529		0.894	0.886	0.517
loan/deposit ratio	0.0002	0.0001	1.4978		0.113	0.111	1.978
operating expenses	-1.6419	0.7563	-2.1710	**	-7.123	-7.058	0.016
staff expenses	3.2227	1.2161	2.6501	***	9.329	9.244	0.011
deposits per 100 workers	0.0021	0.0012	1.7899	*	2.055	2.037	3.537
loans per 100 workers	0.0002	0.0014	0.1069		0.101	0.100	2.398
interbank deposits/total deposits	-0.0012	0.0087	-0.1375		-0.059	-0.058	0.180
leverage (x1,000)	0.0365	0.0081	4.5342	***	0.162	0.161	0.016
own capital	0.1276	0.0443	2.8809	***	1.457	1.444	0.042
liquidity	0.0161	0.0014	11.7103	***	1.502	1.488	0.342
Herfindahl index (x10,000)	0.0456	0.0431	1.0580		1.792	1.776	0.144
market share	0.0001	0.0004	0.2227		0.099	0.098	4.237
constant	-0.3210	0.1334	-2.4061	**			
year dummies	F(4, 73) = 1.55 (0.20)						
fixed effects	F(24, 73) = 4.82 (0.00)						
number of observations	118						
number of banks	25						
Hausman test	$\chi^2(20) = 167.19$ (0.00)						
Note:							
Size effect is bell-shaped with turning point (maximum) at 13.352 compared to mean log size of 12.765							

Table 9: Rate of return on total equity							
Variable	coefficient	standard error	t-statistic	significance	Short-run elasticity	Long-run elasticity	mean
lagged profitability	-0,1327	0,1054	-1,2583				0,120
ownership	-0,1153	0,1782	-0,6470		-11,531	-10,181	
Size	1,3636	1,3042	1,0456		0,777	0,686	12,049
size squared	-0,0527	0,0567	-0,9295				
proportion of OBS business	0,8713	0,4004	2,1763	**	3,739	3,301	0,517
Loan/deposit ratio	-0,0003	0,0076	-0,0438		-0,005	-0,005	1,978
operating expenses	-0,4649	7,6585	-0,0607		-0,128	-0,113	0,033
Staff expenses	1,4750	0,7565	1,9497	*	7,994	7,058	0,653
deposits per 100 workers	-0,0526	0,0559	-0,9415		-1,546	-1,365	3,537
loans per 100 workers	0,2016	0,0737	2,7360	***	4,017	3,546	2,398
interbank deposits/total deposits	0,2432	0,4218	0,5765		0,363	0,321	0,180
leverage (x1,000)	0,9724	0,4126	2,3568	**	0,131	0,116	0,016
Own capital – omitted							
liquidity	0,2817	0,0709	3,9709	***	0,799	0,706	0,342
Herfindahl index (x10,000)	5,6590	2,2140	2,5560	**	6,770	5,978	0,144
market share	-0,0015	0,0214	-0,0680		-0,051	-0,045	4,237
constant	-11,1093	7,7445	-1,4345				
Year dummies	F(4, 74) = 2,07 (0,09)						
fixed effects	F(24, 74) = 2,62 (0,00)						
number of observations	118						
number of banks	25						
Hausman test	$\chi^2(19) = 94.00$ (0.00)						
Note:							
Size effect is bell-shaped with turning point (maximum) at 12.936 compared to mean size of 12.049							

Table 10: Persistence of Profitability			
Date of regression	rate of return on assets	rate of return on assets (incl. OBS business)	rate of return on equity
$\pi_{it} = \alpha_i + \beta\pi_{i,t-1} + \Sigma\gamma_t T_t$			
1982-98	0.54*	0.65*	0.52*
1983-98	0.53*	0.64*	0.51*
1984-98	0.51*	0.63*	0.49*
1985-98	0.46*	0.59*	0.47*
1986-98	0.43*	0.58*	0.45*
1987-98	0.39*	0.55*	0.43*
1988-98	0.33*	0.51*	0.39*
1989-98	0.24*	0.43*	0.34*
1990-98	0.08	0.30*	0.24*
1991-98	-0.08	0.21*	0.13
1992-98	-0.20*	0.17*	0.04
1993-98	-0.27*	0.15	0.01
1994-98	-0.32*	0.23*	-0.05
1995-98	-0.36*	0.04	0.06
1996-98	-0.77*	-0.25	-0.47*

Table 11 Privatisations

Bank	year	previous owners	buyer	percentage	other information
Bank of Piraeus	1991	Commercial Bank	UNICO AE	66.67%	
Bank of Athens	1992	National Bank of Greece			formerly Traders' Credit Bank
Bank of Attica	1996	part-owned by Commercial Bank	Deposit and Loan Fund and Engineers Pension Fund	49.5%	
General Bank	1998	Greek Army Pension Fund	Interamerican Insurance Group and other institutional investors	33%	
Bank of Crete	1998	state	Eurobank	97%	since 1988 in the hands of the Bank of Greece
Bank of Macedonia-Thrace	1998	National Bank of Greece, ETEBA, Postal Savings Bank	Bank of Piraeus	37%	
Bank of Central Greece	1998	Agricultural Bank	Egnatia Bank	51%	
Ionian Bank	1999	part-owned by Commercial Bank	Alpha Credit Bank	51%	
ETBA	1999		sold on Athens Stock Exchange	30%	

Table 12 Inward Internationalisation into EU countries: market shares of foreign branches and subsidiaries as a percentage of total domestic assets

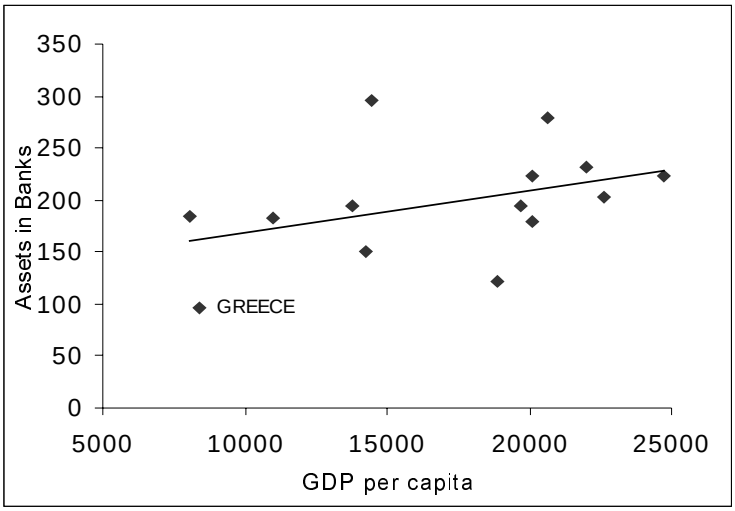
Sorted by the market share of total branches and subsidiaries in 1997 (final column)

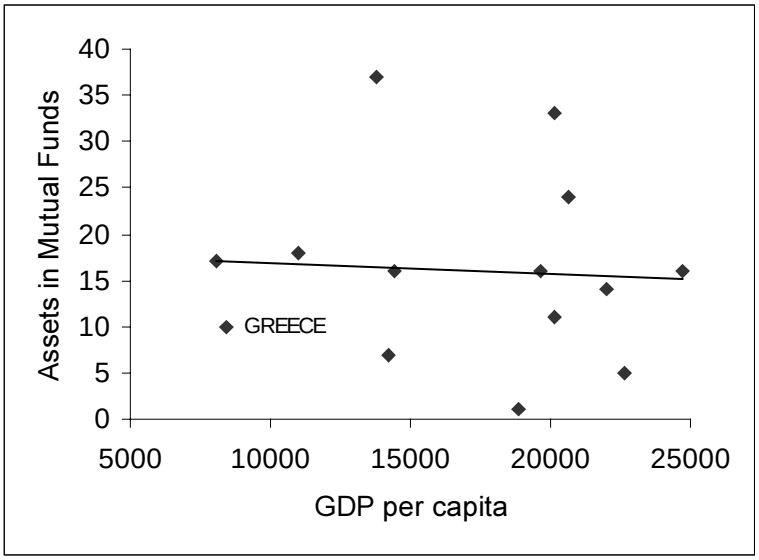
Country	1985	1990	1995	1997		
				from other EU countries	from third countries	total
Luxembourg			99.7	90.9	9.5	99.9
Ireland			40.6	45.4	8.1	53.6
UK			51.6	23.4	28.6	52.1
Belgium		30.0	28.4	28.2	8.1	36.3
Greece	14.5	13.0	18.6	13.0	8.9	21.9
Spain	8.0	8.9	11.8	8.2	3.5	11.7
Portugal	2.3	3.8	9.4	9.4	1.2	10.5
France			12.2			
Netherlands	14.6	12.6	9.8	5.3	2.4	7.7
Finland			6.5	7.1	0.0	7.1
Italy	2.6	2.8	5.4	5.3	1.5	6.8
Germany			4.2	2.4	2.0	4.3
Austria		2.8	3.5	2.3	1.1	3.3
Sweden			1.7	1.3	0.3	1.6

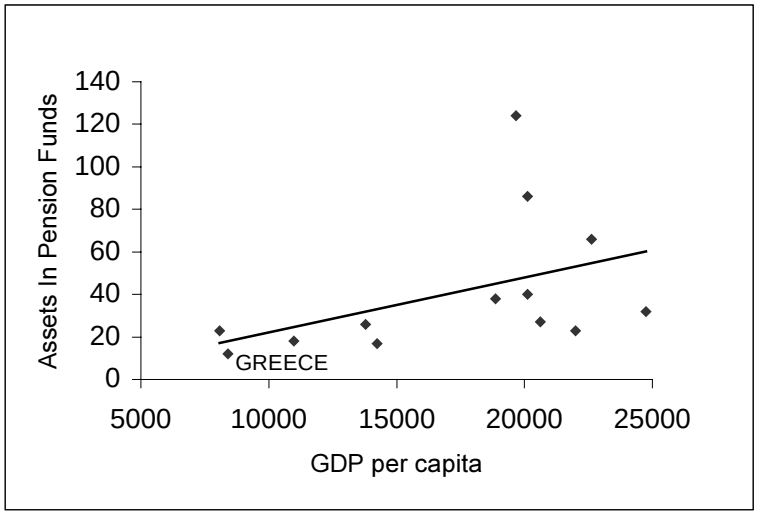
Source: ECB (1999).

Table 13 Mergers, Takeovers, Participations and Cooperative Agreements			
A. Mergers and Takeovers			
Banks		Year	Other information
Commercial Bank	Investment Bank	1992	The Commercial Bank was already the majority shareholder in Investment Bank
National Mortgage Bank	National Housing Bank	1997	National Housing Bank was owned by National Bank of Greece
Eurobank	Credit-Lyonnais Grece	1997	Retail operations only of Credit-Lyonnais Grece taken over.
Eurobank	Interbank	1997	
Bank of Piraeus	Chase Manhatten	1997	Network of Chase Manhatten in Greece taken over.
National Bank of Greece	National Mortgage Bank	1998	National Mortgage Bank was owned by State Pension Funds
Eurobank	Bank of Athens	1998	
Bank of Piraeus	Xiosbank	1998	
Bank of Piraeus	National Westminster	1999	Network of 5 branches of National Westminster in Greece taken over.
Bank of Piraeus	Credit Lyonnais-Grece	1999	Now called Piraeus Prime Bank, it deals with investment banking
Telesis Brokerage Firm	Dorian Bank	1999	
Eurobank	Ergobank	1999	
Agricultural Bank and others	Bank of Nova Scotia (in Greece)	2000	Agricultural Bank bought 45%; the remainder was purchased by various Greek businesses
B. Participations and Cooperative Agreements			
Banks		Year	Other information
Deutsche Bank	Eurobank	1999	Deutsche has taken a 10% stake in Eurobank
Credit Agricole	Commercial Bank	2000	Credit Agricole takes a 6.7% participation in the Commercial Bank and this may be increased in the future to 15% (by beginning of 2001, it had reached around 10%).
Bank of Tokyo Mitsubishi	Bank of Piraeus	2000	Cooperative agreement reached regarding investment banking services; Bank of Piraeus now in talks with ING Bank over possible cooperation.

Figure 1. Financial Development in 14 European Countries, 1995







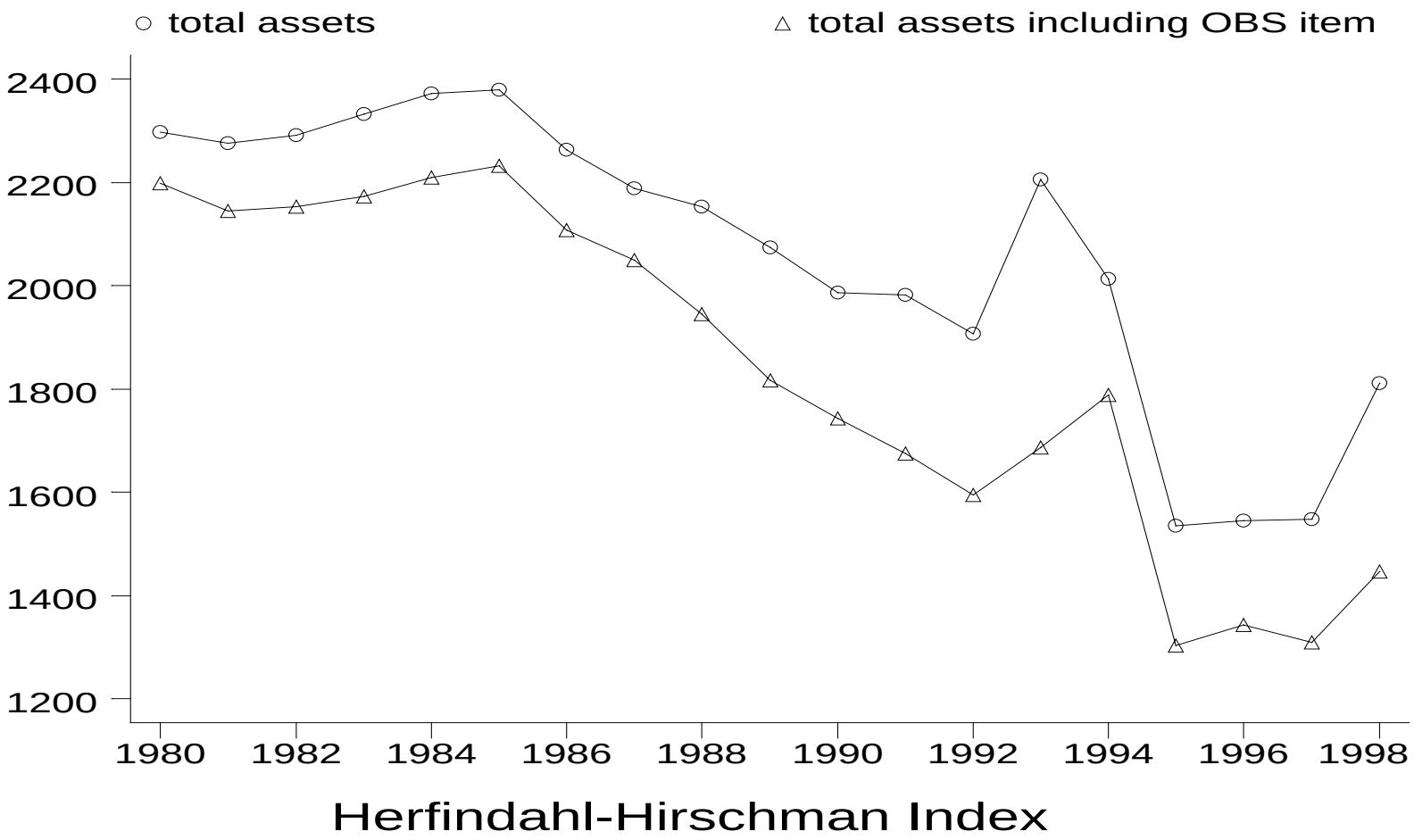


Figure 2
Source: own calculations from sample of Greek banks

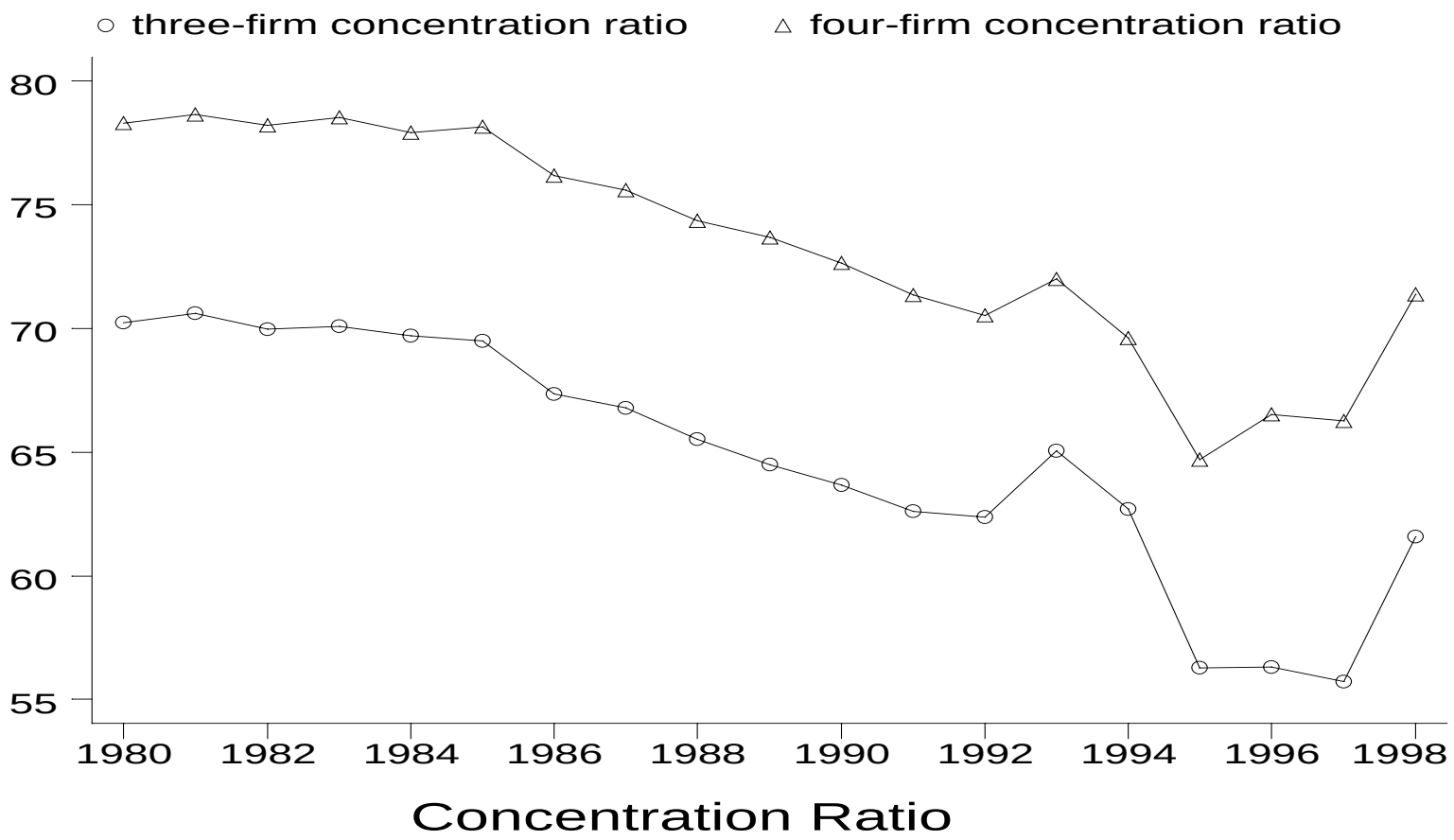


Figure 3
Source: own calculations from sample of Greek banks

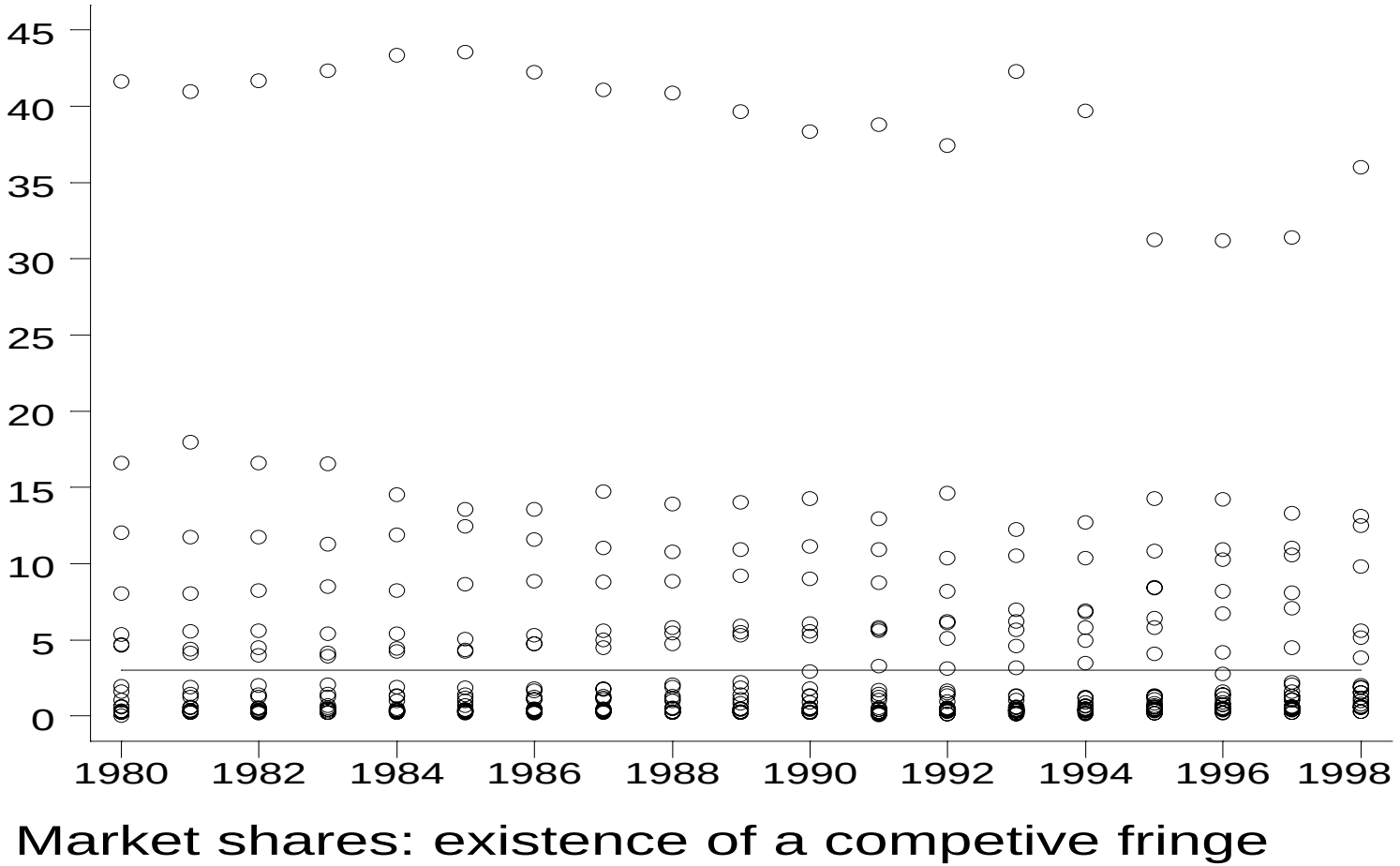


Figure 4
Source: own calculations from sample of Greek banks

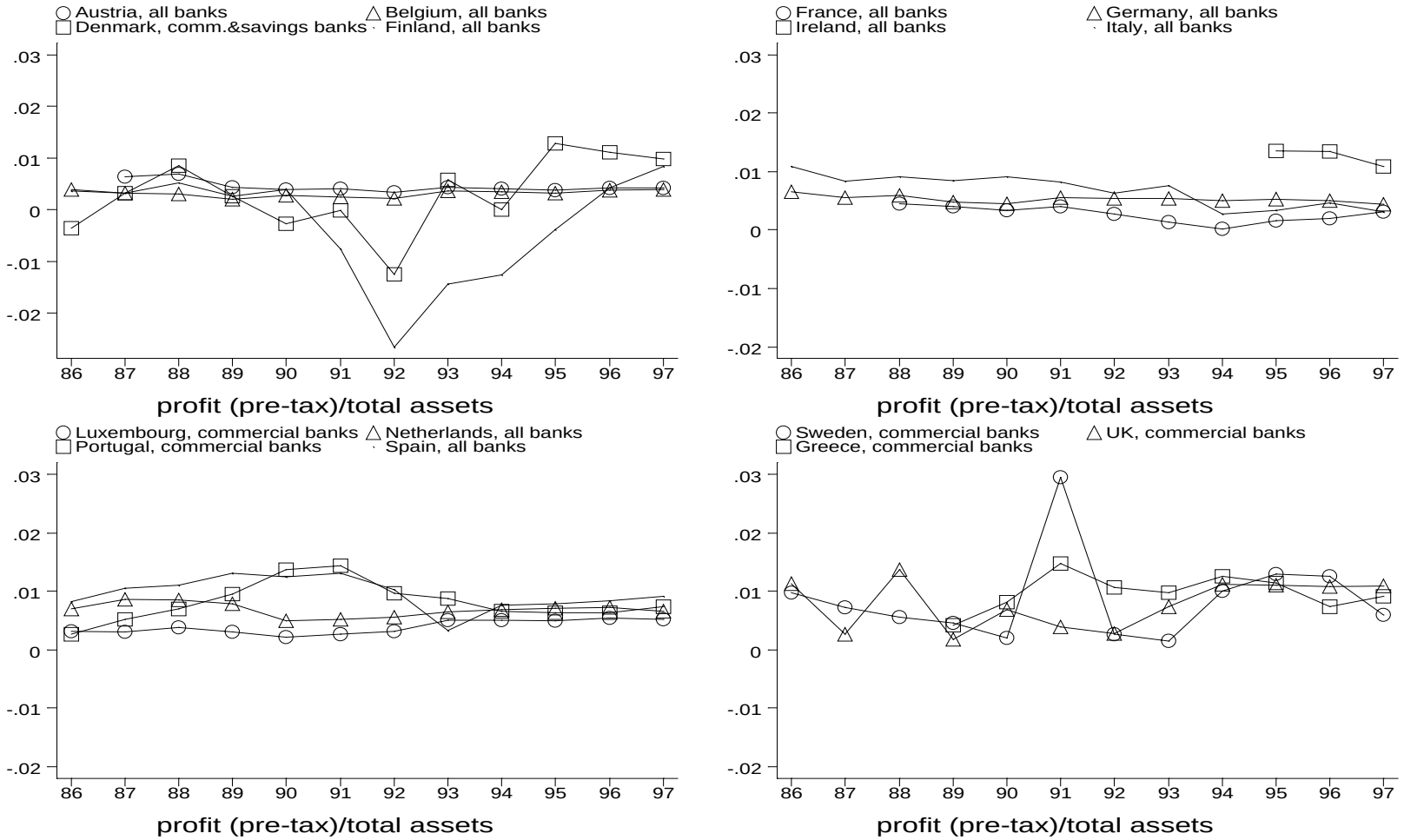


Figure 5
Source: OECD *Bank Profitability*, various years

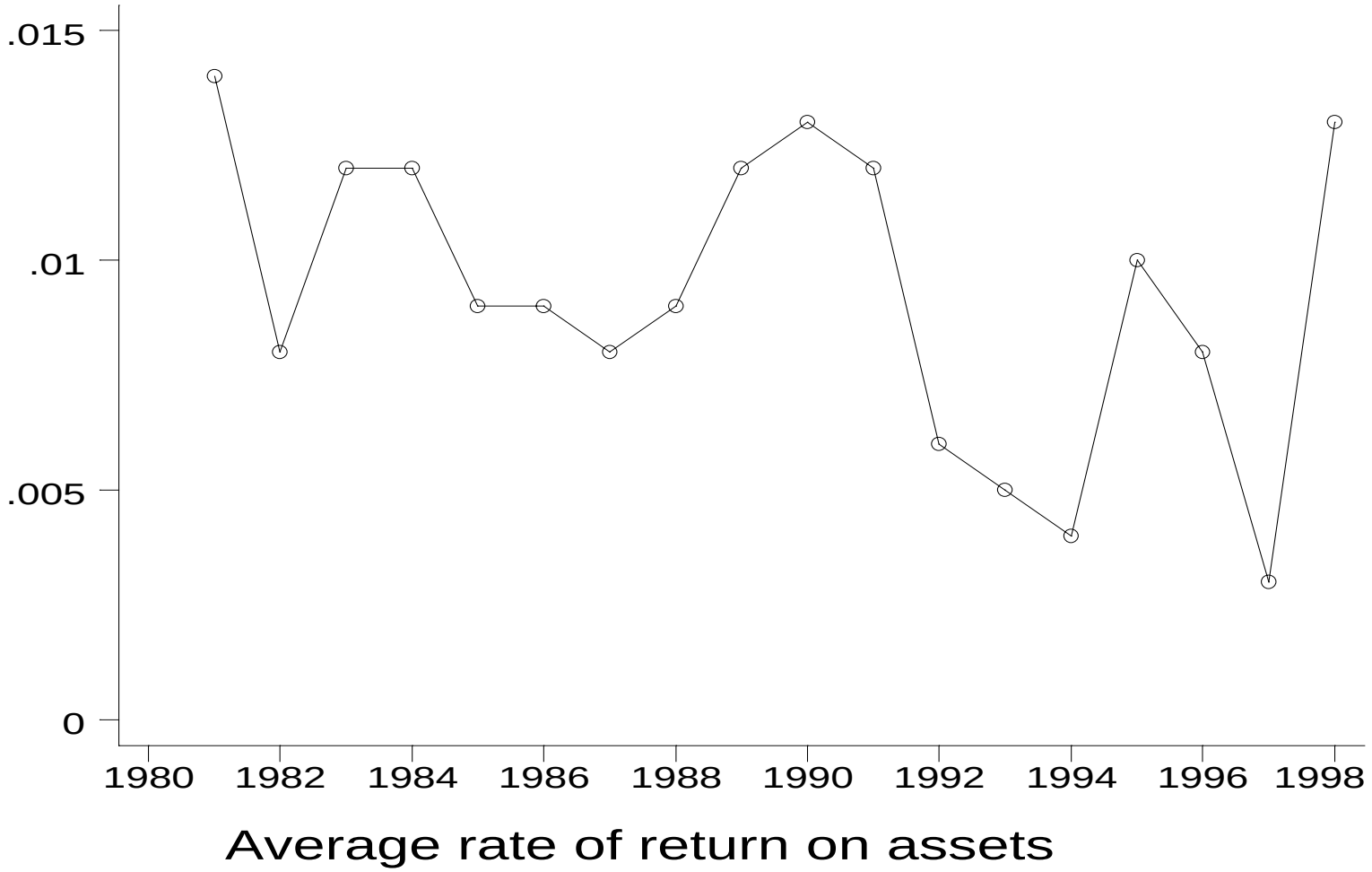


Figure 6
Source: own calculations from sample of Greek banks

Figure 7
Source: own calculations from sample of Greek banks

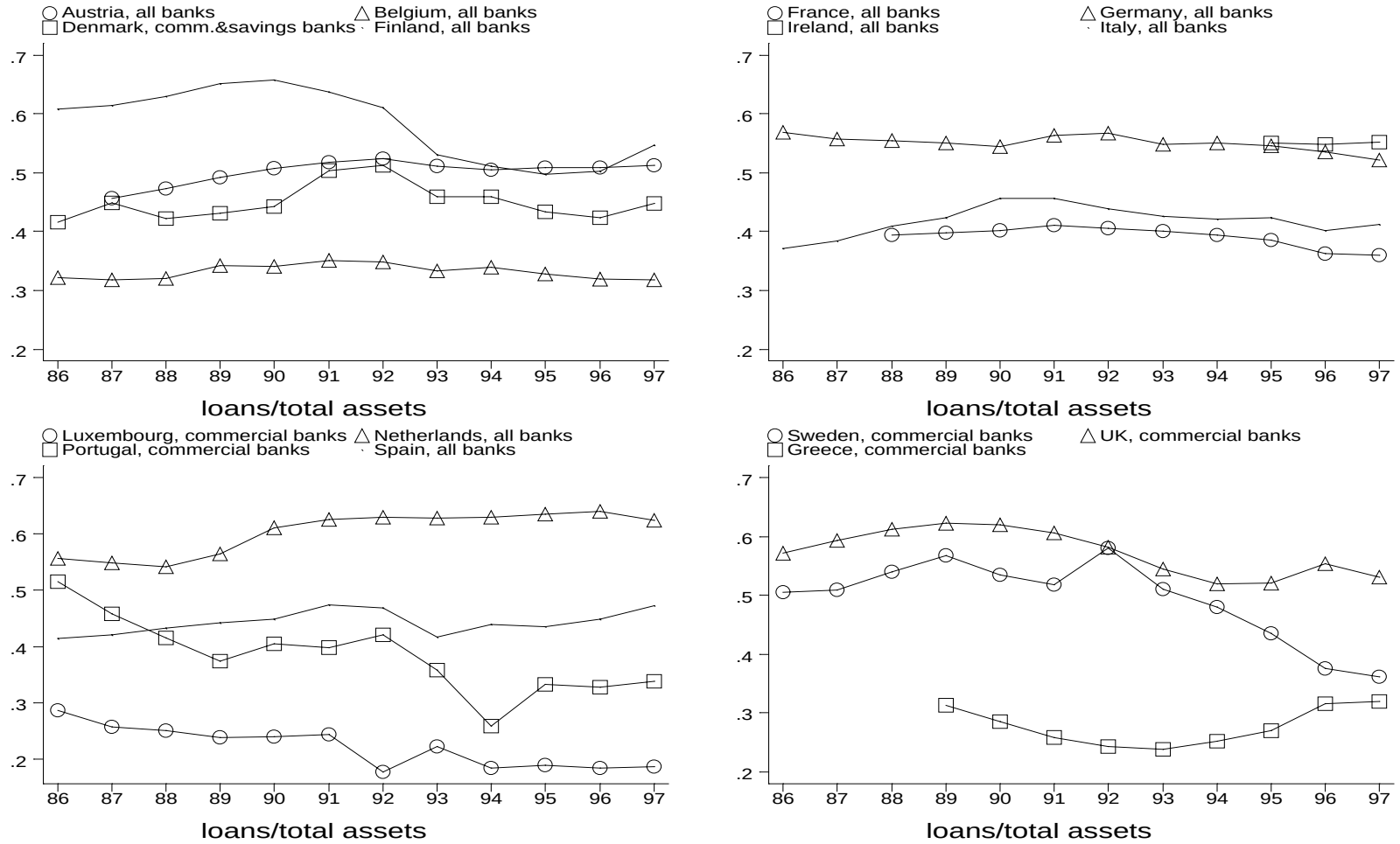


Figure 8
Source: OECD *Bank Profitability*, various years

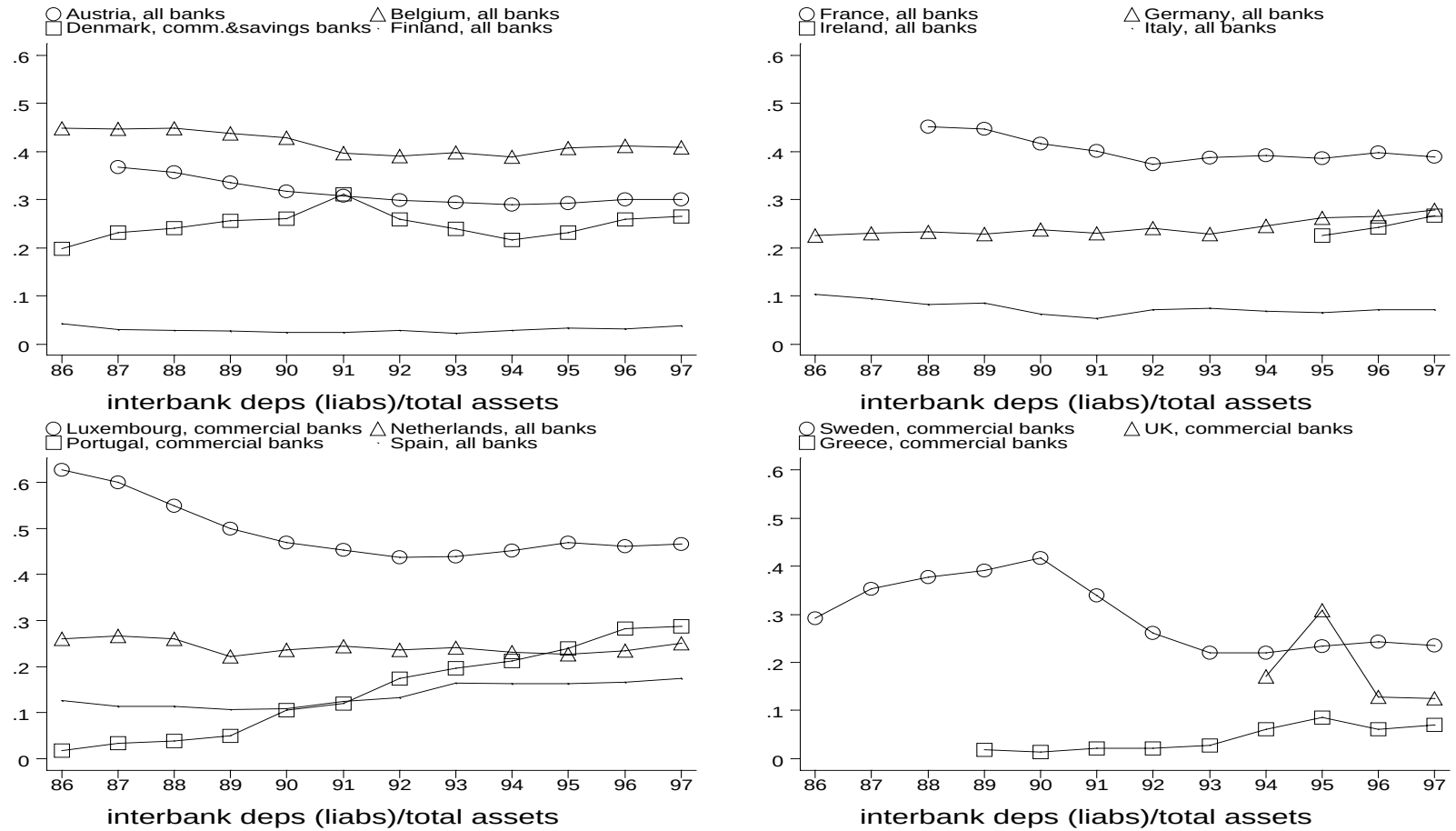


Figure 9
Source: OECD *Bank Profitability*, various years

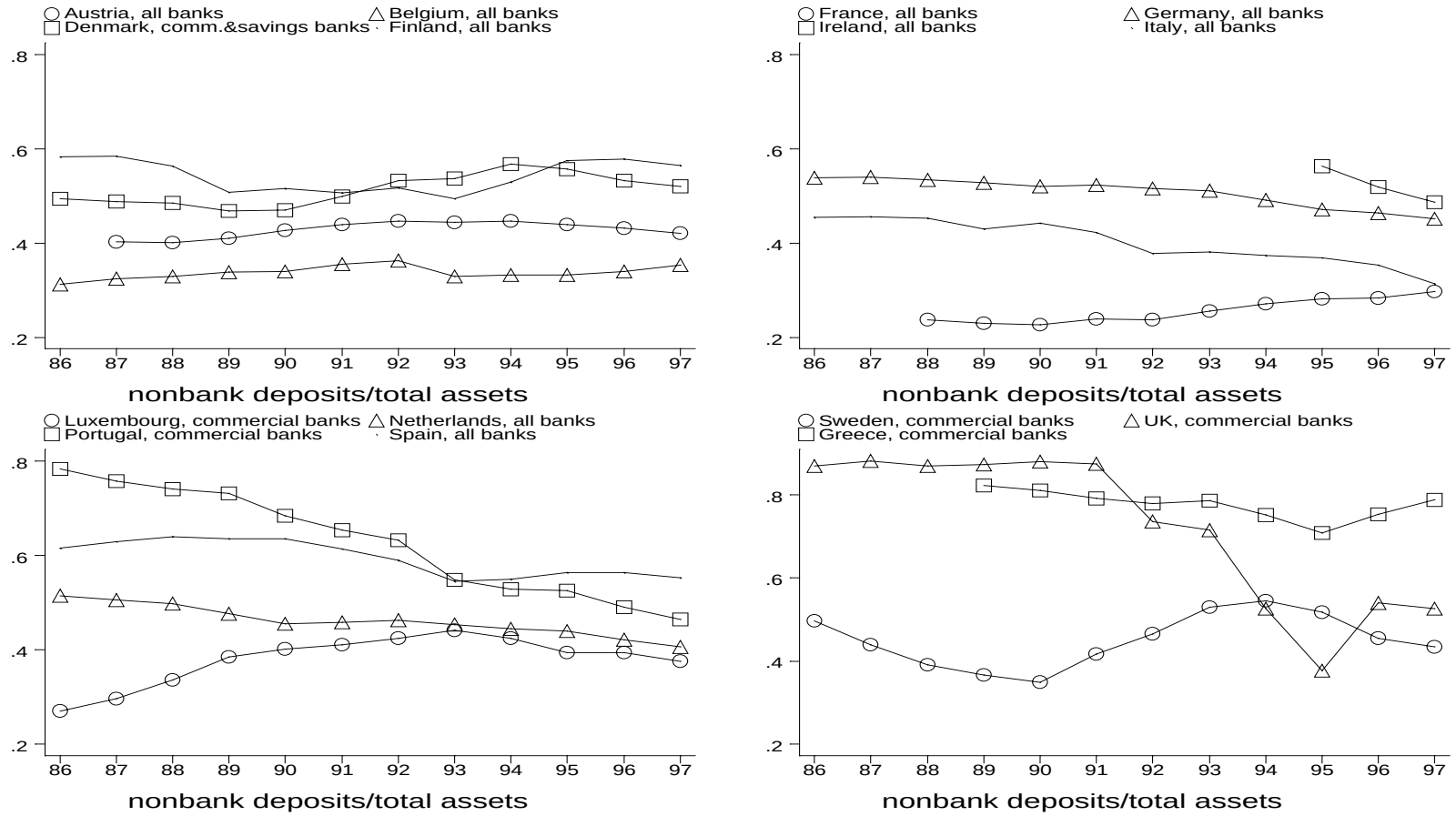


Figure 10
Source: OECD *Bank Profitability*, various years

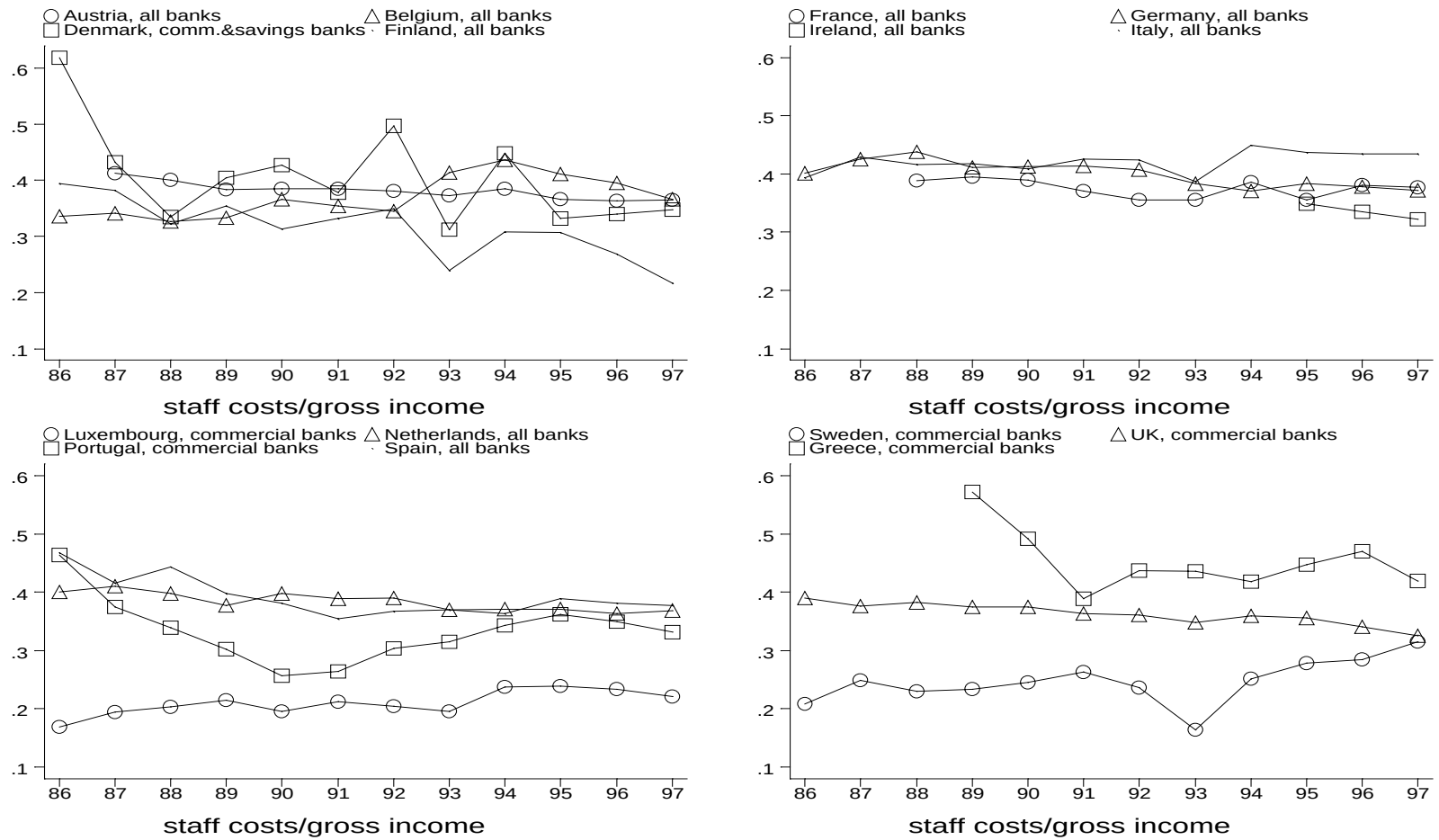


Figure 11
Source: OECD *Bank Profitability*, various years