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Banking competition, financial development and economic growth

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1. Introduction

*Finance-Growth nexus

- Financial development \Rightarrow Economic growth
- Abundant empirical evidence (Goldsmith, 1969, Levine, 1993, King and Levine, 1993; Levine and Zervos, 1998; Guiso et al., 2004; Levine, 2005; etc.)

General conclusion: financial development promotes growth

$$* \Delta \text{GDP} = f(\Delta \text{K/L}, \Delta \text{TFP})$$

$$\bullet \Delta \text{Saving} \Rightarrow \Delta \text{Investment} \Rightarrow \Delta \text{GDP}$$



Financial system:

- Financial intermediaries
- Financial markets

1. Introduction

- Criticism of the positive correlation between financial development and economic growth usually observed:

Rajan and Zingales (1998), AER: Is it the result of an omitted variable problem?

- Financial development = $f(\text{saving rate})$
- Economic growth = $f(\text{saving rate})$

$$\Delta \text{GDP} / \text{GDP} = \alpha + \beta \text{ Financial development} + \lambda \text{ saving rate}$$



1. Introduction

- Solution to the relevant omitted variable: RZ (1998) explicit the mechanism by which financial sector affects growth.
- Does ex-ante financial development facilitate access to financing and therefore enhances ex-post economic growth in the more financially dependent sectors?
- Sectors most dependent on external financing will grow faster the more developed the financial markets are.
- RZ (1998) contribution is not dependent on the macroeconomic modeling habitual in the literature:
 - Habitual approach: $\Delta\text{GDP}/\text{GDP}=f$ (proxies of financial development)
 - RZ (1998) approach:
$$\Delta\text{GDP}/\text{GDP}=f(\text{Fin. Dependence} * \text{proxies of financial development, control variables})$$

1. Introduction

- An additional and related issue: the effect of banking competition on economic growth
- Ambiguous effect:
 - Conventional economic theory suggests that market power translates into:
 - Higher loan interest rate
 - Lower quantity of credit } Lower economic growth
 - Relationship banking: if there is bank market power, banks have incentives to invest in the acquisition of soft information by establishing close relationships with borrowers to overcome informational problems, thus facilitating the availability of credit (information monopoly)
- Consequently: the effect of bank market power on the conditions of finance (and, hence on economic growth) is a matter to be settled with empirical evidence

1. Introduction

- Contributions of our paper:

- a) We provide empirical evidence using a **new sample** (all the previous papers use the same sample, countries, sectors, measure of financial dependence, etc) **for a recent period (1993-03) and for a sample of 53 sectors and 21 countries.**

- b) Considering the limitations of market concentration as proxy variable for competition, **we use non-structural indicators of banking competition.**

- c) **We test the robustness of the results using different indicators of banking competition:** the H-statistic and the Lerner index (and also market concentration measures)

- d) We calculate **indicators of external dependence for a more recent period (1993-03 vs. 1980-90 in previous papers).** Furthermore, the years for which financial dependence is calculated are the same as the rest of the variables.

- e) **We expand the range of sectors analyzed, including the services sector** (in Rajan and Zingales, 1998 and Claessens and Laeven, 2005 the focus is on the manufacturing sector).

2. Banking competition and economic growth: background

- Two areas of research have analyzed the effect of banking competition on economic growth:
 - **Direct effect:** relationship banking, banking competition and finance conditions. These papers analyze the direct effect of competition on certain variables (cost of finance and availability of credit) which are, in turn, determinants of economic growth.
 - Petersen and Rajan (1995), D'Auria et al. (1999), Angelini et al. (1998), etc.
 - **Indirect effect:** banking competition and economic growth: cross-country studies. Papers that focus on the effects of financial markets on growth without considering if it is by means of interest rates or by availability of credit.
 - Bank competition-finance conditions-growth (Cetorelli & Gambera, 2004; Claesens & Leaven, 2006).
- Our paper uses this latter approach following the model specification of Rajan and Zingales (1998).

3. Methodology

3.1. Model specification RZ (1998):

$$Growth_{j,k} = Constant + \psi_1 Sector\ Dummies_j + \psi_2 Country\ Dummies_k +$$

$$\psi_3 Industry\ share\ in\ value\ added_{j,k} + \psi_4 External\ Dependence_j * Financial\ Development_k + \varepsilon_{j,k}$$

where j =sector, k =country, $Growth$ = average annual real growth rate of value added of sector j in country k .

- RZ (1998) focus on the relationship between financial development and growth, testing whether the sectors most dependent on external finance present higher rates of growth in countries with a higher level of financial development.
- The sector and country dummies capture the influence of effects specific to each sector or country, respectively.
- The beginning-of-period sector share in value added captures the possible “convergence” effect at sectoral level. It is expected that sectors with large initial shares usually grow more slowly.

3. Methodology

3.1. Model specification:

$$\text{Growth}_{j,k} = \text{Constant} + \psi_1 \text{Sector Dummies}_j + \psi_2 \text{Country Dummies}_k + \psi_3 \text{Industry share in value added}_{j,k} + \psi_4 \text{External Dependence}_j * \text{Financial Development}_k + \psi_5 \text{External Dependence}_j * \text{Banking Competition}_k + \varepsilon_{j,k}$$

- **Extensions** of Cetorelli and Gambera (2001) and Claessens and Laeven (2005) also include the interaction between market power and financial development to test if firms more dependent on external funds grow faster in more competitive markets.
- Hence, the extension takes into account the mechanism by which competitive rivalry in the banking markets affects growth, which is through firms' financial dependence.

3. Methodology

3.1. Model specification:

$$\begin{aligned} \text{Growth}_{j,k} = & \text{Constant} + \psi_1 \text{Sector Dummies}_j + \psi_2 \text{Country Dummies}_k + \\ & \psi_3 \text{Industry share in value added}_{j,k} + \psi_4 \text{External Dependence}_j * \text{Financial Development}_k + \\ & \psi_5 \text{External Dependence}_j * \text{Banking Competition}_k + \varepsilon_{j,k} \end{aligned}$$

So, What do we need?

We need measures of:

- Bank competition:
 - We will use indicators of concentration, the H statistic, and the Lerner Index.
- Financial dependence
- Financial development

4. Variables, sources of information and sample

A. The measurement of banking competition: We use alternatively three types of indicators.

All the banking indicators are calculated on the basis of BankScope Database.

A.1. **Structural Indicators:** Indicators of market concentration:

- R3, R5, HHI

A.2. The **Lerner index**

$$\frac{[r_{TA}^* - cm_{TA}]}{r_{TA}^*}$$

- r_{TA} is proxied by the ratio of total revenue to total assets
- Marginal costs include both operating and financial costs
- cm_{TA} are estimated from a translog cost function with 3 input prices: labor, fixed capital and financial funds.

4. Variables, sources of information and sample

A. The measurement of banking competition: We use alternatively three types of indicators :

A.3. The H-statistic (Panzar and Rosse)

$$\log(TR/TA)_{it} = \sum_{j=1}^3 \alpha_j \log w_{it}^j + \beta \log S_{it} + \sum_{n=1}^2 E_{it}^n + \lambda_i + u_{it}$$

$$H = \sum_{j=1}^3 \alpha_j$$

where TR = total revenue, TA = total assets, w are the input prices (labor, lendable funds and physical capital), S is a scale variable, and E are exogenous variables specific to each bank which affect revenue. The revenue function is estimated separately for each country and includes fixed-effects.

As demonstrated by Panzar and Rosse (1987), on the assumption that firms operate at their long term equilibrium levels:

- A value of the H -statistic equal to 1 is consistent with a situation of perfect competition;
- A value of H between 0 and 1 indicates the existence of monopolistic competition
- Values equal to or less than 0 are consistent with a situation of monopoly.

Consequently, the higher the value of the H-statistic, the lower the bank market power.

4. Variables, sources of information and sample

B. Financial dependence

- Following the approach of RZ (1998), the identification of the external financial dependence at the sectoral level is based on the available information on a country (benchmark) with developed financial markets in which firms do not face restrictions in their access to financing (USA in RZ, 1998).
- Assumption: there are technological reasons (project scale, gestation period, etc.) why some sectors depend more than others on external finance, and these reasons are the same in all countries.
- In our case, because of the availability of information, the benchmark is the UK:
 - The most highly developed financial markets
 - (MK/GDP=121% in UK, 66% in EU15 and 115% in USA)
 - A country with a diversified productive structure
- External dependence is measured for listed firms (less restricted to their access to external finance than others of smaller size)

4. Variables, sources of information and sample

- **Financial dependence** (source: Amadeus), measured for UK quoted firms (9,087 firms)
 - Specifically, the degree of external financial dependence is proxied as the ratio of debt with cost to current liabilities. The definition used is as follows:

$$\frac{[\text{Non current liabilities}] + [\text{Current liabilities : loans}]}{[\text{Total assets}] - [\text{Current liabilities : creditors}] - [\text{Other current liabilities}]}$$

C. Economic growth. Annual average sectoral growth of real value added

- Source: Groningen Growth and Development Centre. *The 60-Industry Database* Centre (26 countries, 1979-03, 57 sectors classified according to ISIC rev. 3).
- **Advantages over RZ (1998):**
 - It directly offers the **deflators of gross value added** for each of the sectors of **activity** included. Using an aggregate deflator would cause us to compute part of the price variation as a variation in real activity.
 - Secondly, as already remarked, it allows us to carry out the **analysis for all sectors of the economy**, without having to circumscribe it to manufacturing sectors.

4. Variables, sources of information and sample

D. **Financial development:** Three variables are used alternatively:

- **Ratio credit to GDP** (Private Credit/GDP), taken from International Financial Statistics (IMF)
- **Ratio market capitalization to GDP** (MK/GDP) taken from World Development indicators (World Bank)
- **Total capitalization/GDP** . Calculated as the sum of Private credit /GDP and MK/GDP.

SAMPLE USED:

Therefore, the sample consists of **53** activity sectors observed in **21** countries in the period **1993-2003**.

That is 995 observations

[15]

Country	Period
Germany	1993-2003
Australia	1993-2003
Austria	1993-2003
Belgium	1993-2003
Canada	1993-2002
Korea	1993-2002
Denmark	1993-2003
Spain	1993-2003
USA	1993-2003
Finland	1993-2003
France	1993-2003
Greece	1993-2003
Netherlands	1993-2003
Ireland	1993-2003
Italy	1993-2003
Japan	1993-2003
Luxembourg	1993-2003
Norway	1993-2002
Portugal	1993-2003
United Kingdom	1993-2003
Sweden	1993-2003

5. Results

Table 9. Economic growth and financial development

	(1)	(2)	(3)
Constant	0.0126 (0.0151)	-0.0015 (0.0167)	-0.0201 (0.0193)
Share in value added. 1993	-0.0905 (0.1356)	-0.0843 (0.1352)	-0.0954 (0.1350)
Financial dependence*Credit/GDP	0.0005 * (0.0003)		
Financial dependence*Market capitalisation/GDP		0.0006 ** (0.0002)	
Financial dependence*Total capitalisation/GDP			0.0006 *** (0.0002)
R² adj.	0.8222	0.8229	0.8236
Number of observations	995	995	995
Differential in real growth rate	0.40	0.53	0.49

Notes: The dependent variable is the annual growth rate in real value form the period 1993-03 for each sector in each country. Definitions and data sources are in Table 7. The differential in real growth rate measures (in percentage terms) how much faster a sector at the 75th percentile level of financial dependence grows with respect to a sector at the 25th percentile level when it is located in a country at the 75th percentage of financial development rather than in one at 25th percentile. All regressions include both country and sector fixed effects (not reported). Robust standard errors are reported in parentheses. * Significant at 10%; ** significant at 5%; *** significant at 1%.

5. Results

Table 10. Economic growth, financial development and bank competition

	(1)	(2)	(3)	(4)	(5)
Constant	-0.0172 (0.0196)	-0.0184 (0.0197)	-0.0166 (0.0194)	0.0150 (0.0215)	-0.0180 (0.0310)
Share in value added. 1993	-0.0955 (0.1350)	-0.0955 (0.1351)	-0.0977 (0.1349)	-0.0975 (0.1341)	-0.0957 (0.1351)
Financial dependence*Total capitalisation/GDP	0.0006 *** (0.0002)	0.0006 *** (0.0002)	0.0006 *** (0.0002)	0.0007 *** (0.0002)	0.0006 * (0.0002)
Financial dependence*R3	-0.0414 (0.0535)				
Financial dependence*R5		-0.0178 (0.0442)			
Financial dependence*Herfindahl index			-0.2382 * (0.1385)		
Financial dependence*H-statistic				-0.1684 *** (0.0470)	
Financial dependence*Lerner index					-0.0166 (0.1952)
R² adj.	0.8236	0.8235	0.8240	0.8259	0.8235
Number of observations	995	995	995	995	995
Differential in real growth rate					
Financial development	0.46	0.48	0.45	0.51	0.49
Bank competition	-0.16	-0.09	-0.32	-0.53	-0.02

Notes: The dependent variable is the annual growth rate in real value form the period 1993-03 for each sector in each country. Definitions and data sources are in Table 7. The differential in real growth rate measures (in percentage terms) how much faster a sector at the 75th percentile level of financial dependence grows with respect to a sector at the 25th percentile level when it is located in a country at the 75th percentile of financial development (bank competition) rather than in one at 25th percentile. All regressions include both country and sector fixed effects (not reported). Robust standard errors are reported in parentheses. * Significant at 10%; ** significant at 5%; *** significant at 1%.

**Higher bank competition
(H-Statistic), less
economic growth**

6. Robustness tests: initial values

Table 11. Economic growth, initial financial development and bank competition

	(1)	(2)	(3)	(4)	(5)
Constant	-0.0079 (0.0168)	-0.0120 (0.0173)	-0.0079 (0.0168)	0.0104 (0.0203)	-0.0544 (0.0238)
Share in value added. 1993	-0.1017 (0.1345)	-0.0980 (0.1349)	-0.1017 (0.1346)	-0.0952 (0.1346)	-0.0995 (0.1344)
Financial dependence*Total capitalisation/GDP 1993	0.0006 *** (0.0002)	0.0007 *** (0.0002)	0.0006 *** (0.0021)	0.0008 *** (0.0002)	0.0008 *** (0.0002)
Financial dependence*R3 1993	-0.1540 ** (0.0698)				
Financial dependence*R5 1993		-0.0057 (0.0390)			
Financial dependence*Herfindahl index 1993			-0.1545 ** (0.0698)		
Financial dependence*H-statistic 1993-98				-0.1055 ** (0.0524)	
Financial dependence*Lerner index 1993					0.2789 ** (0.1142)
R² adj.	0.8248	0.8238	0.8248	0.8246	0.8250
Number of observations	995	995	995	995	995
Differential in real growth rate					
Financial development	0.50	0.59	0.50	0.67	0.67
Bank competition	-0.85	-0.04	-0.26	-0.46	0.62

Notes: The dependent variable is the annual growth rate in real value form the period 1993-03 for each sector in each country. Definitions and data sources are in Table 7. The differential in real growth rate measures (in percentage terms) how much faster a sector at the 75th percentile level of financial dependence grows with respect to a sector at the 25th percentile level when it is located in a country at the 75th percentage of financial development rather than in one at 25th percentile. All regressions include both country and sector fixed effects (not reported). Robust standard errors are reported in parentheses. * Significant at 10%; ** significant at 5%; *** significant at 1%.

6. Robustness tests: sectors & exclusion of benchmark

Table 13 Economic growth, initial financial development and bank competition:
Non linear effect

	(1)	(2)	(3)	(4)	(5)
Constant	-0.0213 (0.0178)	-0.0275 (0.0191)	-0.0112 (0.0171)	0.0193 (0.0685)	-0.0973 *** (0.0334)
Share in value added. 1993	-0.1046 (0.1342)	-0.1022 (-0.7590)	-0.1027 (0.1345)	-0.0949 (0.1347)	-0.0934 (0.1343)
Financial dependence*Total capitalisation/GDP 1993	0.0006 *** (0.0002)	0.0007 *** (0.0002)	0.0006 *** (0.0021)	0.0008 *** (0.0002)	0.0008 *** (0.0002)
Financial dependence*R3 1993	0.4871 ** (0.1923)				
Financial dependence*R3 1993 ²	-0.6016 *** (0.2088)				
Financial dependence*R5 1993		0.3928 * (0.2174)			
Financial dependence*R5 1993 ²		-0.3701 * (0.1985)			
Financial dependence*Herfindahl index 1993			0.0820 (0.2164)		
Financial dependence*Herfindahl index 1993 ²			-0.3975 (0.3443)		
Financial dependence*H-statistic 1993-98				-0.1745 (0.5127)	
Financial dependence*H-statistic 1993-98 ²				0.0484 (0.3581)	
Financial dependence*Lerner index 1993					1.4691 ** (0.6598)
Financial dependence*Lerner index 1993 ²					-2.5084 * (1.3698)
R ² adj.	0.8255	0.8243	0.8248	0.8244	0.8254
Number of observations	995	995	995	995	995
Differential in real growth rate					
Financial development	0.50	0.59	0.50	0.67	0.67
Bank competition	-1.07	-0.87	-0.07	0.05	-2.30

Inverted U-shaped relationship between market power and growth

Notes: See notes before. Robust standard errors are reported in parentheses. * Significant at 10%; ** significant at 5%; *** significant at 1%.

7. Conclusions

- Our new empirical evidence shows a positive effect of financial development on economic growth of the sectors most dependent on external finance.
- Certain level of bank market power favors the growth of sectors most dependent on external finance, (although it has an inverted U-shaped effect, the maximum effect is at intermediate levels).
- Results are in agreement with the contributions in the field of relationship banking: banks with market power have incentives to establish long lasting relationships with the borrowers to overcome informational problems and facilitating access to credit, reducing financial constraints.
- Results are sensitive to the indicator of banking competition used.
- Results are robust to different alternative specifications (initial conditions, manufacturing sectors, benchmark).
- Policy implications: there is a need to conjugate greater financial development with the exercise of (certain) market power (apart from the effect of bank competition on financial stability and, therefore, on growth).

Banking competition, financial development and economic growth

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