

# **THE CHANGING STRUCTURE OF BANKS' INCOME – AN EMPIRICAL INVESTIGATION<sup>1</sup>**

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## **Introduction**

In recent years, the changing nature of the banking and financial services industry has become an increasing focus of policy interest and of academic study. It has been argued that widespread deregulation accompanied by technological development has changed the environment in which financial intermediaries, and in particular banks, are operating. In Europe, further financial change seems likely to be provoked by EMU, in particular changes linked to the integration of euro area financial markets (De Bandt 1998). Depending on the point of view of the commentator, these changes may be seen as (i) necessary and welcome progress towards a more efficient financial system, which provides financial intermediation more cost-efficiently and allocates capital more efficiently than has been previously the case; and/or (ii) they are seen as threatening to financial stability and as a development towards a financial system that is prone to crises at frequent intervals.

One aspect of overall financial change is a shift in the pattern of business undertaken by banks, which is thought to be manifested in a relative increase in fee and other non-interest income vis-à-vis net interest income. Among the key underlying factors have been increased competition (both among banks and vis-à-vis securities markets), which has put interest margins under pressure; the growth of securitisation, which has increased the scope for non-interest earnings; and capital adequacy requirements, which encourage economy in the use of capital by various off-balance sheet activities. In common with the United States and Japan, these features have of course been prevalent in a number of EU countries, albeit to a varying degree.

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The debate on the changes in the nature of financial intermediation has been mostly based on theoretical and anecdotal bases rather than numerical evidence. That has often led to a sort of abstractness in the discussion and possibly weak grounds for what have often been far-reaching conclusions and projections in individual analyses of the issue of financial change. In this study, we try to take a more down to earth approach by focusing attention on empirical patterns of the structure of banks' income and changes therein. Following the line of argument above, income structure is considered to be a particularly fruitful area to look for indications of changes in the nature of the banking industry, because it accumulates the changes in the whole spectrum of banking activities into one indicator. The assessment of the data is informed by theories and projections regarding financial change and its implications that have commonly been proposed in the economic and financial literature.

The study is structured as follows. We first take a brief look in Section 2 at the overall pattern of financial change, and in Section 3 at underlying causes of such change and their impact on banks' income. In particular we note the impact of technological progress, disintermediation, financial liberalisation and prudential supervision. In other words we assess why the income structure of banks would be changing. This raises the issue of the kind of implications these underlying trends would have for banks' overall profitability and its volatility from year to year, which we then go on to investigate empirically. In Section 4, we investigate the data available, and in Section 5 we provide some empirical analysis. Do the changes in financial behaviour show up in the data, be it at a macro or micro level, and are there cross-country differences, which might indicate that banking industries in some countries or areas have seen these changes earlier or to a greater extent than others? A particular focus will of course be the split between interest and non-interest income and the structure of the latter. Finally, we draw some conclusions from the statistical evidence in the light of the theory, and consider issues for prudential policy. Notably, it will be considered whether the shift in income structure is making the banking sector more or less fragile. In this context we also try to draw some conclusions about likely effects of EMU for banks' income structure, and assess what further issues for research might arise.

## **2 The evolution of financial systems**

The changes in banking and its income structure are a part of wider evolutionary changes in the financial system as a whole. While financial systems appear to move more or less slowly through the phases, and may "pause" at one stage for decades, a broad form of evolution is nonetheless widely apparent – and appears to be accelerating, owing to technological change, deregulation and the increased scope of cross border financial activity affecting previously segmented financial systems (see also Section 3).

Different writers have used different classifications and names for the phases of the development and changes in the financial system, but the content of these descriptions is generally the same. Following Rybczynski (1997), the evolution of the financial system can be divided into three phases, bank-oriented, market-oriented and the securitised phase. In respect of the “functions of the financial system”, in all phases of evolution banks are largely responsible for the functions of provision of payments services and liquidity. But on the other hand, there is an adjustment in the locus of collection and allocation of saving; monitoring and disciplining users of external finance; and assumption, measurement, pricing and management of risk.

In the bank-oriented phase, the external funding of non-financial firms is obtained from banks in the form of non-tradable bank loans, with banks monitoring the performance of borrowers and disciplining them as necessary. Banks also collect the bulk of savings of the economy. Money markets are not very developed and are almost exclusively interbank. During this phase, the banks play a dominant role in the economy; most financial intermediation goes through banks and shows up in their balance sheets. They may even, if permitted, hold equity stakes in non-financial firms. This dominance of financial flows as well as of balance sheet components reinforces banks’ position as they are uniquely placed to access private information about borrowers, evaluate risk of prospective borrowers and price and diversify risks. Most of banks’ income is interest income and there can be cross-subsidisation between different bank products, which may further increase the relative share of interest income.

During the so-called market-oriented phase, banks face more competition from other providers of savings media and financing products (in particular reflecting the growth of institutional investors as well as direct holdings of securities by households). But banks remain the major source of external funding to the non-financial sectors. Meanwhile the size of money markets increases, although they are still dominated by interbank activities. Capital markets start to develop, but they mainly provide bond financing to government as well as a certain number of new issues of equity. Nevertheless, this phase is characterised by a relative decline in the traditional direct role of banks, be it in terms of the importance of deposits as an asset for households, loans as a source of external finance to companies and on-balance sheet versus market financing activities. Monitoring begins to be shared with other financial institutions (via the rise of the take-over mechanism). In respect of financial innovations, other market participants may take a leading role and new products emerge, which compete with traditional banking products. In the banks’ balance sheets this will lead to a decline in the share of traditional bank lending and increase in holding of tradable assets on the assets side, and a shift from retail to costlier wholesale liabilities. Consequently the income structure shifts towards a larger share of trading and underwriting income, while the impact of competition from other financial institutions means cross-subsidisation has to diminish.

In the third, securitised phase, the market provides the bulk of financing to the non-financial and also financial sector. Corporate bonds and commercial paper substitute for bank loans, while mortgages and consumer credit may be securitised. Collecting and allocating savings, monitoring and disciplining is undertaken mainly by financial markets (in the form of rating agencies, investment banks and institutional investors) rather than banks, with financial assets held increasingly on the balance sheet of institutional investors. In this context, new financial products develop, such as derivatives, which allow for pricing and trading of various risks, and new expertise and institutional players emerge in the financial markets. From banks' point of view this means that trading, underwriting, advisory and asset management activities come to centre stage while traditional banking loses importance.

The pattern described above – as well as the differing stages reached by different countries - is apparent for all the G-7 countries. This is illustrated in Tables 1-4, which are drawn from Davis (1998). The tables show data for end-1997, drawn from National Flow of Funds Balance Sheets, and comparative data for 1980<sup>2</sup>. Table 1 shows that the volume<sup>3</sup> of financial claims relative to GDP has grown sharply in all of the G-7, albeit varying in terms of levels. This has coincided in most cases with an increase in financial intermediation - the proportion of claims held indirectly in banks or institutional investors as opposed to being held directly by non-financial sectors. Thus, regardless of patterns of disintermediation, financial evolution involves a shift away from *direct* holding of financial claims by the non-financial sector. Of the intermediated claims, a growing proportion has been in the form of institutional investment (including life insurance, mutual funds and pension funds). It is noteworthy that this tendency is apparent across all countries shown and not just the so-called Anglo-Saxon ones, although differences in levels are still marked.

These changes have coincided with in most cases a sharper rise in securities (i.e. bonds and equities) than in deposits and loans, implying that bank assets and liabilities have declined relative to the total (Table 2). Meanwhile, households have tended to shift the composition of their balance sheets to institutional investors and away from deposits and even from direct ownership of equities and bonds (Table 3). Patterns for companies are less clear, but there would appear to be a tendency for them to reduce their dependence on loans and increase their reliance on equities, as shown in Table 4 (it being borne in mind that the balance sheet composition reflects capital gains as well as new issuance). Use of corporate bonds is still particularly low in all the EU countries shown.

### **3 Factors underlying the changing structure of the financial system**

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<sup>2</sup> The data are based on national definitions which mean comparisons of levels should be made cautiously. In particular, in France "total equity" is thought to include estimates of the equity in non-corporate business. In the case of the UK, the data are adjusted to exclude the euromarkets (foreign currency bank lending) so as to make the data more comparable in terms of the scope of domestic financial systems.

<sup>3</sup> The size indicator shows the total value of all financial assets of the conventional economic sectors in the System of National Accounts (household, corporate, banks, non-bank financial institutions, government, foreign).

A mere description of the different stylised phases of the development of the financial system does not tell us anything about the underlying causes of the evolution, nor does it help to explain why financial systems in different industrial countries are currently at different phases and what kind of development we would expect to see in the future. Therefore it is important also to assess factors which underlie these changes, which may be classified under headings such as technological development; deregulation and liberalisation (i.e. the regulatory environment); increased and transformed wealth of individuals; and globalisation. These factors are very much interrelated, and authors differ in the emphases they put on what are often interlocking or mutually reinforcing causal relations. In the following we will concentrate on how these underlying factors are considered to affect banks' balance sheet and income structure rather than analysing them in depth (see Revell (1997) for some recent in-depth studies).

One of the most important underlying factor shaping the structure of the financial system is the pattern of technological development that has obtained over recent decades. This has reshaped the relative costs of different banking and financial services and facilitated the production of new types of services. The costs of collecting, processing and using information have decreased dramatically.<sup>4</sup> This has for example entailed more efficient production of financial information and better techniques for assessing and pricing risks, in turn reducing the cost of external finance. On balance, it has tended to favour markets rather than banks in the context of the greater reliance of the former on public rather than private information (Information Technology allows more information to become public and for public information to be more widely and rapidly disseminated). It has also affected banks' income and cost structures. To some extent banks have been able to profit; banks have been able to specialise in information production and monitoring of credit exposures as agents rather than principals (e.g. in the context of loan securitisation) thus raising the share of non-interest income. On the other hand banks' profits have come under pressure in some areas such as lending to large firms because owing to technical progress, these areas are also open to competition from inside the domestic banking sector, cross-border and also from other financial institutions. Notably, the development of institutional investors has been facilitated by technological changes reducing the cost of collecting saving, gathering and disseminating public information and assessing risk.

Competition linked to innovation is not confined to the assets side of banks' balance sheets. Technological innovations also impact on the cost of funds by facilitating economy in liquid balances and competition in provision of liquidity. For wholesale, corporate deposits the main threat is directly from markets (such as repos and commercial paper for companies) and for households it is non banks (such as money market funds), which has even led to part of banks' traditional functions, provision of

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<sup>4</sup> At the same time, however, some have argued that financial services have in some fields become more capital intensive, leading to clearer economies of scale and scope.

liquidity, being increasingly undertaken by other institutions or markets. While there will be ongoing demand for nominal value certain saving instruments (deposits), the amount is likely to be smaller than currently in most EU countries.

Technological development has facilitated the rapid development of new financial products. While a large proportion of innovations could not have been possible without developments achieved in the theory of finance, it is mostly technological progress that has made the wide use of these innovations possible. The independent role of financial innovations is a debated issue, whereby some commentators would see them as a major factor in themselves in generating financial change and some as by-products or natural consequences of technological development. In either case, innovations in financial products have facilitated a reshaping of the balance sheets and income structures of banks considerably. The related possibility of separating risks from capital has led to a massive increase in off-balance sheet activities (Metais 1997), which has also changed the income structure.

The above-mentioned developments underlie recent changes in the structure of the financial system. Following the classification above, financial systems are departing from the bank-oriented phase and becoming more market-oriented or even securitised. The share of deposits in household portfolios is declining, not only owing to shifts to long terms assets. Meanwhile, again aided by technology as noted above, the disintermediation process on the assets side is underway in a number of countries, even though the process has been quite slow and the number of companies relying solely on market financing in the EU is still quite small. However, the effect of the structural change toward market-oriented financial system can be larger than the share of external financing from the market would suggest. The existence of market financing could have affected terms and conditions of bank lending in the sense that banks are more clearly only one possible supplier of external funding for all but the smallest firms. In other words, the market for external financing has become contestable, with potential competition from market financing limiting the scope for banks to profit from lending relationships. One may add that banks have been encouraged to take part in the process of securitisation by undertaking investment banking activities such as underwriting, which employs their capacities of information gathering as well as private information based on existing credit relations. This tends to boost non-interest income.

The shift towards a more market-oriented or even securitised financial systems is shown by the increased importance of new type of players in the financial system. Most apparent is the rise of institutional investors, that are gaining more and more role in allocating savings of the household sector to the corporate sector both domestically and cross-border. They have, on the one hand, provided new types of savings product (high risk and high return), often underpinned by tax concessions on pension or life insurance saving, as well as, as noted above, by technological change reducing the cost of collecting saving, gathering information and assessing risk. On the other hand, they have created more demand

for different types of securities. While they have enhanced structural change in the financial system, they have also started to compete with traditional banking in respect of both assets and liabilities. However, in Europe these institutional investors are often part of banking groups, or banks own the asset management firms which undertakes portfolio management for institutions. Banks in the EU still have the most extensive distribution network of any type of financial institution, even if its importance is declining, and their existing customer relations give them a competitive advantage in the provision of many new financial services. Therefore, while reducing interest income the growth of such products may increase non-interest income of the same banking groups.

The deregulation and liberalisation process that has been an ongoing issue for some time already has also permitted an increase in the overall level of competition in the financial systems.<sup>5</sup> In the EU, liberalisation gained momentum with Single Market programme. The single most influential act has been the Second Banking Co-ordination Directive, providing a passport for banks to offer services across the Union on the basis of home country authorisation. Banks – and their competitors – were also able to take advantage in the area of investment banking of the Investment Services Directive, which granted the cross border passport to securities firms, portfolio managers and investment advisors.

At present, liberalisation and deregulation in the EU financial services sector is very extensive<sup>6</sup>, and rather than anticipating new acts of liberalisation, ongoing incremental adjustment of the regulatory environment implemented in the 1980s and early 1990s seems more likely. On the other hand, the impact of deregulation and liberalisation may go much further because of the way it *facilitates* change. In effect, the process allows other driving forces to “leverage” and have a more profound effect on financial system. One of these factors which is facilitated by liberalisation is globalisation, that is occurring in most private sectors of the economy. As companies and individuals requiring financial services are becoming more globally oriented, they demand appropriate financial services. Globalisation is seen to increase competition in most areas of financial services, but also it could increase economies of scale and scope. The effect on income structure is less clear, but it can be argued that many markets which have previously been “segmented”, be it on- or off-balance sheet, will face more competition and reduced margins. At the same time globalisation has opened up new markets for banks particularly in trading, asset management and investment banking activities. Therefore we might expect banks to get more trading and investment banking income and to face some further reduction of interest margins.

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<sup>5</sup> However, deregulation was arguably not always a causal factor in the way that the forces of technology and growth of institutional investors are, but was often a belated response to changes already underway.

<sup>6</sup> One may add that deregulation and liberalisation have a global perspective, which is linked to the increased scope of world trade in goods and services and liberalisation in that area in general. Rather than always leading this process, the financial services industry has in some ways been forced to adjust to the development in other sectors of the economy.

The regulatory environment has also affected the financial system directly, not merely by inducing competition. The clearest example is the effect from capital requirements, and different risk weights therein. It has been argued that the huge increase in off-balance sheet items largely results from lower capital requirements attached to off-balance sheet items than for activities conducted on-balance sheet. In the income structure this is reflected in the increase in the relative share of non-interest income. Similarly, lower risk-weights attached to inter-bank loans has most likely increased their share in balance sheets, and as they have lower margins than loans to non-financial clients, reduced overall interest income relative to assets (albeit in this case with no major implications for overall profitability).

The wealth of individuals has increased, and a larger proportion of the population is making portfolio investments. This partly results from changing demographics i.e. ageing of the population, which in itself has increased the average wealth of people but also from changes in pension systems in a number of countries from a pay-as-you-go to a funded basis (Davis 1995a). The perspective for the future is for more such change. Some political economists also claim that due to this change in wealth, the political climate has become more investor-friendly. The increased number of wealthy individuals has changed the demand for financial services. Traditional banking services or products, while maintaining a strong position in liquidity provision, are not adequate for people interested in diversification and maximisation of return subject to risk in the context of long-term investments. The associated rise in demand for securities has entailed an increased importance of brokerage, fund management and consultancy activities. While there are new providers for these services, banks could remain at centre-stage, albeit with their services more oriented towards asset management, and hence a change in their income structure.

In addition to overall increase in wealth of individuals, the type of wealth typically held has changed towards financial instead of real wealth. That is manifest in the increase in the relative market value of stock exchanges, which is most apparent in the UK, but clearly visible in most other EU countries as well. The increase in financial wealth relates closely to the shift towards a securitised phase of financial markets and also to the increased importance of institutional investors. This is because they have a comparative advantage over direct holdings of securities by individuals, owing to superior possibilities of diversification, specialisation in information collection, sharing of asset management expertise and reduction in transactions costs for large trades.

On balance, the pattern of financial change in industrial countries and the underlying factors provide ample reasons for anticipating banks would switch from interest to non-interest income. This in turn raises the issue of what the implications could be for financial stability. The answer relates not only to the speed of the change but also to route it takes. It could be argued that the decreased amount of deposits and bank loans, disintermediation, would in the long run increase the stability of the banking



sector by decreasing the probability of bank runs. However, the stability of the banking sector depends less on the share of non-interest vis-à-vis interest income than on the risks banks accept.

The following sections investigate the related changes numerically for the individual EU countries as well as for the US, which provides something of a benchmark for a financial system which is clearly in the “securitised” stage of Rybczynski (1997) classification. It may be added that we have of course not yet treated the impact of EMU on income structure; we will investigate this briefly in the forward looking analysis provided in the concluding section (see also Davis (1998)).

#### **4 Data issues**

The datasets used in this study are two-fold. First, we employ the OECD data on bank profitability (OECD 1997). These data provide information on financial statements of banks in 28 OECD countries for 1979-95, although for some countries the time series are shorter (see Table 5). Banks are defined broadly as “institutions primarily taking deposits from the public and providing finance for a wide range of purposes”. The data cover both balance sheets of banking sectors and the corresponding income and expenditure accounts. Note that the data are at a macroeconomic or sectoral level and do not give any information on individual banks. They cannot be used systematically to assess how behaviour varies across sizes of institution (although subsectors are provided for some countries). In this paper we focus largely on the national patterns given by the sector “all banks”.

We use the national data to define estimates of the banking sector for the EU and for the euro area. These are based on GDP weights, which are the standard approach for weighting financial quantities such as monetary aggregates. They may of course be inaccurate if financial sectors as in Luxembourg are larger than GDP; also, for some countries only commercial banks are included. Moreover, data for France are only available after 1988 and for Italy after 1984. Estimates for the EU and euro area correspondingly begin in 1984, with appropriate weighting being undertaken for the absence of France over 1984-88.

The second data source is the Fitch-IBCA Bankscope CD-ROM (henceforth IBCA). This provides data on the individual balance sheets and profit and loss accounts for over 10,000 international banks over the period 1989-97. The focus in our current work is on cross-sectional analysis, using the year 1996 as the most recent for which complete data are available. The sectors included in the sample were commercial banks, co-operative banks, saving banks, mortgage banks, long term credit banks and holding companies. Hence to ensure a degree of homogeneity we exclude investment banks (as well as non bank credit institutions, government banks, central banks and Islamic banks). We do however, include public, private and mutual banks in the same sample. For reasons of maximum coverage, we give data from unconsolidated balance sheets, except for the UK where consolidated are most readily

available. Some aspects of financial conglomeration may hence be missed. EU and euro area aggregates could again be constructed, using simple aggregation since the data are valued in US dollars. The number of banks covered in the EU is over 3,000, of which 1,458 are German, 575 Italian and 350 French (see Table 5). Banks are divided into small, medium and large, where large is defined as over \$4 billion, medium \$1-4 billion and small below \$1 billion.

In examining the results it may be borne in mind that accounting differences may have a marked effect on the patterns shown and may veil fundamental differences or similarities. For example in some countries trading income may be classified as interest income, and in Denmark, non interest income is strongly affected by the need to mark to market bond holdings annually, thus entailing unrealised capital gains and losses.

## **5 Empirical findings**

### **(a) Time series results**

We focus first on the OECD macroeconomic data. Table 6 shows that for the EU and the euro area there has been a rise in the ratio of non-interest income to assets, taking successive four-year periods to smooth out cyclical irregularities. But the upward pattern is much less marked than is often stated, and contrasts sharply in terms of both levels and growth rates with the US. Whereas the EU banking sector has shown an increase in non interest income from 0.9% of assets in 1984-7 to 1.0% in 1992-5, the corresponding figures for the US are 1.3% and 2.1%. The most marked contrast is between the US and the euro area. In the euro area, non-interest income has played a minor role, while in the US it has increased considerably. In addition, much of the growth in the euro area can be attributed to the French banking sector. Elsewhere levels are relatively low and changes small or even negative (as in Italy and, outside the euro area, Denmark).

It is important also to examine net interest income, as the importance of non-interest income may also increase if this source shows weakness. This, as shown in Table 7, proved to be the case for the EU and euro area over the successive periods shown. For the EU, net interest income as a proportion of assets declined from 2.7% in 1984-7 to 2.2% in 1992-5. Such a decline is apparent also in a large number of individual EU countries; among the exceptions are Sweden, Austria and Denmark. There was a pickup in the US. The apparent trend decline in interest income suggests EU banks will need to focus to a greater extent than in the past on generation of non-interest income.

The levels (as opposed to changes) of non-interest and net interest income as a proportion of assets show some striking contrasts between different EU countries and relative to the US. In the EU, a high ratio of non-interest income to assets of more than 1.5% in 1992-95 can be found only in the UK,

Greece, Sweden and Finland. Of these countries, two have gone through banking crises during the 1990s, which implies a link of increased non-interest income to asset disposals as well as fee income. Meanwhile, in Belgium, Denmark and Luxembourg ratios are 0.5% or less. Net interest income as a proportion of assets is below 2% for Belgium, Greece, Luxembourg, the Netherlands, Austria and Finland. The highest margins can be found in Denmark, Spain, Italy and Portugal. Excluding Denmark, these countries had higher rates of inflation (which tends to boost margins), and also the steepest decline in inflation during the observation period (implying wide margins may not be sustainable).

Note that in all cases, such differences in levels are affected by the denominator as well as the numerator and may reflect also the importance of low-yielding interbank deposits on the one hand, and different risk profile in lending on the other hand. In order to illustrate this point, we show in Table 8 the balance sheet composition of banks in EU countries for 1995 as shown by the OECD data. Interbank deposits account for more than 25% of assets for the banking sectors of Belgium, France, Luxembourg, Austria and Portugal. The EU weighted average is 21%.

There may also be cyclical effects on net interest income. While the aggregation of four-year periods seeks to remove some such irregularities, there remain differences in the average cyclical situation, for example over 1988-91 vis-à-vis 1992-95. As one might expect interest income to be sensitive to the cyclical position of the economy, the apparent reduction in interest income in number of countries should be assessed with caution. The same comment applies to non-interest income.

A better measure of the relative importance of income sources, and one possibly less sensitive to the cycle is given by a simple ratio of net interest income to non-interest income (Table 9). Here the pattern is clear, with a fall in the ratio for the EU from 2.9 in 1984-87 to 2.3 in 1992-5. The corresponding figures for the US are 2.6 and 1.8. Declines in the ratio are seen for virtually all EU countries, with Italy being the main exception; in some cases there has been a partial recovery of the interest share as in Germany. As regards levels, ratios of 1.5 or less in 1992-5 were seen in Greece, Spain, France, Finland, Sweden and the UK. The pattern is very similar in the US, although no doubt partly due to the cycle it has been driven by the more rapid increase in non-interest income rather than the decline in interest income as has been the case in the EU.

As shown in Table 10, the gross income/asset ratio has also declined in the EU, from 3.6% in 1984-7 to 3.1% in 1992-5. This contrasts sharply with a pickup in the US from 4.8% to 5.9%<sup>7</sup>. However, given that profitability is the key to survival of banks, it is the return on equity which is the most important additional variable to examine. This is shown in Table 11. There we see that there has been a general decline in the return on equity in the EU and the euro area, which is shared by most of the constituents. Only in Greece, Luxembourg, the UK and US does 1992-5 show the highest level of profitability. The

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<sup>7</sup> The high level of gross income in the US may link partly to the accounting treatment of stock options.

implication is that the relative decline in interest income and attempts to replace it by non-interest income has not been a smooth process wherein profitability has been maintained. Underlying this pattern in a number of countries is the need for provisioning of losses following patterns of what proved in retrospect to be high-risk lending (Davis 1995b). The UK and US, although they show a recovery in the mid 1990s, were also characterised by this pattern. Besides suggesting an increase in risk, the pattern may suggest that the rise in non-interest income did not involve an increase in profitability, but rather it has been absorbed e.g. in increased staff costs.

In addition to the negative sign of the change in profitability (ROE) the *levels* of profitability in a number of EU countries were very low in 1992-95. Only in Greece, Luxembourg, the Netherlands and the UK was the return on equity above 15%, while in Denmark, Spain, France, Italy, Austria, Portugal and Finland it was less than 10%. Even taking into account cyclical factors, these levels of profitability are a cause of concern, and even more so if they signal that the banking sectors in EU have been unable to adjust to the changes in financial systems.

Table 12 shows the volatility of income at a sectoral level. Is non-interest income more or less stable? At an EU level the advantage to non-interest income is quite marked. There is a sharp contrast to the US, where non-interest income is much more volatile. One point to note is that the process of aggregation smoothes out the pattern for the EU, with most countries showing a higher volatility. But in most cases the pattern of higher volatility for net interest income holds, with Denmark, Austria and Sweden being in fact the only EU countries where non-interest income has been more volatile. This may link to the fact that some elements of non-interest income such as those from insurance or asset management fees may be less cyclical than interest income. It is notable that non-interest income is more volatile than interest in the US. This raises the issue of whether such relatively high volatility in the US relates to a different pattern of non-interest income by source, different macroeconomic and financial market conditions or rather a higher level of competition. Does the US represent a paradigm towards which the EU is moving, or is it distinct, owing e.g. to the separation of commercial and investment banking?

The pattern of non-interest income, broken down by the OECD, is shown in Table 13 for 1995 (these data are only available for a subset of countries, and then only for the last 2-3 years of the dataset). UK banks rely to the greatest extent on fees and commissions, in line with their US counterparts. Danish banks show a large item for profit and loss on financial operations, which may help to explain the relative volatility of non-interest income there. The “other income” item is important in France, Italy, Austria and the US.

An important empirical question for the stability of banks is whether the levels or changes in non-interest income are correlated with net interest income. Can they rely on non-interest income to tide

them over when margins narrow?<sup>8</sup> As shown in Table 14, in Germany, Greece, France and Luxembourg this appears to be the case, consistently for both levels and changes. However, elsewhere the results are mixed, and for Italy, the Netherlands, Portugal, Finland and Sweden, as well as the US, there are consistent positive correlations, which for Sweden and the US are quite large (0.5 or more). It may be added that year-to-year changes may be more important than correlations in levels, and considerably fewer countries show negative correlations for changes than for levels. One explanation for negative correlations in Europe could be that European banks have often large equity stakes in non-financial companies. While lower interest rates tend to cause a decline in margins between deposit and lending rates, they also tend to lead to higher equity prices, making it possible for banks to replace interest income with profits from their equity holdings.

### **(b) Cross sectional results**

Turning to the microeconomic data on individual banks, one may start with two notes of caution; first that the patterns being only for one year may be affected by cyclical patterns. Hence their value in cross-country comparison is limited. Second, for some countries there are limited numbers of observations and hence the results may be distorted by patterns for individual institutions (see Table 5). And third, as noted, both public and private banks are included in the sample.

There seems to be a pattern in the EU of small banks having rather higher non-interest income as a proportion of assets than their medium and large counterparts (Table 15). This appears to be true both at the Union level and for most individual countries. Even for the US, small banks as defined here have rather more non-interest income as a proportion of assets than large banks. Interestingly, there appears to be a lower level of non-interest income in many countries for medium banks. This pattern comes through at the EU level and also in the US for example. Meanwhile, as shown in Table 16, in the EU small banks also tend to have higher levels of net interest income; a pattern that does not arise in the US. In the US, medium size banks tend to rely most on interest income, which is the opposite result to the EU. That could arise from the fact that medium size banks in our sample are quite often large banks in their domestic market-place (e.g. in small countries) and are hence in a good position to harvest non-interest income. As this market-place, at least for wholesale operations is becoming euro-area wide, these patterns could also indicate that some adjustment to a role as “regional banks” is still to come for such banks.

A possible explanation for the pattern among small banks is of course that smaller banks have larger proportions of higher yielding assets in their balance sheets, while larger banks have more interbank and money market claims, which increase the size of the balance sheet and reduce the income ratios,

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<sup>8</sup> One possible source of correlation is if declining interest rates, which reduce net interest income, lead to greater scope for profit from selling assets such as bonds.

without any necessary implication for profitability. Accordingly, in Tables 17 and 18 we show some relevant measures with alternative denominators. Hence, Table 17 shows the share of non-interest income in total income, which shows that large banks tend to rely on it to a greater extent than small banks as an income source, on average across the EU as well as in the US. Individual countries such as France, Italy and the UK also show this pattern. This is not however true for all countries, with for example Germany having a consistent pattern of greater reliance on non-interest income for smaller banks; this is also the case for Austria.

How do these patterns affect profitability? Perhaps for similar reasons to those mentioned above, the pattern for the return on average assets (Table 18) shows small banks with higher returns, i.e. because large banks are more likely to hold low yielding money market assets as well as higher yielding retail assets. A given level of non-interest income is distributed across a larger volume of assets. Hence it may be more revealing – as for the macro data above - to look at returns on equity. An interesting pattern emerges whereby for the EU as a whole as well as the US, large banks were more profitable in 1996 than small, but that in the EU as a whole, medium banks were less profitable than either of them. The latter pattern may however result from aggregation of different levels of profitability rather than being a structural element. The result of large banks being most profitable is however borne out for most EU countries as well as the United States; among the exceptions in 1996 are Germany, Italy and Austria. Generally, however, the results suggest that the higher returns on assets, for both interest and non-interest income, on the part of small banks, do not translate into higher levels of “shareholder value”.

One reason why small banks’ higher revenue ratios do not carry over into profitability is that their cost income ratios are in most cases much higher than large banks (this topic is explored at length in Davis and Salo (1998)). This pattern is borne out at EU level (Table 20), in countries such as Germany, Spain, Luxembourg, the Netherlands, the UK and the US. A further point is that small banks often have higher equity/assets ratios than large banks. In countries such as the UK this is often at the behest of supervisors.

### **(c) Simple econometric results**

To conclude the empirical section, we examined the cross sectional sample using simple econometric estimates. Note that the samples for Greece, Ireland, Finland and Sweden are very small and hence results should be regarded particularly cautiously. We assess the determinants of on the one hand non-interest income as a proportion of the total, and on the other non-interest income as a proportion of total assets. The intention is merely to show what variables are strongly correlated with non-interest income, controlling for other influences; there is not any attempt to infer causality.

In the context of the equations for the log of the share of non-interest income in the total, the independent variables were the log of total assets, the log of the cost-income ratio and the log of the return on average equity. We are seeking to assess whether a high share of non-interest income typifies large or small banks, with high or low cost income ratios, and whether it relates to higher or lower levels of overall profitability. In general, the results suggest, in line with Table 17, that larger banks tend to be more dependent on non-interest income in the EU and the US. This is also true statistically for Denmark, Germany, Spain, Italy and the UK. For most other countries there is no significant relationship, although in Greece and Austria there are signs of a significant inverse relationship.

Meanwhile, there appears to be a strong positive relation of non-interest income to the cost-income ratio. In the EU, US and virtually all individual countries, a higher level of non-interest income is associated with a higher cost ratio. This is a plausible result, in that generation of commissions, fees and other non-interest revenues may need more staff than “classic” deposit taking and loan provision. Finally there is no strong relation at the EU level between non interest income and profitability. However, a significant positive relationship does come out for some individual countries, including some of the more liberalised (Luxembourg, Netherlands, UK, US).

The results of the non-interest income/assets regressions broadly complement the above. Note that owing to the difficulties of interpreting this measure (see above), more focus should perhaps be put on the results for income shares noted above. For the ratio to assets the extra variable net interest income/assets is added to the regression. The overall pattern seems to be that given the levels of the other variables, high non-interest income tends to accompany high net interest income. The implication is not that banks “substitute” at any time between these income sources, but rather that successful banks have high levels of both. In principle, the separate inclusion of the total assets should capture any tendency of banks of a given size class to have higher gross income/assets ratios; but problems of simultaneity cannot be ruled out.

## **6 Conclusion**

In line with the stylised facts of long-term financial evolution and the key drivers of recent financial change, there is evidence of changes in income structure for most EU countries, leading banks to have a greater relative dependence on non-interest income. The rise in the relative share of non-interest income has not led to a higher non-interest income to assets ratio; indeed, it has in many cases accompanied a decline in overall profitability, giving some grounds for concern regarding overall financial stability. Banks in the EU have not been able to increase their non-interest income sufficiently to offset falling interest income, given accompanying changes in other aspects of profit and loss. However, the fact that the relation of non-interest income to profitability tends to be positive for the

more liberalised financial systems gives some grounds for comfort about the likely long-term consequences for financial stability. There remain potential concerns about the medium term outlook or the adjustment process of banks to increased profitability in the new financial landscape of EMU.

Although there are common trends, there are also marked cross country differences in the level of non-interest income, as well as interest income, which may link to such features as differences in market conditions, corporate governance, the level of competition and the balance sheet structure of the non-financial sector. Whereas on the one hand, increased competition may be expected to lead to an increase in non-interest income via disintermediation, it may also be the case that non-competitive features of financial systems such as underwriting cartels and cartelised asset management sectors may bolster non-interest income while they last.

For most countries, the time series evidence does not suggest that non-interest income is less stable than net interest, and for a number of countries there are helpful negative correlations between the type of income. This suggests that banks may obtain diversification benefits in increasing non-interest income, helping to smooth profitability. Note however, that evidence at a macro level will not necessarily apply to individual institutions. In particular, the volatility of banks' non-interest income inside one country could be uncorrelated, resulting in a lower year-to-year volatility for the aggregated figures than is experienced by individual institutions.

Turning to the micro analysis, on balance, it appears to be larger banks that are more able to sustain high levels of non-interest income. This could imply that small banks have a comparative advantage in generating interest income. A less comforting view is that small banks are less able to evolve to a greater dependence on non-interest income, given the need for extra staff and capital investment to accompany it, and possible economies of scale. For such institutions, there may be incentives to increase the risk on the balance sheet in order to maintain profitability, giving rise to concerns about financial stability when borrowers come under pressure. Meanwhile, although rising non-interest income appears to raise the cost income ratio in the most liberalised countries it also seems to link to higher profitability.

In the EU, medium size banks tend to rely less on interest income than in the US. One possible explanation is that medium size banks in the EU have hitherto been "large banks" in their respective marketplaces. As EU banking sector are becoming more integrated, these banks' roles will have to evolve. This could in turn increase the need for adjustment in their income structures, in particular, if they lose some part of their non-interest income that they get as the "leading banks" in the domestic market. Verification of this concern would require further detailed investigation however.



One may conclude with some suggestions about the likely effects of EMU on the overall patterns. The bulk of commentaries on the financial market consequences of EMU (see for example, De Bandt (1998), Dermine (1996), IMF (1997) and McCauley and White (1997) as well as the summary in Davis (1998)<sup>9</sup>) are that it will, inter alia:

- entail certain *transitional effects*, notably imposing relatively high costs on commercial banks in terms of adaptation of computer systems
- raise disintermediation by the following channels
  - raising the attractiveness of commercial paper, bond and equity finance to companies relative to bank loans (owing inter alia to integration of money, bond and equity markets and the reduction in crowding out of private bond issuance by government bonds);
  - increasing the supply of equity and high yield bond finance as a consequence of corporate restructuring, and possibly also raise the supply of equity owing to the greater incidence of asymmetric shocks to individual euro economies, which stimulates firms to issue shares;
  - reflecting integration and greater liquidity, EMU will increase the attractiveness of securitised products (repos, bonds) as an asset for the non-financial sector relative to bank deposits, so banks may need to attract a greater proportion of more costly wholesale finance (CDs, interbank deposits, bonds);
- *change financial-market and macroeconomic conditions* in a way that may be adverse to banks
  - lower inflation in some EU countries may tend to put banks' interest margins under downward pressure;
  - it may reduce directly some sources of non interest income such as foreign exchange transactions and income from trading in some related derivatives contracts;
  - EMU may reduce overall day-to-day financial market volatility in integrated euro markets, although peaks in volatility cannot be ruled out.
- increase interbank competition
  - competition for deposits may increase owing to the scope for cross border banking; competition for loans to smaller borrowers may be weaker owing to the importance of idiosyncratic information;
  - there could be increased competition across border and from outside the Union for other types of non interest income, notably correspondent banking, underwriting, trading and asset management; multi-national enterprises may rationalise their banking relationships;
- *affect banks' comparative advantage in the longer term*; EMU may more tentatively reduce banks' comparative advantage in information gathering, since credit characteristics of corporate borrowers in a given industrial sector will become more comparable across countries;

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<sup>9</sup> See also market commentaries such as those by UBS (1998), Flemings (1998), HSBC (1998) and Salomon Smith Barney (1998).

On balance, these EMU effects seem likely to increase the scope of disintermediation as well as intensifying competition for traditional banking products from within the sector. They may also, however, intensify competition for non-interest income, where competitors include not only other EU banks, but also US investment banks, which are highly skilled in credit risk evaluation and securitisation. In connection with the existing decline in profitability, there would seem to be grounds for heightened vigilance on the part of regulators, and a willingness to allow mergers in order to reduce potential spare capacity (a merger wave is already underway, see Salomon Smith Barney (1998)).

Further work in this area could include the following:

- assessment of more detailed accounting data on non-interest income;
- time series assessment of the volatility of non-interest income for individual institutions;
- a more detailed comparison of the income structure of small as opposed to large banks and the effects on profitability;
- assessment of the degree to which markets for fee income are still segmented but could become competitive under EMU;
- interviews with banks on their non-interest income and the risks attached;
- consideration in detail of certain aspects of non-interest income such as asset management;
- consideration of the extent to which non-interest income is raised in conglomerates rather than individual institutions;
- an assessment of parallels between income structure and other aspects of financial evolution, such as the growing income and wealth of individuals.

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**Table 1: Aspects of financial structure 1997 (1980)**

Percent	Size indicator (total financial assets/GDP)	Financial intermediation ratio	Of which: Bank intermediation	Of which: Institutional intermediation
Germany	6.1 (3.6)	47 (45)	75 (86)	22 (12)
France	10.0 (4.8)	35 (62)	73 (68)	27 (4)
Italy	5.3 (3.9)	32 (32)	91 (98)	9 (5)
United Kingdom	11.4 (4.2)	42 (34)	42 (64)	38 (26)
Canada	7.1 (5.1)	41 (34)	46 (55)	33 (19)
Japan	8.5 (5.1)	45 (42)	34 (36)	19 (10)
United States	7.7 (4.1)	38 (37)	26 (58)	52 (31)

Source: National balance-sheet data

**Table 2: Financial instruments as a proportion of the total, 1997 (1980)**

Percent	Equities	Bonds	Deposits	Loans
Germany	15 (8)	22 (12)	28 (37)	35 (43)
France	40 (15)	9 (5)	20 (36)	26 (43)
Italy	23 (17)	26 (11)	21 (33)	26 (33)
United Kingdom	40 (24)	9 (16)	28 (35)	18 (24)
Canada	25 (22)	25 (19)	21 (27)	24 (28)
Japan	10 (10)	17 (16)	36 (35)	35 (38)
United States	33 (19)	29 (23)	11 (22)	24 (33)

Source: National balance-sheet data

**Table 3: Household sector assets 1997 (1980)**

Percent	Equities	Bonds	Deposits	Institutional investment
Germany	8 (4)	14 (12)	40 (59)	30 (17)
France	32 (12)	3 (9)	31 (59)	29 (9)
Italy	25 (10)	22 (8)	23 (58)	10 (6)
United Kingdom	20 (12)	1 (7)	21 (43)	53 (30)
Canada	28 (24)	5 (8)	30 (38)	32 (21)
Japan	5 (7)	3 (9)	62 (69)	31 (13)
United States	24 (21)	7 (10)	14 (33)	47 (28)

Source: National balance-sheet data

**Table 4: Corporate sector liabilities, 1997 (1980)**

Percent	Equities	Bonds	Loans
Germany	32 (20)	2 (2)	46 (52)
France	72 (34)	4 (4)	23 (60)
Italy	53 (52)	1 (4)	38 (43)
United Kingdom	69 (37)	1 (2)	11 (22)
Canada	37 (41)	17 (8)	17 (22)
Japan	20 (22)	7 (3)	45 (45)
United States	58 (49)	13 (17)	12 (13)

Source: National balance-sheet data

**Table 5 Details of data sources**

	Sector for OECD sample	Years for OECD sample	Banks for IBCA sample
BE	All banks	1981-95	84
DK	Commercial banks and savings banks	1979-95	110
DE	All banks	1979-95	1458
GR	Commercial banks	1989-95	16
ES	All banks	1979-95	188
FR	All banks	1988-95	354
IE	All banks	1995	21
IT	All banks	1984-95	575
LU	Commercial banks	1979-95	124
NL	All banks	1979-95	47
AT	All banks	1987-95	89
PT	Commercial banks	1979-95	25
FI	All banks	1979-95	8
SE	Commercial banks	1979-95	19
UK	Commercial banks	1979-95	139
<b>EU</b>		<b>1984-95</b>	<b>3257</b>
<b>Euro</b>		<b>1984-95</b>	<b>2972</b>
USA	Commercial banks	1979-95	381

**Table 6: Non interest income/assets**

	1984-87	1988-91	1992-95
BE	0.4	0.4	0.5
DK	1.2	0.8	0.4
DE	0.6	0.6	0.6
GR		2.3	2.3
ES	0.8	0.9	0.9
FR		0.5	0.9
IE			
IT	1.2	1.0	0.8
LU	0.3	0.3	0.4
NL	0.8	0.8	0.8
AT		0.7	0.9
PT	0.8	0.7	0.6
FI	1.9	1.9	1.7
SE	1.1	0.8	1.9
UK	1.8	1.9	1.9
<b>EU</b>	<b>0.9</b>	<b>0.9</b>	<b>1.0</b>
<b>Euro</b>	<b>0.7</b>	<b>0.7</b>	<b>0.8</b>
USA	1.3	1.7	2.1

Source: OECD Bank Profitability

**Table 7: Net interest income/assets**

	1984-87	1988-91	1992-95
BE	1.7	1.5	1.3
DK	2.9	2.8	3.7
DE	2.4	2.0	2.1
GR		1.7	1.8
ES	4.1	4.0	3.2
FR		1.8	1.3
IE			
IT	3.4	3.3	2.9
LU	1.1	0.8	0.8
NL	2.4	2.1	1.8
AT	1.8	1.8	1.9
PT	2.6	4.3	2.7
FI	2.3	1.9	1.6
SE	2.3	2.2	2.5
UK	3.1	3.1	2.4
<b>EU</b>	<b>2.7</b>	<b>2.4</b>	<b>2.2</b>
<b>Euro</b>	<b>2.7</b>	<b>2.4</b>	<b>2.1</b>
USA	3.4	3.5	3.8

Source: OECD Bank Profitability

**Table 8: Banks' balance sheet structure**

as a percentage of year-end balance sheet total

	BE	DK	DE	GR	ES	FR	IE	IT	LU
<b>Assets</b>									
Cash & balance with Central bank	0.2	4.1	1.3	21.0	3.1	0.2	0.6	3.1	0.2
Interbank deposits	32.8	19.1	21.9	11.0	16.0	38.9	18.7	6.0	58.3
Loans	32.7	43.4	54.6	27.0	43.6	38.5	55.1	42.4	18.9
Securities	29.1	29.0	19.7	34.0	19.5	16.3	18.7	13.9	18.9
Other assets	5.1	4.5	2.5	7.0	17.9	6.0	6.9	34.6	3.7
<b>Liabilities</b>									
Capital & reserves	2.6	6.9	4.2	5.0	8.6	4.4	6.7	9.2	2.5
Borrowing from Central bank	0.0	4.7	3.0	1.0	5.5	0.1	0.0	0.3	0.0
Interbank deposits	40.7	23.2	26.2	9.0	16.2	38.6	22.6	6.6	46.9
Non-bank deposits	33.2	55.7	47.1	71.0	56.3	28.2	56.2	36.9	39.3
Bonds	16.4	2.0	14.9	1.0	2.7	21.3	7.6	8.6	6.2
Other liabilities	7.1	7.5	4.6	14.0	10.6	7.5	6.9	38.5	5.1
<b>Memo items</b>									
Short-term securities	4.6	8.0	2.5	2.0	5.7	0.0	4.8	1.8	0.0
Bonds	23.0	16.8	13.8	27.0	10.3	7.6	13.8	12.2	6.2
Shares and participations	1.5	4.2	3.4	4.0	3.5	3.0	0.2	2.0	0.3
Claims on non-residents	38.7	Na	17.0	Na	14.8	18.8	51.3	9.1	Na
Liabilities to non-residents	43.5	Na	13.4	Na	11.0	17.6	53.0	13.6	Na
	NL	AT	PT	FI	SE	UK	EU	Euro	US
<b>Assets</b>									
Cash & balance with Central bank	1.6	1.4	1.2	2.7	0.6	0.7	1.7	1.5	4.4
Interbank deposits	18.3	30.3	29.1	3.0	15.1	13.8	21.0	22.6	2.8
Loans	63.4	50.9	33.3	49.7	43.6	52.1	46.8	46.4	63.4
Securities	14.1	14.3	23.2	26.5	35.6	18.5	18.8	17.7	21.4
Other assets	2.6	3.1	13.1	18.2	5.1	14.9	11.1	10.8	8.1
<b>Liabilities</b>									
Capital & reserves	4.2	4.6	8.2	4.8	5.9	3.9	5.3	5.5	8.1
Borrowing from Central bank	0.7	0.0	1.9	1.2	0.0	0.0	1.4	1.7	0.0
Interbank deposits	22.6	29.3	23.9	3.2	23.4	30.9	25.1	24.5	1.0
Non-bank deposits	44.0	44.0	52.5	57.5	51.7	37.6	41.4	40.8	69.0
Bonds	16.2	17.4	1.0	7.0	6.1	11.2	12.9	13.9	1.0
Other liabilities	12.4	4.7	12.5	26.3	12.9	16.4	13.2	12.7	20.8
<b>Memo items</b>									
Short-term securities	3.0	0.3	2.8	10.1	9.1	3.7	2.7	2.2	Na
Bonds	10.3	10.2	14.5	12.4	18.0	Na	10.6	11.7	Na
Shares and participations	0.6	3.8	3.2	4.0	2.9	Na	2.5	2.8	Na
Claims on non-residents	24.4	21.0	10.4	16.3	33.0	Na	14.5	16.9	Na
Liabilities to non-residents	23.0	22.1	4.3	19.8	41.9	Na	14.0	16.0	Na

Source: OECD Bank Profitability

**Table 9: Ratio of interest to non-interest income**

	1984-87	1988-91	1992-95
BE	4.4	3.7	2.8
DK	1.5	4.6	-2.4
DE	4.1	3.3	3.6
GR		0.7	0.8
ES	5.4	4.4	3.5
FR		3.6	1.5
IE			
IT	2.9	3.4	3.7
LU	4.6	2.6	2.0
NL	3.0	2.5	2.2
AT	4.1	2.6	2.1
PT	3.4	4.7	3.3
FI	1.2	1.0	1.0
SE	2.1	2.7	1.5
UK	1.8	1.6	1.3
<b>EU</b>	<b>2.9</b>	<b>2.7</b>	<b>2.3</b>
<b>Euro</b>	<b>3.6</b>	<b>3.3</b>	<b>2.8</b>
USA	2.6	2.1	1.8

Source: OECD Bank Profitability

**Table 10: Gross income/assets**

	1984-87	1988-91	1992-95
BE	2.1	2.0	1.8
DK	4.1	3.6	4.0
DE	3.0	2.7	2.7
GR		4.0	4.0
ES	4.8	5.0	4.1
FR		2.3	2.2
IE			
IT	4.5	4.3	3.8
LU	1.4	1.2	1.2
NL	3.1	2.9	2.7
AT		2.5	2.8
PT	3.4	5.2	3.5
FI	4.2	3.7	3.3
SE	3.4	3.0	4.4
UK	4.9	5.0	4.3
<b>EU</b>	<b>3.6</b>	<b>3.3</b>	<b>3.1</b>
<b>Euro</b>	<b>3.4</b>	<b>3.1</b>	<b>2.8</b>
USA	4.8	5.2	5.9

Source: OECD Bank Profitability



**Table 11: Return on equity**

	1984-87	1988-91	1992-95
BE	0.13	0.08	0.11
DK	0.09	0.02	0.02
DE	0.18	0.14	0.13
GR		0.22	0.24
ES	0.10	0.13	0.08
FR		0.12	0.03
IE			
IT	0.13	0.11	0.06
LU	0.09	0.09	0.17
NL	0.18	0.16	0.16
AT		0.11	0.08
PT	0.05	0.10	0.08
FI	0.06	0.02	-0.28
SE	0.09	0.18	0.12
UK	0.18	0.13	0.21
<b>EU</b>	<b>0.15</b>	<b>0.13</b>	<b>0.10</b>
<b>Euro</b>	<b>0.15</b>	<b>0.13</b>	<b>0.08</b>
USA	0.11	0.13	0.20

Source: OECD Bank Profitability

**Table 12: Standard deviations of income sources**

	Net interest/ assets	Non- interest/ assets	Difference	Gross income/ assets	Memo: return on equity
BE	0.18	0.07	0.12	0.17	0.03
DK	0.49	1.27	-0.78	1.28	0.13
DE	0.18	0.07	0.10	0.16	0.02
GR	0.49	0.49	0.00	0.58	0.06
ES	0.49	0.13	0.36	0.48	0.03
FR	0.29	0.21	0.08	0.13	0.05
IE					
IT	0.25	0.18	0.07	0.38	0.04
LU	0.18	0.08	0.10	0.13	0.05
NL	0.30	0.08	0.21	0.32	0.03
AT	0.12	0.39	-0.27	0.26	0.04
PT	0.94	0.38	0.57	1.01	0.02
FI	0.35	0.29	0.06	0.52	0.18
SE	0.26	0.66	-0.40	0.86	0.14
UK	0.35	0.12	0.23	0.36	0.09
<b>EU</b>	<b>0.23</b>	<b>0.07</b>	<b>0.16</b>	<b>0.23</b>	<b>0.03</b>
<b>Euro</b>	<b>0.25</b>	<b>0.05</b>	<b>0.20</b>	<b>0.25</b>	<b>0.03</b>
USA	0.19	0.35	-0.16	0.52	0.05

Source: OECD Bank Profitability

**Table 13: Patterns of non-interest income in 1995**

as a proportion of assets	Total	Fees/commis- sions receivable	Fees/commis- sions payable	Profit/loss on finl operations	Other
BE	0.5	0.2	0.2	0.3	0.1
DK	1.6	0.8	0.1	1.0	-0.1
DE	0.5	0.5	0.1	0.1	0.0
ES	0.8	0.7	0.1	0.2	0.1
FR	1.0	0.5	0.2	0.3	0.4
IE	1.3	1.0	0.1	0.2	0.2
IT	0.7	0.4	0.1	0.0	0.4
NL	0.9	na	na	0.2	0.1
AT	1.1	0.6	0.1	0.2	0.5
PT	0.7	0.4	0.1	0.2	0.1
UK	1.8	1.4	0.2	0.5	0.0
US	2.0	1.5	0.0	0.2	0.4

Source: OECD Bank Profitability

**Table 14: Correlation of income sources**

	levels	changes
BE	-0.44	0.00
DK	-0.16	0.12
DE	-0.36	-0.46
GR	-0.30	-0.59
ES	-0.16	0.24
FR	-0.91	-0.15
IE		
IT	0.58	0.06
LU	-0.74	-0.34
NL	0.13	0.23
AT	0.11	-0.52
PT	0.21	0.19
FI	0.28	0.26
SE	0.66	0.63
UK	-0.02	0.45
<b>EU</b>	<b>-0.15</b>	<b>0.18</b>
<b>Euro</b>	<b>-0.08</b>	<b>0.16</b>
USA	0.89	0.49

Source: OECD Bank Profitability

**Table 15: Banks in the EU, non-interest income/assets in 1996**

	Large banks		Medium banks		Small banks
BE	0.25		0.23		1.19
DK	-0.08		0.28		0.50
DE	0.56		0.57		0.86
GR	1.28		2.39		2.64
ES	0.75		0.84		0.83
FR	0.99		0.99		2.95
IE	0.34		0.00		0.09
IT	1.27		1.61		1.42
LU	0.56		0.49		1.49
NL	0.03		0.32		0.78
AT	0.54		0.87		3.44
PT	1.21		1.48		1.19
FI	1.11		1.99		0.74
SE	0.81		0.54		-0.18
UK	1.36		1.70		1.98
<b>EU</b>	<b>0.88</b>		<b>0.84</b>		<b>1.23</b>
<b>Euro</b>	<b>0.81</b>		<b>0.79</b>		<b>1.25</b>
USA	2.20		1.52		2.30

Source: IBCA Bankscope CD-ROM. Large banks are defined as having assets of \$4 bn. plus, medium banks \$1 -4 bn. and small banks below \$1 bn.

**Table 16: Banks in the EU, net interest income/assets in 1996**

		Large banks		Medium banks		Small banks
BE		1.44		2.18		2.33
DK		0.94		3.24		5.07
DE		2.48		2.89		3.11
GR		2.05		3.14		3.37
ES		3.11		3.41		4.01
FR		1.60		2.72		3.28
IE		2.03		1.14		5.63
IT		2.75		4.14		5.04
LU		0.74		0.82		1.00
NL		0.81		-0.10		1.93
AT		1.58		1.99		2.30
PT		2.29		0.90		2.40
FI		1.22		3.03		1.71
SE		1.72		2.57		3.01
UK		2.18		2.73		3.42
<b>EU</b>		<b>2.07</b>		<b>2.86</b>		<b>3.57</b>
<b>Euro</b>		<b>2.07</b>		<b>2.86</b>		<b>3.49</b>
USA		3.86		4.02		3.57

Source: IBCA Bankscope CD-ROM

**Table 17: Banks in the EU, non-interest income as a percent of income in 1996**

		Large banks		Medium banks		Small banks
BE		14		5		21
DK		-14		8		9
DE		15		16		19
GR		38		44		44
ES		21		21		18
FR		45		28		33
IE		14		1		5
IT		30		28		22
LU		37		33		50
NL		2		26		20
AT		25		30		43
PT		36		69		29
FI		42		40		29
SE		22		44		0
UK		33		32		26
<b>EU</b>		<b>28</b>		<b>22</b>		<b>22</b>
<b>Euro</b>		<b>29</b>		<b>21</b>		<b>23</b>
USA		32		23		26

Source: IBCA Bankscope CD-ROM

**Table 18: Banks in the EU, ROAA in 1996**

		Large banks		Medium banks		Small banks
BE		0.31		1.61		0.71
DK		0.73		2.58		1.28
DE		0.30		0.31		0.29
GR		0.36		-0.02		1.05
ES		0.84		0.79		1.02
FR		0.18		0.01		0.11
IE		0.63		0.79		5.10
IT		0.20		0.53		1.61
LU		0.45		0.57		0.49
NL		3.09		0.33		1.48
AT		0.29		0.27		0.97
PT		0.70		0.97		0.35
FI		0.37		0.49		-0.16
SE		0.71		-1.63		-1.38
UK		0.82		1.00		1.38
<b>EU</b>		<b>0.50</b>		<b>0.41</b>		<b>0.73</b>
<b>Euro</b>		<b>0.44</b>		<b>0.38</b>		<b>0.68</b>
USA		1.38		1.18		1.33

Source: IBCA Bankscope CD-ROM

**Table 19: Banks in the EU, ROAE in 1996**

		Large banks		Medium banks		Small banks
BE		19.65		9.27		5.80
DK		9.56		6.87		8.49
DE		6.61		7.09		6.41
GR		9.64		-0.48		11.55
ES		11.84		10.23		7.79
FR		5.47		-4.38		-1.98
IE		12.97		7.25		73.25
IT		-2.80		5.67		11.87
LU		15.78		10.90		6.92
NL		12.62		7.23		7.03
AT		7.20		6.13		9.54
PT		11.18		5.26		-0.29
FI		7.84		9.35		-6.44
SE		25.75		-5.10		-7.30
UK		15.66		9.87		10.34
<b>EU</b>		<b>9.01</b>		<b>5.76</b>		<b>7.50</b>
<b>Euro</b>		<b>7.36</b>		<b>5.61</b>		<b>7.39</b>
USA		17.40		14.37		11.14

Source: IBCA Bankscope CD-ROM

**Table 20: Banks in the EU, cost income ratios in 1996**

		Large banks	Medium banks	Small banks
BE		65	68	52
DK		17	23	69
DE		60	64	69
GR		78	94	79
ES		61	67	71
FR		67	80	67
IE		64	12	45
IT		65	66	61
LU		40	49	66
NL		22	45	61
AT		65	63	71
PT		65	70	70
FI		57	74	60
SE		47	43	38
UK		60	65	66
<b>EU</b>		<b>60</b>	<b>66</b>	<b>67</b>
<b>Euro</b>		<b>61</b>	<b>66</b>	<b>66</b>
USA		57	60	65

Source: IBCA Bankscope CD-ROM

**Table 21: Econometric results using 1996 bank data**

(i) Dependent variable: log of non-interest income as a proportion of total

	Constant	Log total assets	Log cost income ratio	Log return on average equity	R bar	se	Obs	DW
<b>EU</b>	<b>-6.3 (23.3)</b>	<b>0.1 (7.9)</b>	<b>0.64 (24.0)</b>	<b>0.003 (0.3)</b>	<b>0.27</b>	<b>1.2</b>	<b>2980</b>	<b>1.9</b>
BE	-2.9 (1.6)	0.03 (0.4)	0.18 (0.6)	-0.02 (0.16)	-0.04	1.23	58	2.1
DK	-8.1 (3.4)	0.24 (2.8)	0.83 (1.7)	-0.16 (1.0)	0.06	1.19	96	2.1
DE	-4.3 (8.1)	0.03(1.9)	0.49 (4.9)	-0.03 (3.3)	0.03	0.77	1418	1.5
GR	-0.02 (0.1)	-0.09 (2.0)	0.08 (0.3)	0.002 (0.2)	0.1	0.22	13	2.8
ES	-12.4 (8.3)	0.54 (4.7)	0.61 (7.1)	-0.04 (0.7)	0.39	2.5	172	2.2
FR	-3.4 (6.0)	0.04 (1.0)	0.38 (6.1)	0.014 (0.4)	0.12	1.1	264	1.9
IE	-6.5 (1.5)	0.26 (0.7)	0.2 (0.7)	-0.31 (0.6)	-0.26	0.7	9	2.2
IT	-5.1 (10.9)	0.1 (5.7)	0.56 (6.4)	0.01 (0.3)	0.14	0.7	557	1.5
LU	-2.3 (2.6)	-0.08 (1.9)	0.54 (4.5)	0.21 (7.7)	0.39	0.77	117	2.0
NL	-10.1 (1.7)	-0.02 (0.7)	1.7 (2.3)	2.3 (3.3)	0.31	1.9	28	2.1
AT	-0.7 (0.7)	-0.1 (2.6)	0.2 (1.0)	0.01 (0.2)	0.06	0.5	84	1.9
PT	-1.1 (0.6)	0.17 (1.6)	-0.62 (1.9)	-0.1 (2.3)	0.15	0.7	23	1.5
FI	-10.3 (4.4)	0.13 (1.5)	2.1 (2.7)	-0.76 (1.0)	0.8	0.3	7	1.4
SE	-15.1 (2.4)	0.17 (0.6)	2.6 (2.6)	0.05 (0.1)	0.49	1.2	12	2.0
UK	-9.2 (8.1)	0.07 (2.1)	1.5 (6.4)	0.27 (2.6)	0.28	0.7	122	2.2
USA	-6.4 (11.4)	0.09 (4.0)	0.79 (7.4)	1.16 (4.8)	0.18	0.6	371	1.9

(ii) Dependent variable: log of non-interest income as a proportion of average assets

	Constant	Log total assets	Log net interest income/average assets	Log cost income ratio	Log return on average equity	R bar	se	Obs	DW
<b>EU</b>	<b>-5.2 (16.8)</b>	<b>0.03 (2.1)</b>	<b>0.41 (8.8)</b>	<b>0.69 (23.1)</b>	<b>0.02 (1.9)</b>	<b>0.26</b>	<b>1.1</b>	<b>2965</b>	<b>1.9</b>
BE	-0.18 (0.1)	-0.14 (1.3)	0.02 (0.1)	0.19 (0.5)	0.26 (1.3)	-0.02	1.6	58	1.8
DK	-8.1 (3.2)	0.26 (2.8)	1.1 (2.9)	0.81 (1.6)	-0.18 (1.0)	0.11	1.3	96	2.1
DE	-3.0 (4.8)	-0.01 (0.6)	0.55 (6.8)	0.5 (4.6)	-0.03 (3.0)	0.06	0.9	1418	1.6
GR	2.2 (0.8)	-0.16 (2.0)	0.8 (2.7)	-0.02 (0.1)	-0.002 (0.1)	0.58	0.39	13	2.8
ES	-9.6 (5.2)	0.44 (3.6)	-0.04 (0.1)	0.6 (6.8)	-0.02 (0.3)	0.34	2.6	172	2.2
FR	-0.36 (0.5)	-0.19 (4.0)	0.26 (2.5)	0.62 (8.2)	0.08 (2.3)	0.34	1.2	252	2.1
IE	-10.4 (3.0)	0.68 (2.4)	2.3 (4.7)	0.09 (0.4)	-1.3 (2.6)	0.73	0.5	9	3.1
IT	-4.7 (7.2)	0.1 (5.1)	0.79 (7.9)	0.59 (5.7)	0.005 (0.1)	0.12	0.7	557	1.6
LU	-0.47 (0.3)	-0.23 (3.4)	0.54 (3.2)	0.73 (3.8)	0.31 (7.3)	0.44	0.9	117	2.1
NL	-3.7 (0.5)	-0.7 (1.5)	0.03 (0.1)	1.6 (2.0)	2.9 (3.8)	0.4	2.0	28	2.2
AT	2.4 (1.5)	-0.3 (4.9)	-0.014 (0.1)	0.37 (1.1)	0.05 (1.4)	0.24	0.8	83	2.0
PT	-0.96 (0.3)	0.17 (1.1)	0.47 (1.0)	-0.48 (0.8)	-0.02 (0.3)	-0.05	0.9	21	2.0
FI	-12.1 (3.1)	0.02 (0.1)	-0.07 (0.1)	3.0 (2.4)	-0.16 (0.1)	0.83	0.5	7	2.1
SE	-17.3 (2.3)	0.2 (0.7)	0.63 (1.0)	3.0 (2.5)	0.24 (0.3)	0.56	1.4	12	2.1
UK	-12.7 (8.4)	-0.02 (0.5)	0.23 (2.0)	2.5 (8.3)	0.83 (6.0)	0.47	0.9	122	2.2
USA	-9.2 (11.1)	0.14 (4.6)	0.97 (10.1)	1.33 (8.3)	0.23 (4.6)	0.44	1.1	370	1.9