The Productivity
of the Spanish Banking System
in the 80s: International Comparison *

1. Introduction

Measuring gains of productivity in banking is difficult but not impossible. This paper is an attempt to measure banking productivity in a similar way to that used in other industry studies, namely using total factors productivity. The results seriously question the traditional characterization of the Spanish banking system (SBS) as inefficient.

Measuring the *level* of total factor productivity entails complicated problems with index numbers. If factor prices vary as a consequence of a change in the competitive conditions throughout the period, the level index will be affected. Additionally, when comparing the different banking systems, the relationships between levels of productivity in the base year are difficult to establish, since there are no common prices upon which comparisons can be based.

Productivity growth rates can be computed with a clearer meaning, using the previous year's prices to compare any two consecutive years. The purpose of this work is to analyze the evolution of the SBS during the 1980s, as well as to establish comparisons with the banking systems of several major countries.

2. Measurement Problems

In the banking sector, output measurement is often defined as an average value of assets (stock measure) but, for different reasons,[1] we use a *value-added measure* of output.[2] To quantify the banking output value in real terms we consider the purchasing power deterioration experienced by the given/obtained loanable funds. According to this criteria – used in the analysis of the consequences of inflation on bank valuation[3] – a generic deflator showing the evolution of the value of money – such as the GDP deflator – will be useful to capture the effect of inflation on the banking output.

We must also specify what definition of capital will be considered as an input for banks. In industry studies, fixed assets are often deemed as capital stock, which are usually larger than equity, since to finance them long term liabilities are employed. In the case of the banking firms equity funds are usually larger than fixed assets. The difference between equity funds and fixed assets is "free capital", and it is used in part as a permanent source of funds by the banking firm for prudential reasons. Hence we will consider equity as bank capital.

Price increases erode the value of the share of bank capital whose value does not experience the same increase with inflation. Consequently, to calculate a real value of equity partly invested in *nominal assets* – whose price is one, by definition – nominal values should be deflated. However, it is difficult to separate real and monetary assets. Our position is an intermediate one between completely deflating the capital series and not correcting them at all. The real capital stock has been calculated by individually deflating the net capital allocations for each year following 1985, the base year.

The data used refer to the period 1980-1988, and are described in the Appendix.

[1] See Pérez and Doménech (1990).
[2] See Nomisma (1987).
[3] See Petersen (1986).

3. Definition of Variables

According to the criteria above, we have built the corresponding series for Spain, the U.S., France, Italy, the U.K. and West Germany for the period 1980-88. 1985 is taken as base. Calling (P) the GDP deflator, the real series obtained (*) result from the following expressions:

$$OUTPUT^4 = X(t)/[PPP(t) \cdot P_{USA}(t)]$$

     X(t) = staff expenses and profits before tax in year t ($\cong$ value added in t).

$$CAPITAL = \text{before } 1985: K(t)^* = K(t)/[PPP(t) \cdot P_{USA}(t)]$$
$$\text{after } 1985:$$
$$K(t)^* = K(85)/PPP(85) + ... + \Delta K(t)/PPP(t) \cdot P_{USA}(t)$$

$$WAGES = w(t)^* = w(t)/PPP(t) \cdot P_{USA}(t)$$

$$COST \ OF \ USE \ OF \ CAPITAL = r(t)^* = \text{interest rate of government bonds at } 1/p20 - \text{GDP deflator}$$

With the series above and the sector employees series we have calculated the apparent productivity of labour and capital as well as their respective variation rates. To compute an aggregated index of productivity we have used the measure of *revealed productivity*, which measures the gains in unitary costs, given the prices, which is equivalent to the so-called *total factors productivity* (TFP). In a time series, the reductions in cost are calculated by comparing, at current prices, two technological alternatives (X, L, K) which correspond to the present period and the previous one. The expression that measures the growth rate of productivity is as follows:

$$PR = \frac{X(t)^*/[r(t)^* + w(t)^* L(t)^*]}{X(t-1)^*/[r(t)^* K(t-1)^* + w(t)^* L(t-1)^*]} - 1$$

[4] The output definition followed here differs slightly from the one used in Pérez and Doménech (1990) with individual data of the institutions. PPP stands for purchasing power parity (see Appendix).

This way of computing the productivity gains in terms of cost reduction, given the prices, can be found in a part of the literature on technical change related to the Farrell and Kendrick perspective on efficiency analysis, and Salter's perspective on technical progress.[5] Unlike the studies where the use of prices of any base year is considered indifferent, here we propose the use of the prices of the previous year to compare any two consecutive years. This allows a rationalization of the observed choice made by producers, provided we find positive productivity growth rates.[6] Consequently we have constructed a growth index of productivity that can be interpreted as a chain index of quantities.[7]

4. Empirical Results

The main findings of our analysis can be summarized as follows:

4.1. *Productivity*

a) We have found strong productivity, TFP, improvement rates for the SBS after the 1980s banking crisis. Productivity in the SBS was stagnant during the period 1980-83 but since 1984 strong productivity gains are to be found. We must take into consideration the effects of increased competition in recent years. As a consequence of greater competition, an underevaluation of the rates of productivity growth has been observed, since some of the production factors prices are changing.

This word of caution reinforces the consideration that during the 1980s the productivity gain has been intense. This improvement was better than that experienced by the other countries in our sample which, however, were not subject to strong adjustment processes, as was the SBS in the early 1980s.

---

[5] See FARRELL (1957), SALTER (1972), FØRSUND and HJALMARSSON (1987).
[6] See MAS and PÉREZ (1989).
[7] See DIEWERT (1989) on the index numbers.

b) The labour productivity level improved substantially during the period analyzed. In the late 1980s it was situated in the higher scale of the set of countries considered.

c) The capital productivity level makes no progress, which also happens in the other countries in our sample. In 1988, it was situated in the scale defined by the reference countries.

It is difficult to draw a conclusion between the SBS and that of the other countries in the light of the two partial indicators about the differences of static efficiency at the end of the period analyzed. However, in the light of the global productivity growth rate, which is an indicator of dynamic efficiency, in relative terms the SBS global productivity has been high in recent years. Yet, the fact that a banking crisis with severe effects on the productivity had to be overcome casts some doubts as to whether the starting point was very low in terms of efficiency for the SBS. The international comparison of the partial labour and capital productivities in the early 1980s does not justify a pessimist attitude: the SBS showed a level of labour and capital productivity not far from those of the other countries.

Thus, in the light of these data about the sector dynamics, it appears necessary to revise the traditional opinion that the SBS is inefficient, and to verify whether this affirmation is acceptable. We are interested in evaluating the current situation and, consequently, it is important not to forget the consequences of the time trajectories we study, because some of the statements that were perhaps justified concerning the SBS years ago, are today no longer valid. From the point of view of diagnosis and definition of policy any delay in recognizing the actual situation may have bad consequences for the SBS.

4.2. *Margins, Costs and Profits*

The starting point of the traditional diagnostic of the SBS was the affirmation that the margins per unit of total assets were too high. Regarding this point, it is very important to understand the meaning of the margins and ratios employed. We suggest once more that total assets are not an acceptable output indicator in an era when an increasing percentage of the banking activities go off-balance-sheet, scope economies are viewed as increasingly important, and bank

FIGURE 1

GROWTH RATES OF TOTAL PRODUCTIVITY: INTERNATIONAL COMPARISONS
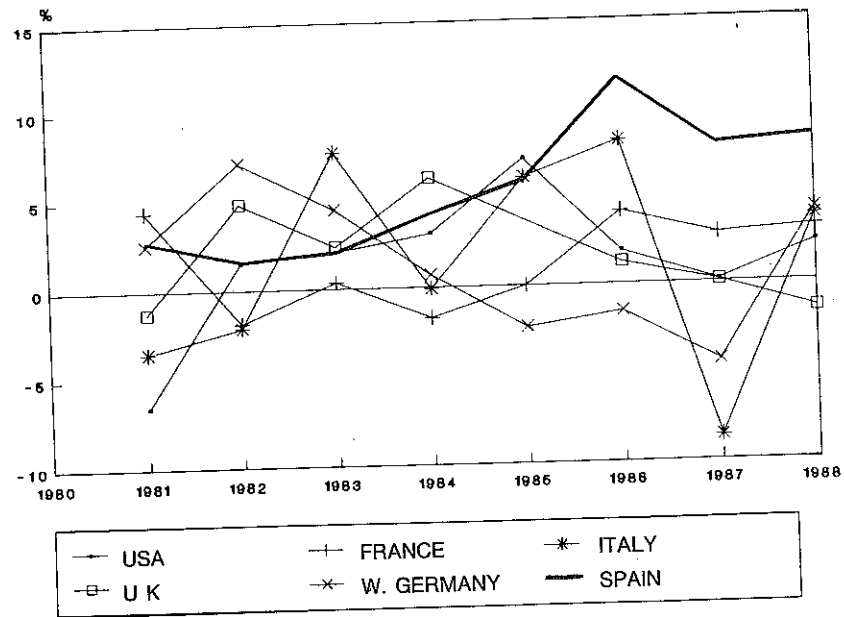(in percentage)

FIGURE 3

GROWTH RATES OF REAL AGGREGATED FACTORS EMPLOYMENT:
INTERNATIONAL COMPARISONS
(in percentage)

FIGURE 2

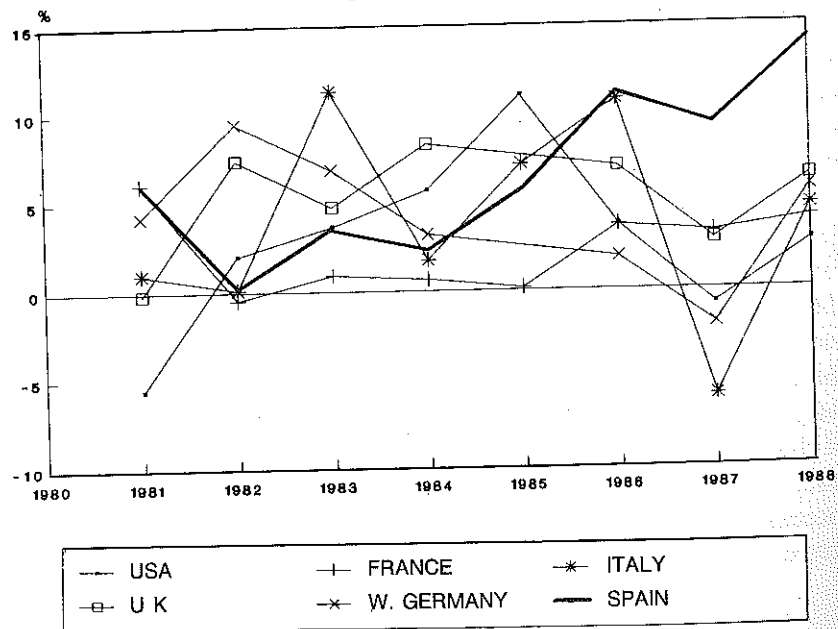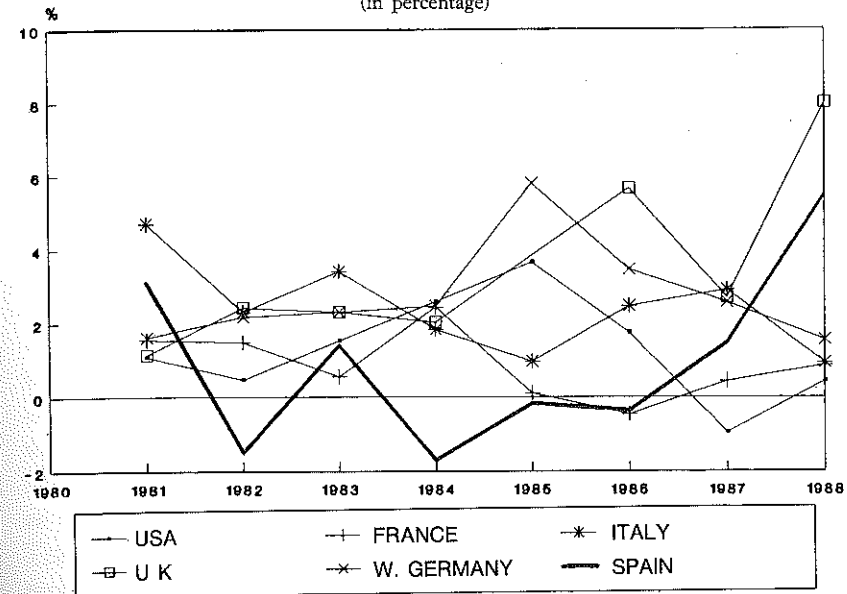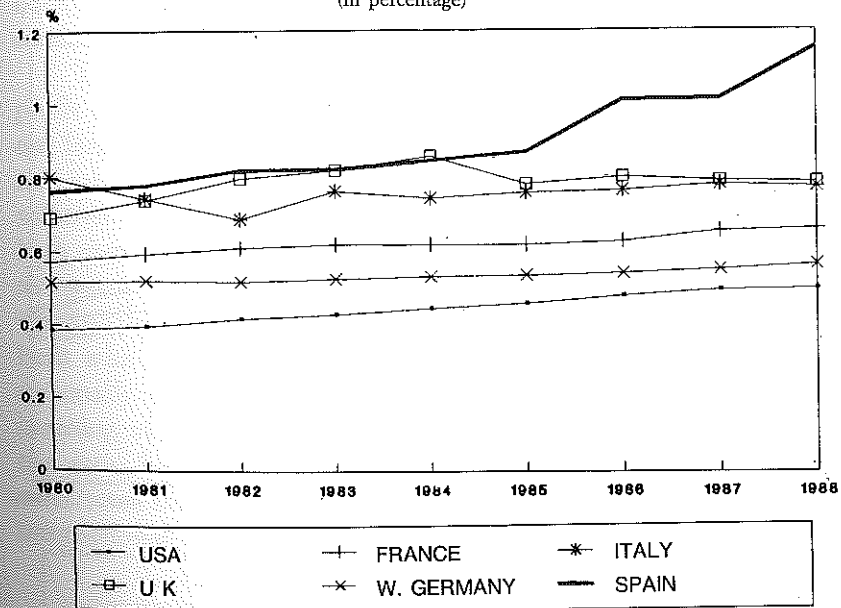GROWTH RATES OF REAL OUTPUT: INTERNATIONAL COMPARISONS
(in percentage)

FIGURE 4

EVOLUTION OF REAL w/r: INTERNATIONAL COMPARISONS
(in percentage)

FIGURE 5

EVOLUTION OF THE APPARENT LABOUR PRODUCTIVITY:
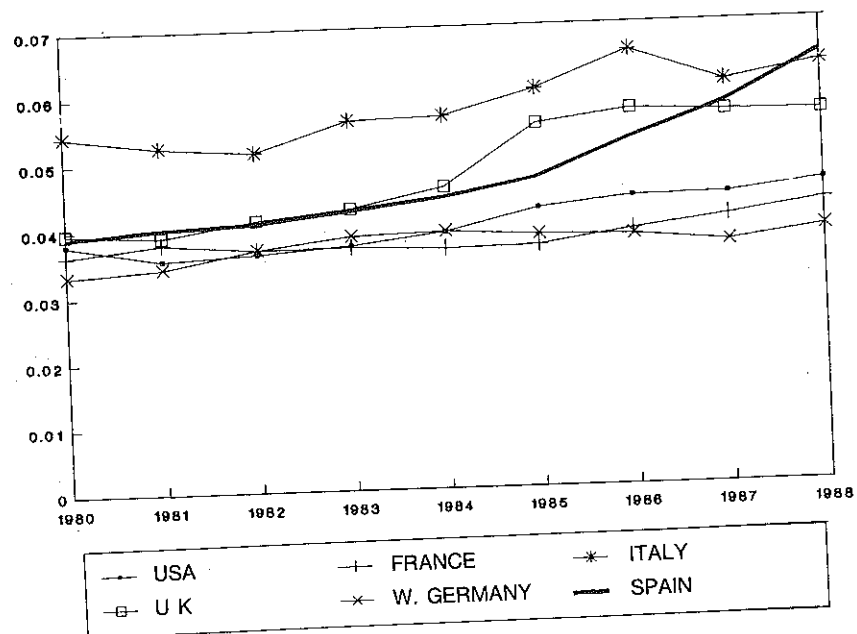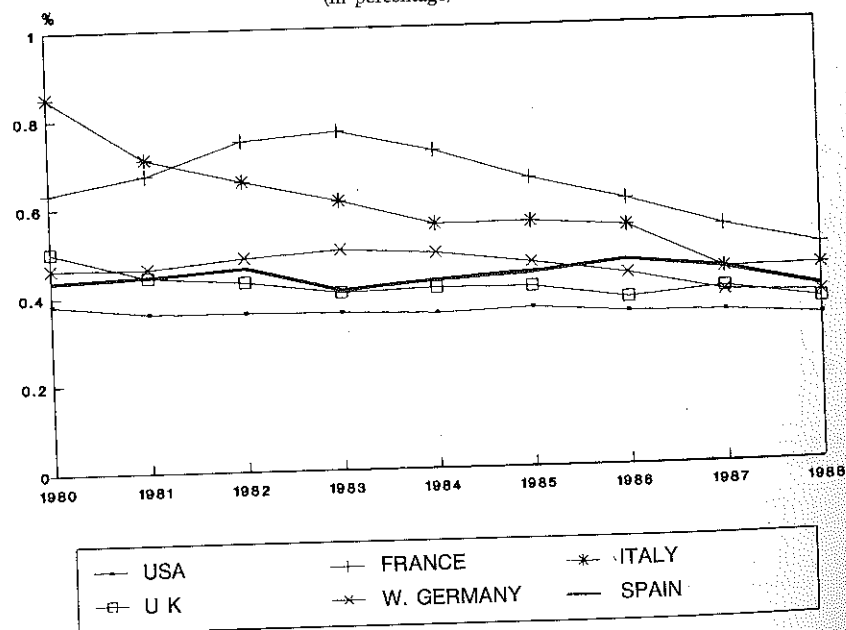INTERNATIONAL COMPARISONS

—·— USA	—+— FRANCE	—*— ITALY
—□— U K	—×— W. GERMANY	—— SPAIN

FIGURE 6

EVOLUTION OF THE APPARENT CAPITAL PRODUCTIVITY:
INTERNATIONAL COMPARISONS
(in percentage)

—— USA	—+— FRANCE	—*— ITALY
—□— U K	—×— W. GERMANY	—— SPAIN

services' income is expanding. In the case of the ratio (gross margin to total assets) which may be regarded as an indicator of the total intermediation cost for the rest of the economy, the SBS does not show great disadvantages with regard to the other countries considered. Hence, we cannot affirm that the intermediation cost is high in relative terms for the Spanish case.

The second reference to discover situations of inefficiency is usually the profit rate which is associated with the competition intensity in the market. From the level of this variable for the second half of the 1980s we cannot infer that the SBS enjoys a higher market power than the rest of the countries. Therefore, market power does not make financial intermediation relatively more expensive in Spain. If the profit rate indicated whether or not there is intense competition, then the data would indicate that there is strong competition. However, competition is now more intense than the period considered. A variable that has improved gradually is the differential between the banking system profitability and the interest rate deemed as the cost of use of capital (that of long-term government bonds). This differential, which was clearly negative during the crisis, has in recent years reached international standards. We must be prudent with the interpretation of the differential and we must understand its variability as a manifestation of the higher risk that characterizes banking assets. It would be premature to affirm the existence of a tendency defined in the evolution of the differential.

The following interpretation may be suggested: since the low profit rate is a result of the regulation that has obliged banks to carry out large endowments of equity, the reduced level of profitability is not an indicator of efficiency. Consequently we need to explore whether the inefficiencies appear not in the high rate of profits, but in high costs of other factors. However, the ratio given above is against this possibility since it shows an index of total intermediation costs for the SBS similar to those of other countries. The margins and ratios built with operating costs and average assets do not show an internationally disadvantageous situation for the SBS. In any case, the meaning of these ratios in terms of efficiency is rather obscure, like the ratio built with staff costs and total assets. In fact, the staff costs/total assets ratio for the SBS is situated in the high scale of the international comparison.

FIGURE 7

GROSS MARGIN TO TOTAL ASSETS RATIO: INTERNATIONAL COMPARISONS
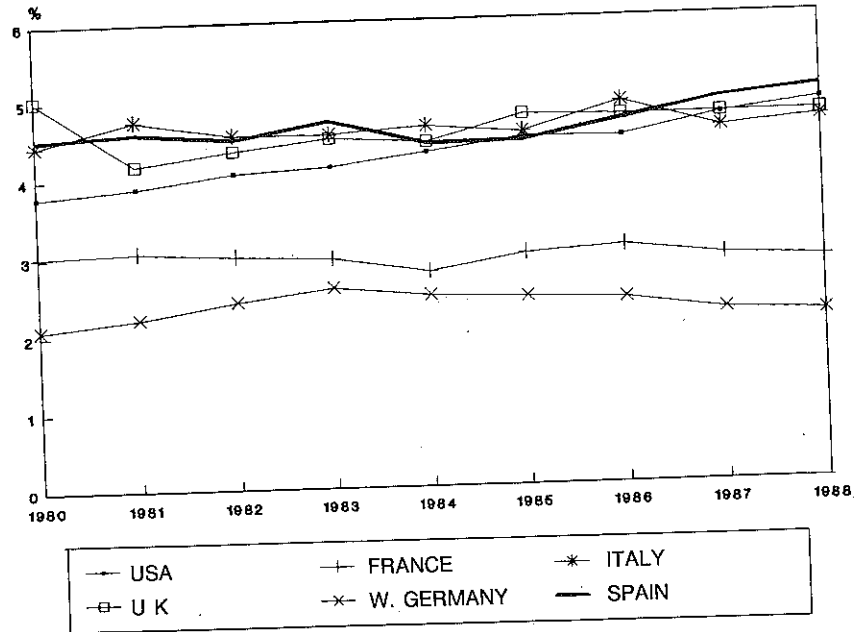### (in percentage)

| — USA | + FRANCE | * ITALY |
| —□— U K | —×— W. GERMANY | — SPAIN |

FIGURE 9

OWN FUNDS TO TOTAL ASSETS RATIO: INTERNATIONAL COMPARISONS
(in percentage)

| — USA | + FRANCE | * ITALY |
| —□— U K | —×— W. GERMANY | —— SPAIN |

FIGURE 8

REAL PROFIT RATE TO OWN FUNDS RATIO: INTERNATIONAL COMPARISONS
(in percentage)

| — USA | + FRANCE | * ITALY . |
| —□— U K | —×— W. GERMANY | —— SPAIN |
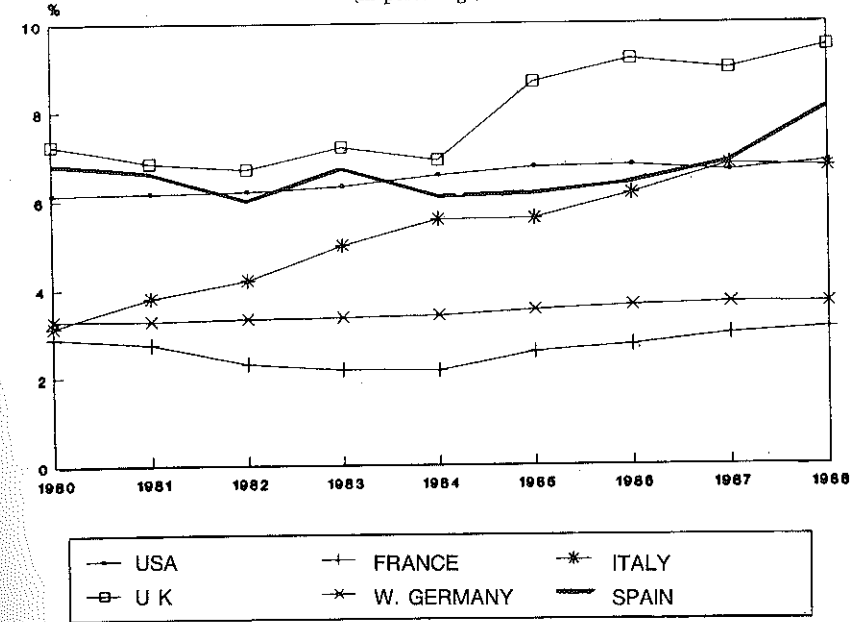
FIGURE 10

OPERATING EXPENSES TO TOTAL ASSETS RATIO: INTERNATIONAL COMPARISONS
(in percentage)

| — USA | + FRANCE | * ITALY |
| —□— U K | —×— W. GERMANY | — SPAIN |
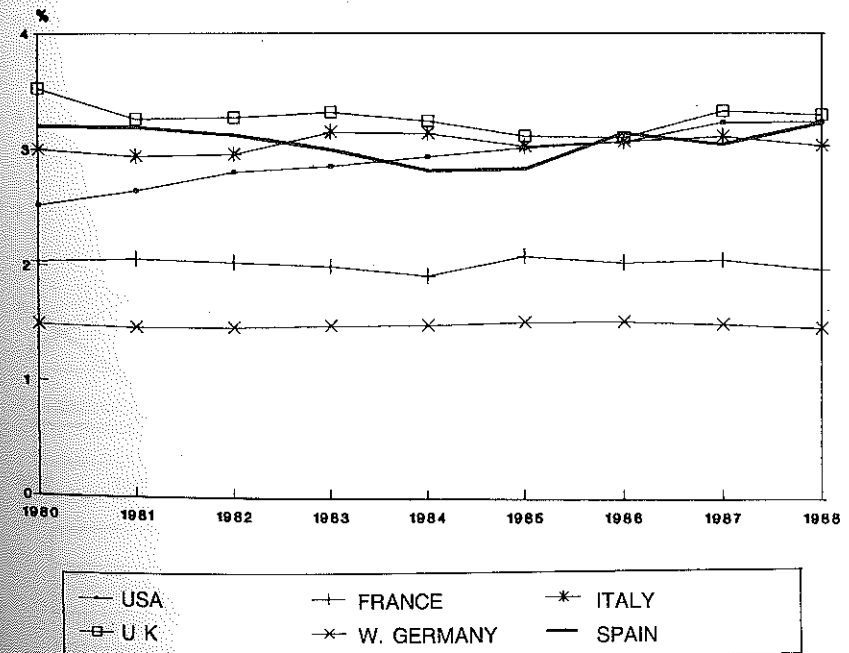
FIGURE 11

GROWTH RATES OF REAL OWN FUNDS: INTERNATIONAL COMPARISONS
(in percentage)

| ── USA | ─+─ FRANCE | ─*─ ITALY |
| ─□─ U K | ─×─ W. GERMANY | ── SPAIN |
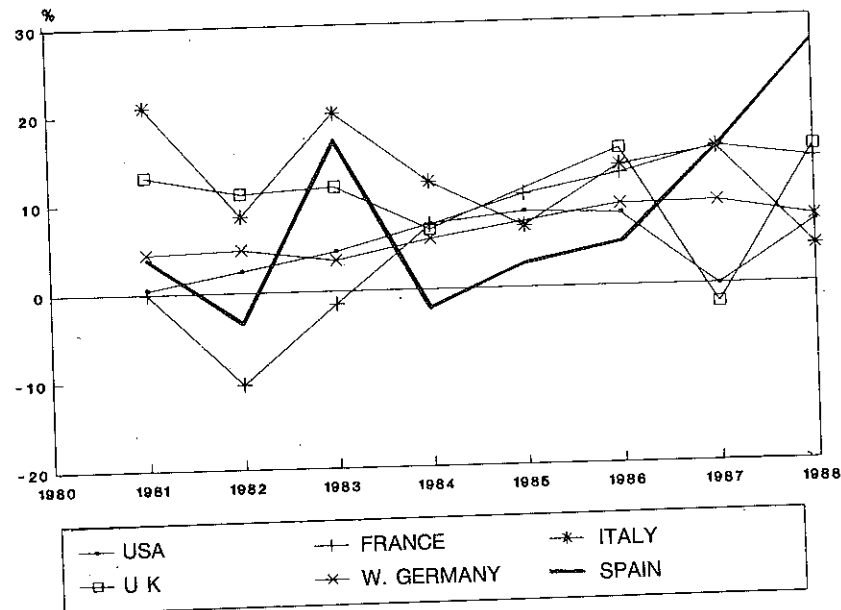
FIGURE 12

EMPLOYEES GROWTH RATES: INTERNATIONAL COMPARISONS
(in percentage)

| ── USA | ─+─ FRANCE | ─*─ ITALY |
| ─□─ U K | ─×─ W. GERMANY | ── SPAIN |
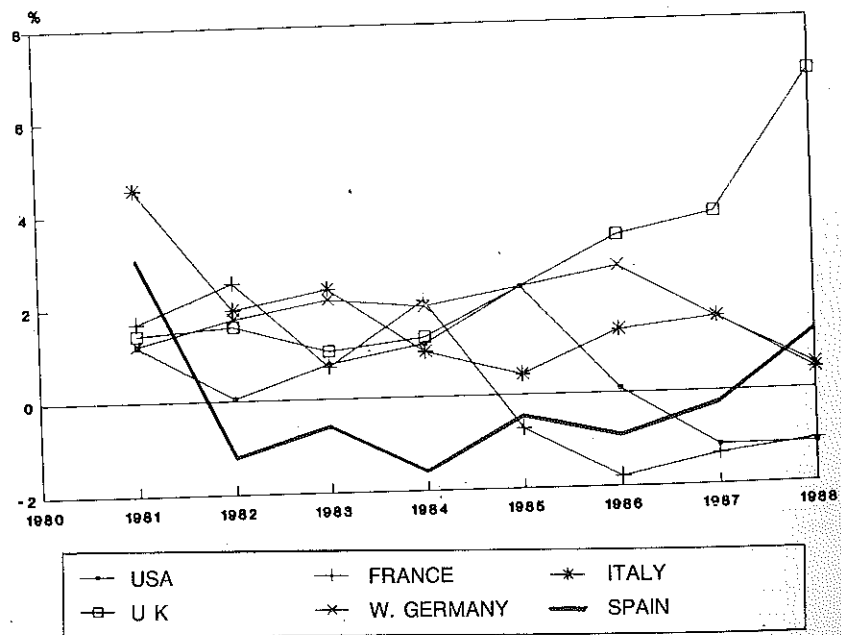
FIGURE 13

REAL OWN FUNDS PER EMPLOYEE: INTERNATIONAL COMPARISONS
(in percentage)

| ── USA | ─+─ FRANCE | ─*─ ITALY |
| ─□─ U K | ─×─ W. GERMANY | ── SPAIN |
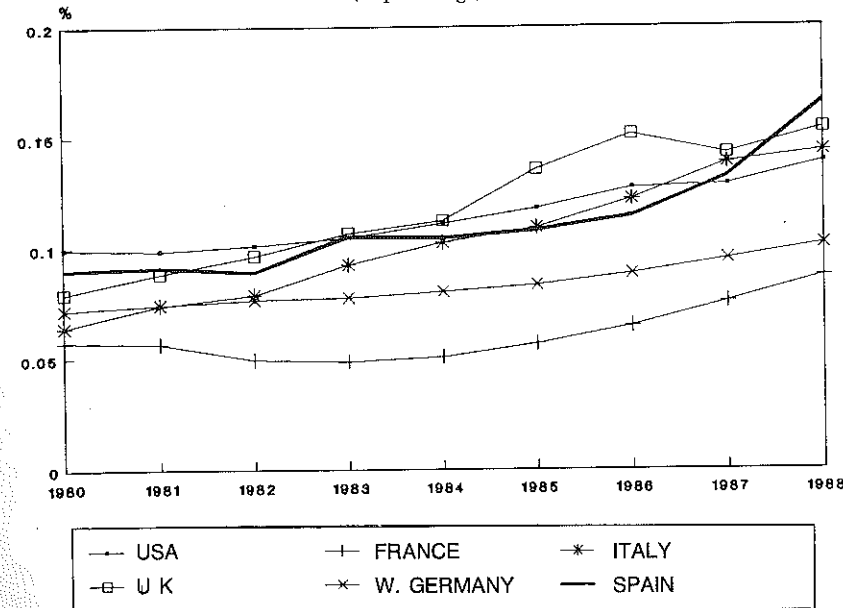
FIGURE 14

REAL OWN FUNDS PER BRANCH: INTERNATIONAL COMPARISONS

| ── USA | ─+─ FRANCE | ─*─ ITALY |
| ─□─ U K | ─×─ W. GERMANY | ── SPAIN |
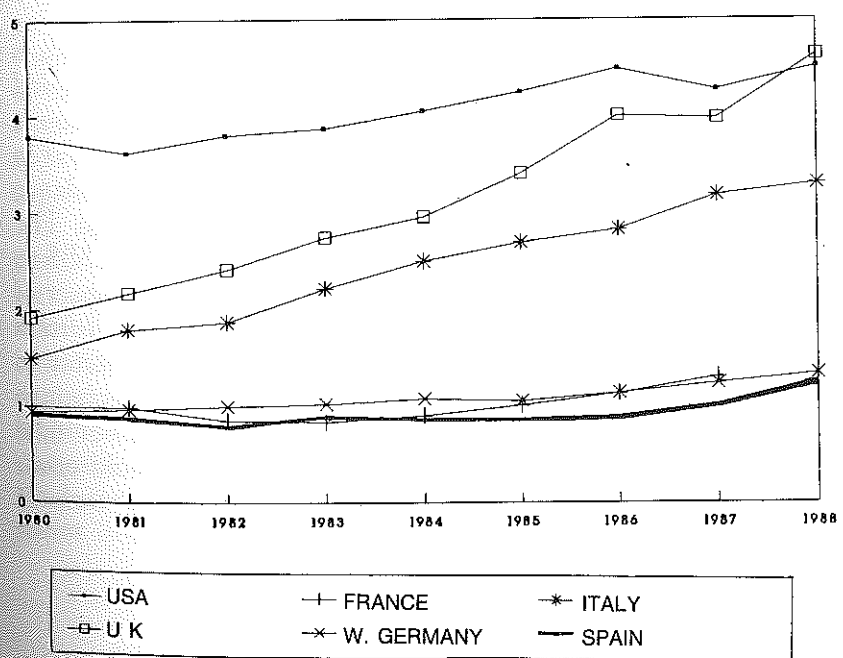
As might be expected, labour reaches high productivity levels since it is supported by large amounts of capital. And yet, we need to remember that the partial productivity indicators are misleading. In this sense, it is even more inaccurate to employ other ratios for comparisons, such as deposits per employee, total assets per employee or employees per branch, unless they are carefully explained. These indicators are very sensitive to the type of banking specialization and to the organization of the sector in each country and we must be careful about their interpretation.

The relevant question is whether the recent gains in productivity in the SBS are only the result of the influence of the demand on the degree of utilization of productive capacity – and thus have a cyclical nature which will disappear – or if these gains also include a long-run trend element. The time series available does not allow us to obtain conclusions on this matter but, even if it were possible, we would also have a diagnostic problem regarding the effect that the recent change in regulation and the opening of the banking markets to competition might have.

The demand expansion gives any sector more favourable conditions for a complete utilization of its capacity and for resources optimization. In other words, in an expansion context it is easier for the supply to accommodate and to adjust the relations between input and output. Therefore, it seems reasonable to associate the rates of productivity gains with strong rates of output growth.

An important characteristic of the SBS throughout the 1980s is the intense process of capitalization. The influence of the capital requirements regulations on this process is quite clear. The reason is that the information about the proportion that banking firms invest in physical resources do not leave any doubt about the overabundance of "free capital", if we consider the advantages of the leverage. The strong pace of capitalization induced by regulation has led the SBS to higher levels of the ratio capital/labour and reinforced the impact of labour-saving technologies. However, if labour requires a certain period of time to be replaced – because it is a quasi-fixed factor in practice – when own funds increase as a consequence of regulations or technological choices, the substitution of labour does not take place simultaneously. Hence, the high existing ratio (k) could cause increases in the capital/labour ratio in the future, if the process of substitution is completed.

It is necessary to investigate whether the differences observed in the solvency ratios of the different countries are justified by the different risk levels of their banking system, or if they are only a consequence derived from different criteria of assets valuation. However, it is possible that the application of the capital requirements regulation in Spain might be generating an excessive use of factors that negatively affects the productivity. In other words, if capital increases so fast that the corresponding labour substitution cannot occur at the same rate, then there will be an overemployment of factors, at least temporarily. It is important to establish the coefficient for solvency reasons, not productive technology reasons, but the effects on productivity take place anyway. Therefore, the speed in adopting the most demanding solvency ratios are an inefficiency factor unless they are justified by a high risk intrinsic in the SBS.

4.3. Branch Networks

A third characteristic of the SBS during the 1980s is the consolidation of an organization and commercial model based on a dense network of branches. As is known, this model has its origin in the interest rates regulations, and it is not yet possible to evaluate the transformation that it may experience in a context of free prices, such as nowadays. A dense branch network has two potential effects on productivity. The first effect is negative since it may require larger volumes of fixed factors to supply the output. This has been the case of labour in the SBS. As for the capital, although the physical capital employed for the savings banks was even larger than capital requirements, it does not seem an important element in the total use of capital in the late 1980s.

The positive effect of the dense network results from the capacity to generate and to capture demand for all kinds of banking services; then the output increases. This aspect should not be considered a result of market power or "overbanking" in the Spanish economy. If a household or firm pays for a service situated closer – as happens, for instance, when we go to the local shop instead of the bigger supermarket – the market computes certain activities in the domestic output that in other cases would be placed in the households (storing higher amounts of money or vegetables) or in another sector (transport).

The combination of both effects must be analyzed in the light of certain reactions to price competition in the future. Yet the evidence available so far shows determined willingness to maintain the existing network which has been better used as a consequence of the sector growth and which may be optimized in some cases through merger processes. The cross-section analysis has found that the potential productivity gain through bigger branch size was higher for commercial banks than for savings banks. This is one of the points we can make about the inefficiency of the sector: in general, it cannot be associated with the small branch model, but depends on the relation between branch size and specialization.

The specialization is still an element that makes commercial and savings banks differ. This affects the evolution of productivity in favour of the commercial banks since the larger expansion in output has taken place in the markets where banks have a greater presence. This is not a stable circumstance because it has been largely caused by the process of extension of the banking payment systems to households, and by the higher competition of other financial alternatives for the firms. However, the savings banks have also borne the capitalization demands from a lower starting level and with limitations to capture resources. This effort will have to be continued in the future, if we take as reference the 8% objective of capital requirements established by the Cook Report.

FIGURE 15

NUMBER OF EMPLOYEES PER BRANCH: INTERNATIONAL COMPARISONS
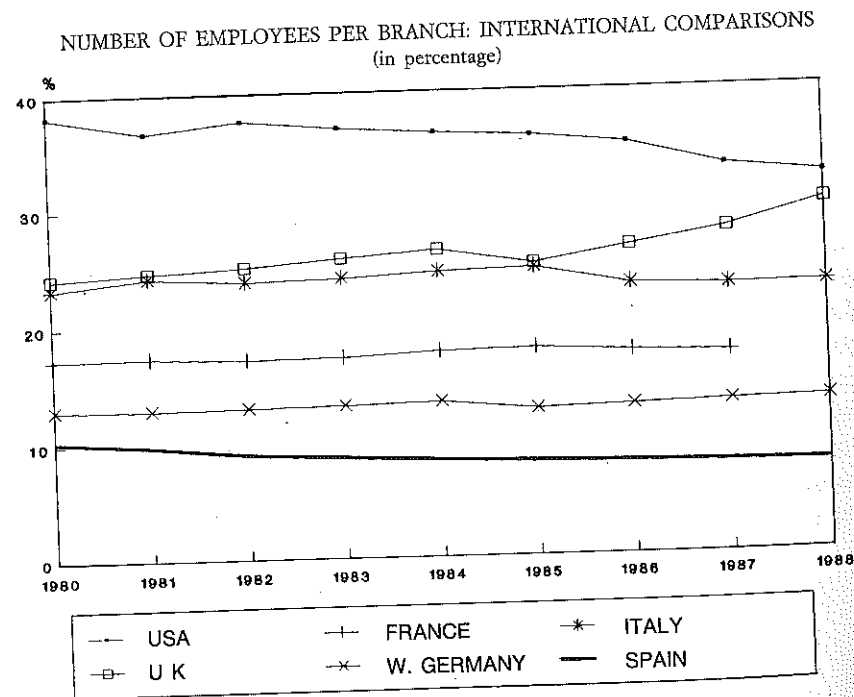(in percentage)

FIGURE 16

GROWTH RATES OF TOTAL PRODUCTIVITY: SPANISH BANKING SYSTEM (SBS)
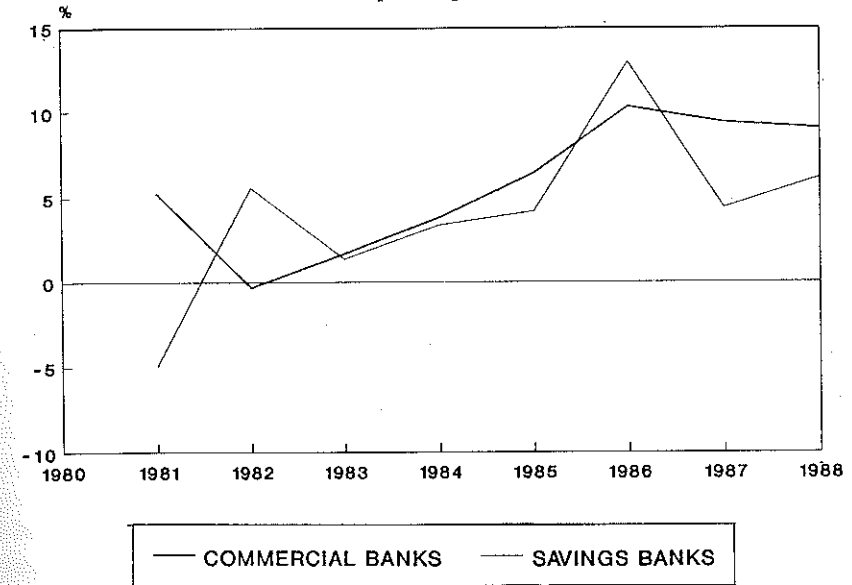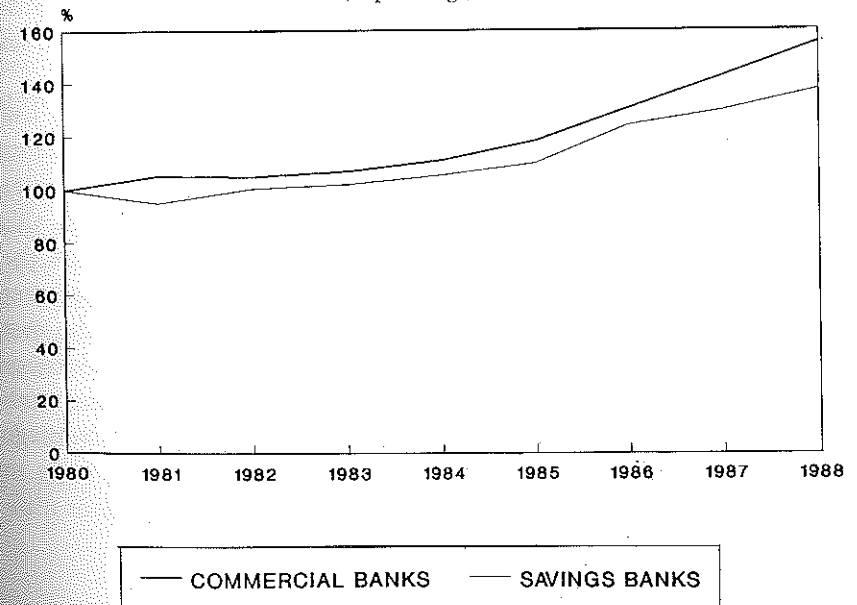(in percentage)

FIGURE 17

GROWTH RATES OF TOTAL FACTORS PRODUCTIVITY: SBS (1980 = 100)
(in percentage)

Despite the lower rates of productivity growth, the savings banks presented higher efficiency levels in the cross-section analysis for 1988. Hence, savings banks must have been more efficient than commercial banks at the beginning of the period considered. However, in those days the intensity of the competition must have been different for both types of institutions. This can deprive the productivity indices of meaning, since prices might contain market power elements.

Finally, competition between savings and commercial banks is now very intensive, as a consequence of the removal of barriers between them.

5. Conclusions

The conclusion we can draw from the above comments is that the dynamics of the productivity in the SBS in recent years make us consider the sector as potentially efficient in a double sense: it reaches levels of total factors productivity similar to those of other banking systems, and there exist no symptoms of absence of competition. In any case, the most reasonable cause of certain decreases in productivity is the own funds regulation which has been imposed in an accelerated way in recent years.

We must also appraise the elements that may influence the capability to compete in the future. According to the arguments frequently employed, difficulties for the SBS could appear if price competition narrows margins. According to our estimations, this would mean a reduction in the productivity estimations, given the price of the factors. The probability of this event is higher, the greater the profit margins of the domestic institutions or the larger the cost differences with foreign competitors. However, none of these things seem to be happening: profit rates are moderate and the ratios, such as gross margin to assets or operating costs to assets, do not advantage the majority of the foreign banking systems in a clear way so as to engage in competition wars that would leave the SBS in serious difficulties.

Naturally, this strong competition can result from an initiative of the most efficient institutions (domestic and foreign). Yet, if we are concerned about characterizing the average SBS institution, it is not situated in a position of disadvantage. On the contrary, if we examine the situation of Spanish banks with regard to the EEC objective in terms of solvency ratio, we can say that Spanish commercial banks – and to a lesser degree the savings banks – are, alongside the UK banks, in a better position than the other countries. Hence, the capitalization efforts will lower the productivity growth rates in the firms which are making those efforts, and in this context Spanish banking firms will enjoy some advantages in the next few years.

Given the relatively stable levels of capitalization, if the expansion of the sector is not stopped, Spanish commercial and savings banks can complete the process of adaptation to the new technological condition with optimism – since they are well positioned – and can adjust employment in a new competitive framework defined above. Important productivity gains should be derived from that process. There will be two forces that will press to reduce the price of the factors and the output value: the differences in productivity across firms, and the release of captive resources from the cash and investment coefficients. Both circumstances will be key elements to develop internal competition, and are at least as important as the pressure of foreign banks. This seems to be happening in recent periods of competition since this work was undertaken. In these processes, banks have responded to the change in circumstances with new competition pressures. As a consequence, we cannot say that the profitability on equity has been jeopardized.

To sum up, the productivity improvements of the sector lead us to revise some previous interpretations. If, as in the conclusion of this work, there exist good reasons to believe that the SBS is not inefficient nowadays, measures of economic policy taken from the opposite perspective may produce the opposite of the desired effect. Specifically, if the conditions in which the SBS performs its activities are as competitive as those of the other countries, any hardening of those conditions in the name of efficiency improvements may imply an unnecessary effort – as occurs with own funds – and this might cause difficulties to a smoother adjustment to the new technological conditions.

Valencia

Francisco Pérez García
Rafael Doménech Vilariño

APPENDIX
DATA EMPLOYED

Spain

The data used for the SBS are those given by the Bank of Spain to the OECD (*Bank Profitability*) for the period 1980-88. The institutions included are private banks (both domestic and foreign) and savings banks, excluding the official credit institutions and, from 1982 onwards, the private banks' branches abroad. In 1988, the number of institutions in the sample were 138 private banks, 79 savings banks and 117 credit co-operatives.

Staff costs include the contributions to the pension funds. We must be careful with the interpretations of the findings for the unitary labour costs and the w/r relationship since strong variability in those contributions has been observed in recent years as a consequence of the measures taken by the Bank of Spain.

As far as the capital definition is concerned, the data source utilized follows the Bank of Spain's criterion. Thus, the loan and loss reserves and the pension funds are included and the subordinated debt is excluded. This variable has been redefined by eliminating loan and loss reserves and by including the subordinated debt in order to come closer to the definition of the countries with which we establish comparisons.

Other Countries

The countries we have made comparisons with are the U.S.A., the U.K., France, Italy and West Germany. The data employed are those published in *Bank Profitability* (OECD). However, these data have two main deficiencies. First, there is a lack of information for several countries about very important variables to compute productivity measures. The number of employees and the number of branches are the most frequently unavailable. The second deficiency is the lack of a periodic revision of the series. 1986 is the last year which has been published. For those reasons, we have used the sources employed by the OECD in order to revise and complete the information for these countries during the period 1980-88.

We have followed homogeneous variable definitions for all the countries to obtain the information required. The output definition contains both staff costs and profits before tax. The staff costs, from which we have obtained cost per employee, include wages (net remuneration, social security contributions and taxes) and other costs such as profit bonus and contribution to the pension funds. In general, the greatest difficulties arise when attempting to obtain only

one definition of capital. As a result of the shortage of supranational rules on banking institution solvency (the EEC Directives on the issue were passed later and the BIS convergence movement has no force of law), the central banks carry out banks' supervision, which means that the solvency ratio definitions differ between countries, even if the central banks hold a similar approach. Therefore, the capital requirements series used in this analysis are based on each country's application of the rules imposed by the supervisory authorities. Let us review the capital definitions for each country in our sample.

In the case of the U.S.A., the data source is the FDIC (Federal Deposit Insurance Corporation). The data refer to commercial banks registered in the FDIC. The number of banks was 13,139 in 1988 which represents the majority of U.S. banks.[1] The capital requirements series contains equity, reserves (from share issues and from retained profits) and subordinated debt, but not loan and loss reserves. During 1985-87, these institutions carried out extraordinary provisions in order to offset the losses resulting mainly from the less developed countries (LDC) debt and from the agriculture sector loans, which negatively affected the profits of those years. In order to eliminate output measure distortion, we have adjusted the provision endowments to get rid of that irregular movement which at the same time should affect other years of the period considered.

As for the West Germany data, the institutions included in the sample are commercial banks, savings banks and credit co-operatives (from 1985 onwards) as well as other specialized institutions.[2] In 1988 the sample had 4,327 institutions which means almost the totality of the German banking system. Since we included the credit co-operatives from 1985, we must be cautious about the interpretations of the results. The Deutsche Bundesbank definition of capital contains reserves, but not loans and loss reserves.

The data for Italy were provided by the Banca d'Italia in its annual reports and statistical bulletins covering all Italian commercial and savings banks. In 1988, there were 319 banks, which represented almost the totality of the Italian banking system, if we leave out the rural credit institutions. The definition of capital requirements applied by the Bank of Italy includes equity, reserves, bad debt loan and loss reserves and other special reserves.

The institutions representing the French banking system are all the commercial banks, all the popular banks and the co-operative, agriculture and mutual credit institutions. The information used here is from the annual reports published by the Commission Bancaire. The definition of capital requirements includes equity, reserves, and provisions not dedicated to assets' depreciation.

Finally, the U.K. data are published periodically by the Committee of London and Scottish Bankers and, until 1984, they included Barclays Group,

---

[1] For more information, see *Statistics on Banking* (various years, FDIC).
[2] The complete information can be found in the articles that are published every year in the DEUTSCHE BUNDESBANK *Monthly Report* on profitability of the German banks.

Lloyds Group, Midland Group and National Westminster Group. Since 1985 the Bank of Scotland Group, the Royal Bank of Scotland Group and the Standard Chartered and TSB Group are also included. In terms of total assets they represented 67% of the British banking system (including building societies but not foreign banks' branches) in 1987. The definition of capital requirements from the 1980 rules of the Bank of England includes equity, reserves, subordinated debt and general provisions. The latter represented a 12% of total provision in 1987.

As can be seen, capital definitions vary fundamentally across countries as a consequence of the different considerations of some provisions as a part of capital requirements.

The procedure followed to transform a nominal series into a real one by applying an exchange rate has been the following: first we have employed the purchasing power parities (PPP) of each currency by taking the U.S. as reference country. The PPP represents the units of domestic currency per U.S. dollar that guarantee the same purchasing power in each country as one U.S. dollar. Eurostat has provided the data and 1985 is the year taken as base. These are the PPPs for each country in 1980, 1985 and 1988:

	1980	1985	1988
U.S.A.	1.0	1.0	1.0
France	6.0	7.27	7.46
Italy	862	1302	1449
U.K.	0.522	0.568	0.605
W. Germany	2.72	2.48	2.43
Spain	71.3	95.3	109

The use of any other exchange rate (such as peseta/dollar or peseta/ECU) strongly affects the series and makes them misleading. We must remember the devaluations of the Spanish peseta or the overvalue of the dollar in the foreign currency markets in the mid-1980s. Once we have obtained the PPP series, it is necessary to apply the U.S.A. GDP deflator, since the PPP only corrects the inflation differentials across countries.

F.P.G. - R.D.U.

REFERENCES

BAILY, M.N. and GORDON, R.J. (1988), "The Productivity Slowdown, Measurement Issues, and The Explosion of Computer Power", *Brookings Papers on Economic Activity*, Vol. 2.

BANCA D'ITALIA, *Abridged Report for the Year 1988,* Rome.

BANCA D'ITALIA, *Bolletino Statistico,* 1988, Rome.

BANK OF ENGLAND, *Banking Act Report for the Year 1989/90,* London.

COMMISSION BANCAIRE, *Rapport Annuel de la Commission Bancaire* (various issues), Paris.

COMMISSION BANCAIRE, *Les Résultats des Etablissements de Credit en 1988,* Paris.

COOK REPORT, COMMITTEE OF BANKS REGULATIONS AND SUPERVISORY PRACTICES (1988), *International Convergence of Capital Measurement and Capital Standards*, BIS, Basle.

DEUTSCHE BUNDESBANK, *Monthly Report* (various issues), Frankfurt.

DIEWERT, W.E. (1989), "The Measurement of Productivity", *Discussion Paper* No. 89.04, University of British Columbia, Vancouver.

EUROSTAT, *Money and Finance,* Monthly Bulletin (various issues).

FARREL, M.J. (1957), "The Measurement of Productive Efficiency", *Journal of Royal Statistics Society*, Series A, No. 120.

FEST, H. (1990), "Productivity in the Service Sector", *Working Paper* EC90-03, IVIE, Valencia.

F.D.I.C., *Statistics on Banking* (various issues), Washington D.C.

FØRSUND, F.R. and HJALMARSSON, L. (1987), *Analysis of Industrial Structure: A Putty-Clay Approach*, The Industrial Institute for Economic and Social Research, Stockholm.

I.N.E. (1986), *Contabilidad Nacional de España. Base 80. Cuentas Nacionales y Tablas Input-Output,* Madrid.

MÁS, M. and PÉREZ, F. (1989), "The Determinants of The Spanish Productivity Evolution", mimeo, University of Valencia.

NOMISMA (1987), *La produttività nelle aziende di credito. Un'analisi su dati di bilancio,* Edizione del Sole 24 Ore, Milano.

PÉREZ, F. and DOMÉNECH, R. (1990), *La Productividad de los Bancos Cajas de Ahorro,* mimeo, FIES, Madrid.

PETERSEN, L. (1986), "The Effects of Inflation on Bank Profitability", *Recent Trends in Commercial Banks Profitability,* Federal Reserve Bank of New York.

OECD (1988), *Bank Profitability,* Paris.

OECD, *Main Economic Indicators* (various issues), Paris.

SALTER, W. (1966), *Productivity and Technical Change* (2nd ed.), Cambridge University Press.