EUROPEAN INTEGRATION, FINANCIAL SYSTEMS AND CORPORATE PERFORMANCE (EIFC)

WORKING PAPER

NO. 02-13

TECHNOLOGICAL AND STRUCTURAL CHANGE IN THE EUROPEAN BANKING INDUSTRY

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Project financed by the European Commission, DG Research
Improving the Human Potential and the Socio-Economic Knowledge Base Programme

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Abstract

The world banking industry is undergoing a large-scale transformation. Banking systems and financial markets, both domestic and international, have been undergoing a series of profound changes. One of the main driving forces of these worldwide changes is the introduction of innovations in new information technologies. Against these trends, industrial structure in the banking industry and banking regulation have sometimes encouraged these trends and sometimes adapted to them. The aim of this paper is to present research findings and the main arguments in the literature on technological change and industrial organisation in the banking industry. The last section of the paper focuses on the role of information technologies in the banking industry. We present research findings of functional studies on IT investment in the banking industry. These studies have analysed the relationship between IT and corporate performance by examining specific IT applications in the context of corporate strategies.

ISSN 1682-3739

[Contract No HPSE-CT-1999-00039]

Published by the United Nations University, Institute for New Technologies,
Keizer Karelplein 19, 6211 TC Maastricht, The Netherlands
E- mail:postmaster@intech.unu.edu URL: http:\www. intech.unu.edu

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ECONOMIC GROWTH AND FINANCIAL INTERMEDIATION

Many economists have devoted their attention to the relationship between the financial sector and economic growth. Bagehot and Schumpeter pointed out the contribution of banks in the improvement of welfare and economic development a long time ago. Over the years, economic theories have offered different and in some cases contradictory approaches on the relationship between financial development and economic growth. In recent years, contributions from the economics of information and contract theory developed a comprehensive analysis of financial system, in particular the functions of banks, stock markets and other financial institutions. This framework for the analysis of financial systems has emphasized the importance of the specific characteristics of financial institutions and the complex relationship between financial systems and economic growth. The new theories of finance have introduced analytical models, which tried to capture this complexity in theoretical and empirical work on the contribution of the financial sector to economic growth (Tsuru, 2000, p.5).

On the contrary, the conventional growth theory, which builds on the models of Harrod-Domar and Solow-Swam, as well as the neoclassical theory on financial systems assumed a passive role of the financial sector in economic growth. That brings us back to the foundations of the Arrow-Debreu model. The markets in this context are functioning, access to information is symmetric among involved agents and other frictions are not present. Hence, there is no need for any further consideration on the costs of getting access to information and/or conducting efficient transactions in financial markets. In the neo-classical approach, economic growth is driven by the accumulation of inputs in the production process and technical progress while the role of finance is considered only as a source for the accumulation of capital. Finance is restricted to capital as an important factor and its accumulation as a condition for sustainable economic growth. Also finance contributes to technical progress to the extent that technical advances embodied in the capital stock will influence productivity.

McKinnon (1973) and Shaw (1973) found a strong correlation between the degree of financial system development and the rate of economic growth and they questioned the validity of policy measures, which were based on monetary growth theory. However they did not develop a theoretical framework for this relationship and their empirical research could not prove that the direction of causality went from financial development to growth. The relations may be coincidental or high growth could lead to the extension of financial intermediaries and markets (Tsuru, 2000, p.6). McKinnon proposed the liberalisation of financial markets and the introduction of positive interest rates with the assumption that this incentive structure will increase the level of savings and the investment rate. Many developing countries have introduced these policy instruments, in an attempt to achieve macroeconomic stability and economic development. The implementation of these measures contributed to financial deepening and to the structural transformation of the financial sector (Edey, 1995, pp. 8, 14).

However, since the 1980s, the development of endogenous growth models has stressed the link between financial development and economic growth via the possibility that institutional arrangement could have an impact on growth rates. In the simplest type of endogenous growth model, "AK" financial development could influence the productivity of capital, reduce the lack of resources required for investment and contribute to the efficiency of financial systems via saving rates. In fact, a large number of recent papers concentrated on the interaction between the size of the financial system and the level of economic development. They emphasized the differences in the way firms finance investment in bank-based systems and market-based systems (Santos, 2000, p.3). The bank-based systems facilitate the mobilization of resources, the monitoring of managers and managing risks and the identification of good projects. On the contrary the market-based systems mainly facilitate diversification and the customisation of risk management devices. This system quickly reveals information in public markets and thus may hinder incentives for identifying innovating projects and also it may impede efficient capital allocation to new and innovative firms (Beck, 2000, pp.2-3). Firms operate, moreover, in an imperfectly competitive environment, which comprises, apart from conventional enterprises, newly-created enterprises in new and emerging technological areas. The availability of external and internal finance and the terms on which that will be obtained can influence their investment capabilities and their performance. Capital markets are characterized by imperfections, resulting from information asymmetries and agency costs. Internal finance is often less costly than external finance because agency cost is not available to new firms. Thus, the availability of internal funds can influence significantly the financing of investment and the choice of investment opportunities.

Furthermore, empirical studies indicate a link between the level of financial development and the rate of accumulation of capital or multifactor productivity. The first evidence became available in 1969, when Goldsmith stressed the positive correlation between financial development and growth in a study, which covered 35 countries over the period 1860-1963. Recent studies, among others by King and Levine (1993), Rousseaun and Wachtel (1998), Levine et. al, (2000), Beck. et. al (2000) which referred to firm-level, industry-level and cross-country level found a strong statistical relationship between finance and growth. The empirical analysis on growth and finance in these studies differs as far as data coverage; countries and time periods, variables and estimation methods are concerned. However, it is widely accepted that the role of an efficient financial sector in economic growth is positive, especially in

Developing Countries. The financial sector is larger, more active and more efficient in high-income countries because higher economic growth creates demand for more financial services and stimulates the development and diversification of the financial sector (M. Thiel, 2001, pp. 20-6). In addition the empirical literature has pointed out the relationship between the legal framework of a country and the form of its financial system. (Tsuru, 2000, p. 6-14). Furthermore, other parameters like economic development, openness of an economy, changes in technology and accumulation of human capital influence financial development and economic growth (M. Thiel, 2001, pp. 25,31).

The New Theory of Finance is based on the economics of information and gives a great deal of attention to the issue of interpersonal resources transfer (Stiglitz and Weiss, 1981). This theory draws on neo-classical assumptions with one significant exception, that is their approach on asymmetrical information among economic agents. The effect of interpersonal resource transfer on financial markets can exercise positive or negative influence on the process of a country's economic development. The New Theory of Finance supports the development of specific institutions and the introduction of a financial system that could address the problems of uncertainty. Financial systems contribute to the reduction of the special transaction costs that emanate from the asymmetric information in the relation between borrower and lender. Financial contracts are often designed to ensure comparative advantage between financial intermediaries in the implementation and enforcement of these contracts. The New Theory of Finance tried to develop a comprehensive framework on financial deepening and sustainable economic performance. They support the implementation of financial market regulation to the extent that is facilitates solutions to information and incentive problems. The presence of market failures justifies banking regulations. In addition these theories emphasized the importance of the implementation of macroeconomic monetary policy in each country and the role of central banks in this process (A. Winkler, 1998). Another dimension in this debate is the need for regulation and supervision that focuses on the performance of the financial systems is the new global financial and technological environment.

The level of financial development has a significant impact on bank performance. Demirguc-Knut and Levine (1999) suggest that in developing countries both banks and stock markets are less developed and financial system tends to be more bank-based. On the contrary, the financial sector’s development leads to more active and more efficient operation of financial intermediaries. However Demigruc-Kunt and Huizinga (2000) show that banks have higher profits and margins in underdeveloped financial systems while in developed financial systems there isn’t any significant difference between bank-based and market-based systems. Higher level of bank development is related to lower bank profitability and interest margins because developed banking markets usually reflect increasing efficiency due to greater competition among banks, higher efficiency levels and lower profits. Stock market development may improve bank performance as equity markets accumulate information that is also useful to banks. The legal and regulatory environment may influence stock market development and this could have an impact on the functioning of banks. Germany and Japan are generally regarded as typical representatives of bank finance and UK and USA are seen as market-oriented financial system (A. Demirguc-Kunt, H. Huizinga, 2000).   However economic research has not yet addressed problems related to the design of an appropriate regulatory and supervisory environment ("international financial architecture") that could be applied in many countries throughout the world (Barth, Caprio and Levine. 1998).

The structure and the development of financial system evolves as a result of the interactions between markets, institutions, financial instrument, technology and rules that define the organisation of the financial system. Three are the main functions of the financial sector within the economy: a) to offer saving and investment products b) to allocate resources and c) to provide payments and clearing mechanism. The financial sector performs these functions with different ways. Empirical research has indicated the parallel existence of financial intermediaries and markets and has stressed the differences between bank-based systems and market-based systems and the role of various financial intermediaries. In practice the distinction of financial structure is made between bank-based and market-based financial system. There are many differences between the financial systems with a dominant role for banks and those with a dominant role for financial markets. In short, bank finance is the intermediation between surplus and deficit spending households and market finance is between borrower and lender. Bank finance is associated with debt while market finance with equity. Empirical evidence suggest that an important difference between these two systems is in asset distribution among financial intermediaries. Also, differences between countries are the outcome of a complex interaction between diversity in regulation, culture and tradition. Significant impacts on the structure of the financial system stem mainly from financial regulation, which is the result of politics, ideology and culture system (Scholten, 301 & 320). Recently another approach has been proposed on the relationship between financial structure and growth. It stressed the impact of legal system on innovation and growth. The legal system can determine the effectiveness of the financial system in facilitating innovation and growth (La-Porta, 1997, 1998).

To sum up, there are two different approaches on the institutional and economic characteristics of financial intermediaries. In the traditional approach, the emphasis is on interest rates between borrowers and lenders and the scale of a financial investment, its maturity and risk. Households usually have a preference for short-term investment at low risk while enterprises have different preferences because they need large sums to finance capital accumulation so the role of intermediaries is restricted to the improvement of the allocation of resources. New theories of financial intermediation give to the financial sector a more prominent role in accomplishing an efficient allocation of capital. This approach of the economic function of finance is linking financial intermediaries with transaction costs and asymmetric information. Furthermore, financial intermediaries accumulate special knowledge in evaluating and monitoring projects and they develop comparative advantages in evaluating risks and designing financial contracts (Thiel, 2001, p. 15)

THE CHANGING STRUCTURE OF FINANCIAL SYSTEMS

In the post-war period Governments in advanced and developing countries implemented macroeconomic policies supported by a system of financial market regulations in which setting ceiling for nominal interest rates was one of the main instruments. These regulations can be divided into two groups. The first group includes those which affect the operation of financial markets with interest rate and credit controls, investment rules and capital account controls. They have been introduced as a response to financial stability concerns. The second group includes those which affect the institutional organisation of financial markets and comprises controls on ownership, cross-border market entry rules and other business regulations. These policy instruments are being used as a response to macroeconomic management concerns. In many cases, the implementation of these policies was accompanied by higher inflation rates and declining economic growth particularly in developing countries (for an assessment of this experience, see Edey 1995, p.9).

The implementation of macroeconomic policies failed to prevent financial crises, especially in East Asia and Latin America, with negative impact on economic growth and corporate performance at the country level. In recent years regional financial crises had a dramatic negative impact on the economics performance of many countries. In the last two decades, a number of financial crises, in particular costly bank failures have occurred throughout the world and the need to improve the performance of local financial systems is receiving increasing attention. There are many differences between the proposed reforms but nearly all the policy recommendations have suggested changes in existing financial regulations and supervisory standards. The international financial institutions have attempted to adopt appropriate regulations and supervisory practices on local financial systems that would enhance financial stability and improve economic development. At the same time, deregulation and the liberalisation of financial markets was introduced and it resulted in major structural changes of the financial sector in Europe, USA and Japan since the 1970s. Financial liberalization was initiated in a small number of industrial countries in the 1970s and was adopted by many other countries in the 1980s and 1990s. The speed of this process was not identical in all the industrialised countries. In some of them, such as the USA, the UK, Nordic countries, Australia and New Zealand, the abolition of price and quantity controls was completed by the mid-1980s. In some European Countries and Japan this process was delayed for a longer period while in Germany, Canada and the Netherlands banks' interest rate and capital controls was removed much earlier in the late of 1960s and the early 1970s (Edey, 1995, pp.9-10). The abolition of legal barriers and administrative regulations facilitated the introduction of mergers, acquisitions and other alliances within domestic and international markets.

Due to these changes, financial systems in many countries have undergone a dramatic transformation. Many changes occurred in the volume of financial activity. Markets have grown in size and new financial products have been introduced. Investment in the expansion of the financial sector has increased. The same applies for the percentage of financial assets to GDP. The financial sector's share in total employment increased in all OECD countries since the late 1970s. The traditional distinction between financial markets has broken down. The structural changes in the financial sector have resulted in the increase of competition, the introduction of new financial products and the increasing internationalisation of financial markets (Edey, 1995, pp. 14-5). Also the financial structure has undergone a significant change in recent years. The general trend is an increase of market-based elements and the decline of conventional intermediation. Another significant change in the industrial structure of the banking sector is the increasing concentration of banks, the increasing number of strategic alliances and mergers among equity market organisations and the expansion of new forms of financial intermediaries such as pension funds, venture capitalists and risk capital markets (Thiel, 2001, p.38).

The role of banks is significant in the operation of these financial transactions. According to the traditional approach, banks use economies of scale for the transformation of household savings into corporate debts and they provide payment services. With the increasing importance of asymmetric information and agency costs, banks may gain information advantages from relations with customers, by learning from past experience and they can realise economies of scale by offering payment services (Thiel, 2001, p.15). This role of banks builds almost entirely on information asymmetry problems. They provide depositors with liquidity insurance. Households are better equipped to face idiosyncratic shocks to their consumption needs over time because deposits offer better risk sharing among them. Also banks can provide monitoring services between firms and investors. Firms want more information on their investment projects than investors and investors can have this information but with high monitoring costs. However they can delegate the monitoring of investment projects to a bank, which provides funding to the firm. Banks operate as delegated monitors of investors and obviously they save on monitoring costs and can offer funding to firms at a lower cost than direct lending (Santos, pp. 3-4). The establishment of long-term relations tends to reduce monitoring costs and offers the opportunity for tailored investment processes funding. The role of banks is different when they are dealing with large corporations. They provide services for the issuance of shares or corporate bonds (Thiel, 2001, p.39).

Financial systems provide financial services to the corporate sector. These services are crucial for firm creation, industrial expansion and growth. The level of investment (in physical capital and R&D) in firms is influenced, among other things, by the availability of cash flow. This implies that financial constraints play a more severe role in the market-oriented financial systems. Empirical studies in OECD countries find that cash flow and profits play an important role for financing investment in France, Germany and the United Kingdom. However, it was more important was in the U. K. than other European countries. This implies that financial constraints may be significant in the more market-oriented UK financial system. Empirical literature stresses the correlation of investment with cash flow in firms, which face financial constraints. However the 'Tree cash flow" theory supports that financing constrained firms which have excessive internally generated funds tend to promote over-investment where there are few sound investment opportunities. The double-edged nature of cash flow is also related to a question of how a firm can efficiently allocate its funds to different functions. In the case of a diversified conglomerate there has been extensive discussions on whether corporate headquarters by forming internal capital markets can allocate capital across divisions efficiently or not. In addition empirical studies found a small positive impact between financial pressure (interest payments relative to cash flow) and capital productivity (Tsuru, 2000, p.20).

Finally, financial constraints and capital market imperfections impede the performance improvement of individual firm. The availability of internal funds could promote necessary investments and internal capital markets can contribute to necessary resource allocation. On the contrary, the availability of abundant internal funds in combination with limited investment opportunities can lead to an inefficient allocation of funds and unproductive investment. The efficiency of internal capital market depend on severe external factors and one of them is the development of external capital market in particular in economies which characterised by market-oriented financial systems such as United States and the United Kingdom.

Banking is one of the most regulated industries in the world and bank capital is one of the most important aspects of financial regulation. This situation is a result of the important position that banks hold between financial intermediaries and the important role of bank capital for bank soundness and prevalence of common standards between banks in different countries. The international convergence of bank capital regulations started in 1988 with the Basle Accord on capital standards. At first, advanced countries signed the Accord with regard to the measurement of capital and the definition of capital standards for credit risk. In 1996 it was revised and it was amended again in 1999, setting a proposal which covered three points: a) minimum capital standards, b) a supervisory review process and c) effective use of market discipline, in particular this proposal intended to a new capital adequacy framework.

The evaluation of the banking sector as one of the key financial intermediaries is another issue of recent research. A large number of empirical studies have indicated the decline of the role of American banks when it comes to financial intermediation and an increase of the role of non-bank financial intermediaries and financial markets in the American economy (Schmidt and Hackethal, 1997, p.38). When it comes to the role of banks, these theories have suggested a number of interesting insights. While in the context of conventional theories, the role of banks is being measured according to their proportion in financial intermediaries, the new theories of finance analyse the quality of banks' services and suggest that the role of banks is essential in the provision of liquidity and monitoring of the use of capital (Schmidt, Hackethal and Tyrell, 1997, pp.52-3).

The Transformation of European Financial Systems

The European financial systems went through a large number of changes since the mid-1970s. The process of European financial integration was accompanied with many regulatory changes in the European Union (EU) and the banking industry responded with dramatic changes in the same period. The removal of legal barriers and administrative regulation increased competition in domestic and international market. This process has influenced the structure of the financial sector and the conduct of business of banks in the EU. The recent convergence of macroeconomic policies across EU countries has introduced additional elements of competition pressures on the banking sector. The introduction of the Euro will intensify the existing competitive pressure with the creation of the world's biggest financial market.

The deregulation and liberalisation of the banking sector was a gradual process that took place in different periods and in different speed across EU countries. Until the 1980s, banks in the majority of EU countries operated in a regulated national environment. However, there were countries such as the UK, Germany, the Netherlands and Denmark where the banking industry operated in a less regulated environment. The removal of restrictive controls started from the wholesale market and later, with the introduction of rules for the creation of the Single Market, expanded to the retail market. The process of deregulation intensified in the late 1980s and in the 1990s. In 1986, the Single European Act introduced proposals, which solved existing problems and led to the creation of the Single Market with the removal of all physical and technical barriers among the majority of the EU countries by the end of 1992. Parallel to these developments was the introduction of new regulation concerning consumer protection and the reduction of systemic risk. The objective of these proposals was to provide a competitive environment for the provision of financial services and a large choice of products with minimum guarantee protection.

The most important elements for an integrated banking industry in the Single European Market were capital liberalisation and deregulation of interest rates. However, the deregulation of interest rates and the liberalisation of capital movements were not in place in all EU countries until the early 1990s. The process of implementation went on for a long period and the speed varied across EU countries. The deregulation of interest rates started mainly from large corporate investors and the creation of free money market rates and it was completed with the lifting of ceilings on bank lending and deposit rates (European Commission, 1977, pp. 19-25).

Since the mid-1980s non-bank financial intermediaries have expanded their activities in the traditional banking services and at the same time some of them managed to increase in size. The distinction between different kinds of banks, non-bank financial groups and insurance companies is becoming more and more vague while banking products have become more homogeneous across national borders. Traditional banking couldn't secure market shares and a sustainable future in a new, rapidly changing environment. Financial companies have entered the market and they can provide consumer and industrial credit and mortgage loans. At the same time, these new financial companies have access to funds provided by life insurance companies and pension funds (Panorama, 96, p.24-9). In the early 1990s, these non-bank intermediaries and insurance companies became increasingly active and they increased competitive pressures with their involvement in credit cards and insurance business. The new non-bank intermediaries are complementary to banking as well as to insurance activities (Panorama, p.24-39). Banks were forced to improve their competitive position in the market, with the introduction of new products and services and the diversification of their activities into areas such as financial intermediation and advisory services, investment management, fee-based operational services, trading and merchant banking, and equity investment (European Commission, p.45, Panorama, p.24-17). The life insurance market offers to banks attractive prospects for improving the returns from their distribution network. At the same time, the banks' network systems were also attracting insurance companies, because a large number of customers could be accessed at low cost (Panorama, p.24-7). These trends have caused the reduction of distinctions between different kinds of banks. However two kinds of banks are still very important: Universal Banks and Specialised Banks. Universal banks can offer all the financial services and most of them are commercial banks. Specialised banks offer services according to their scope such as mortgage investment, industrial banks etc. (European Commission, 1997, p.72, Panorama, p. 24-9).

The presence of these trends is affecting the size and the number of banks and also they have an impact on employment and skills. Since the early 1980s, the EU banking sector was growing significantly, especially during the period 1980-86 the deposit banks asset as a percentage of GDP has increased in the majority of EU Member States (European Commission, 1997, Table 2.3, p. 13). On the contrary, after that period the number of banks declined in most of the EU countries with the exception of Belgium, Greece, Ireland and Luxembourg. The number of commercial banks has increased in some EU countries while the number of saving and co-operative banks have declined. When it comes to small size banks, they have merged or were taken over by larger banks as a result of increasing competitive pressures (European Commission, 1994, p.135). In the 1980s, the number of employees increased in most EU countries and particularly in Greece and Luxembourg. The adoption of major structural changes and especially the introduction of new information technologies have improved banks' performance but simultaneously they have caused a decline in the level of employment since the early 1990s. Employment levels have declined in Belgium, Denmark, France, Portugal, Spain and the largest reduction in employment took place in the UK. Employment has declined in retail banking and it has been increasing in investment banks. In addition, the need for employees with professional skills and a higher education level has increased in recent years. However, the staff of retail and investment banks must have a higher education level in order to provide services, which require job specific skills and an ability for good inter-personal communication (European Commission, 1994, pp. 13, 21-3, European Commission, 1997, pp. 16, 77).

The process of European integration has introduced a large number of significant changes in the operation of the European banking sector. The creation of the Single Market intensified competition and increased the pressure to the banking sector to apply cost-saving measures for the improvement of their performance. These measures led to large-scale mergers and acquisitions and to the adoption of lean production methods in the banking industry, which increased the demand for financial services. In addition, these changes have been combined with major technological developments (European Commission, 1994, p.20). These activities took place after 1985 and they were more widespread in northern European countries (European Commission, pp.58-9).

The Southern European Countries

The liberalisation and deregulation of the banking sector was a gradual process and it was implemented at different points in time in EU countries. The Southern European countries (Portugal, Spain and Greece) introduced significant reforms in the period 1986-1992, although certain restrictions still remain in local financial markets. These reforms were mainly due to those countries' accession in the European Community (Greece joint the Common Market in 1981 while Spain and Portugal entered in 1986).

Until the mid-1980s the financial markets of these countries were protected and competition was limited to a small fraction of the local financial markets. The main features were public ownership and heavy regulation in the operation of their financial systems. The public sector banks were dominant in Portugal and Greece until 1988. In Portugal, the percentage of public banks as a share of total assets was 87.1 % and the same figure for Greece was 87.3 %, while in Spain the percentage of private banks was 49.0, almost half of the total assets (European Commission, 1997, Table 2.6, p.15). The Portuguese and the Greek banking sectors were characterised by the leading role of large public commercial banks while saving banks were playing an important role in the Spanish banking sector (European Commission 1997, p.67). The activities of commercial banks remained limited. It was not permitted to undertake insurance business as well as portfolio management, leasing and factoring activities. When it comes to regulations, interest rate restrictions and capital controls remained in place for the banking sector in these countries (European Commission 1997, p. 13, Table 2.4, p. 14).

Until the mid-1980s the Portuguese banking sector operated in an environment, which was characterised by a high level of state intervention and particularly a wide range of administrative controls, state owned banks and an underdeveloped secondary market (European Economy, 1997, p.78). That was the result of the Government's decision to introduce a system of credit ceilings and capital controls in order to mobilise and channel resources according to its objectives. However, these policy measures failed to overcome the stagnation in the economy in the 1970s and led to the expansion of deposits instead of credit to the private sector and to an increase in the purchase of government paper through low interest rates.

Since 1983, however, a period of wide-ranking reforms started which contributed to the stabilisation and modernisation of the Portuguese economy. At the same time, the prospects of the Portuguese accession to the European Union in 1986 facilitated the successful implementation of these reforms. The improvement of the overall macroeconomic conditions, for example, had a positive influence and strengthened the performance of the banking system. During the period 1983-85, Portugal introduced a stabilisation programme which resulted in the reduction of government debt, inflation declined and since 1984 foreign banks and new private banks were allowed to operate in Portugal (European Economy, 1997, p. 78, IMF, 1998, p. 6). Since 1985 the foreign exchange rate could be defined directly in the spot market and since 1986 Portugal abolished the distinction between different kinds of banks. In addition, in the period 1985-87 negotiable treasury bills and bonds were introduced in the Portuguese financial market and the Government started borrowing at market interest rates (IMF, 1998, p.6).

The second wave of reforms took place in the 1990s and was connected to the Portuguese efforts to achieve complete participation in the European Monetary Union. These reforms comprised the autonomy of central bank, the abolition of restrictions on interest rates and credits, liberalisation of ownership and significant changes in the regulatory framework of the banking system. In 1990, the Portuguese Central Bank was provided with autonomy in the implementation of monetary and exchange rate policy. Since 1992, universal banks could participate in commercial and investment activities. In 1996 there was only one state-owned banking group (Caixa Geral de Depositos) and at the same time, private sector investment in new banks took place and financial intermediaries were established. Lower inflation provided favourable conditions for issuing long-term bonds with fixed rates and the domestic securities markets were reorganised and modernised.

Overall, in the case of Portugal, the most significant measures for the deregulation of the banking system were applied gradually since Portugal joined the ERM in 1992. The interest rate deregulation process started in 1987 and until the end of 1989 the restrictions of interest rates were abolished with the exemption of the restriction of deposit rates, which was abolished in 1992. The removal of capital controls was completed in the same period. The credit ceilings were phased out in two steps, 1990 and 1992 (European Economy, 1997, p.78, INIF, p.6). Foreign banks have experienced a steady development in Portugal. Since 1992, they have doubled their total assets and liabilities. Whereas assets of non-banks intermediaries have experienced a modest development and this indicates that the role of banks is still very important in the operation of the Portuguese financial system. The introduction of portfolio capital in Portugal has grown very rapidly in the past few years. The bulk of foreign portfolio investors are foreign banks, investment funds and pension funds mainly from the UK, Germany and the US (European Economy, 1997, p. 81,82).

The deregulation and liberalisation of the Portuguese financial sector was a gradually process and contributed to significant structural changes in the banking sector. During the period 1990-97 the size of the banking sector increased rapidly. Banking assets grew with an annual rate of 15 percent and the number of branches increased considerably. In 1990 the number of banks was 31 and reached 62 in 1997. The number of branches followed a similar trend and from 1999 in 1990 increased to 4234 in 1997 (IMF, 1998, , table 2). The Portuguese banking system became more concentrated and went through a large number of mergers and acquisitions. The banking sector is dominated by large financial conglomerates, which control commercial and investment banks, mutual funds and insurance companies. In parallel the liberalisation of other sectors in European markets and particularly the insurance sector as well as the increasing competition from non-bank financial intermediaries have led to linkages between banks and insurance companies. The rising competition is evident in the insurance sector and particularly in life insurance in recent years (IMF, 1998, p. 15-19).

The modernisation and liberalisation of the Spanish financial system started in the mid-1980s. The Spanish accession in the Single European market in 1986 created the need for the adjustment of the Spanish economy and contributed significantly to the reform of the financial system. Until the late 1980s the Spanish banking sector was characterised by low efficiency. It was protected by foreign competition and was mainly operating in domestic markets with limited activities in foreign markets. The banking sector played a major role in the Spanish financial system while financial and non-financial intermediaries had a limited role. The rate of concentration in the banking sector was high and it was well capitalised in terms of solvency ratio which reached 11,5 percent for the whole banking sector, in line with EU standards. Banks had higher operating expenses than in other European counterparts and that was mainly due to the overstaffing and over branching of Spanish banks (European Economy, 1994, p.218).

Since the late 1980s, the modernisation of the banking sector as well as the entrance of Spain in the Single market contributed effectively to a concentration process. Mergers and acquisitions took place in the Spanish banking sector as a result of efforts to improve efficiency in a response to increasing competition. The first major merger took place between two commercial banks: Banco Bilbao and Banco Vizcaya in 1988. Two other commercial banks, Banco Central and Banco Hispano Americano, merged in 1991. In the case of saving banks, a large number of mergers took place among small and medium-sized banks. A similar trend took place in the case of large savings banks with the merger of two important saving banks la Caixa de Pensioners and la Caixa de Barcelona in 1990. In addition a number of important public banks merged and they expanded their activities abroad in the 1990s, primarily in Latin America with the creation of a financial holding company in Argentina. In 1994 the acquisition of Banesto by Santander took place and led to the establishment of the biggest Spanish banking group (European Economy, 1994, p.219). Since the early 1990s Spanish banks have promoted the formation of joint ventures with foreign insurance companies such as Banco Bilbao Vizcaya with the Groupe Axa of France and also Caixa Bank with Fortis from the Netherlands (European Commission, 1997, p.57).

The liberalisation of the Spanish financial market was a gradual process and the removal of capital controls was completed in 1992. However there were still some exceptions concerning the exportation of banknote and bank cheques above PTA 5 million and the Royal Decree on the special status of foreign direct investments in Spain. In these cases, the transfer of money abroad has to go through an authorisation process. Until the end of 1992 Spanish legislation allowed to foreign bank only limited operations, either through limited direct branching or relatively small subsidiaries. Since 1 January, 1993 these restrictions were gradually removed. When non-restricted cross-border financial transactions started in April 1994, foreign banks expanded their operations in Spain (European Economy, 1994, p. 223). The introduction of foreign banks played an important role in the Spanish banking sector. They contributed to the development of the inter-bank market, established investment banking and introduced new technologies in the banking sector (European Commission, 1997, p.71-2). Overall, the liberalisation of the Spanish capital market has contributed to the increase of cross-border capital movements as well as to the expansion of foreign portfolio investment in Spain, particularly for the public debt and also in short-term outflows especially with opening of accounts abroad by residents and short-term credit granted to non-residents (European Economy, 1994 p.215 and 227).

The reform of the financial system in Greece was initiated in the mid-1980s. Until this period the government and the Central Bank were heavily involved in the regulation of the activities of the banking sector. The Greek accession to the EU, the creation of the Single Market and the perspective for the adoption of a single currency led to significant changes in the Greek financial system in the early 1990s. Especially in 1993, a number of measures were effectively introduced which contributed to the deregulation and liberalisation of the banking sector. In fact, the deregulation of interest rates, the liberalisation of capital movements and the removal the credit restrictions in the banking sector's operation took place in 1993. Since then, banks have been able to decide about their investment policy. Until that year, banks had to allocate a portion of their deposits for the provision of credit to manufacturing firms or public organisations and they were obliged to invest a fixed percentage of their assets in government bonds (Noulas, 2000, pp. 53-4).

These changes led to an increasingly competitive environment for the operation of the Greek banking sector. Large insurance companies and private banks have been established and the Athens Stock Exchange expanded significantly. Until the mid-1980s private and public sector companies had access to external funding only from banks. Since 1990, the role of banks declined and they provide only 50 percent of domestic supply of corporate financing. Private companies and the public sector started to finance their needs from capital markets, in particular the private sector has raised funds in the stock market after issuing new shares and has invested in buying government securities. As a result of this diversification, total savings have declined in the banking sector. One explanation for these trends is the high interest rates of banks and therefore the significant increase of the intervention cost in recent years. In 1985, the intervention cost was 4.8 and it reached 11.3 in 1991 and 12.0 in 1994 and only in 1997 it eventually declined to 8.4 per cent. In addition, the government started to finance its debt directly from the capital market through the issuing of government bonds (Sournopoulos, 2000, pp. 65-69).

These reforms led to increasing competition, which forced Greek banks to a large number of mergers and acquisitions as well as to the diversification of their products. The banking sector includes eleven banks; five of them are large groups of banks created from mergers between banks. In addition, banks have expanded their activities to new financial products such as issuing credit cards, ATM cards and bonds. Major changes took place to the yield rates of different categories of financial transactions. The relative importance of the three main categories of banks revenue has changed significantly since 1993. Banks have been increasing their revenues by commissions and financial activities while their revenue from interest rates is declining. In 1993, the revenue from commissions as a percentage of total banks revenue was 8.76 percent and in 1998 it reached 10.4 percent. The revenue of financial activities as a percentage of total banks revenue was 4.09 percent in 1993 and it was 6.42 percent in 1998. On the contrary the revenue of interest rates as a percentage of total revenue from 85.95 percent in 1993 dropped to 80.93 percent in 1998. In addition, the cost of labour and administration has decreased the same period. Especially in 1993 the percentage of expenses on employment and administration/total revenue was 63.65 percent and it declined to 61.29 percent in 1998 (Noulas, 2000). These changes have a positive impact in the overall performance of Greek banks due to the fact that increasing commission revenue can eventually counter balance the decline of revenues that was caused by the continuous and steep decline of interest rates revenues.

The deregulation process of the banking industry in Southern European countries has contributed to the introduction of structural changes in their banking sector. Significant changes took place as far as the number and type of banks as well as the size of bank assets and the number of branches are concerned. During the period 1985-1994 the total number of banks in Portugal and in Greece increased while in Spain it declined. However, the volume of assets controlled by banks as well as the number of branches increased in all three countries in the same period (European Commission, 1997, pp.701). The number of commercial banks has increased and in the case of Portugal it was doubled from 23 banks in 1985 to 46 banks in 1994. In contrast, a significant reduction took place in the total number of Spanish co-operative banks from 146 banks in 1985 to 99 in 1994 (European Commission, 1997, pp. 68-9). The increase of competition and the diffusion of advanced technologies in the banking sector contributed to the reduction or to the marginal increase of employment in the banking sector. Since 1990, a marginal increase of employment took place in Portugal and Greece while the Spanish banking sector went through a small decline in terms of employment. The number of employees was 52,000 in Greece in 1990 and reached 54,000 in 1993. In the case of the Portuguese banking sector from 59,000 in 1990 it reached 60,000 in 1993 while in the case of the Spanish banking and credit sector, employment was reduced from 252,000 employees in 1990 to 247,000 in 1993 (European Commission, 1997, p. 77).

A comparative assessment on the recent performance of Southern European banks with their competitors in others European countries indicates that most of the Southern European banks are lacking behind in their preparation to face increasing competition from other EU Countries. Southern European banks are smaller than their European counterparts but they are doing comparatively well in profitability. However, only a small part of their income comes out from commission and retail business. This contributes to low productivity levels and in some cases to higher cost structures. When it comes to competition in European capital markets, the lower personnel cost in the Portuguese banks in combination with their small size can compensate to some extent the lower levels of productivity. To some extent, low productivity and high operating costs can be interpreted as a consequence of the low level of assets managed per branch or employee and that characterises not only Portuguese groups but their Spanish and Greek counterparts also. These characteristics, to some extent, are some of the usual problems of the banking sector in economies with low per capital income (IMF, 1998, p.28).

TECHNOLOGICAL CHALLENGES TO FINANCIAL INTERMEDIATION

The technological revolution has substantially reduced the cost of information and information asymmetries in financial transactions. The introduction of new advanced technologies is having a significant impact on the conduct of financial services and also to the introduction of new products. The areas of new technological applications in the banking sector are the following: computerised data storage, electronic information processing, institutional and agency networking, computerised business systems, electronic risk and security mechanisms, computer driven marketing processes and computerised client and customer services (European Commission, 1997, p. 366). In fact, the introduction of new technologies contributed to the decline of operating costs, the improvement of services and the improvement of competitiveness in the banking industry. In addition, it contributed to the increasing use of securities from intermediaries and the introduction of derivative products such as futures, options and swaps (Panorama, 96, p. 24-; Edey, 1995, p. 15).

The introduction of advanced technologies has contributed significantly to the expansion of the banking sector and in the improvement of the quality of their services. However, the pace of the introduction of technological change was different in different areas of banking activities and it evolved in different patterns at the country level. In the 1980s, the diffusion of technological change in the banking sector responded to the needs of industry but it failed to yield projected expectations for economic benefits (European Commission, 1997, p. 372). A significant re-engineering process started in the banking sector in the early 1990s. Since this period, banks focus their attention not only on the cost saving aspects of the introduction of new technologies but also they are concerned with economic performance and increasing revenues. Many researchers support that since 1993 banks have ranked the introduction of advanced technologies and competition as the two most important factors for banking growth (European Commission, 1997, p.133).

Structural change and the introduction of new economic activities created demand for new types of financial services. At the same time, new information technology developments have offered new opportunities for expansion to the banking sector by reducing the cost of computers, improving security and by making services faster and more convenient to the customer. Information technologies and microelectronics have altered not only the way information is transferred but also the cost of processing and storing information. Computers made it possible to handle a huge amount of transactions in a very short time and new opportunities have emerged, with important implications on the organisation of the workplace. The continuing development of large-scale back-office systems would not have been possible without information technology. Information Technologies (IT) led to saving in labour costs, but it also initiated a process of saving in other categories of capital as well like buildings. In addition technological advances have contributed to the improvement of the banking sector but simultaneously increased non-bank competition. Banks have to compete with brokerage firms, investment companies and insurance companies for transaction balances and cash management services. Large companies could borrow directly from the money markets because computers enable companies' access to information at a lower cost than they paid to banks. Banks tried to find other sources of revenue and technology was used as a source for the creation of competitive advantages and new market shares (Gupta et al., 2001).

The use of automatic data processing started in the banking sector in the 1960s. There was an increasing demand for new personnel in the banking sector. This trend combined with cost saving considerations led banks to introduce automatic data processing. One of the first steps in this direction, was the so called "wages and salaries directly to bank accounts". In the 1970s, the speed in the introduction of new products and services in banks increased and interest margins became less predictable. Commercial banks started to use automation in front offices, in an attempt to provide better information to personnel working on customer service and in order to improve the quality of products and services. Banks wanted to stabilize the number of personnel and tried to reduce the cost of information handling in operating rooms. A very important technological change in inter-bank financial transactions was the development of electronic payment systems for transferring inter-bank payments. This system improves the quality of payment transmission and creates significant economies of scale and rationalisation gains. The introduction of new payment systems started in the mid-1970s, with the introduction of common on-line based systems between different banks. A few years later, payment systems became fully automatic and created opportunities for new payment services for customers. This integrated system depends on more effective computers and technical improvements in software (Saarinen, 2000, pp.13-4).

During the last two decades banks and especially retail banking started to face increasing competition from the enormous proliferation of traditional retail products which became available elsewhere and from the emergence of new financial institutions in financial markets. Banks began to sell a broader range of credit and investment products. Technology innovation offered the capability for the significant improvement of the relationship between banks and customers with good sales prospects and allowed banks to shift less profitable customers into lower-cost distribution channels such as ATMs and telephone call centers (Hunter et all, 2000, p.12). This system has provided to customers new and flexible way to conduct their banking business. The automated teller machine was the first level of self-service. The use of self-service

ATMs has offered long opening hours at bank offices. Customers have access to cash 24 hours a day. In developed countries about 80% of all transactions take place with ATMs. In the early 1980s, credit cards appeared in the market and they became popular very fast. Other financial products, such as cheques had an enormous impact in daily life. Electronic money is a payment mechanism that is a direct substitute for traditional cash. Electronic money products are defined as ‘stored-value’ or ‘prepaid’ products stored value cards, credit card-sized devices, also know as ‘smart cards’ (Saarinen, p.17). The use of electronic money could influence the level of costs, benefits and risks facing consumers in their day-to-day economic transactions. In the late 1990s, home banking computers were the newest services for banking customers. All of these are new types of payment methods. Internet payments, which are based on a slightly different kind of technique than the previous is another option. There is a continuing movement of entries and exits of these methods in the market. (Saarinem, 2000, pp. 16-26). In the past twenty years the operation of the banking sector has changed significantly. New banking products have emerged and the banking activity has diversified. New products such as multiple currency loans, collaterised mortgages, interest rate and currency options and swaps, futures, credit cards, debit cards, automated teller machines, cash management accounts, electronic fund transfers and point of sale terminals have been introduced.

Technological development and the rate of the adoption of new technologies in the banking sector followed diverse patterns in different EU countries. For example, countries with sophisticated national market, such as France, Germany and the UK developed advanced technological applications that can support local and large European markets. On the contrary, smaller economies such as the Netherlands and Portugal developed significant customer-oriented technological applications (e-mail credit, chipcards etc). However, the introduction of large-scale technological changes has been concentrated in the large European financial centres in London, Frankfurt and Paris. The introduction of technological change has exercised different impact on retail banking in comparison to industrial banking or equity trading. The investment in advanced technologies in the case of retail banking extents to back office production systems, management of information systems, front-office decision support and risk management systems while in the case of merchant and investment banks the usual areas of applications are risk management systems, management information systems and clearing and settlement systems. Also the introduction of IT contributed to the decline of banking jobs. In 1990 the number of workers in American commercial banking was nearly 1.6 million and in 1998 it fell under 1.5 million while the employment for the economy as a whole rose 16,4% and the number of banking transactions increased (most of them as ATM transactions, Hunter et. al, 2000, p.7).

The Introduction of IT in the Banking Sector

The size of the banking sector as well as its capability to dispose large funds is making it possible to invest in Information Technology, including software programmes and training. Banking operations are suitable for the extensive use of Information and Communication Technologies (ICT) in relation to the storage of data and the processing of modifications in data as a consequence of payments transfers withdrawals or deposits. Banks usually operate on a large scale with a branch network across a large geographical area and investment in ICT is expected to increase productivity and the quality of services. The introduction of ICT has caused significant changes in the operation of banks. Information management has become less costly with the use of mainframe computers. Also, the introduction of new communication technologies facilitates the customers' access to his/her accounts. The replacement of personal services has yielded considerable cost reductions. Transactions via telephone are estimated to cost 40 to 70% less and those via the Internet are estimated to reduce cost to 1-25% in comparison to manually handled transactions. The speed of ATM and the reduced density of the branch network are visible signs of this developments in the retail market. In wholesale markets the introduction of information technologies can facilitate remote access to financial services from a long distance (Thiel, 2001, pp.40-1).

The introduction of IT in the banking sector created increasing demand for skilled workers. Technological innovation was accompanied by significant changes not only in machines, computer hardware and software but also with changes in the way that work is organized. This includes the introduction of new work practices and it is having implications on educational requirements and personnel skills. The ability of banks to match products to the needs of customers led to new products, which required additional knowledge and sales skills and techniques for approaching prospective customers. All that needs additional training, licensing and in some cases, required the establishment of new college degrees also. For example, in the USA two large banks tried to meet their customers' expectations by carefully recruiting personnel with these skills. Also, technological innovations enabled automation and shifted workers from routine functions to jobs requiring higher levels of education (Hunter et. al, p. 31-34).

During the last twenty years the role of IT has increased and changed the banking sector significantly. In the past, IT applications aimed at cost reduction and the improvement of the internal efficiency of the back office functions. IT played a supporting role by replacing labour that previously had conducted routine and repetitive tasks. New developments in IT have affected banking services and methods, particularly the payment methods and also their implications for the banking customers. In recent years, with the adoption of extensive use of

IT, banks can achieve new competitive advantages. A bank is well equipped to analyse data and information from its many different operating functions in order to meet the challenges of new business opportunities. They can use databases to analyse customer behaviour and use this information to customise or improve products and service, in ways which most likely will increase efficiency gains. Also the use of IT can enable innovative and strategic initiatives that can contribute to increasing market shares (Mistry, 1999, pp. 28,34).

The introduction of automation in the banking sector has enabled the use of IT for this kind of purposes. Automation of transactions has enabled the gathering of vast amount of data on customer deposits and transaction behaviour. Many banks are using these data to analyse customer behaviour and the value added of new customer services. Banks have centralized account information by linking customers' entire banking profiles and making these records accessible nationally, including data on account, credit cards loans, mortgages and investments. This technological infrastructure, supports bank personnel in cross-selling account management and in more precise identification of market segments. Banks can develop flexible pricing strategies and tailored offering for individual customers because the use of IT has radically reduced the cost of capturing, storing and analysing information and the value of collecting historical data. Also the use of IT has contributed to the distribution of products and services by banks to their customers. As a result of these trends, the volume of transactions in the banking sector increased as well as the number of new products.

The most significant change, however, has occurred in the character of banking services rather than its size. The banking sector has increased the variety of services and the diversification of products. The current IT applications extent from back-office processing, mortgage and loan applications processing, the electronic funds transfer and have used to improve the quality and variety of services in many sectors with their ability to analyse and control a large number of data (Saarinen, p.22). The introduction of IT applications for the development of network integration at the firm and at the branch level intensified the flow of information and changed standard business practises in the banking sector (European Commission, 1997). Significant improvements have been achieved in the operation of branch networks in recent years. Until the early 1980s, the branch networks of European banks were simple but from this period onwards, notable changes took place and slowly and they have rapidly diffused in recent years with the creation of more complex IT infrastructures for the provision of banking services (European Commission, 1994, pp.14-9). Finally, the introduction of advanced technologies has contributed to the rationalisation of banking activities and it has facilitated the process of take-overs, mergers and acquisitions.

EMPIRICAL STUDIES ON IT INVESTMENT IN THE BANKING INDUSTRY

Since the 1960s, the financial sector has started to introduce IT and a decade later it is one of the most benefited branches of economic activity from the diffusion of information technology. Already in the early 1970s, many corporate R&D projects in the computer industry were aiming at the development of new products for the needs of the financial sector. Indeed, the US banking industry's investment in IT increased three-fold in the 1980s. In 1980 it was approximated $ 4 billion and in 1990 it reached $ 12 billion. In the 1980s, banks increased the introduction of IT, including a vast array of hardware, software and telecommunications equipment, spending about $ 60,000 per employee on information technology equipment and applications (Hunter, Bernhardt, Hughes and Skuratowicz, 2000, p.5). In recent years, banks spend about 15% of non-interest expenses on information technology (Hitt, Frei and Harker, 1998, p.2).

In the US banking industry, technological innovation and deregulation are the two main drivers behind the radical reshaping of this industry. Deregulation prompted the consolidation of the industry because banks expanded their operations across borders and market segments at the same time and encouraged bank mergers. Technological innovation allowed economies of scale and reduced the costs associated with back-office processing. Deregulation increased competition among banks and IT improved banks' ability to adjust prices, terms of financial products and basic financial services began to resemble commodity products. Banks gradually had to compete with brokerage houses and money market funds, which started to offer traditional financial products such as checking accounts. Banks began to introduce technologies that made multiple financial products more effective and they tried to use integrated databases, which provided more complete information on customer relationship and transaction patterns. The use of sophisticated software helped banks to utilize these sources of information. This process helped banks to identify sales opportunities in the market (Hunter et. al 2000, p. 6-7).

In recent years, investment in IT has increased significantly across manufacturing industries and services. However, most models used to analyse costs in Management Accounting and Business Economics do not include IT in their analysis. The economic literature on banking production and cost functions has primarily focused on examining the existence of either economies of scope or economies of scale in the banking sector. Studies examining economies of scope have focused on the impact of the joint production of various products on operating cost efficiency and have provided little convincing evidence that economies of scope exist in banking (Mistry, 1999, p.14). Researchers examining economics of scale focus on the question that larger banks have a cost advantage in comparison with smaller banks and whether increasing bank size leads to increasing cost efficiency. The main conclusion from these research findings is that only minor economics of scale exist in the banking sector. Most banks operate relatively efficiently with respect to the scale of production. Another interesting observation is that there appear to be relatively few cost and scale advantage to be gained from mergers and acquisitions or growth activities. However, large banks continue to merge with other large banks and smaller banks. These banks may expect to increase revenues through merging with other banks rather than improved firm efficiency. Also they are exploiting opportunities to grow through mergers or consolidation and not through gradual increases in market shares (Mistry, 1999, pp.15-6).

Banks invest in IT because they expect higher productivity as well as to gain competitive advantages in the market. Until the mid-1990s, many contributions in academic literature on the economic impact of IT applications tried to prove that IT investment contributes to higher productivity. In 1975 Lucas used aggregate measures to examine the impact of IT on bank performance. He examined the introduction of IT in 165 branches of a California bank and found very little differences in banks performance that was explained by the use of IT. Ten years later, Turner (1985) didn't find any relationship between IT and bank performance in an analysis of data from 58 banks. The assessment of increasing IT investment, without thorough assessment of whether and how IT investment is being adopted (and used) at the firm level created many methodological and measurement problems (Brynjolfson, 1993). A number of case studies, pointed out the problem of the productivity paradox in the banking sector but they had several problems which impeded the evaluation of data and the accurate measurement of the impact of IT investment. Many researchers have argued that there is a lack of a formal methodology, which can measure the return of IT investment. Some of them have examined the relationship between investment in IT and corporate performance but they have reported mixed results on the benefits of IT investment at the firm level. The most obvious explanation for this problem, is the fact that there are several factors, which influence corporate performance, and it is difficult to distinguish the contribution of IT investment (Mistry, 1999,pp.19-21).

In addition, it has been argued that measurement techniques of corporate performance are not appropriate for every industry (Mistry, p.22). Other researchers point out the differences between two types of studies of the economic impact of IT. These are the aggregate IT investment studies and the functional IT investment studies (Mistry, p.26). Overall, in recent years, most studies have shown a positive contribution of IT investment to firm productivity. Many studies found a positive relationship between IT and firm level productivity growth. In 1990 Alpan and Kim tried to examine the link between IT value and economic performance in the banking sector and they applied the microeconomic theory of production. They used a model which was estimated with cross-sectional data from the banking industry (Functional

Cost Analysis data) for the year 1979 through 1986. They failed to demonstrate a strong link between IT deployment and enterprise level economic performance for this period. They only showed that high level of IT investment appeared to shift costs from labour to capital and were related to differences in the mix of products (Mistry, 1999, pp. 41-2). In 1993, Markus and Soh examined the impact of IT on bank profitability and they found that a larger investment of IT links explains higher profitability among larger banks and the positive economic outcome was larger when IT expenditures were accumulated over four years. Dos Santos and Peffers examined the impact of IT investment on the market value of firms in the financial services and manufacturing and they found that IT investment affects positively the value of the firm. In another piece of research they examined the impact of IT innovation in banking and especially the introduction of ATMs in banks. The installation of ATMs enabled banks to increase market share and some of them maintained their position in the market after a large number of banks installed ATMs. In this context, one of the findings of this research was that larger banks had greater gains. In 1993, McKeen and Smith analysed the impact of IT on organisational performance and they found that the increase of computerised banks facilitates the effective utilisation of people and computers and results in revenue growth (Mistry, 1999, pp. 38-41). Banker and Kauffman (1988) examined the effects of branch bank ATM terminals and of membership in ATM networks on market share at the branches. They found that membership in ATM networks had a positive impact on market shares. Finally, Grainger-Smith and Oppenheim examined the role of IT in investment banks in Europe and they supported the need to incorporate IT strategy into the strategic management process in order to ensure that IT is concentrated in those areas in which it can create most value (Mistry, 1999, pp. 49-50).

These results are more reliable and they draw on comprehensive and disaggregated data. They do not consider, though, how the performance of investment varies across firms. Recent studies attribute these differences to organizational and strategic factors. Firms that invest in training and pre-employment screening for human capital or to create customer value such as improve service, timeliness, convenience, variety have achieved greater performance than firms which invest in IT for cost reduction purposes. Another obvious factor is corporate strategy but academic research has been paid little attention to the interaction between decisions for technology adoption and corporate strategies (Hitt, Frei and Harker, 1998, pp.5-6).

CONCLUDING REMARKS

Banking has traditionally been a largely domestic and highly protected sector of national economies, but the rapid deployment of information technology and the liberalization of capital flows led to tremendous growth in international transactions and the expansion of banking operations across borders. Increasing competition, both domestically and internationally, have led to a greater awareness of costs and of the productivity gains to be realised from work reorganisation. Banking was the first major service industry to be heavily computerised. The computerisation of banking operations led to a rapid expansion in turnover, as new services were offered and new accounts opened. Advances in information technology have facilitated the flow of information, which has helped to reduce various barriers to competition. The increased speed and lower costs in communicating and transmitting data over large geographical areas have eliminated distance as an obstacle to competition.

Since the late 1970s, significant changes have been occurring in the financial services industry due to market de-regulation and financial innovation, combined with the development of new information technology applications. As part of these markets trends, large, diversified financial firms are increasingly operating in what once were separated banking, insurance and securities sectors. Meanwhile, with the growing competition between all types of financial intermediaries, traditional demarcations, both functional and geographical have faded. Against these trends, changes in banking legislation and regulation have sometimes encourages these trends and sometimes adapted to them. In effect, structural change in world banking markets has led regulators to reconsider traditional approaches to supervision and regulation.

Much has been written about the likely effects of EMU on European financial markets. For banking in particular, a number of key conclusions have emerged. A wave of mergers and acquisitions is creating a new generation of larger banks to take advantage of the removal of barriers to Eurozone business and the creation of a single financial market. There will be a variety of expansionary strategies followed, motivated by competition and driven by advances in information management. As a result of broader reforms introduced during the last 15 years, profound changes can be identified with regards to the structure of the national financial sectors in Europe. In this paper, we examined in detail technological changes in the banking sector and we identified the economic forces responsible for these changes. In the past the introduction of IT in the banking sector was justified if it could achieve cost reduction. Today the effectively utilization of IT capabilities requires complex organizational changes and an increasingly complex set of inter-organizational arrangement. Researchers support that the diffusion process is not limited to the conventional approximation (R&D and incentives). In recent years, researchers have conducted functional studies of IT investment in the banking industry. They analysed the relationship between IT and firm performance by examining specific IT applications.

This group of studies examined the impact of IT on the relationship between costs and cost drivers and between revenue and revenue drivers of various banking functions. They support that the understanding of the impact of IT investment on other cost drivers will contribute to the analysis of productivity in the same way that our understanding of the relationship between revenues and revenue drivers can contributes to the analysis of market shares and competitiveness. Mistry (1999), for example, developed a context specific cost driver model of the banking industry, which was estimated with a sample of 59 banks from the functional cost and profit analysis data set collected by the US Federal Reserve Banks. The sample size is small but the data set provides financial and operating data including direct and distributed costs of specific banking functions that enabled the allocation of support cost, including IT to functions. The findings of this research show that there is a differential impact of cost drivers in different banking functions. This relationship leads to the hypothesis that research at the aggregate level may be incomplete. A more detailed approach revealed a differential impact of IT investment on different products and functions at the firm level. Thus, a broader perspective is needed, which by using cost driver models will examine the link of specific IT application with functional related banking activities. In follow up work, we will examine the potential of banks in Southern Europe, to adopt and strategically implement new technologies by examining in detail organisational restructuring and the impact of investment on financial innovation to the competitiveness of the banking industry.

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