EUROPEAN CENTRAL BANK

# 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
  - King & Levine (1993), Rajan & Zingales (1998), Wurgler (2000)
- 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

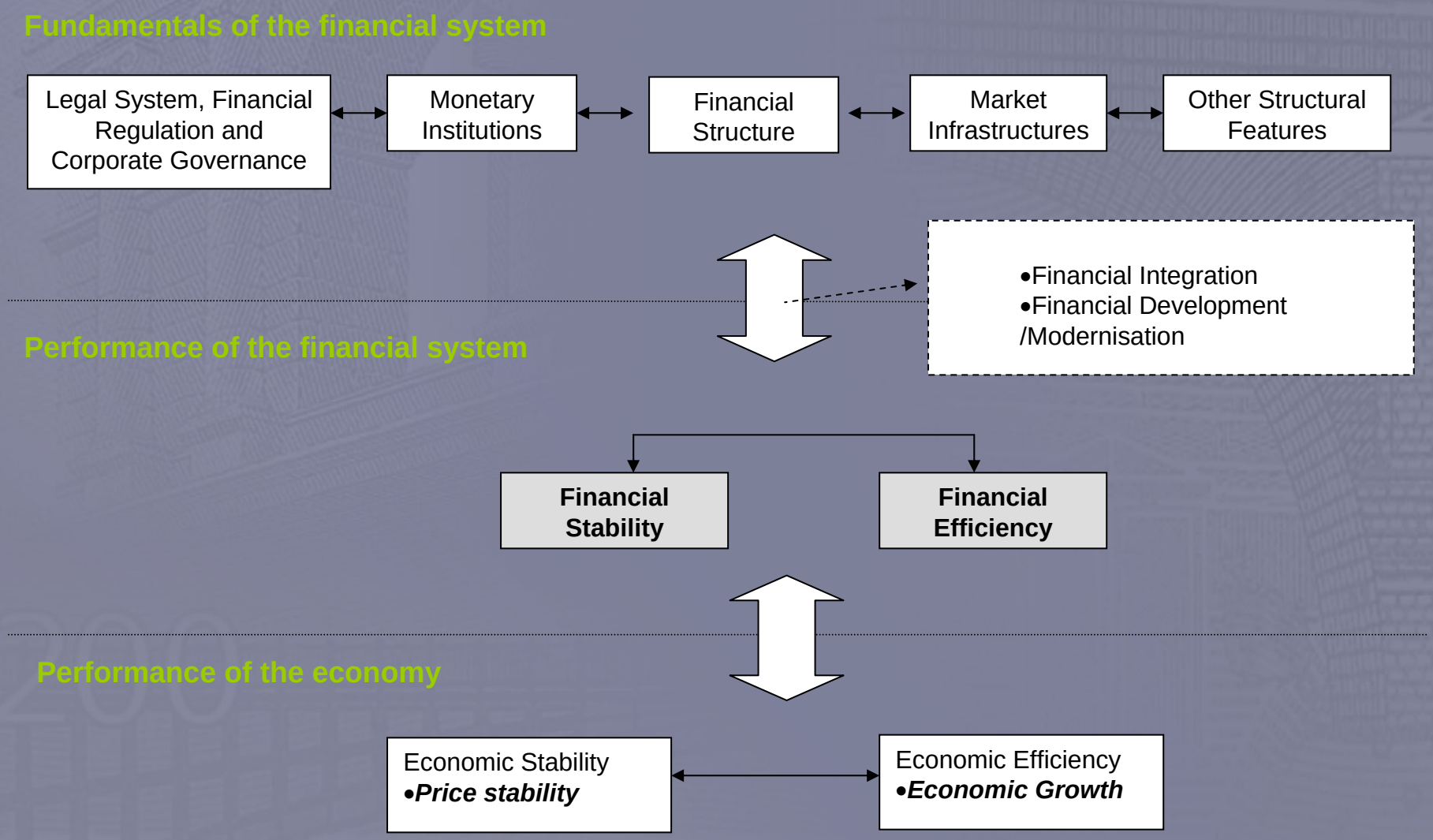
- Total capital market size is a useful summary statistic
  - Captures overall financial development of an economic region
- Financial market framework conditions could be improved

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)?

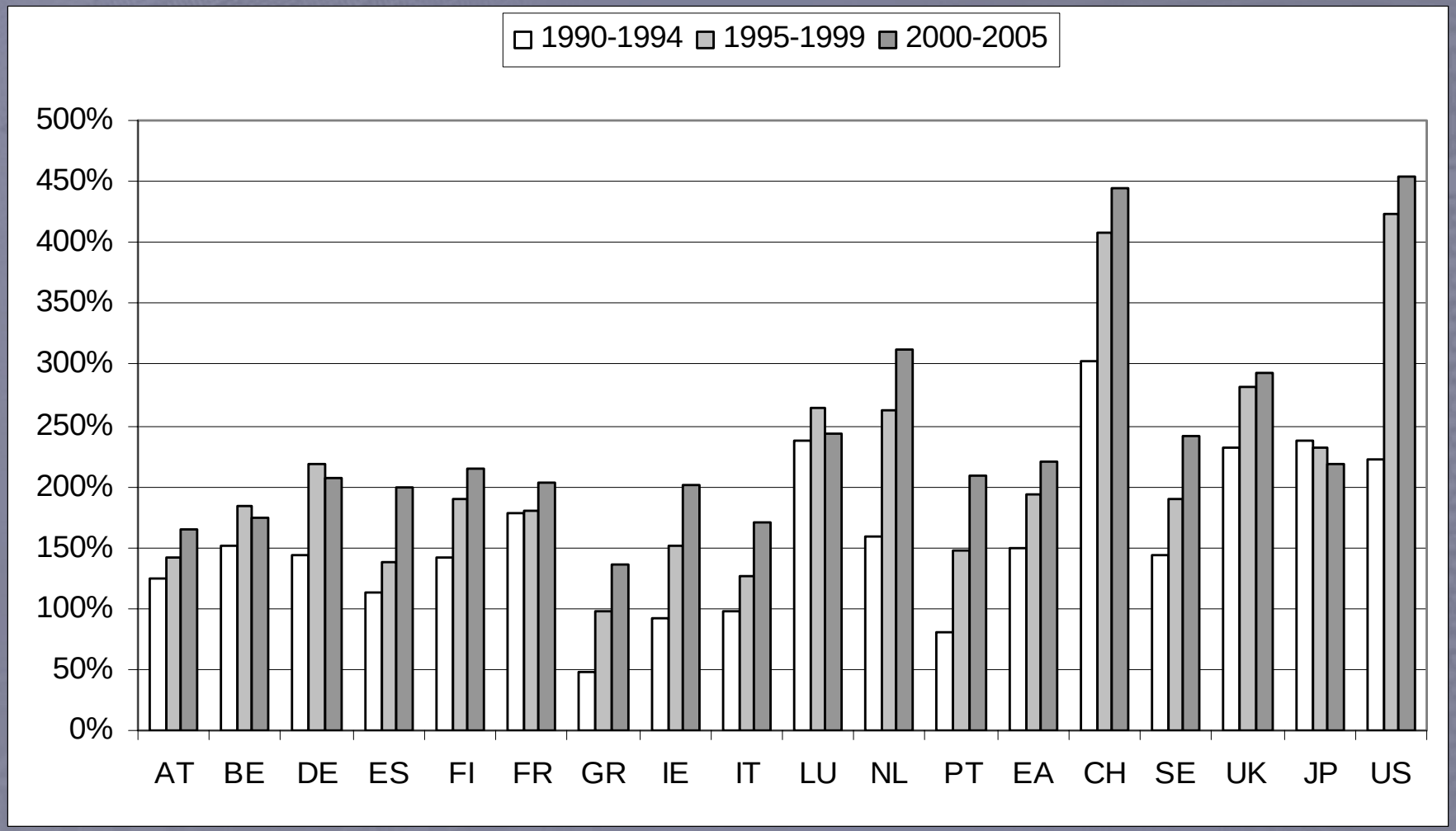
# Less strong results

- 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

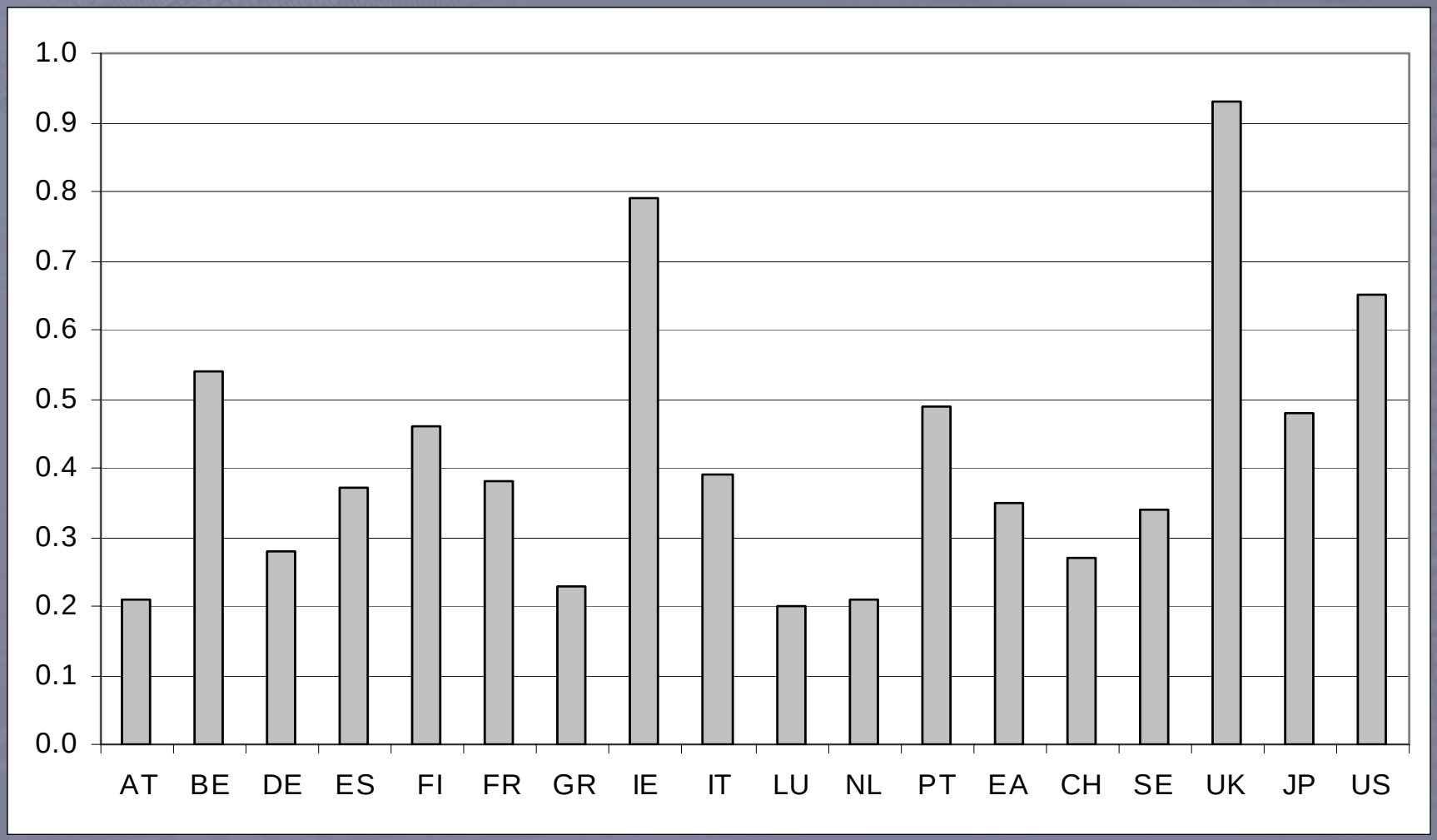


# Size of capital markets



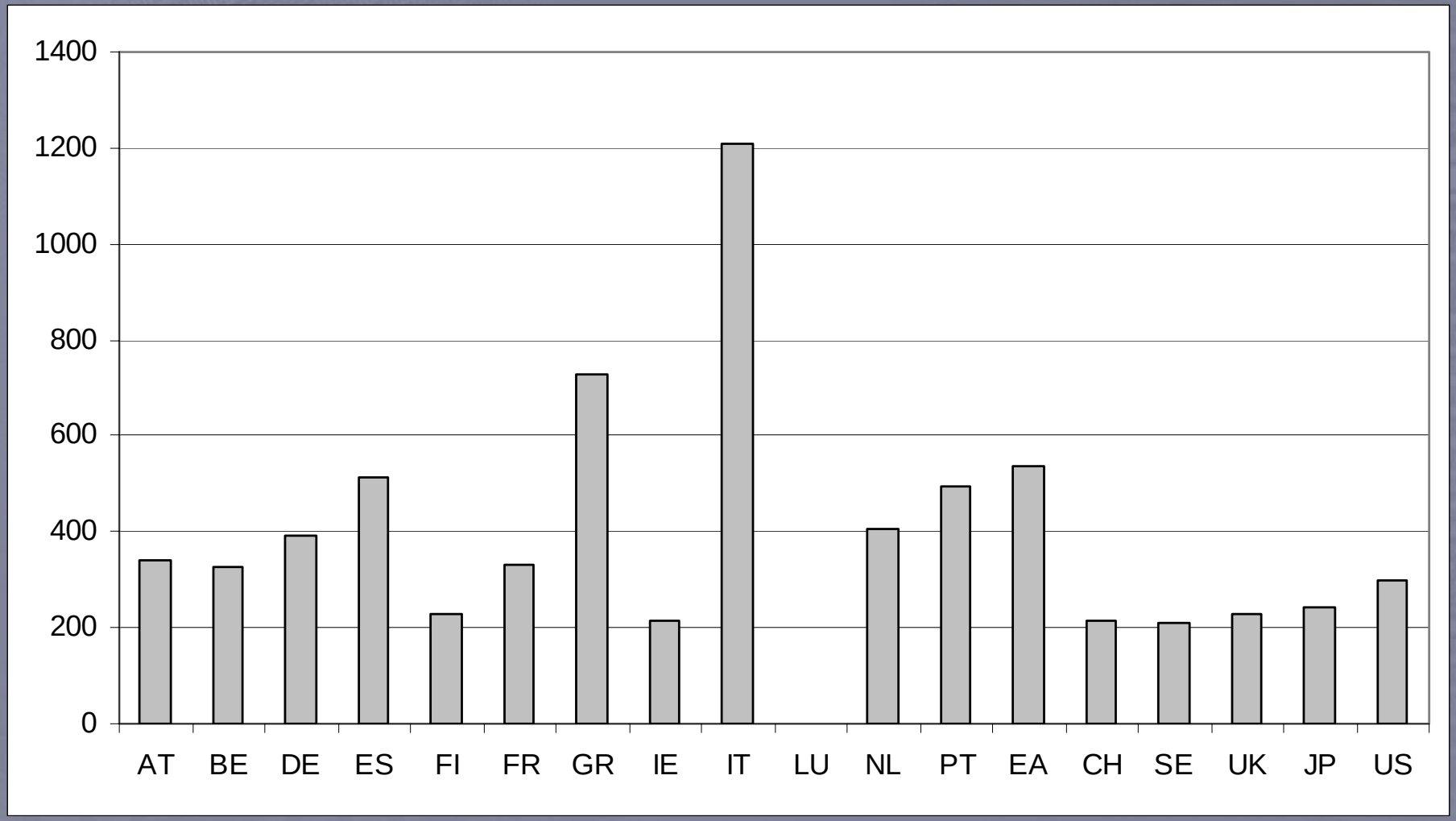

(% of GDP; sum of loans, equity and bonds, BIS, ECB, IMF, Eurostat, WFE)

# Enforcement of shareholder rights against self-dealing by corporate insiders



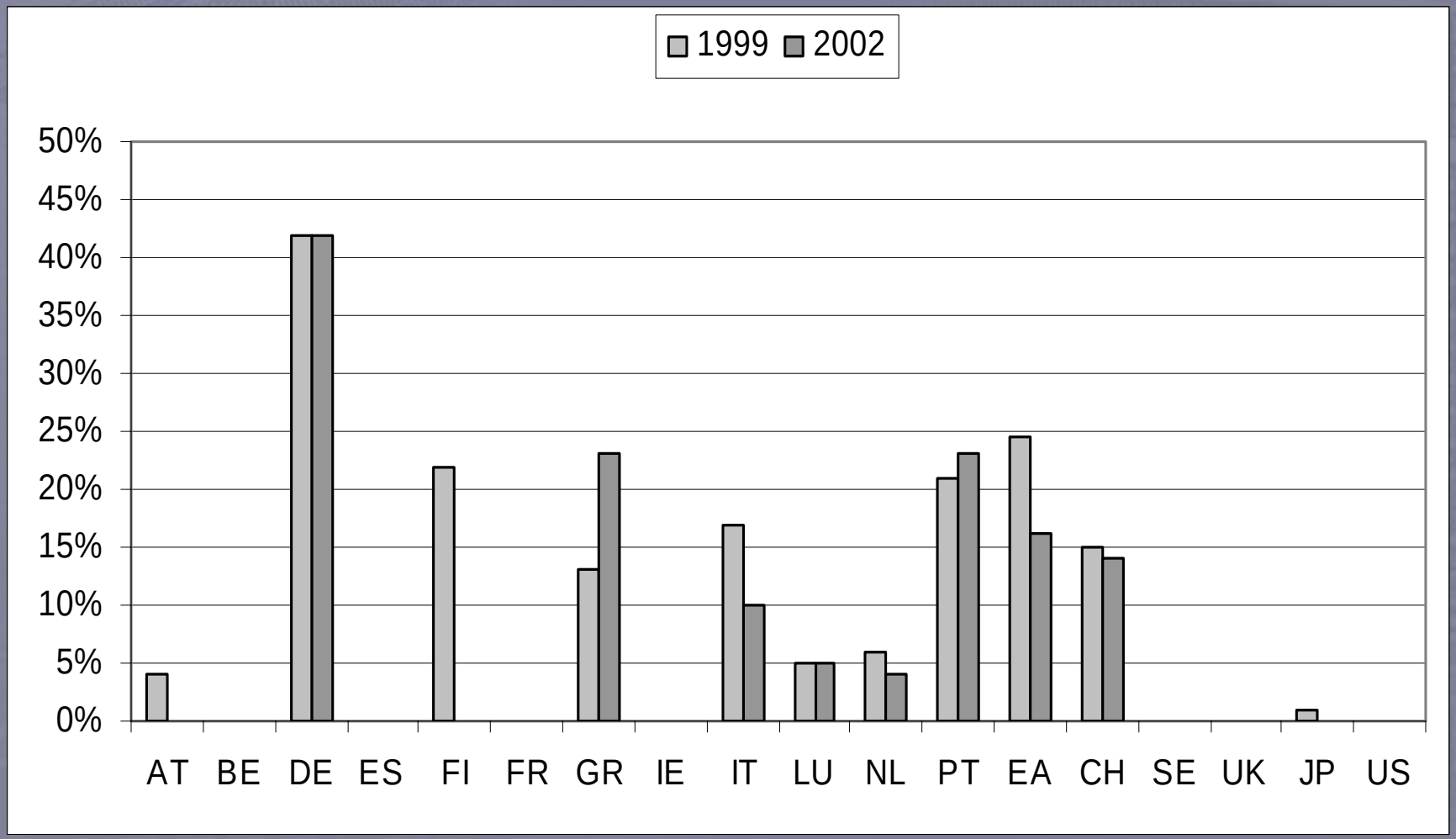

(high score = strong rights, anti-self dealing index, Djankov et al. 2006)

# 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.

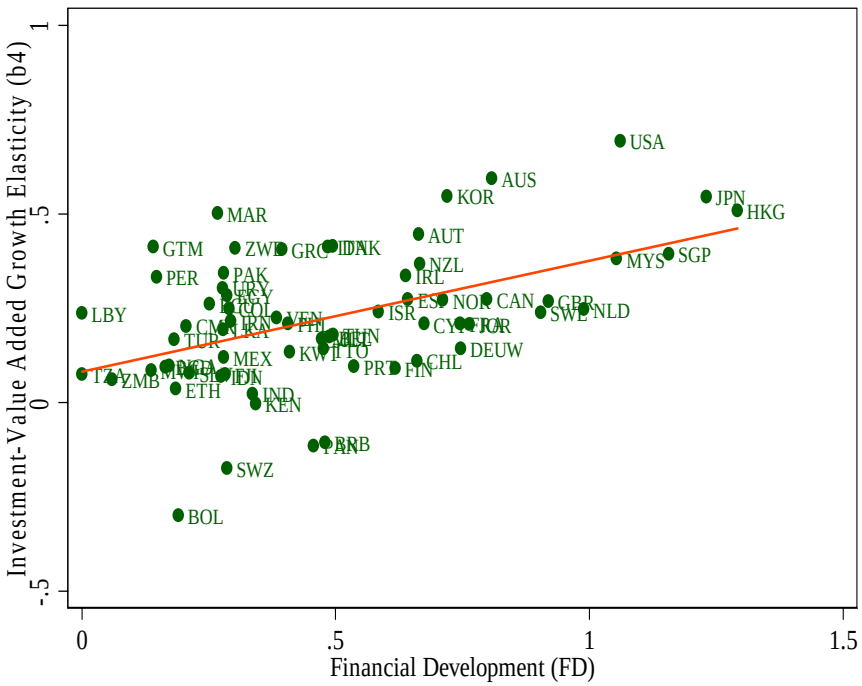
Significant refinement of Wurgler (JFE, 2000)

# 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

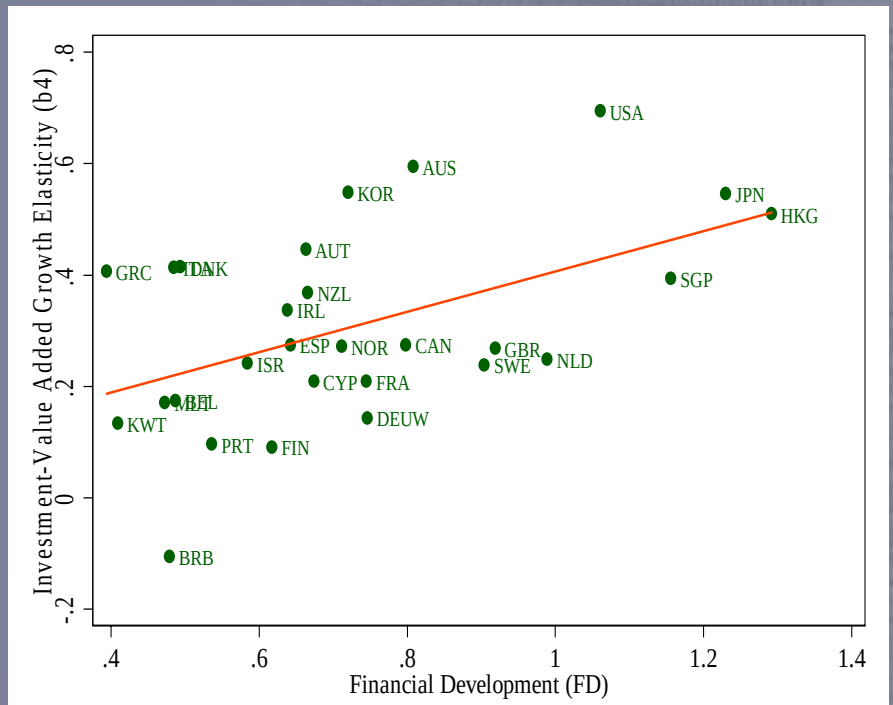
# Speed of inter-sectoral capital reallocation and capital markets size: Plots

## All Countries




Investment-Growth elasticity estimated:
controlling for country, industry, year, country-industry, industry-year and country-year fixed-effects

## High Income

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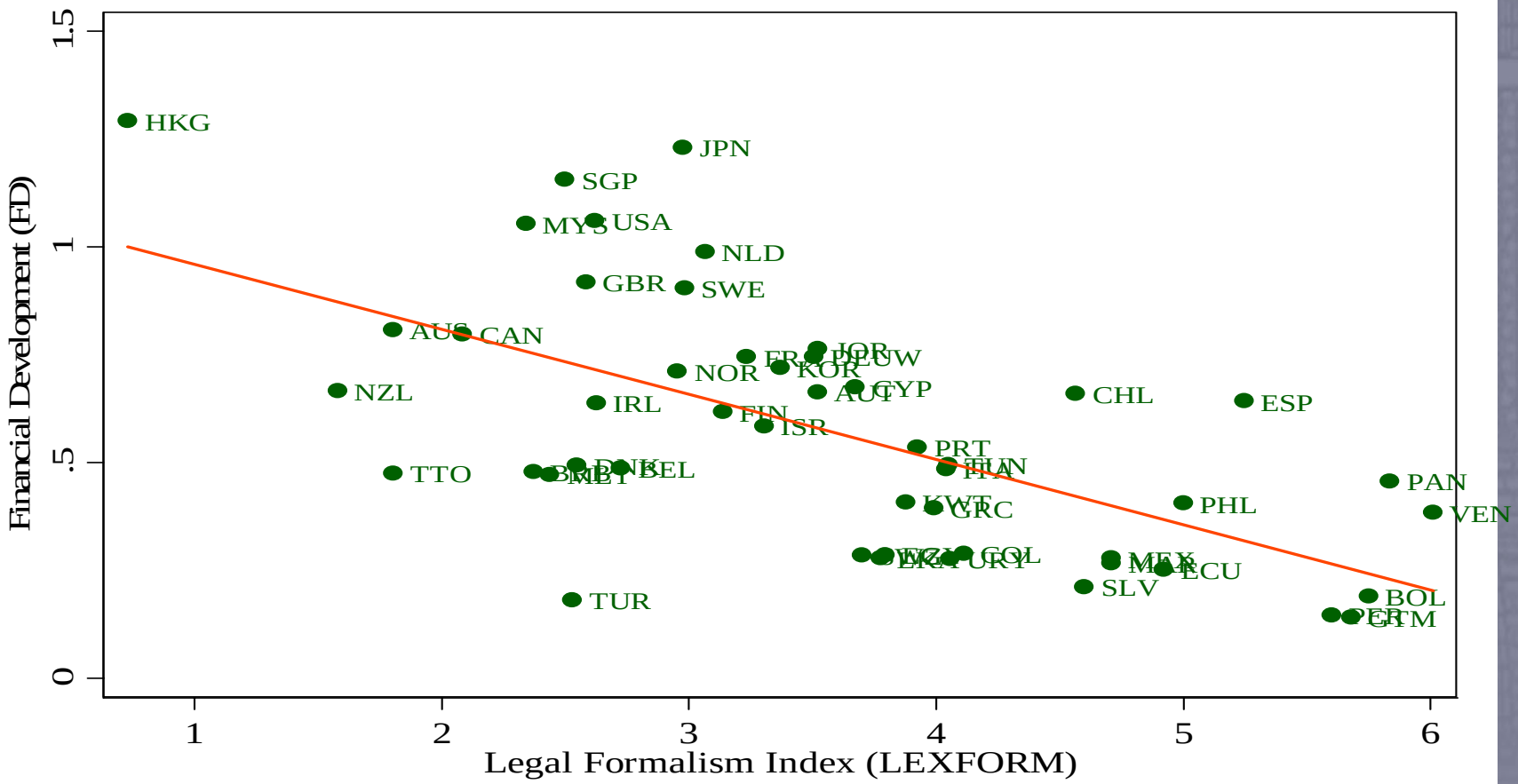
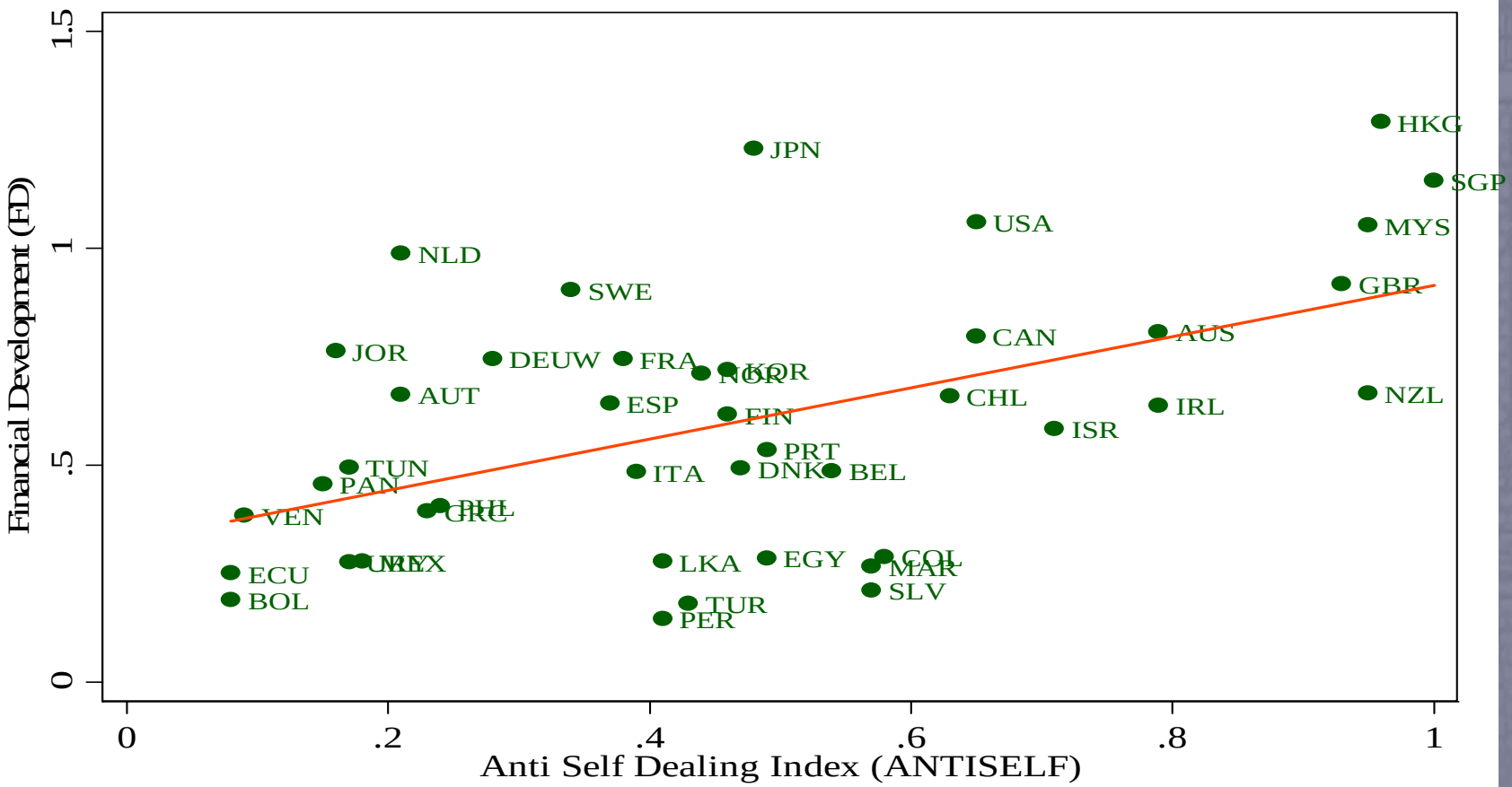
# Legal efficiency and capital market size



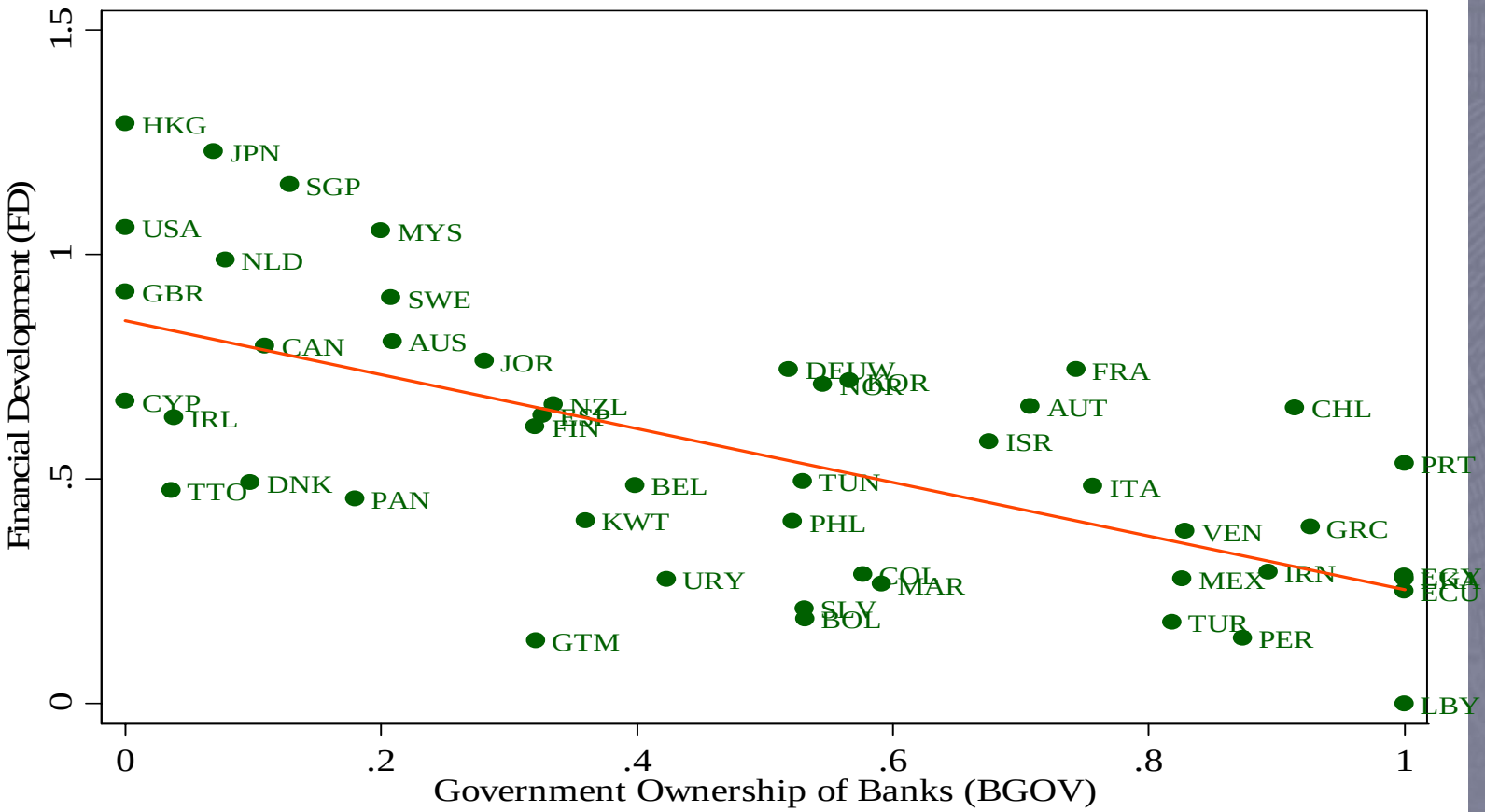

Estimation: Excluding Low Income Countries

# Anti-self dealing and capital market size



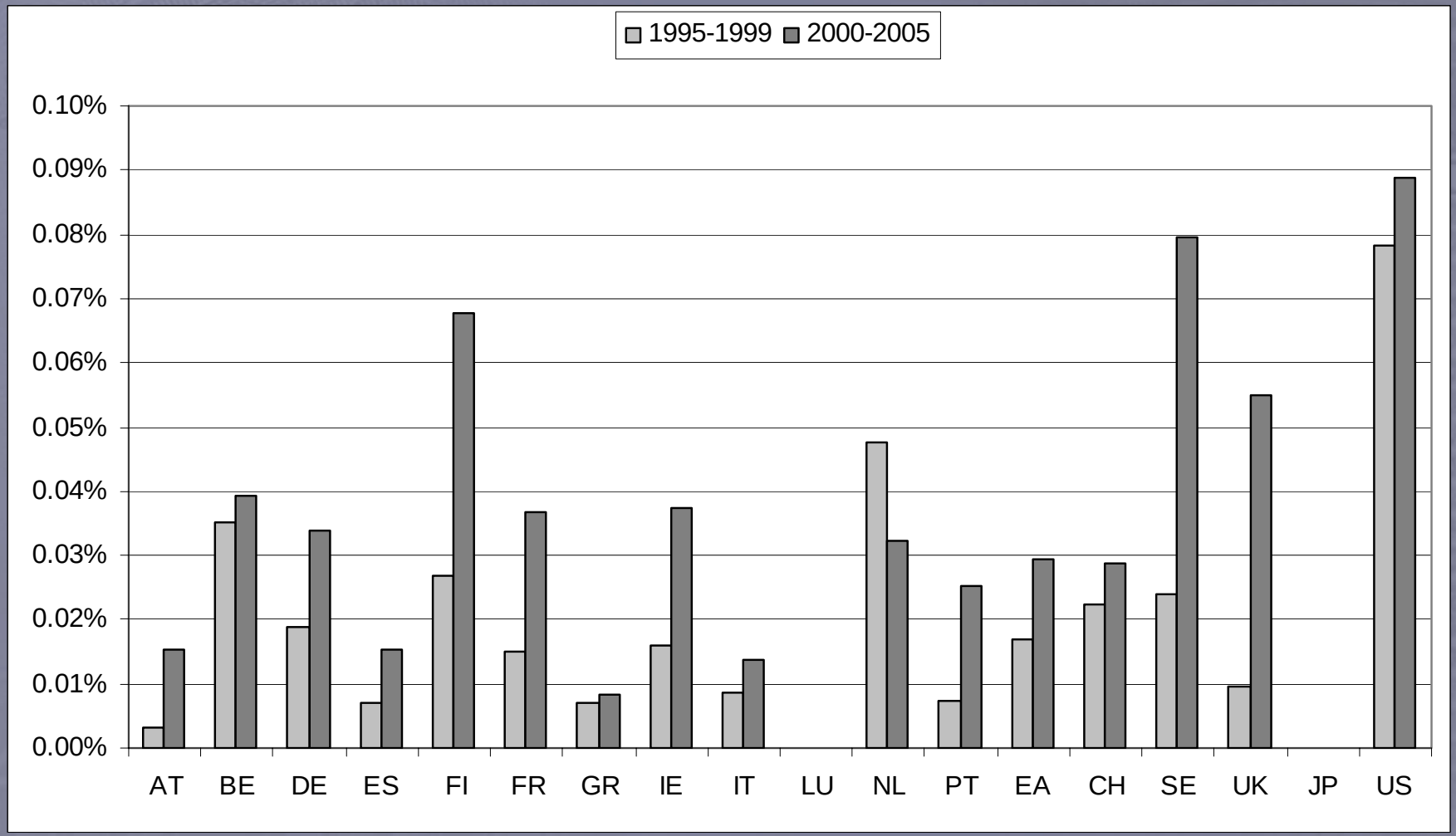

Estimation: Excluding Low Income Countries

# State ownership of banks and capital market size




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

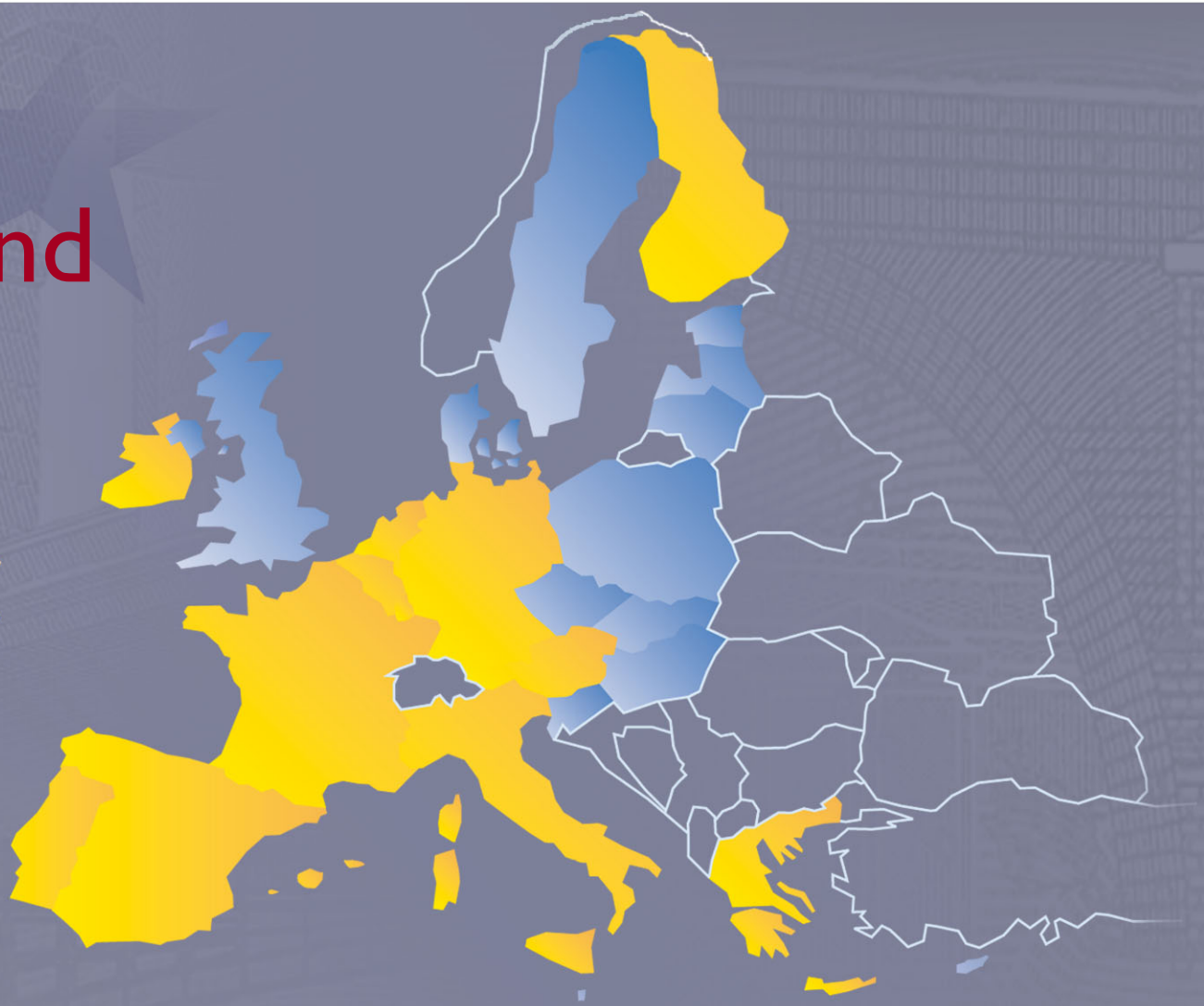
- Taxes
  - Low capital gains tax is a crucial stimulus to VC investment;
  - Tax advantaged stock options most noteworthy change of later years.
- Regulations
  - Integrated financial services market and a harmonized regulatory network reduce the cost of capital and widen access to investors;
  - Common 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

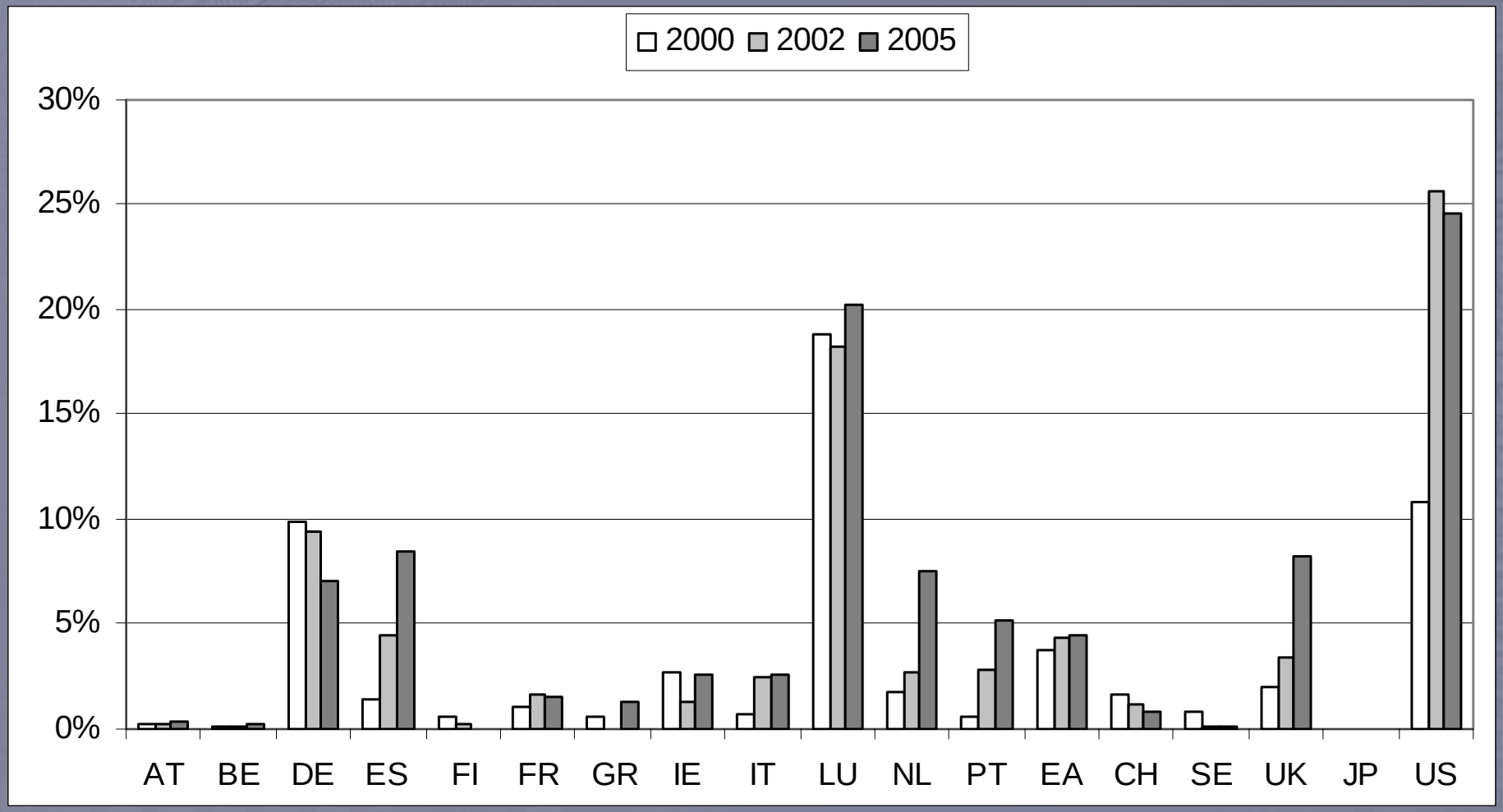
| | Share of high-tech investment | | | Share of early-stage investment | | |
|---|---|---|---|---|---|---|
| | *(i)* | *(ii)* | *(iii)* | *(i)* | *(ii)* | *(iii)* |
| New market | 0.090<br>(0.049)* | 0.085<br>(0.045)* | 0.088<br>(0.046)* | 0.087<br>(0.033)*** | 0.089<br>(0.033)*** | 0.088<br>(0.033)*** |
| Capital gains tax | -0.014<br>(0.003)*** | -0.012<br>(0.003)*** | -0.015<br>(0.003)*** | -0.008<br>(0.002)*** | -0.008<br>(0.002)*** | -0.008<br>(0.002)*** |
| Per capita public R&D | -0.004<br>(0.006) | -0.001<br>(0.006) | -0.002<br>(0.006) | 0.000<br>(0.005) | 0.001<br>(0.005) | 0.000<br>(0.005) |
| Per capita VC funds | -0.013<br>(0.039) | -0.011<br>(0.038) | -0.022<br>(0.038) | 0.017<br>(0.028) | 0.019<br>(0.028) | 0.021<br>(0.028) |
| Last-year‘s per capita VC funds | 0.006<br>(0.048) | 0.004<br>(0.048) | 0.001<br>(0.048) | -0.003<br>(0.035) | -0.000<br>(0.035) | -0.001<br>(0.035) |
| Aggregate barriers to entry | 0.060<br>(0.038) | | | -0.028<br>(0.027) | | |
| Hiring and firing indicator | | 0.044<br>(0.019)** | | | -0.009<br>(0.014) | |
| Immigration law indicator | | | 0.050<br>(0.023)** | | | -0.002<br>(0.017) |
| Observations | 171 | 171 | 171 | 171 | 171 | 171 |

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

# The end

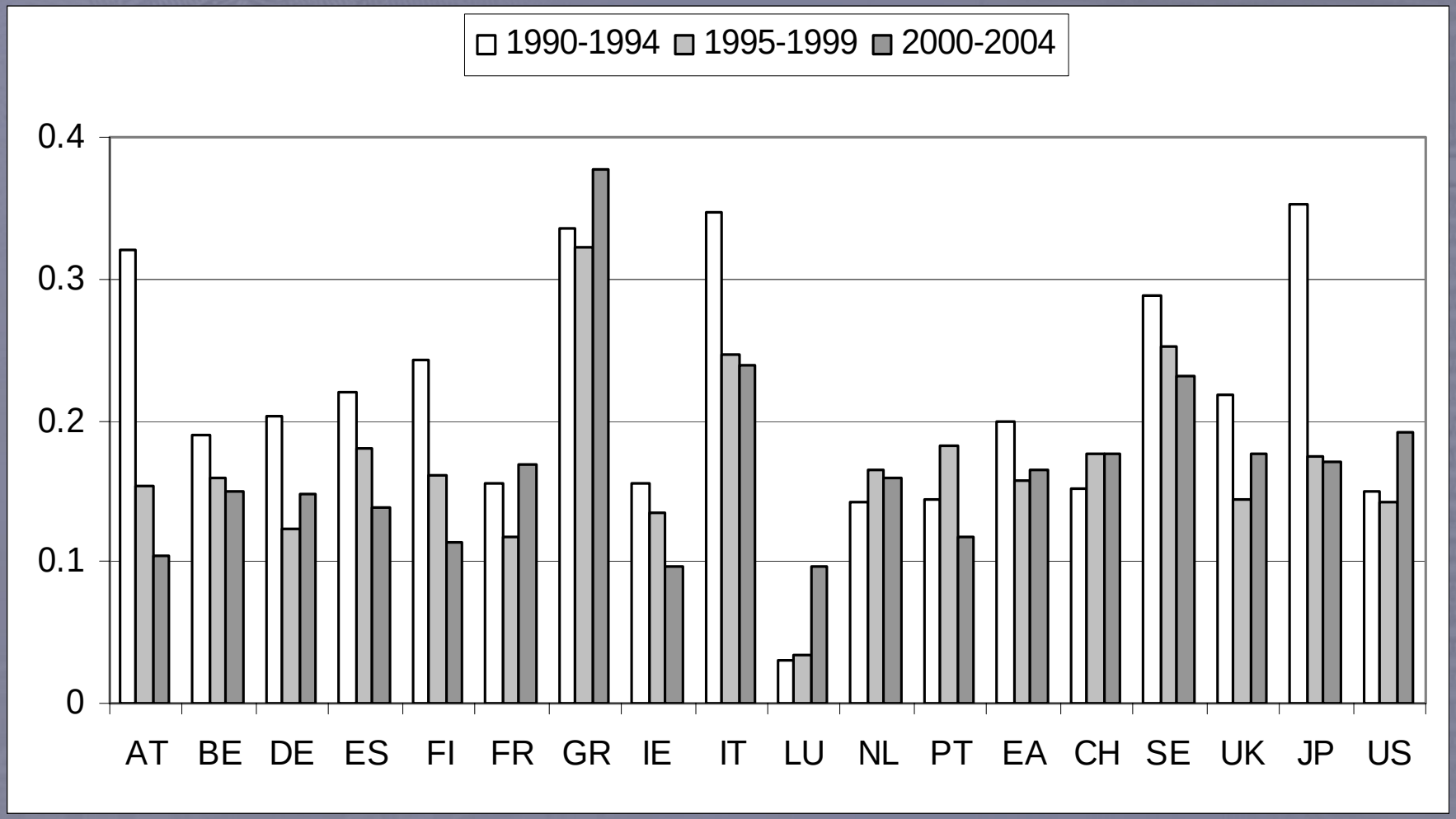


# Securitisation



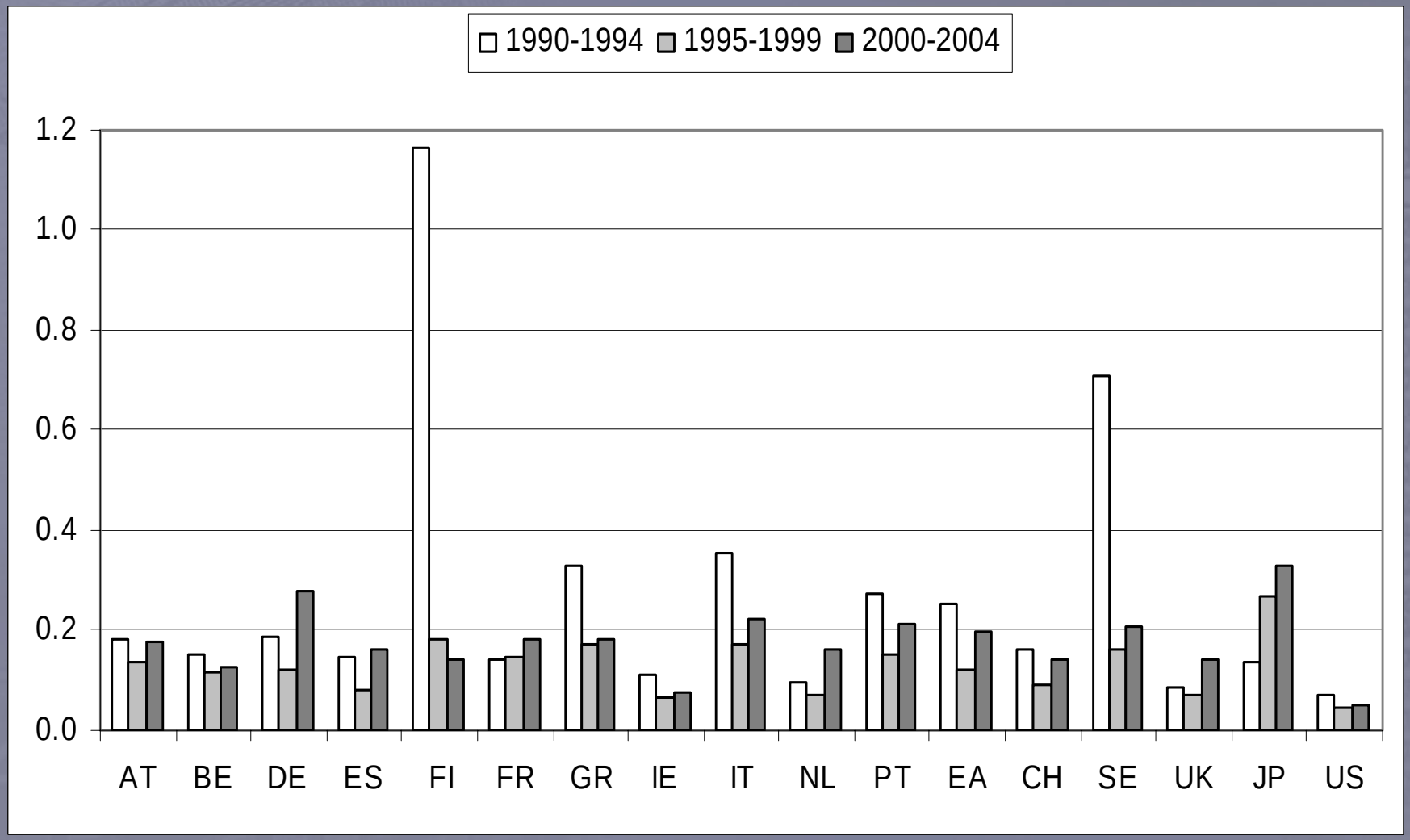

(% of GDP, by country of collateral, ESF, Eurostat, SIFMA)

# Pricing of firm-specific information



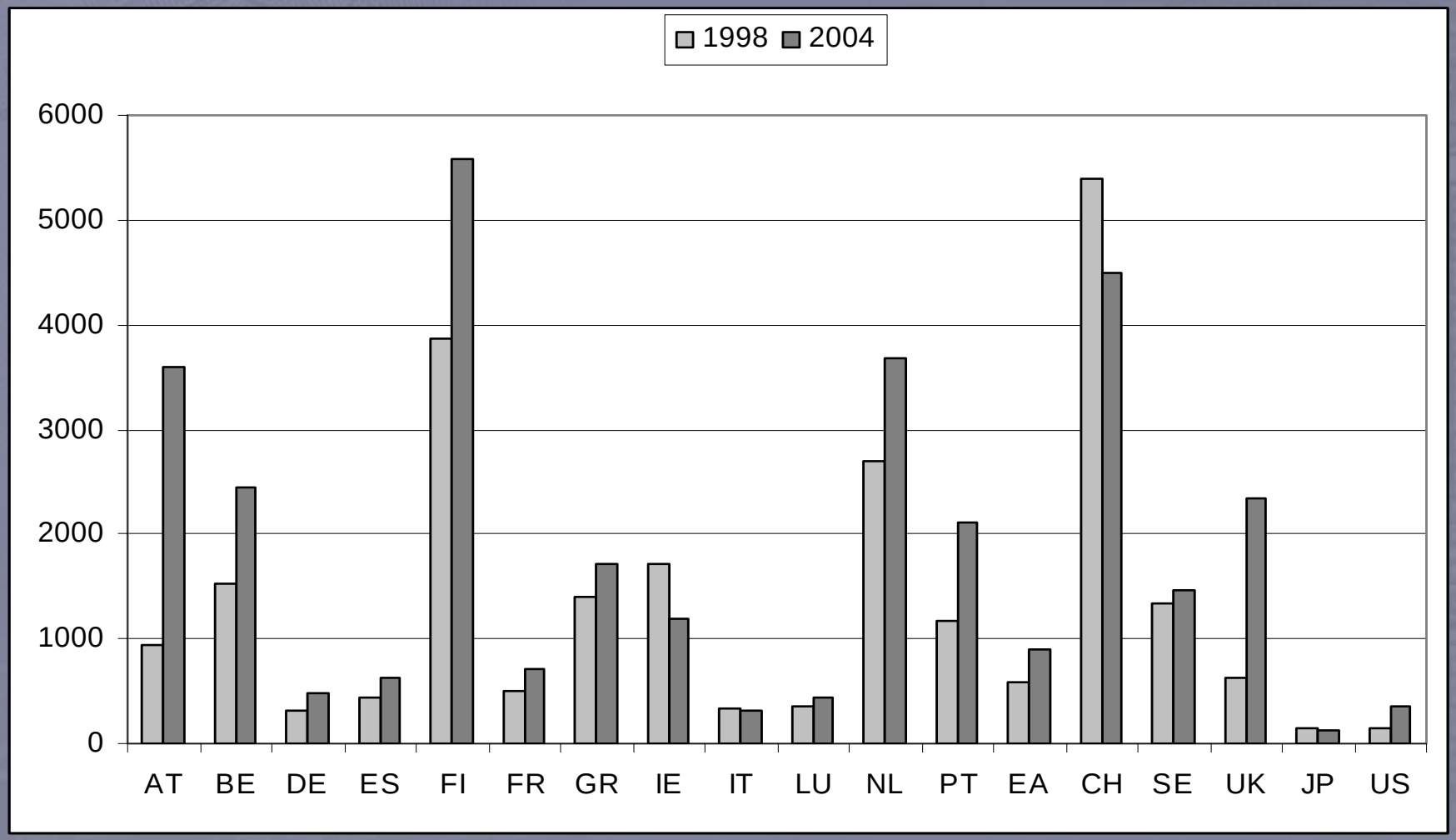

(R2, high score = less pricing of idiosyncratic risk, own estimations/Datastream)

# Dispersion of analysts' EPS forecasts



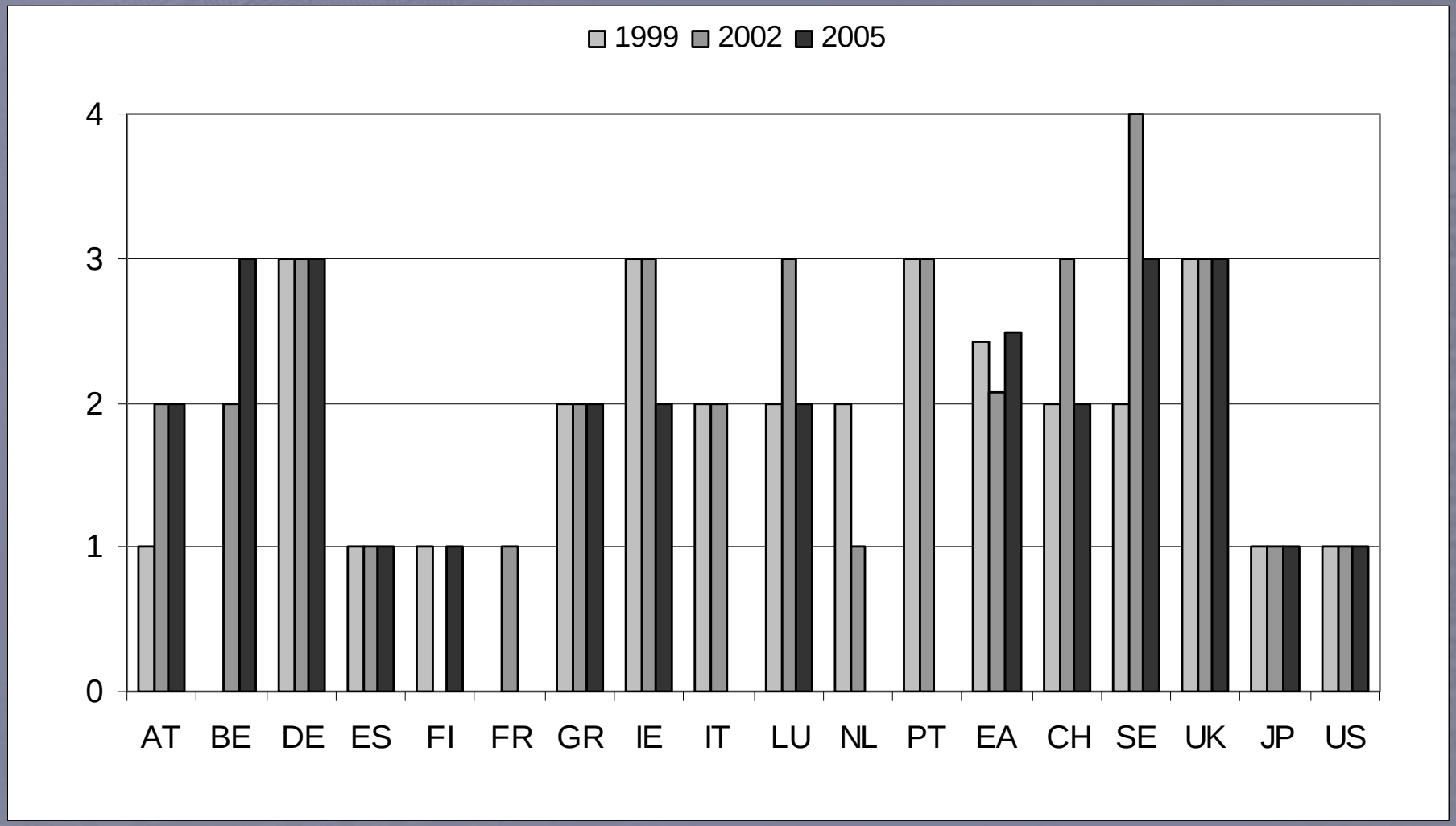

(standard deviation of EPS forecast/level of forecast, Thomson Financial)

# Bank concentration




(Herfindahl index for total assets, Bankscope)

# Supervisory forbearance discretion




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

# 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?