Non-interest income and total income stability

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The views expressed in this paper are those of the authors and do not necessarily reflect those of the Bank of England.

Contents

Abstract

Banks can differ markedly in their sources of income. Some focus on business lending, some on household lending, and some on fee-earning activities. Increasingly, however, most banks are diversifying into fee-earning activities. Such diversification is either justified (by the bank) or welcomed (by commentators), or both, as reducing the bank's exposure to risk. Diversification across various sources of earnings is welcomed for, it is claimed, diversification reduces risk. Whether it does of course depends on how independent of each other the various earnings sources are. Traditionally fee income has been very stable; but, also traditionally, it has been a small part of the earnings stream of most banks. Has non-interest income remained stable, or at least uncorrelated with interest income, as banks have increased its importance in their earnings? This paper examines the variability of interest and non-interest income, and their correlation, for the banking systems of EU countries for the years 1994-98. It is found that the increased importance of non-interest income did, for most but not all categories of bank, stabilise profits in the European banking industry in those years. It is not, however, invariably more stable than interest income.

Key words: European banking sector, non-interest income, profitability, statistical analysis, stability.

JEF classification: G21.

Summary

It is generally believed that diversification by a firm reduces risk, just as diversification of investments by an individual does. In both cases, however, whether the desired risk reduction effect is achieved does of course depend on the correlation between the different activities or lines of business (in the case of the firms), and on the correlation between the prices of the different investments (in the case of the investing individual). Banks, like other firms, generally seek to reduce their risks by diversifying across various lines of business, although there is usually some degree of specialisation. In recent years, banks have started to move increasingly into areas that yield non-interest income – into activities that earn fees rather than interest. Some banks (traditionally, for example, the United Kingdom's merchant banks), have always concentrated on fee-earning activities, such as advising on how to raise capital. All banks have traditionally earned *some* fee-income – the trustee business is a good example. The traditional fee-earning business was both a small part of most banks' earnings and indubitably little affected by such factors as fluctuations in the economy. But as the profitability of traditional banking activities has, for a wide variety of reasons, come under pressure in recent years, fee-earning activities have greatly increased their contribution to bank profits. It is therefore important to see whether these new activities offset fluctuations in other sources of earnings as successfully as did traditional fee-earning work. Addressing that question is the aim of this paper.

Having summarised the results of various earlier studies in the opening of the paper, the behaviour of interest and non-interest income is then discussed, first in broad outline for all EU banking systems, and then in some detail for the systems of Germany and the United Kingdom.

The paper examines the variability of each source of income, as well as the correlation between these different sources. Where possible, the results are reported not just for the banking systems as a whole, in the countries of the EU but also by size and type of financial institution. By comparing the behaviour of fee and non-fee income the paper examines how the move into fee-earning activities changes the range of risk and return possibilities for banks. Other studies have considered whether increased fee income reduces or increases the riskiness of banks. But whether the change in risk is a result of banks' behaviour or of the nature of the two income streams is inevitably left obscure. This paper looks at the nature of non-interest income, concentrating in particular on the extent to which it represents not earnings from new activities, but earnings from performing the same business in a new way – for example earning a fee by

arranging a loan for a customer rather than earning an interest spread by lending to the customer. Sources of non-interest income for depository institutions include securitisation and other major off balance sheet activities. Some of the different results obtained in this paper may be a product of the heterogeneity of fee-earning activity. The paper also considers why the changes have taken place; this may have implications both for the durability of the changes (were they the result of a passing fashion, or of some more durable change in conditions) and for future regulation or supervisory policy.

In broad outline, the paper finds that fee-earning income is less stabilising than seems generally believed; indeed, fee-earning income is actually more variable for most categories of banks than traditional interest income. It does, however, help in most cases to stabilise profit streams.

1 Introduction

Traditionally banks have been thought of as firms which take deposits and make loans, and profit by the difference between the costs of the former and the earnings from the latter activities. There have, of course, been specialised institutions – UK merchant banks were a good example of these – where activities, such as advising on how to raise capital, were mainly fee-earning. But such banks were small relative to the banking system as a whole, and were not a key part of the monetary system of an economy.

In recent years, though, the distinction between types of banks has become blurred, partly by takeovers and partly by traditional retail banks going into fee-earning activities. The profitability of traditional banking activities such as business lending and raising deposits has diminished in recent years. As a result, banks have increasingly turned to new, non-traditional financial activities as a way of maintaining their position as financial intermediaries. The changes are of importance for financial stability. The reason is straightforward. The more unstable is a bank's (or any other firm's) earnings stream, the more risky the firm is. A paper by Hoggarth, Milne and Wood (1998) drew attention to an example of this, comparing banking sector profitability in Britain and Germany. It was observed that banking profitability in Germany was lower than in Britain, but also less variable, suggesting that the systems had pursued alternative routes to stability.

Section 2 presents a literature review of the non-interest income effects on bank profitability. Section 3 explores the correlation between the different sources of income and sets out various measures of the variability of each source in both time series and cross-sectional form. To the extent that it is possible, the results are reported not just for banking systems as a whole, but also separated by size and type of financial institution. In Section 4 we examine the correlation of income sources and try to observe whether the increased importance of non-interest income related activities helps stabilising total operating income. Then, in Section 5, we look in a little detail at the nature of non-interest income, focusing in particular on the extent to which it represents not earnings from new activities, but earnings from doing the same things in a new way – for example, earning a fee by arranging a loan for a customer rather than earning an interest spread by lending to the customer. This section provides an overview of different sources of non-interest income for depository institutions, including securitisation, and other major off-balance sheet activities. It also considers why the changes discovered have taken place; this

may have implications both for the durability of the changes (whether they are the result of a passing fashion, or of some more durable change in conditions) and for future regulation or supervisory policy. The study then concludes with a brief summary of our main findings and an assessment of their implications for the stability of the banking system.

2   Literature review

It has been widely believed that banking is a declining industry, faced with reduced demand for the intermediation services it produces. To support this view, economists have relied on data which show banks with a declining share of intermediated savings instruments, loans, and total savings of the customer sector. However, recent research suggests that the banking industry is not actually declining in any meaningful economic sense; rather, the nature of its intermediation activity is changing (eg Kaufman and Mote (1994)). While the basic functions of banks and other financial service companies have remained relatively constant over time, the specific products and services through which these functions are provided have changed. Economic forces have led to financial innovations that have increased competition in financial markets. Greater competition in turn has diminished the cost advantage banks had in acquiring funds and has undercut their position in loan markets. As a result, traditional banking has lost profitability, and banks have begun to diversify into new activities that may bring higher returns.

It appears to be the conventional wisdom that non-interest income is more stable than interest income and that fee-based activities reduce bank risk via diversification. The combination of banking, insurance and securities activities may lead to a more stable profit stream, since the revenues stemming from different products in a conglomerate organisation are usually imperfectly correlated. While banks' net interest margins are highly dependent on interest-rate movements and economic cycles, fee income provides diversification and greater stability for bank profits. If that is correct, it then follows that mixing interest and non-interest income will reduce the volatility of earnings. For example, the Chairman of Firstar Corporation, Roger Fitzsimmons, observed that '… *there is a stability to [fee] income that we like'*;[1] and Richard X.

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[1] *American Banker,* 30 May 1997.

Bone, a banking analyst, observed that '*banks that have strong fee-based business and that do not have major commitment to the loan sector can weather the storm much better than those banks that are building a loan portfolio*'.[2]

Several empirical studies have indicated substantial benefits from diversification into non-bank activities, eg Eisemann (1976), Brewer (1989) and others. More recently, Gallo, Apilado and Kolari (1996) found that a high proportion of mutual fund assets managed relative to total assets of bank holding companies over the period 1987-94 was associated with substantially increased profitability for bank holding companies (BHCs) and also with risk reduction. Canals (1993) concluded that the increased revenues obtained from new business units have significantly contributed to improving bank performance in recent years.

There are also studies which find that fee-based income stabilises profitability. Saunders and Walters (1994) found that the expansion of banks' activities reduces risk, with the main risk-reduction gains arising from insurance rather than securities activities. Proponents of this view point out that those studies which found risk-reduction benefits from asset diversification generally report their findings in terms of potential, not actual realisations. Heggestad (1972) examined the riskiness of various industries between 1953 and 1967. He measured riskiness by the coefficient of variation of return on equity for 13 different industries. In addition, Heggestad correlated industry earnings with returns in banking. He discovered that commercial banking was one of the least risky activities but also found that industries such as leasing, insurance, or real estate offer risk-reducing diversification potential given their negative correlation with banking. Also, interestingly, most of these authors tend to suggest that a modest amount of fee-earning activity captures all the potential for risk reduction. For example, Boyd, Hanweck and Pithyachariyakul (1980) measured the correlation between accounting rates of return of bank and non-bank affiliates of BHCs between 1971 and 1977 and concluded that the potential for risk reduction was exhausted at relatively low levels of non-bank activities. Mester (1992) found that mixing traditional banking activities of originating and monitoring loans with non-traditional

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[2]*American Banker,* 30 May 1997.

activities of loan selling and buying products leads to diseconomies of scope and some economies of scale.

This conventional wisdom may however be rooted in the past behaviour of non-interest income. Banks have, for many years, earned some non-interest income; trustee business, for example, is a traditional banking activity. But non-interest income provided only a small part of their earnings, and may well, as is certainly the case for trustee business, have been largely unaffected by the economic cycle.

As fee-based activity of banks has increased, this conventional wisdom may no longer be justified. De Young and Roland (1999), in a paper correlating product mix with earnings volatility at commercial banks, consider three fundamental observations each of which suggests that fee-based income need not be more stable than income from traditional banking activities. Revenue from a bank's traditional lending activities is likely to be relatively stable over time, because switching and information costs make it costly for either borrower or lender to walk away from a lending relationship, while revenue from fee-based activities may fluctuate from period to period because it may be easier to switch from bank to bank for many of the new fee-based activities than it is for traditional banking. Second, expanding fee-based services can require substantial additions to fixed costs, which increase the operational leverage of the bank. Once a lending relationship is established the only cost of an additional loan is the interest expense while the same does not apply for non-interest income where additional staff may be required. Finally, capital is not required for many fee-based activities. This suggests a higher degree of financial leverage; hence earnings volatility may increase.

In addition to these *a priori* reasons for doubting the conventional wisdom there is a growing body of evidence which casts doubt on it. Much of this evidence is for the United States, but there is also some from elsewhere (extensive analysis of the literature review is provided by De Young and Roland (1999)). Johnson and Meinster (1974), and Wall and Eisenbeis (1984) compared the earnings stream of the banking industry with that of other financial industries (eg securities, insurance, real estate, leasing). Banking earnings were more volatile than those of some industries but less than those of others, while the correlation of bank earnings was negative with the earnings of some financial industries and positive with others.

Several studies have calculated the effects of hypothetical mergers between banks and other types of financial firms. An interesting example is that by Boyd, Graham and Hewitt (1993). That study, by simulating mergers between bank holding companies and non banking financial firms between 1971 and 1987, and using both accounting and market data, found that risk was reduced by merging with life insurance or property/casualty firms but increased by merging with securities or real estate firms. Wall, Reichert and Mohanty (1993) constructed synthetic portfolios based on the accounting rates of return earned by banks and non-bank financial firms. Their results suggest that, had banks been able to diversify into small amounts of insurance, mutual fund, securities brokerage, or real estate activities, they could have experienced higher returns and lower risk between 1981 and 1989.

More recent US studies have started to disaggregate the data to a lower stage, ie firm level than the industry level examined in the previously mentioned papers. A number of approaches were tried and again, suggesting a lack of reliable diversification effects, a variety of results emerged. According to Boyd and Graham (1986), expansion by BHCs into non-bank activities tended to increase the risk of failure. Their results indicate, however, that when BHCs are more stringently regulated, the positive association between non-bank activity and risk may disappear. Sinkey and Nash (1993) found that credit card lending specialisation (that activity is often securitised in the United States and thus generates fee income) gives higher and more volatile returns than those achieved by banks with 'conventional' product mixes. Demsetz and Strahan (1995) found that, although BHCs tend to become more diversified as they grow larger, this diversification does not necessarily translate into risk reduction because these firms also tend to shift into riskier activities and hold less equity. In other words, the risk-reducing potential of diversification at large BHCs is offset by their lower capital ratios, larger commercial and industrial loan portfolios, and greater use of derivatives. Indicating that it is easier for 'fee-based customers' to move, Roland (1997) found that high returns from fee-based activities were less persistent than those from lending and deposit-taking. Most recently, De Young and Roland (1999) found that as banks move towards fee-earning activities, revenue volatility increases, as do both total leverage and earnings.

Kwan (1997) studied the implications of securities activities on bank safety and soundness. He examined the returns on securities activities conducted by Section 20 subsidiaries - subsidiaries that were authorised by the Federal Reserve Bank to conduct bank-ineligible securities activities - and their relationship with the returns on banking activities. He found that securities subsidiaries tend to be riskier but not necessary more profitable than their bank affiliates. For securities

subsidiaries that are primary dealers of government securities, their higher riskiness partially comes from their higher leverage, whereas for those that are not primary dealers, despite having lower leverage, they tend to be riskier than their bank affiliates because of their aggressive trading behaviour. Nevertheless, in this study, securities subsidiaries appear to provide diversification benefits to bank holding companies. Kwast (1989) found that both the mean and standard deviation of securities activities' returns are greater than those of non-securities activities. Some potential for diversification gains is found, although this appears to be quite limited. A related study is that of Eisenbeis, Harris and Lakonishok (1984), which examined the effects of one-bank holding company formations on bank stock returns. They found significant positive abnormal returns to the stock of banking firms announcing the formation of one-BHCs between 1968 and 1970, a brief period during which one-BHCs were permitted to engage in a wide variety of non-banking activities. The authors found no abnormal returns to announcements of one-BHC formations after 1970, when regulation limited the scope of these activities.

In summary, the main conclusion of the US studies is that the picture is much more complex than the conventional wisdom suggests. Whether diversification in fee-based activities actually increases or decreases risk seems to be an empirical question, with the answer varying from case to case and study to study. Theory alone does not answer this question or strongly support either side of the argument. Now, these findings prompt numerous questions and hypotheses, but before turning to these we set out some detailed findings on the behaviour of non-interest income in several major banking industries.

According to the ECB survey (2000), drawing on a survey among EU supervisory authorities, net interest income as a percentage of total assets (the interest margin) continuously declined, as an EU average, over the period 1989-98. By contrast, during the same period, an increasing trend can be observed for the non-interest income to assets ratio (from 0.94% to 1.15% in the period 1995-98). Within Europe a wide range of non-interest variation was observed. They also noted that non-interest income is less volatile in Europe than in the United States. With regard to the most recent years, there has been a noteworthy increase from 32% in 1995 to 41% in 1998 in the relative importance of non-interest income (as a percentage of total operating income) in the EU. The growth of non-interest income seems to have a positive effect on bank profitability. The positive impact on profitability has, however, been limited by the increased operating costs associated with the development of activities generating non-interest income.

A publication by Aggeler and Feldman (1998) show that while net interest income of the US banks (Ninth District United States banks) rose by 12% over the period 1992-97, the biggest gain in bank earnings came from non-interest income. Non-interest income grew by 34% in that period – nearly three times as fast as interest income. Also, the most important difference in profitability between large banks (banks with $1 billion or more in total assets) and small banks concerns the source of income. Non-interest income made up an average of 27% of total income in the large banks between 1992 and 1997, compared with 12% for smaller banks. Since 1992, non-interest income as a per cent of assets increased by 83% in the largest banks but was essentially flat in smaller banks.

Our analysis with Fitch-IBCA data using income statement data for the period from 1992 to 1999 reveals that net interest margins have continued to decline in the majority of EU countries. With the prominent exception of Germany profitability before provisions increased in the period 1996-99 compared with the period 1992-95, as the fall of net interest income was more than offset by lower costs and higher non-interest income. Germany also diverges somewhat from the overall European trend. In the German case there has been little increase in non-interest income as a share of bank assets.

3 Return and risk of income sources

Fitch-IBCA Bancscope database provides data for interest and non-interest income of the financial institutions in all EU countries. It provides figures for interest revenues and interest expenses, so the net interest income is the difference between them. Non-interest income includes fees and commission income, trading income, and income from financial transactions, and other operating income. We exclude banks that do not provide data for all years in the period 1994-98. We exclude also 'births and deaths' during that time period. So we conclude with a balanced sample of 2,655 financial institutions across the EU area that provide data for the examined time period. An extension to the above sample is to take all the banks that provide data for some or all the years in the period 1992-99. In this case the unbalanced sample consists of 4,166 financial institutions (see Table A).

The analysis is for all years in the time period 1994-98 (the pooled results are also presented). We observe not only country differences, but also size and type of institution effects. We examine the income sources for the financial institutions of the 15 EU countries by using the balanced sample.

Table A shows the number of banks from each EU country. Then we split the European banks in large and small financial institutions. We have sorted all the banks by their total assets in 1998 and we have selected as a cut-off point for the size separation the US$10 billion. In this case we have 200 large banks and 2,455 small banks (the respective figures for the unbalanced sample are 251 large banks and 3,915 small banks). Finally we examine the several types of financial institutions. In this case we have 830 commercial banks, 700 savings banks, 1,011 co-operative banks, and 114 mortgage banks (the respective figures for the unbalanced sample are 1,314 commercial banks, 968 savings banks, 1,711 co-operative banks and 173 mortgage banks). Most of the savings banks are in Germany, Spain, and Austria, while the vast majority of co-operative banks are established in Germany and Italy. Finally, most of the mortgage banks are the UK building societies.

The study is an advance over previous efforts in the following respects. First, because the unit of observation is the firm, returns and risks can be examined at the appropriate level of aggregation. Using firm-level data avoids the potential aggregation bias of using industry-level data. Second, the microeconomic cross-sectional yearly time series nature of the data, combined with the large number of banks used, means that enough observations are available to investigate hypotheses reliably. Finally, a recent time period is examined for all EU banking sectors.

Table A: Number of banks in the sample from each EU country

Country	Number of institutions (unbalanced sample)	Number of institutions (balanced sample)
Austria	153	34
Belgium	80	45
Denmark	181	74
Finland	13	6
France	435	305
Germany	2,023	1,378
Greece	22	9
Ireland	30	11
Italy	617	390
Luxembourg	132	108
Netherlands	58	34
Portugal	36	28
Spain	160	90
Sweden	22	11
UK	204	132
Total	*4,166*	*2,655*

Source: Own calculations from Fitch-IBCA Bankscope database.

Time series analysis

We provide the arithmetic mean. However, it is important to measure and understand the dispersion of a distribution. What we need is a relative measure that will give us a feel of the magnitude of the deviation relative to the magnitude of the mean.

The coefficient of variation (c.v.) is one such measure of dispersion. It relates the standard deviation and the mean by expressing the standard deviation as a percentage of the mean. Table B presents not only the mean values of net interest income, non-interest income, and profits before tax to total assets, but also their standard deviation and coefficient of variation across the five years for the industry aggregation experiments of each EU country. In this case we are interested in each year's figures and the trend, and not the aggregate ratios for each country in the examined period. The analysis is not cross-sectional but time series. (We carry out the cross-sectional analysis subsequently.)

Table B: Return and risk of income sources for EU countries

Year	Statistics	NII/TA	NonII/TA	PbT/TA
1994	Mean	3.23	0.88	0.76
	St. Dev.	1.79	1.63	1.17
	C.V.	55.53	185.36	152.47
1995	Mean	3.15	0.90	0.95
	St. Dev.	1.72	1.45	1.39
	C.V.	54.82	160.56	146.76
1996	Mean	2.99	0.96	0.90
	St. Dev.	1.59	1.88	1.47
	C.V.	53.15	194.37	163.37
1997	Mean	2.82	1.02	0.86
	St. Dev.	1.50	2.16	1.64
	C.V.	53.16	210.53	189.65
1998	Mean	2.69	1.09	0.80
	St. Dev.	1.66	3.54	2.44
	C.V.	61.71	325.42	303.72

From Table B we observe a clear decrease in the level of net interest income as a proportion of total assets. This is accompanied by an increase in the level of non-interest income to total assets. Reductions in the ratio of net interest income to assets followed a clear, common and continuously declining pattern in the EU. For the whole EU sample the average net interest income falls from 3.23% of total assets in 1994 to 2.69% in 1998.

A number of hypotheses can be advanced about the causes of this decline in net interest income. One explanation frequently put forward is increased competition in both deposit and lending markets. It is however difficult to test this explanation because it is not at all easy to measure the level of competition. A related hypothesis explaining declines of interest margins is deregulation and financial innovation. The removal of administrative constraints on interest rates paid on customer deposits and the increasing common practice of making some interest payments on sight deposits has tended to reduce interest margins. But most of this deregulation took place in the 1980s or earlier. It cannot explain the recent decline of net interest income. Reductions in requirements to hold non-interest bearing reserves will have a positive impact on net interest income as a share of assets, but this makes the widespread decline of net interest income more rather than less difficult to be explained.

The mix of assets is also an important determinant of net interest income. If secure components of the loan book, such as mortgage lending, grow relatively fast then this can lead to a decline of net interest income as a share of total assets (or net interest margin). Similarly increases of interbank lending or of holdings of marketable securities could reduce interest margins.

Much the most compelling explanation of the reduction in bank net interest income as a share of assets for European banks is the reduction of inflation and nominal interest rates in the 1980s and early 1990s. Banks have access to important sources of non-interest bearing or funding, notably capital reserves and non-interest bearing sight deposits. As nominal interest rates decline then the 'endowment' income on interest-free liabilities, ie the income arising because interest-bearing assets exceed interest-bearing liabilities, is reduced. This is the case that occurs in the great majority of EU banks.

For the whole EU sample the average non-interest income increases from 0.88% of total assets in 1994 to 1.09% in 1998. Only in Spain, Greece, Finland, Portugal, and Sweden non-interest

income as a proportion of total assets decreases in the last two years, however, these countries already have high levels of this source of income. Profitability ratio, measured as profits before tax as percentage of total assets (ROA), increases from 1994 to 1995 and then it follows a falling trend. It seems that the increase of non-interest income to total assets is accompanied by a universal fall in profitability. This evolution may indicate that the growth of non-interest income did not fully offset the reduction in the interest margin or that this may occur due to increased operating costs associated with the development of activities generating non-interest income. For example, banks that sell sophisticated products to their clients (structured products) which have been engineered by third-party specialists, could be associated with an increase in brokerage fees payable. However, we should repeat at this point that we used a balanced sample in the period 1994-98, excluding the banks that enter or exit the market.

However, return on assets in the last year of the observation period (1998) remains at 1994 levels (0.80% compared with 0.76%). This evolution may indicate that although the growth of non-interest income did not fully offset the reduction in net interest margin, this growth nevertheless helped to consolidate the banks' overall profitability at 1994 levels. This result can however conceal market differences in profitability across the EU countries and across banks in every country (see also ECB (2000)).

The coefficient of variation of net interest income to total assets is almost stable, with significant increase observed for the last examined year (the standard deviation follows a falling trend, except for 1998). So, while it was 55.53% on the pan-EU basis in 1994 it increased to 61.71% (the standard deviation decreased from 1.79% in 1994 to 1.66% in 1998).

The coefficient of variation for non-interest income related activities significantly increases from 185% in 1994 to 325% in 1998; the same is observed for the standard deviation of non-interest income to total assets (from 1.63% in 1994 to 3.54% in 1998). In other words, the increase of non-interest income is accompanied by its higher variability. It is a puzzle that the coefficient of variation decreases for *smaller* EU countries and Spain but increases significantly for *large* EU countries (Italy, France, Germany, and the United Kingdom).

If the statistical indicator used to measure volatility is the coefficient of variation, the volatility of non-interest income is higher than the volatility of interest income for all EU countries and the

examined years. So, although net interest income levels are much higher than the respective for non-interest income, the volatility of the non-interest sources of income is much larger. On the one hand, profits from financial operations and, to a lesser extent, income from securities have demonstrated high volatility, but, on the other, fees and commissions have typically been quite stable. So, non-interest income as a whole does not seem to be less volatile than interest income.

We continue the analysis by examining large and small banks (Table C). In the examined period, we observe higher levels of net interest income and non-interest income for smaller banks compared with large financial institutions. Small banks may be successful in non-interest income business by operating in niche markets, service high net-worth individuals by offering private banking activities, and exploiting localisation advantages. However, non-interest income makes up a higher proportion of total income for the large banks, compared with smaller banks. Large banks seem to be at a competitive advantage as the larger scale of operations lets them choose those fields of operation which suit them best. Furthermore, in both size categories, non-interest income as a percentage of total assets increased, while the opposite occurs for net interest margin. The mean value of net interest income to total assets is 2.11% and 3.35% respectively for large and small banks in 1994, and falls to 1.68% and 2.81% respectively in 1998. For non-interest income to total assets, it is 0.74% and 0.91% for large and small banks in 1994, and 0.96% and 1.10% respectively in 1998.

The riskiness measured by the coefficient of variation of non-interest income to total assets for large banks is much smaller than the respective one for small banks. Among the advantages, set at the ECB report, are the achievement of a critical mass, economies of scale and scope, the provision of a large spectrum of products and services, increased productivity, and efficient cost, structure and risk diversification. Through the years, the increase of non-interest income is accompanied by a similar increase on its riskiness for both size categories.

Table C: Return and risk of income sources for large and small EU countries

Large banks – Year	Statistics	NII/TA	NonII/TA	PbT/TA
1994	Mean	2.11	0.74	0.63
	St. Dev.	1.39	0.84	0.67
	C.V.	66.15	114.15	107.31
1995	Mean	2.02	0.76	0.74
	St. Dev.	1.44	0.69	0.58
	C.V.	71.11	90.51	78.41
1996	Mean	1.89	0.82	0.75
	St. Dev.	1.36	0.77	0.57
	C.V.	72.05	94.48	76.05
1997	Mean	1.77	0.82	0.72
	St. Dev.	1.24	0.72	0.63
	C.V.	69.76	87.09	86.70
1998	Mean	1.68	0.96	0.79
	St. Dev.	1.25	0.89	0.67
	C.V.	74.36	93.21	84.96

Small banks – Year	Statistics	NII/TA	NonII/TA	PbT/TA
1994	Mean	3.35	0.91	0.72
	St. Dev.	2.14	1.77	1.19
	C.V.	64.03	194.37	164.41
1995	Mean	3.28	0.93	0.90
	St. Dev.	2.14	1.62	1.40
	C.V.	66.17	173.94	155.64
1996	Mean	3.12	1.01	0.85
	St. Dev.	2.03	2.15	1.50
	C.V.	64.91	213.31	175.26
1997	Mean	2.93	1.05	0.81
	St. Dev.	1.58	2.28	1.65
	C.V.	54.14	216.23	202.48
1998	Mean	2.81	1.10	0.85
	St. Dev.	1.95	3.63	6.02
	C.V.	69.28	330.32	700.99

The last analysis is based on data for the different types of financial institutions (Table D). Commercial banks rely much more on non-interest income compared with the other types of banking institutions. Based on 1998 figures, the mean values of non-interest income to total assets is 1.74% for commercial banks, 0.64% for savings banks, 0.98% for co-operative banks, and 0.31% for mortgage banks. The figures for net interest margins are 2.47%, 2.75%, 2.95%, and 1.63% respectively. There is a clear increase in the proportion of non-interest income to total assets for all types of financial institutions and a decrease of net interest margin (with the only exception of commercial banks for the period 1997-98). For all types of financial institutions the

coefficient of variation of the non-interest ratio is higher than that of the net interest margin. The coefficient of variation of non-interest income to total assets for commercial banks increases significantly in the examined time period. This may occur because commercial banks rely much more compared with the counterparts on non-interest income sources.

Table D: Return and risk of income sources for types of EU banks

CB – Year	Statistics	NII/TA	NonII/TA	PbT/TA
1994	Mean	2.61	1.41	0.79
	St. Dev.	2.19	2.85	1.93
	C.V.	83.80	201.71	242.90
1995	Mean	2.56	1.41	0.92
	St. Dev.	2.20	2.52	2.31
	C.V.	86.12	178.86	248.57
1996	Mean	2.48	1.50	0.89
	St. Dev.	2.22	3.21	2.50
	C.V.	89.46	214.02	280.57
1997	Mean	2.40	1.69	1.01
	St. Dev.	2.32	3.68	2.75
	C.V.	96.64	217.69	272.33
1998	Mean	2.47	1.74	1.25
	St. Dev.	2.88	6.16	10.38
	C.V.	116.41	354.35	824.83

CB: Commercial banks.

SB – Year	Statistics	NII/TA	NonII/TA	PbT/TA
1994	Mean	3.35	0.55	0.76
	St. Dev.	0.88	0.31	0.58
	C.V.	26.48	56.32	76.65
1995	Mean	3.24	0.58	1.01
	St. Dev.	0.87	0.34	0.68
	C.V.	27.05	58.73	67.86
1996	Mean	3.14	0.59	0.99
	St. Dev.	0.81	0.36	0.62
	C.V.	25.94	60.95	63.38
1997	Mean	2.97	0.60	0.86
	St. Dev.	0.78	0.31	0.54
	C.V.	26.50	52.06	62.65
1998	Mean	2.75	0.64	0.80
	St. Dev.	0.74	0.37	0.48
	C.V.	26.85	58.15	60.85

SB: Savings banks.

Cp B – Year	Statistics	NII/TA	NonII/TA	PbT/TA
1994	Mean	3.74	0.74	0.64
	St. Dev.	2.52	0.49	0.53
	C.V.	67.30	65.90	83.82
1995	Mean	3.70	0.82	0.74

	St. Dev.	2.52	0.73	0.60
	C.V.	68.30	89.94	81.04
1996	Mean	3.45	0.91	0.71
	St. Dev.	2.32	1.36	0.57
	C.V.	67.17	149.43	80.56
1997	Mean	3.15	0.86	0.61
	St. Dev.	1.08	0.45	0.51
	C.V.	34.26	51.79	83.35
1998	Mean	2.95	0.98	0.54
	St. Dev.	1.47	0.86	0.52
	C.V.	50.07	87.69	95.61

Cp: Cooperative banks.

MB – Year	Statistics	NII/TA	NonII/TA	PbT/TA
1994	Mean	1.98	0.32	0.76
	St. Dev.	1.00	0.77	0.73
	C.V.	50.55	239.03	96.22
1995	Mean	1.95	0.19	0.64
	St. Dev.	1.05	0.34	1.53
	C.V.	53.85	174.52	237.97
1996	Mean	1.81	0.24	0.61
	St. Dev.	0.98	0.50	1.08
	C.V.	54.01	207.74	177.88

1997	*Mean*	1.67	0.23	0.49
	St. Dev.	1.10	0.41	1.44
	C.V.	66.23	181.29	290.29
1998	*Mean*	1.63	0.31	0.57
	St. Dev.	1.10	0.58	1.04
	C.V.	67.65	185.81	181.50

MB: Mortgage banks.

Cross-sectional analysis

In order to conduct a cross-sectional analysis we compute coefficient of variation across time for each individual bank and then average those for all banks in that country. In this case we have

$$\sigma_i = \sqrt{\frac{1}{5}\sum_{t=1994}^{1998}(\pi_{it} - \overline{\pi}_i)^2}$$

where

$$\overline{\pi}_i = \frac{1}{5}\sum_{t=1994}^{1998}\pi_{it}$$

The resulting measure of standard deviation $\sigma = \frac{1}{N}\sum_{i=1}^{N}\sigma_i$ should then be interpreted as the

volatility measure of profits for each country in the examined period (Table E). It should be stated that for the purpose of this empirical investigation, the statistical indicator used to measure volatility is only the coefficient of variation. The coefficient of variation has been considered to be an appropriate statistical indicator for measuring relative variability across samples of groups of data (eg across countries), since it is not influenced by the problem of the scaling of data (see also ECB (2000)). For every EU country net interest income was found to be less volatile than non-interest income (this was also observed in the time-series analysis). For the EU area the coefficient of variation for interest income is 14.13% and for non-interest income is 28.78% (the

numerical results are not the same because we follow a different approach in the cross-sectional analysis). Among EU countries, Luxembourg, Belgium, and Netherlands have the highest coefficient of variation for non-interest income, while Sweden, Ireland, Denmark and Austria have the smallest.

Table E: Volatility of interest and non-interest income (coefficient of variation) – country comparisons

Country	CV (Int. Inc.)	CV (Non-Int. Inc.)
Austria	14.52	23.14
Belgium	22.42	61.23
Denmark	11.03	22.93
Finland	16.56	32.70
France	21.27	27.58
Germany	10.06	27.35
Greece	22.23	26.35
Ireland	21.24	22.14
Italy	16.21	38.12
Luxembourg	23.25	75.45
Netherlands	19.61	52.20
Portugal	30.09	44.36
Spain	16.04	34.18

Sweden	24.83	19.92
UK	17.06	35.06
EU	14.13	28.78

We conduct the same analysis for the different bank sizes and types of financial institutions. With the exception of commercial banks, the variability of non-interest income is larger than that of interest income (Table F). The riskiness of interest income activities is the highest for commercial banks, while that of non-interest activities is the highest for cooperative banks.

Table F: Volatility of interest and non-interest income (coefficient of variation) - size and type comparisons

Size and type	*CV (Int. Inc.)*	*CV (Non-Int. Inc.)*
Large banks	13.33	14.21
Small banks	14.06	21.80
Commercial banks	**_21.78_**	**_14.12_**
Savings banks	9.44	23.25
Cooperative banks	11.50	32.24
Mortgage banks	10.04	12.25

4 Return, risk and correlation of income sources

Non-interest income could exert a stabilising influence on banks' results by offsetting the fluctuations in interest income. Do the results suggest that banking systems have become more or

less stable? In answer to this question, the first point to be made is, quite simply, that the variety of responses suggest responses to different circumstances, and, as banks surely wish to survive, that will be stabilising. But beyond that, what matters is how these changes have affected vulnerability to shocks.

Shocks are of two types – bank specific or system wide. Bank-specific shocks are, in turn, internal or external. External ones can have their effects mitigated only by diversification across a wide range of customers. The data presented here do not enable us to distinguish among earnings from different customers or classes of customers. So we cannot address this issue. But they do help with regard to internal shocks – fraud, failure of risk management, failure of part of the business. The more diversified are sources of earnings, the less likely is any one such shock to affect a bank. That is as far as we can go on bank-specific shocks.

The method of this section is based on an aspect of modern portfolio theory. Returns and risks of existing interest and non-interest related activities, as well as the correlation of such returns, are estimated and used to compute the potential for diversification gains. While all returns are *ex post,* considerable attention is given to the issue of whether the distribution of *ex post* returns and risks is stable across time and groups of banks.

Let *I (t), NII (t)* and *NonII (t)* represent total operating income, net interest income and non-interest income respectively at time *t*, all of them divided by the total assets at time *t*, so that:

$$I\ (t) = NII\ (t) + NonII\ (t) \qquad\qquad\qquad \textbf{(1)}$$

We use the coefficient of variation for measuring the fluctuations around the trend. The main question is under what conditions will the coefficient of variation of income (CV_I) be less than the coefficient of variation of net interest income (CV_{NII}), so that non-interest income succeeds in reducing the instability of total income.

By a well-known statistical theorem

$$\sigma_I^2 = \sigma_{NII}^2 + \sigma_{NonII}^2 + 2\ r_{NII\ NonII}\ \sigma_{NII}\ \sigma_{NonII} \qquad\qquad \textbf{(2)}$$

where $r_{NII\,NonII}$ is the correlation coefficient between the net interest income and the non-interest income. If $r_{NII\,NonII} = 0$, the variance of income exceeds the variance of the net interest income by the variance of the non-interest income.

The best way to check whether non-interest income stabilises total operating income is to use the coefficient of variation. In this case, non-interest income stabilises total operating income if

$$CV_I/CV_{NII} < 1$$

according as

$$CV_I^2 < CV_{NII}^2 \text{ or}$$

$$(\sigma_I / \mu_I)^2 < (\sigma_{NII} / \mu_{NII})^2 \text{ or}$$

$$\sigma_I^2 \, \mu_{NII}^2 < \sigma_{NII}^2 \, (\mu_{NII} + \mu_{NONII})^2 \text{ or by using} \qquad \textbf{(2)}$$

$$\sigma_{NII}^2 \, \mu_{NII}^2 + \sigma_{NONII}^2 \, \mu_{NII}^2 + 2r_{NII\,NONII} \, \sigma_{NII} \, \sigma_{NONII} \, \mu_{NII}^2 < \sigma_{NII}^2 \, \mu_{NII}^2 + \sigma_{NII}^2 \, \mu_{NONII}^2 + 2\sigma_{NII}^2 \, \mu_{NII} \, \mu_{NONII}$$

or by dividing both parties of the equation by $(\mu_{NII}^2 \, \mu_{NONII}^2)$ we have

$$CV_{NONII}^2 + 2r_{NII\,NONII} \, CV_{NII} \, CV_{NONII} \, (\mu_{NII} / \mu_{NONII}) < CV_{NII}^2 + 2 \, CV_{NII} \, (\sigma_{NII} / \mu_{NONII}) \text{ or}$$

$$CV_{NONII}^2 + 2r_{NII\,NONII} \, CV_{NII} \, CV_{NONII} \, (\mu_{NII} / \mu_{NONII}) < CV_{NII}^2 + 2 \, (\mu_{NII} / \mu_{NONII}) \, CV_{NII}^2$$

The last equation indicates the condition under which non-interest income succeeds in stabilising bank income. For the variances we plugged into the formula, we used averages by country calculated over time for each bank in the relevant country. The same occurs for the different size and type categories of financial institutions. We also repeated the exercise for each individual bank, and report for what proportion of banks (by country/size and type of financial institution) non-interest income appeared to be likely to stabilise total operating income. Of course, the sample correlation coefficients will not be very precise estimates of the underlying coefficients with such short time series.

We start the analysis by presenting the results for the correlation coefficient of interest income with non-interest income for the several EU countries (Table G). If the two components of banks'

income demonstrate different behaviour, non-interest income could exert a stabilising influence on banks' results by offsetting the fluctuations in interest income. From the empirical analysis we find a correlation of net interest income with non-interest income much lower than one. In 9 out of 15 EU countries (Austria, Belgium, Denmark, France, Finland, Greece, Italy, Portugal and Spain) we find a negative correlation coefficient. A few of these figures do not pass the conventional tests of statistical significance, but this may well be an inevitable result of the small sample size. Overall, it seems that there is a slightly negative correlation of the two sources of income, very close to zero. Negative coefficient of correlation is also observed for both large and small banks, and all types of financial institutions, except of mortgage banks.[3] However, the results should be interpreted with caution, mainly due to the fact that the composition of non-interest income has not remained stable during the period under consideration.

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[3] The correlation coefficient is -0.152 for large banks, -0.071 for small banks, -0.076 for savings banks, -0.071 for commercial banks, -0.096 for co-operative banks, and 0.043 for mortgage banks.

Table G: Correlation of income sources (coefficient of variation) – country comparisons

Country	Correlation coefficient
Austria	-0.179
Belgium	-0.040
Denmark	-0.143
Finland	-0.186
France	-0.274
Germany	0.010
Greece	-0.036
Ireland	0.136
Italy	-0.262
Luxembourg	0.004
Netherlands	0.225
Portugal	-0.375
Spain	-0.326
Sweden	0.132
UK	0.142
EU	-0.077

We next present the results for the several EU countries (Table H). From the empirical analysis, with the partial exceptions of Belgium and Netherlands, non-interest income seems to stabilise total income. If the right-hand side of the inequality p.od is equal to X and the other side is equal to Z we have the following results for the EU countries. Belgium and Netherlands are the two countries with the highest coefficient of variation for non-interest income (Table E). These results are consistent with the findings of the Banking Supervision Committee's (BSC) report that use the correlation between interest and non-interest income (ECB (2000)). Non-interest income demonstrates stabilisation effects mainly in smaller countries, like Greece, Denmark, and Finland.

Table H: Country comparisons

Country	X	Z	Proportion of banks	Effect
Austria	0.097	0.032	26 / 34 = 76.5%	Stabilise
Belgium	0.268	0.350	18 / 45 = 40.1%	Destabilise
Denmark	0.173	0.008	62 / 74 = 83.7%	Stabilise
Finland	0.110	0.077	5 / 6 = 83.1%	Stabilise
France	0.199	0.021	233 / 305 = 76.4%	Stabilise
Germany	0.096	0.077	972 / 1378 = 70.5%	Stabilise
Greece	0.161	0.016	9 / 9 = 100.0%	Stabilise
Ireland	0.406	0.001	8 / 11 = 72.7%	Stabilise
Italy	0.230	0.020	287 / 390 = 73.6%	Stabilise
Luxembourg	0.229	0.005	80 / 108 = 74.2%	Stabilise
Netherlands	0.144	0.335	14 / 34 = 41.1%	Destabilise

	X	Z	Proportion	Effect
Portugal	0.549	-0.052	21 / 28 = 75.1%	Stabilise
Spain	0.173	0.009	65 / 90 = 72.2%	Stabilise
Sweden	0.375	-0.003	7 / 11 = 63.6%	Stabilise
UK	0.161	0.076	78 / 132 = 59.0%	Stabilise
EU	0.151	0.062	1885 / 2655 = 71%	Stabilise

Table I: Size and type comparisons

Size and type	*X*	*Z*	*Proportion of banks*	*Effect*
Large banks	0.100	0.007	125 / 200 = 62.5%	Stabilise
Small banks	0.142	0.034	1760 / 2455 = 71.7%	Stabilise
Commercial banks	0.324	0.009	508 / 830 = 61.2%	Stabilise
Savings banks	0.101	0.037	523 / 700 = 74.7%	Stabilise
Cooperative banks	0.117	0.076	795 / 1011 = 78.6%	Stabilise
Mortgage banks	0.222	0.031	59 / 114 = 51.8%	Stabilise

We then examine the effects of non-interest activities on the stability of the total income by splitting the banks according to their size and type and conduct the same analysis (Table I). Both for large and small EU banks and the different types of financial institutions non-interest activities seems to help stabilising total income. Small banks and co-operative financial institutions present the highest proportion of stabilising effect.

5 Nature of non-interest income

Non-interest income is a mixture of heterogeneous components that differ in terms of their relative importance. Some sources of fee income have been available to depository institutions for many years, but have recently taken on a more dominant position in the overall financial management strategies of banks. These include deposit service charges, credit card fees, and fees associated with electronic funds transfer. Banks have long earned non-interest income by offering 'traditional' banking services such as checking, and trust and cash management. The investment management and trust businesses of banks can be divided into two aspects: asset management and accounting/record keeping. Asset management includes personal funds management, personal trust and retail mutual funds, defined benefit and contribution pensions, and corporate money management. The account businesses include master trust, global custody, domestic custody, and corporate trust.

Although banks have made significant headway in generating traditional fee income, for banks to remain competitive with other financial institutions, they need to expand their product breadth and to improve sales, relationships, servicing, and investment know-how. New types of activities that generate fee income include securities brokerage, municipal securities underwriting, real estate brokerage services, real estate development, real estate equity participation, and insurance brokerage activities. Many analysts assume that the dramatic rise in non-interest revenues as proportion of total revenues came from investment banking, trading, and brokerage activities. These new products, in addition to generating fee income, make banks more competitive with other banks and non-banks that offer a wide array of services and products.

Banks also receive fee income from a number of off-balance sheet items including loan commitments, note issuance facilities, letters of credit, foreign exchange services, and derivative activities (contracts for futures, forwards, interest rate swaps, and other derivative contracts).[4]

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[4] Loan commitments are legally binding agreements by banks promising to guarantee that a certain amount of funds will be available for a borrower over a given time period for a given rate. Letters of credit include standby and commercial letters of credit. Standby letters of credit provide a promise by a bank that it will perform a contract in the event that the buyer of the letter of credit defaults. Commercial letters of credit are similar but guarantee the credit standing of a buyer for an international trade transaction.

Many institutions have broadened their range of corporate services to include management consulting, data processing and information systems, or other technological services. In addition, depository institutions generate fee income from personal financial planning services, assisting individuals with decisions on budgeting taxes, investments, retirement, estate planning and other financial matters. Since these services can be costly in terms of hiring and training individuals, fees must be commensurate with the cost of producing the service.

However, fee income is not only generated by the traditional fee-based activities and the provision of new products; non-interest income may represent earnings from doing the same things in a new way – earning a fee by arranging a loan for a customer rather than earning an interest spread by lending to the customer, for example. Since the data do not distinguish new lending from lending drawn from existing lines of credit, the possibility exists that any acceleration in loan growth is the result of new loan originations. Anecdotal evidence, however, suggests otherwise. The *New York Times*, for example, reported in November 1998, that 'rather than signaling a flow of new loans, much of the lending appears to be borrowers' drawing on existing lines of credit'.[5] This process, known as securitisation, was applied first to mortgages in the 1970s, and then to both consumer loans and business loans in the 1980s and 1990s. As a result of securitisation, loans originated by banks are often ultimately held by mutual funds and pension funds.

In the United States over the past ten years, non-interest income has accounted for an expanding share of bank revenue. A small part of the increase has been from fiduciary activities and trading revenue, but most of the growth has been in the broad category 'other non-interest income', which includes merchant credit card fees, annual cardholder fees, fees for servicing mortgages, and income from loans that have been securitised. Thus, the increase in the proportion of revenue accounted for by non-interest income likely reflects both the expansion of bank lending to households and the growing fraction of bank loans that are securitised. According to De Young and Roland (1999):

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[5] Uchitelle, L (1998), 'Sure, banks are lending, but will they keep it up?', *New York Times*, 1 November.

'…the recent increase in the importance of non-interest income has come from several sources. First, banks have expanded into less traditional fee-for-service products such as insurance and mutual fund sales and (limited) investment banking activities. Second, banks now charge explicit fees for a number of financial services which traditionally had been bundled together with deposit accounts and which customers previously had paid for by accepting lower interest rates on deposits….Third, the growth of securitisation in mortgage, credit card, and other loan markets.'

Also Radecki and Lawrence (1999), in a study of the importance of fee income to the top 25 US bank holding companies, found that payment services were responsible for as much as two-fifths of the total combined operating revenues. The very substantial amount of revenue derived from payments services indicates that the production and distribution of these services constitute one of the core business activities of commercial banks. The size of payments-related income also implies that lending contributes less revenue to banks than is commonly believed.

Aggeler and Feldman (1998) concluded that about 40% of non-interest income was from fees earned from non-lending products and services provided to customer and commercial customers. These services range from issuing money orders, to selling insurance, to 'servicing' loans (that is, administering and distributing the loan payments of a borrower). Another large element of non-interest income (26%) comes from service charges and fees on, for example, deposit and checking accounts and automated teller machine transactions. Non-interest income from these service charges and fees has remained at near the same per cent over the past five years. Finally, banks also earn non-interest income from trust services whereby, for example, they invest funds for the benefit of clients. Over the past three decades, securities markets have captured a growing share of financial transactions. The decreasing reliance on bank loans has been more pronounced among large businesses, which routinely use the commercial paper market to fill short-term funding needs and the bond market for long-term needs. In addition, illiquid loans that in the past would have remained on bank balance sheets are now used to create tradable securities.

The ECB report (2000) concludes that the composition of non-interest income is rather heterogeneous. Fees and commissions are the main component and in 1998 represented, on average, around 54% of total non-interest income for EU banks (50% for the euro area) with national figures ranging from 72% to 35%. However, a declining trend was observed in the relative importance of fees and commissions as a source of non-interest income for the EU banks

in recent years (1994-98). Fees and commissions can in turn be divided into various sub-components, such as net commissions on payment transactions, on securities transactions, for guarantees, for safe custody and for foreign exchange transactions. The three main components of non-interest income are (i) net profit on financial operations (accounting for nearly 19% of non-interest income in the EU in 1998); income from – variable yield-securities (nearly 17%); and other operating income (around 10%).

The increasing reliance on net trading income may prove to be a temporary phenomenon driven by lower inflation and interest rates and the consequent rise in asset prices. Investment banking, trading, and brokerage activities are much more market sensitive than trust fees and service charges for typical non-interest income. With volatile security markets, some analysts argue that it is too early to look at brokerage activities and other non-traditional securities activities as a way to smooth income for banks in the face of cyclical lending cycles. Hence, many bankers have recently focused on the 'right combination' of fee-based businesses. For instance, a bank enjoying increased revenues from mortgage, investment banking, or mutual fund areas during a bull market might want to invest more in mortgage servicing, securities processing, mutual fund processing, insurance, or cash management, which will provide more consistent annuity-like fees during future bear markets.

6 Concluding remarks

The two basic questions addressed in this study are: (i) what are the profitability and risk of non-interest activities relative to interest-bearing banking activities; and (ii) what are the potential diversification benefits of non-interest activities to a banking firm. To answer the first question, we examine the mean and the coefficient of variation of the non-interest returns and compare them to those of interest-earning activities, with the mean return measuring profitability and the coefficient of variation measuring risk. To answer the second question, we examine the correlation coefficient of interest with non-interest activities and the coefficient of variation for both sources of income and conclude with a formula that contains also their mean value and the correlation coefficient. Both time-series and cross-sectional analysis are carried out for each European bank, splitting the financial institutions also according to their size and type.

The main findings can be summarised as follows:

- Non-interest income has increased in importance relative to net interest income.

- The evolution of non-interest income does not fully offset the reduction in the interest margin.

- Non-interest income is much more volatile than interest income; this is observed both at a pan-European level and for each individual European banking industry (with the only exception of commercial banks). Through the years the variability of non-interest income increases.

- A negative correlation between interest and non-interest income seems to exist in several countries, although in varying degrees; non-interest income seems to stabilise total operating income, with the partial exception of two European countries. So, the expansion of the bank's range of activities reduces the variability of its earnings stream.

- The composition of non-interest income is rather heterogeneous.

As a result of the increased importance of activities generating non-interest income, banks' operational, reputation and strategic risks seem to be heightened. The increased relevance of these categories of risk has made banks' risk management activity, and, accordingly, the task of the supervisors, more complex and requires a focus on these other categories of risk. As regards the current view of capital adequacy these results may support arguments in favour of specific capital requirements for other categories of risk in addition to credit and market risks.

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