

COMMERCIAL BANK INTEREST MARGINS AND
PROFITABILITY: EVIDENCE FOR SOME EU COUNTRIES

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Objectives: The main goal of this paper is to study the determinants of bank interest margins and profitability for some European countries in the last decade. We use a set of bank characteristics, macroeconomic and regulatory indicators as well as financial structure variables in order to explain interest margins and profitability. We intend to evaluate whether European countries, sharing a common bond (EU membership) also share the same interest margin and profitability determinants. In particular, we want to check whether inflation, exchange rates, economic growth, bank size and capitalisation, bank product mix, among others, could be accepted as explanatory variables for interest margins and profitability. At the same time, we evaluate the impact of the EMS crisis of 1992/3/4 on the net interest margin and bank profitability, as well as the impact of the liberalisation of capital movements (occurred in Portugal in 1992 and in Spain in 1993) on Portuguese and Spanish banks.

Background: This paper follows in the footsteps of Demirgüç-Kunt and Huizinga (1999), Bartholdy, Boyle and Stover (1997) and Barth, Nolle and Rice (1997), and several specifications of the equation

$$(1) \quad \Pi_{ijt} = \beta_0 + \beta_i B_{ijt} + \beta_j X_{jt} + \beta_j C_j + u_{ijt}$$

will be estimated (with Π_{ijt} the net interest margin or ROA/ROE for bank i in country j at time t , B_{ijt} represents a vector of characteristics of bank i in country j at time t , X_{jt} is a vector of control variables for country j at time t , and C_j is a vector of country dummy variables).

The focus of the paper will be the investigation of possible influences of a standard set of bank-specific explanatory variables along with other variables taking account of cross-country differences in the regulatory environment in which banks do operate on bank profitability and interest margins. Although in many studies empirical results are essentially unchanged with respect to the used measure of bank performance, we will

use three different indicators of ex-post bank performance: the robustness of our results is at stake. The bank specific variables we use are commonly used variables such as market share, operating costs, capital to asset ratio and loan to asset ratio (to account for bank-specific risk insofar as the dependent variable is not risk-adjusted). Among the macroeconomic variables we use the inflation rate, the unemployment rate, and the nominal effective exchange rate. We will also use dummy variables to account for the range of permissible activities as well as the existence of crises of the European Monetary System.

Some authors have claimed that the relationship between the explanatory and explained variables is not linear and is not stable (v.g. Swamy et al 1996). On the other hand, it is not easy to design a single model that completely describes bank performance. Therefore we will test different specifications of the general model (1) in order to avoid the risk of misspecifying the functional form of the relationship.

Data and Methods: In this paper we will use balance sheet and income statement data from Datastream for the period 1986-99, as well as from other sources (Économie Européenne).

Data set:

Banks from four different EU countries (Portugal, Spain, France and Germany).

Number of banks from each country in the data set.

Years	Portugal	Spain	France	Germany	TOTAL
1986	8	5	0	8	21
1987	8	6	0	8	22
1988	8	7	2	8	25
1989	8	7	2	8	25
1990	8	7	3	8	26
1991	8	7	3	9	27
1992	8	7	14	9	38
1993	8	6	15	9	38
1994	8	7	15	9	39
1995	8	7	17	9	41
1996	8	13	18	10	49

1997	8	14	19	10	51
1998	0	14	19	10	43
1999	0	8	15	9	32

Variable definition:

The dependent variable is a measure of ex-post bank performance. In order to test the robustness of our results we use four different variables: Interest Margin (IM = Interest received – Interest paid), Return on Assets (ROA) and Return on Equity (ROE). NIM is alternatively defined as IM/Total Assets or IM/Equity. ROA is Pre-tax Profit/Total Assets and ROE=Pre-tax Profits/Equity.

The explanatory variables are the following:

- 1) Labor/Assets = Total Employment Costs/Total Assets. It is a proxy for operating costs; it is expected that banks with higher operating costs will have higher net interest margins (in order to survive) and lower ROA and ROE (everything else constant, banks will have lower pre-tax profits). Differences in operating costs may also capture differences in business and product mix or even differences in the range and quality of services offered.
- 2) Equity/Total Assets. We expect that the higher equity-to-asset ratio, the lower need to external funding and therefore higher NIM and profits. It is also a sign that well-capitalized banks face lower costs of going bankrupt and thus their cost of funding is reduced.
- 3) Loans/Assets = Total debtors and equivalent/Total Assets. Traditionally, banks are intermediaries between lenders and borrowers. Other things constant, the more deposits are transformed into loans, the higher the interest margin and profits. However, if a bank needs to incur higher risk in order to have a higher loan-to-asset ratio, then profits may decrease.
- 4) Bank market share (MS), defined as bank's Loans/Country's Domestic Credit. We were unable to get information on total bank loans at the country level. Therefore, the denominator is Domestic Credit of the country.
- 5) Unemployment rate (UR). The Eurostat definition (% of civilian active population).

- 6) Inflation rate (INF). The annual % change of the GDP deflator at market prices.
- 7) Exchange rate (EXR). The nominal effective exchange rate (base 100=1991; performance vis-à-vis the rest of the 22 industrialized countries).
- 8) CRIS: Dummy variable, equal to 1 if the year is 1992 or 1993 (all countries), or 1994 and the country is Portugal.
- 9) DCFPS: Dummy variable, equal to 1 if the country is Portugal and the year is 1992 and beyond, or the country is Spain and the year is 1993 and beyond.
- 10) D1: Dummy variable, equal to 1 if the country is Portugal.
- 11) D2: Dummy variable, equal to 1 if the country is Spain.
- 12) D3: Dummy variable, equal to 1 if the country is France.
- 13) YEAR: Time trend.

Sources:

Accounting data from DATASTREAM is used for banks from Spain, France and Germany. Accounting data from banks' annual balance sheet and income statement for Portuguese banks. As for UR, INF, EXR and Domestic Credit, we use "Économie Européenne", n° 70, 2000 (Commission Européenne, Direction Générale 'Affaires Économiques et Financières').

Descriptive statistics of some variables (%)

	IM ----- ASSETS	PTPROFIT ----- ASSETS	EQUITY ----- ASSETS	LABOR ----- ASSETS	LOAN ----- DEP	MS
Mean	2.54	1.06	6.25	1.43	109.45	4.18
Max	8.01	6.29	26.02	3.14	989.36	33.24
Min	-1.67	-2.62	0.98	0.11	27.48	0.02
Std. Dev.	1.57	0.95	3.52	0.60	70.60	5.98

Results:

LS // Dependent Variable is IM/ASSETS

Sample (adjusted): IF EQUITY>0

Included observations: 477 after adjusting endpoints

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.799791	0.366014	-2.185135	0.0294
LABOR/ASSETS	1.397429	0.136901	10.20757	0.0000
EQUITY/ASSETS	0.110296	0.023534	4.686731	0.0000
LOAN/ASSETS	0.023527	0.004637	5.073225	0.0000
MS	0.008137	0.007843	1.037518	0.3000
UR	-0.030525	0.034397	-0.887425	0.3753
INF	-0.102139	0.036798	-2.775660	0.0057
EXR	-1.77E-05	0.000147	-0.120431	0.9042
CRIS	0.002852	0.001449	1.968705	0.0496
DCFPS	-0.013428	0.003592	-3.738193	0.0002
D1	0.023207	0.004198	5.527786	0.0000
D2	0.019599	0.006007	3.262728	0.0012
D3	-0.002845	0.001698	-1.675304	0.0946
YEAR	0.017382	0.007952	2.185830	0.0293
YEAR*YEAR	-9.60E-05	4.24E-05	-2.263364	0.0241

LS // Dependent Variable is ROA

Sample (adjusted): IF EQUITY>0

Included observations: 477 after adjusting endpoints

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.197540	0.224592	0.879554	0.3796
LABOR/ASSETS	0.094415	0.087026	1.084907	0.2785
EQUITY/ASSETS	0.200242	0.014238	14.06423	0.0000
LOAN/ASSETS	0.007695	0.002590	2.971416	0.0031
MS	0.015280	0.003841	3.978588	0.0001
UR	-0.037868	0.019437	-1.948246	0.0520
INF	-0.043461	0.020308	-2.140148	0.0329
EXR	2.00E-06	8.09E-05	0.024734	0.9803
CRIS	0.000682	0.000890	0.765738	0.4442
DCFPS	-0.004374	0.001891	-2.313033	0.0212
D1	0.001854	0.002211	0.838656	0.4021
D2	0.012096	0.003240	3.733250	0.0002
D3	-0.003270	0.001042	-3.138169	0.0018
YEAR	-0.004278	0.004881	-0.876439	0.3812
YEAR*YEAR	2.25E-05	2.61E-05	0.862377	0.3889

LS // Dependent Variable is IM/EQUITY

Sample (adjusted): IF EQUITY>0

Included observations: 477 after adjusting endpoints

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.366639	6.259955	-0.537806	0.5910
LABOR/ASSETS	15.57204	2.036915	7.644910	0.0000
EQUITY/ASSETS	-3.260323	0.346372	-9.412780	0.0000
LOAN/ASSETS	0.404142	0.076693	5.269616	0.0000
MS	0.154858	0.142458	1.087040	0.2776
UR	-0.592039	0.568037	-1.042253	0.2978
INF	-1.754957	0.711952	-2.464992	0.0141
EXR	-0.002360	0.002590	-0.911101	0.3627
CRIS	0.054085	0.024212	2.233803	0.0260
DCFPS	-0.200159	0.067908	-2.947486	0.0034
D1	0.419235	0.071076	5.898438	0.0000
D2	0.281686	0.093371	3.016853	0.0027
D3	0.024557	0.035286	0.695953	0.4868
YEAR	0.095506	0.136731	0.698497	0.4852
YEAR*YEAR	-0.000591	0.000729	-0.810675	0.4180

LS // Dependent Variable is ROE

Sample (adjusted): IF EQUITY>0

Included observations: 477 after adjusting endpoints

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.077019	3.607479	1.407359	0.1600
LABOR/ASSETS	1.268978	1.358656	0.933995	0.3508
EQUITY/ASSETS	0.775668	0.193757	4.003293	0.0001
LOAN/ASSETS	0.044995	0.039711	1.133073	0.2578
MS	0.340045	0.073922	4.600064	0.0000
UR	-0.862172	0.284189	-3.033792	0.0026
INF	-1.152596	0.442833	-2.602776	0.0095
EXR	0.000456	0.001291	0.353369	0.7240
CRIS	0.001792	0.017467	0.102610	0.9183
DCFPS	-0.061173	0.034003	-1.799072	0.0727
D1	0.026513	0.042200	0.628263	0.5301
D2	0.210882	0.048157	4.379001	0.0000
D3	-0.042555	0.021934	-1.940138	0.0530
YEAR	-0.105481	0.079320	-1.329819	0.1842
YEAR*YEAR	0.000560	0.000426	1.312674	0.1899

Summary of results

	IM/ASSETS		IM/EQUITY		ROA		ROE	
C	-	**	-		+		+	
LABOR/ASSETS	+	*	+	*	+		+	
EQUITY/ASSETS	+	*	-	*	+	*	+	*
LOAN/ASSETS	+	*	+	*	+	*	+	
MS	+		+		+	*	+	*
UR	-		-		-	***	-	*
INF	-	*	-	**	-	**	-	*
EXR	-		-		+		+	
CRIS	+	**	+	**	+		+	
DCFPS	-	*	-	*	-	**	-	***
D1	+	*	+	*	+		+	
D2	+	*	+	*	+	*	+	*
D3	-	***	+		-	**	-	***
YEAR	+	**	+		-		-	
YEAR*YEAR	-	**	-		+		+	

* significant at the 1% level (two-tailed).

** significant at the 5% level (two-tailed).

*** significant at the 10% level (two-tailed).

Some comments on the results:

1. The determinants of NIM and Pre-tax Profits are not the same and this holds true when we use either total assets or equity on the denominator of the ratios. In particular, we have found that CRIS and Labor/Assets impact on NIM only, whilst MS and Ur are relevant for explaining ROA(E).
2. Results do not significantly change when we use Equity (instead of total assets) in the denominator of the dependent variable, meaning that results are robust.
3. Regarding bank-specific variables, the net interest margin reacts positively to operating costs, but pre-tax profits do not. This means that less efficient banks (that is, banks with higher operating costs) charge higher interest rates on loans (or pay lower rates on deposits), therefore passing those costs onto customers. However, competition does not allow them to 'overcharge' and thus all banks achieve similar profitability ratios.
4. Well-capitalised banks (ie, banks with higher equity/assets) face lower expected bankruptcy costs and thus lower funding costs and higher interest margins on assets. In general, this advantage 'translates' into better profitability ratios.

5. The loan-to-asset ratio has a positive impact on interest margins and profitability. This could mean that in our sample period banks did watch carefully the lending process. That is, they did not grant credit at all costs (relaxing credit selection and monitoring), just for the sake of organic growth. Thus, they seem to have been able to maintain low levels of non-performing loans, thereby increasing profits and margins.
6. The market share variable is not significant when we explain the Net Interest Margin. If we consider that MS captures product differentiation as well as market power, then it appears that banks do not differentiate traditional loan and deposit products (and do not exert market power in these markets) but rather less ‘conventional’ bank products and services. It also means that market structure is not relevant in those traditional activities; however, they do exert market power in some other bank products and services such as off-balance activity.
7. Although with a negative sign in all regressions, the unemployment rate (as a proxy for the cyclical behavior of the economy) is relevant in the two last equations only. Results are not better if we use the GDP growth rate instead.
8. The inflation rate is relevant in all models. Inflation brings along higher costs but also higher income. It seems that bank costs increase more than do bank revenues. This contradicts findings from other studies (Barth *et al* 1997, Claessens, Demirguç-Kunt and Huizinga 1998, Hanson and Rocha 1986, Demirguç-Kunt and Huizinga 1999, Demirguç-Kunt and Huizinga 2000, Denizler 2000), but goes along the lines of earlier research (Wallich 1977, Petersen 1986).
9. The nominal effective exchange rate does not have any impact on net interest margins and profitability.
10. The EMS crisis of 1992/3/4 seems to have had a positive impact on the net interest margin on assets but not on bank profitability. Under pressure, European authorities reacted by increasing short-term interest rates and that has had some impact on median and long-term rates. However, credit rates react generally faster than do deposit rates and thus the positive impact on the interest margin. At the same time, exchange rate instability increases risk in cross-border bank activity and losses could have occurred in foreign exchange transactions. Other bank costs may have also increased, thus offsetting increased bank revenues.
11. Portuguese and Spanish banks suffered from the liberalisation of capital movements (occurred in Portugal in 1992 and in Spain in 1993), both in terms of

interest margin and profitability. Given the increased competition brought about by liberalisation, fund holders did look for more efficient banking systems and more profitable applications, thus flowing out of these two countries.

12. Banks in Portugal and Spain perform generally better than banks in Germany. However, French banks at the lower end of the spectrum. We can consider that we have in these four countries bank-based financial systems. And “after controlling for the level of financial development, there is some evidence that a more market-based financial structure would lead to lower levels of bank profits” (Demirgüç-Kunt and Huizinga 2000, p.12). That seems to be the case of Portugal and Spain vis-à-vis France and Germany. The bank sector in Iberian countries thus represents for firms a larger source of funds than does the capital market, leading to superior performances for Portuguese and Spanish banks. As for France and Germany, 1995 data shows that total bank assets represent 119% of GDP in Germany (against the 99% in France), whilst stock market capitalization represents 34% of GDP in France and 24% in Germany (Demirgüç-Kunt and Huizinga 1999, table3). Using the same reasoning, banks in France face more intense competition from the stock market and therefore show lower interest margins and profitability.
13. No clear time trend, except for IM/Assets.

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