The Role of Financial Markets and Innovation in Productivity and Growth in Europe

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Introduction

• Large academic literature on finance and growth

• Complications, esp. from European policy point of view
  – No distinction between industrialised and developing countries
  – Often using historical data
  – Often analysing a very narrow issue

• This paper
  – Adopts a comprehensive view of financial systems
  – Chooses from a large number of indicators and most recent data
    • Updates existing ones
    • Introduces new ones
  – Focuses on industrial countries and Europe/euro area
  – Presents new econometric estimations
  – Ambition to inform European policy
Elements of the analysis

1) Conceptual framework based on an extensive review of the theoretical and empirical literature on finance and growth
   - With a particular eye on what works for industrialised countries

2) Compilation of a comprehensive set of indicators of financial development
   - Embedded in the conceptual framework
   - Firmly grounded in the literature
   - Comprehensively checked for data quality and comparability

3) Econometric analysis of how financial development affects economic efficiency
   - Does a more developed financial system help Schumpeterian process of “creative destruction”, i.e. speed up the reallocation of capital from declining to rising industry sectors?
   - What indicators are particularly relevant for this process?
Main results

• **Total capital market size** is a useful summary statistic
  – Captures overall financial development of an economic region

• **Financial market framework conditions** could be improved
  1) Certain aspects of corporate governance
     – General shareholder rights have improved in Europe
     – But it is still difficult to curb “self-dealing” of corporate insiders
  2) Efficiency of legal system in resolving financial disputes
     – Having many formal steps that regulate legal disputes limits the supply of capital
  3) Structural features of European bank sectors
     – A small number of countries still have significant levels of ownership of banks by the public sector
     – Do these banks perform better than the average recorded in the literature (e.g. such banks distort competition)?
Less strong results

• Information processing capacity of stock markets
  – Less pricing of idiosyncratic risk and greater uncertainty about firm prospects in a few specific European countries

• Creditor rights
  – Bondholders’ say in reorganisations and secured creditors’ priority increases depth and breadth of capital markets
  – But the overall strength is still unclear

• Ownership structures
  – More dispersed ownership of large publicly traded firms and more institutional shareholders could improve corporate governance

• Financial regulation and supervision
  – Some aspects could be improved w.r.t. incentives for risk taking and management
  – Moral-hazard of deposit insurance and forbearance discretion
Financial system concepts and their interrelation

Fundamentals of the financial system
- Legal System, Financial Regulation and Corporate Governance
- Monetary Institutions
- Financial Structure
- Market Infrastructures
- Other Structural Features

Performance of the financial system
- Financial Stability
- Financial Efficiency

Performance of the economy
- Economic Stability
  - Price stability
- Economic Efficiency
  - Economic Growth
Size of capital markets

(% of GDP; sum of loans, equity and bonds, BIS, ECB, IMF, Eurostat, WFE)
Enforcement of shareholder rights against self-dealing by corporate insiders

(high score = strong rights, anti-self dealing index, Djankov et al. 2006)
Duration of enforcement

(calender days, Worldbank, data refer to 2005)
State ownership of banks

(% of total assets, World Bank)
Hypothesis

Argument (Bagehot, 1873; Schumpeter, 1911):

In financially developed countries capital flows to industries (as well as firms and entrepreneurs) with positive prospects

Financial Markets ➔ Productivity-Innovation (relevance for advanced economies)

Only one broad channel addressed, there are others
Two-step procedure

1. **Estimate country-specific speeds of inter-sectoral capital reallocation**
   Using industry-level data (in manufacturing), investment growth is regressed on value-added growth (industry prospects).
   Control in the estimation for all possible sources of unobserved heterogeneity to precisely isolate the inter-industry response of industry investment to the emergence of growth opportunities (i.e. controlling for specialisation patterns; industry-specific global trends; common sector trends).

2. **Examine the effect of capital markets size (financial development) on the estimated speed of capital reallocation and identify the sources of financial development.**
   Two-stage least squares estimation.

Significant refinement of Wurgler (JFE, 2000)
Data

• 65 countries
  – Industrial and developing
  – We separate three groups, distinguishing high and low income countries
• 28 manufacturing industries
• 1963 to 2003
• Source: UNIDO, Industrial Statistics Database
Speed of inter-sectoral capital reallocation and capital markets size: Plots

**All Countries**

- Investment-Value Added Growth Elasticity (b4)
- Financial Development (FD)

**High Income**

- Investment-Growth elasticity estimated: controlling for country, industry, year, country-industry, industry-year and country-year fixed-effects
Legal efficiency and capital market size

Financial Development (FD) vs. Legal Formalism Index (LEXFORM)

Estimation: Excluding Low Income Countries

EUROPEAN CENTRAL BANK
Anti-self dealing and capital market size

Estimation: Excluding Low Income Countries
State ownership of banks and capital market size

Financial Development (FD) vs. Government Ownership of Banks (BGOV)

Estimation: Excluding Low Income Countries
Venture capital financing (early investment stage)

(% of GDP, by country of management, EVCA, PWC, Eurostat)
Venture capital and innovation

- Generally significant economic effect of VC on innovation
  - Lerner and Kortum (RAND, 2000) find that in the US over 1983-1992, VC has accounted for 8% of industrial innovation while being only 3% of R&D investment.
  - Da Rin and Penas (NBER, 2007) find that unlike public funding, VC pushes portfolio companies towards more in-house R&D effort.
  - However, little effect has been found of VC on Europe’s most innovative firms’ ability to raise equity capital, grow and create jobs (Da Rin and Botazzi [CEPR, 2002]), and several case studies show that VC has little impact on the innovation output of European firms (e.g., Peneder [SSRN, 2007] for Austria).

- Interpretation: VC promotes innovation, but only when coupled with available innovative technologies, highly trained workforce, infrastructure, and management expertise, and under the right public policies.
Public policies promoting VC: Literature

- **Taxes**
  - Low capital gains tax is a crucial stimulus to VC investment;
  - Tax advantaged stock options most noteworthy change of later years.

- **Regulations**
  - Integrated financial services market and a harmonized regulatory network reduce the cost of capital and widen access to investors;
  - Common accounting standards ensure transparency and promote confidence in prospective investors;
  - At the same time, too strict anti-trust regulation may create hurdles where no competition issues are raised;

- **Labour regulations**
  - Hiring and firing restrictions hamper high-tech VC investments.

- **Stock markets targeted at entrepreneurial companies positively affect the share of early stage and high-tech VC investments**
## Panel analysis of VC determinants

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<tr>
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<th>Share of high-tech investment</th>
<th>Share of early-stage investment</th>
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<tbody>
<tr>
<td></td>
<td>(i)</td>
<td>(ii)</td>
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<tr>
<td>New market</td>
<td>0.090</td>
<td>0.085</td>
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<tr>
<td></td>
<td>(0.049)*</td>
<td>(0.045)*</td>
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<tr>
<td>Capital gains tax</td>
<td>-0.014</td>
<td>-0.012</td>
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<tr>
<td></td>
<td>(0.003)**</td>
<td>(0.003)**</td>
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<tr>
<td>Per capita public R&amp;D</td>
<td>-0.004</td>
<td>-0.001</td>
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<tr>
<td></td>
<td>(0.006)</td>
<td>(0.006)</td>
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<tr>
<td>Per capita VC funds</td>
<td>-0.013</td>
<td>-0.011</td>
</tr>
<tr>
<td></td>
<td>(0.039)</td>
<td>(0.038)</td>
</tr>
<tr>
<td>Last-year’s per capita VC funds</td>
<td>0.006</td>
<td>0.004</td>
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<tr>
<td></td>
<td>(0.048)</td>
<td>(0.048)</td>
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<tr>
<td>Aggregate barriers to entry</td>
<td>0.060</td>
<td>-0.028</td>
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<tr>
<td></td>
<td>(0.038)</td>
<td>(0.027)</td>
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<tr>
<td>Hiring and firing indicator</td>
<td>0.044</td>
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<tr>
<td></td>
<td>(0.019)**</td>
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<td>Immigration law indicator</td>
<td>0.050</td>
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<td></td>
<td>(0.023)**</td>
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<td>Observations</td>
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</tbody>
</table>

Source: Da Rin et al. (2005), Public policy and the creation of active venture capital markets, ECB WP, no. 430, January.
The end
Securitisation

(% of GDP, by country of collateral, ESF, Eurostat, SIFMA)
Pricing of firm-specific information

(R2, high score = less pricing of idiosyncratic risk, own estimations/Datastream)
Dispersion of analysts’ EPS forecasts

(standard deviation of EPS forecast/level of forecast, Thomson Financial)
Bank concentration

(Herfindahl index for total assets, Bankscope)
Supervisory forbearance discretion

(high score = strong discretion, World Bank and ECB)

EUROPEAN CENTRAL BANK
Empirical approaches

1. Pure Cross-Country Cross-Industry
   Fisman and Love (2004a,b); Ciccone and Papaioannou (2006a)
   Is industries that experience global investment-growth opportunities growing faster in financially developed countries?

2. Cross-Country (I)
   Bekaert, Harvey, Lundbald, and Siegel (forthcoming)
   Do financially developed countries respond faster to shocks in the industries they specialize in?

3. Cross-Country (II)
   Wurgler (2000)
   Is industry investment more responsive to output growth (as a proxy for future growth opportunities) in financially developed countries?