CAPITAL IMMATÉRIEL ET ÉCONOMIE :

Problèmes conceptuels et différences entre les Etats-Unis et l'Europe

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INTRODUCTION

- *A now rather shared analysis: a new productive paradigm is emerging:*
    - farewell to mass production of standardized goods…
    - … from the Information and Communication Techniques and the New Economy…
    - … to the Knowledge Based Economy and the Learning Society
- *It is not well captured by conventional theories and old statistical tools:*
    - technical change is endogenous…
    - …hence Intangible Capital (IC) has become more important than tangible capital.

SYNOPSIS OF THE PRESENTATION

- *Why has the concept of IC emerged (I)?*
- *Is it robust and easy to measure (II)?*
- *Does IC intensity explain diverging national macroeconomic performance (III)?*
- *Is not finance a part of IC with destabilizing consequences (IV)?*
- *Finally what have we learnt (V)?*

I. WHY HAS THE CONCEPT OF INTANGIBLE CAPITAL EMERGED?

1. A necessary complement for accountants in order to capture the value of a firm: goodwill.

$$(1)\ HC+SC+RC = IC = MV-BV$$

- *The taxonomy comprises three categories of intangibles:*

  - *Human* capital is "the knowledge, skills, experiences and abilities of people" (EC 2001:10); it is what leaves a firm when its employees go home.

  - *Structural* capital is "the knowledge that stays within the firm at the end of the working day" (Ibid:11). Structural capital may reside in computer databases and administrative systems, as well as models, patents and concepts (Sveiby 1997:11), some of which may be owned and traded by the firm as legally defined property (Edvinsson and Malone 1997:11).

- *Relational* capital comprises "all resources linked to the external relationships of the firm, with customers, suppliers or partners" (EC 2001:11). Examples of relational capital offered by Meritum were image, customer loyalty, links with suppliers, commercial power, and negotiating capacity.

2. Reconciling of stock market value with book value:

Intangible capital= Market value- book value.

Figure 1 *Relative goodwill and book value from 1983 to 2011 (indexed at 2011 book value = 100; totals for all listed non-financial corporations in France, Germany, the UK, and US; compiled using quarterly accounting and exchange-rate (data from Thomson-Reuters)*

Goodwill and book value in Germany, France, UK and US, 1983-2011
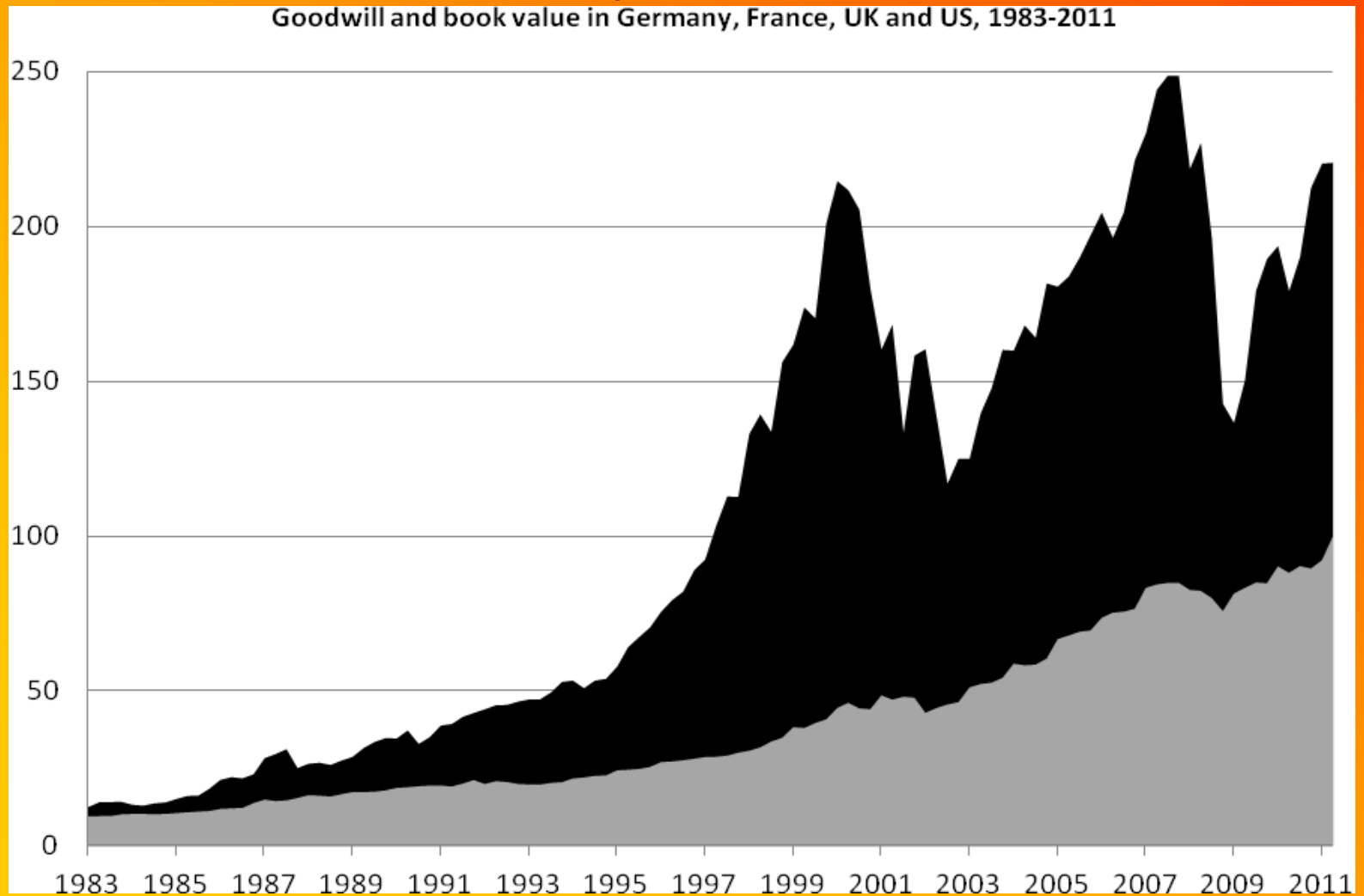
3. Intangible capital seen by macroeconomists:

- *In search for the sources of growth and stock market valuation*

(2) $\qquad q = s_L \bullet \ell + s_K \bullet k + a$

with $\quad q, \ell, k$ rate of growth of output, labour, tangible capital

s_L, s_K respective weight of labour and capital

a = residual / contribution of technical change, generally $a > 0$

(3) $q = s_L \bullet \ell + s_K \bullet k + s_R \bullet r + b$

with   r rate of growth of intangible capital

s_R weight of intangible capital

b = new residual / contribution of

technical change

with the hypothesis that b a and possibly b is near 0

(4) National Intangible Capital = Stock market value – va

lue of tangible capital

- **Possibly a new evaluation of GDP taking into account the extra value created by intangible capital**

$$(5) \qquad P^Q . Q = P^C . C + P^J . J + P^N . N \quad = \quad P^Y . Y + P^N . N$$

Investment in intangible

Implicit flow of services from intangible

Input side

output side

II - ARE INTANGIBLE CAPITAL MEASURES RELEVANT?

1. The time dimension: the more challenging difficulty

$$(9) \quad \sum_{i=1}^{i=1+\theta} w_{t-i} \bullet {}_{t-i} (1+\rho)^{t-i} \quad = \quad R_t \quad = \quad \sum_{i=t+1}^{j=t+\varphi} \frac{E_t(CF_{t+i})}{(1+\rho)_{t+i}}$$

Backward looking approach
Historical cost

Value of IC

Forward looking
expectation on future
cash-flows

Past............................   Present..................   ....Future

$w_{t-i},\ {}_{t-i}$

	wage and labour content of past investment
ρ	Long term interest rate, along a steady state growth
CF_{t+i}	Cash-flow associated to the investment
E_t	Expectations at period t
θ	Maturation on period of investment
φ	Expected life of investment

2. Perfect competition for substitutable factors of production: a second cornerstone of capital measurement

3. The intricacy of capital measurement and the profit rate: Cambridge UK was right after all

(10)   "Volume of IC" $\overline{R_t^i} = \dfrac{R_t^i}{p_R^i}$ Value as equation (9)

Statistical evaluation

For each component $\quad i \in [1, n]$

4. How to measure the volume of capital: quality, price and volume are mixed in the valuation of capital

5. How to aggregate investment of various vintage into a single measure: no satisfactory solution has been found

6. All these difficulties are exacerbated when macroeconomists try to include intangible capital in their analyses

Table 1. Intangible Capital Asset Types

Asset type	Included in National Accounts?
Computerized information	
1. Software	Yes
2. Databases	?[1]
Innovative property	
3. Mineral exploration	Yes
4. R&D (scientific)	Satellite for some[2]
5. Entertainment and artistic originals	EU-yes, US-no[3]
6. New product/systems in financial services	No
7. Design and other new product/systems	No
Economic competencies	
8. Brand equity	
a. Advertising	No
b. Market research	No
9. Firm-specific resources	
a. Employer-provided training	No
b. Organizational structure	No

1. SNA 1993 recommended capitalizing computerized databases.
2. R&D satellite accounts are available, or under preparation many countries. Results for Finland, Netherlands, United Kingdom, and the United States are publically available.
3. The US BEA plans to include entertainment and artistic originals and R&D as investment in headline GDP in a revision in 2013

7. From private accounting to growth accounting: common and converging obstacles in the measure of intangible capital.

Table 2 – Measuring Intangible Assets and Total Factor Productivity Similar Issues

Features	Fields	Private Accounting	Growth Accounting and Theory
1. OBJECTIVE		• To find intangible assets in order to (a) bridge the gap between tangible book value and market value, and; (b) identify the resources of "post-industrial" firms, and explain how these resources are used	• Total Factor Productivity captures the contribution of technical change to growth performance.
2. THEORETICAL BACKGROUND • General		• Atomistic model, reductionist – firm as the sum of its parts • Conflation of prices and quantities via objectification of transactions • An implicit walrassian model of a pure market economy	• A well functioning market economy where prices of factors of production reflect marginal productivity
• Information and competition		• Informational Efficiency of financial markets. • [Make reference to perfect labour and capital markets as before in outsourcing worked-example]	• Perfect competition on product, labour and capital markets.
3. BASIC HYPOTHESES • On production processes • On value and income		• Separability of various assets and contracts • Any income has to be attributed to an asset • "top-down" valuation should NOT differ from "bottom-up"	• Large or even perfect substituability of factors of production • Any extra growth not explained by labour or capital is related to technical change
4. METHOD / EPISTEMOLOGY • Direct/Indirect • Nature of the measure		• Indirect by lack of explicit indexes for intangible capital • Automatic reconciliation of data with the theory.	• Essentially indirect and complement with an evaluation of innovation and stock of Knowledge but still TFP is an unexplained residual. • Any error in the measure of labour and tangible capital is counted as technical change.

III. DOES IC INTENSITY EXPLAIN DIVERGING NATIONAL MACROECONOMIC PERFORMANCE ?

1. The shift from typical mass production to an oligopolistic competition along quality, product differentiation and innovation.

Figure 2 – From standardized goods mass-production to the oligopolistic / monopolistic rents fo contemporary capitalism

Productivity level / standard of living

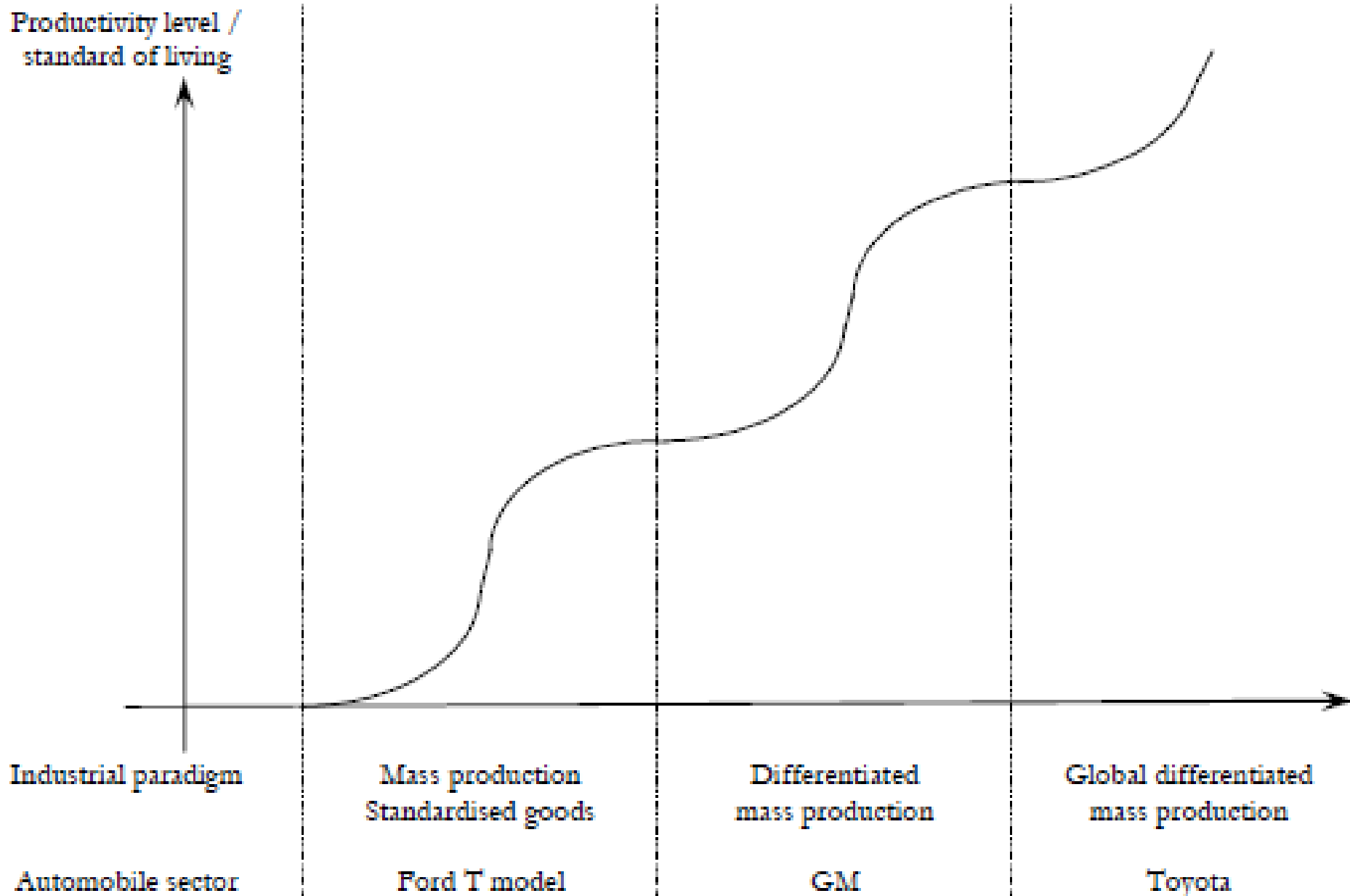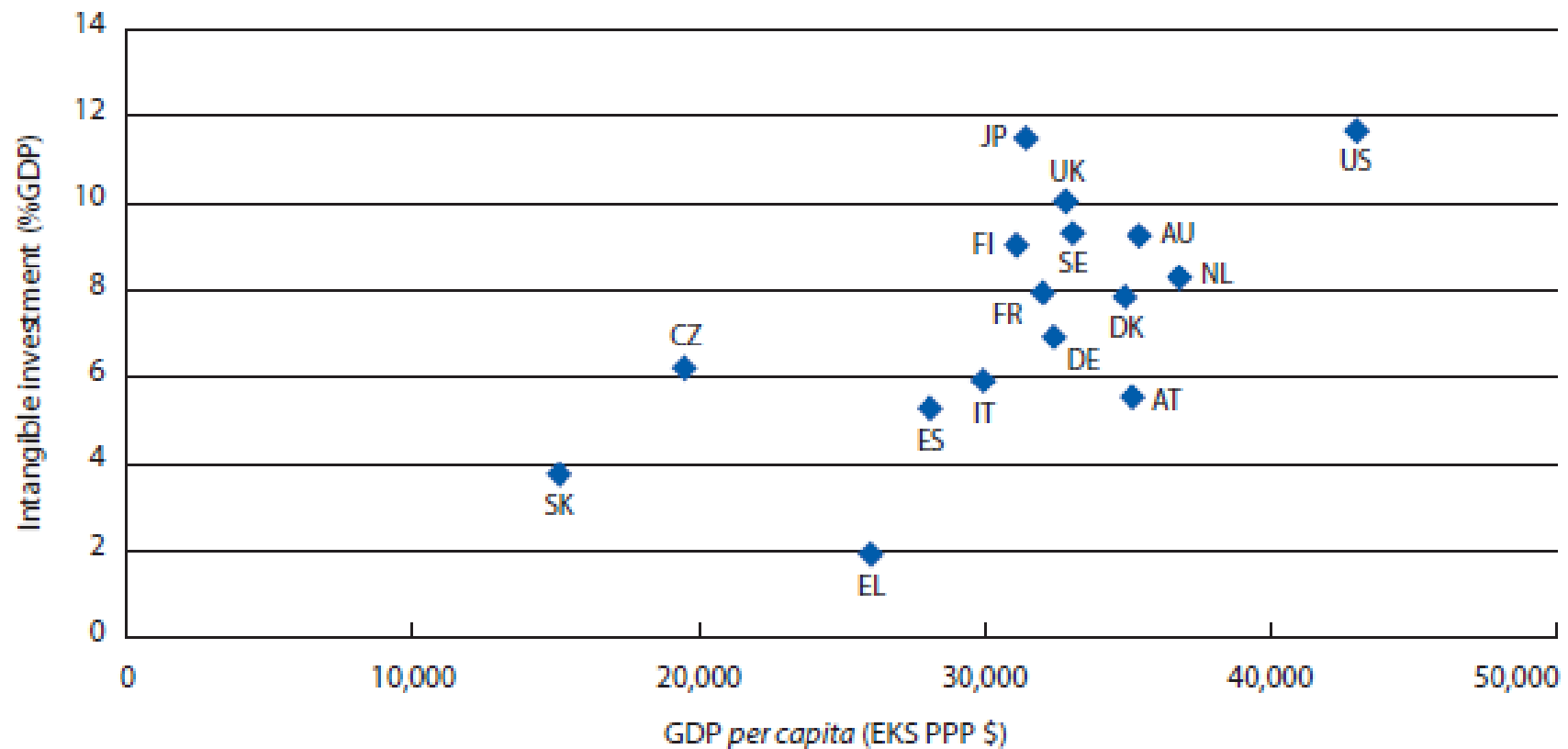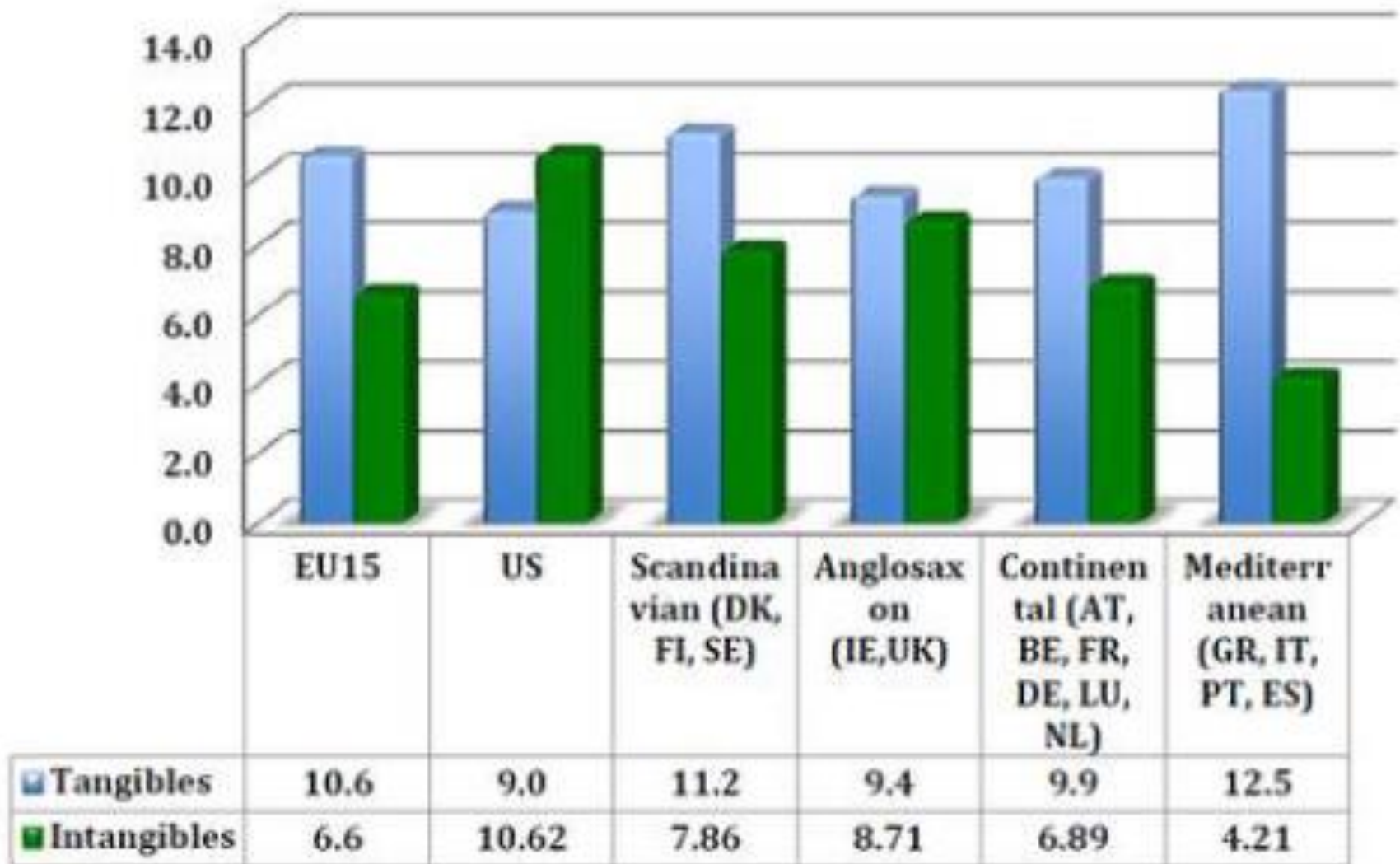| Industrial paradigm	Mass production Standardised goods	Differentiated mass production	Global differentiated mass production
Automobile sector	Ford T model	GM	Toyota

Figure 3 – Intangible investment and GDP *per capita* (2001-04)

2. ICT and Knowledge Based Economies are no more built upon typical productive investment but upon immaterial and relational capital

- The US are leading

- Northern Europe is following

- Southern Europe is lagging

Figure 3 – Tangible vs intangible GDP shares: 1995-2009 (Average value)

	EU15	US	Scandinavian (DK, FI, SE)	Anglosaxon (IE,UK)	Continental (AT, BE, FR, DE, LU, NL)	Mediterranean (GR, IT, PT, ES)
Tangibles	10.6	9.0	11.2	9.4	9.9	12.5
Intangibles	6.6	10.62	7.86	8.71	6.89	4.21

Source: Corrado et al. (2012)

Table 3 – Intangible investment in the market sector in Germany, France, Italy, Spain, UK and US (percent of GDP 2006)

Type of Investment	Germany 2006	France 2006	Italy 2006	Spain 2006	UK 2006	US 2006
1. Computerized information	**0.73**	**1.42**	**0.64**	**0.79**	**1.55**	**1.61**
a) Software	0.71	1.37	0.63	0.76	0.00	
b) Databases	0.02	0.05	0.01	0.03	0.00	
2. Innovative property	**3.59**	**3.18**	**2.21**	**2.78**	**3.16**	**4.37**
a) R&D, including social sciences and humanities	1.72	1.30	0.58	0.63	1.07	} 2.25
b) Mineral exploration and evaluation	0.01	0.04	0.09	0.04	0.04	
c) Copyright and license costs	0.21	0.31	0.10	0.18	0.22	
d) Development costs in financial industry	0.75	0.60	0.58	0.52	0.07	} 2.12
e) New architectural and engineering designs	0.90	0.93	0.86	1.41	1.74	
3. Economic competencies	**2.84**	**3.30**	**2.19**	**1.90**	**5.84**	**5.50**
a) Brand equity	0.56	0.99	0.71	0.42	1.15	1.47
Advertising expenditure	0.41	0.73	0.47	0.19	0.91	
Market research	0.15	0.26	0.24	0.23	0.24	
b) Firm-specific human capital	1.29	1.51	1.02	0.81	2.54	
Continuing vocational training	0.65	1.25	0.71	0.71		} 4.03
Apprentice training	0.64	0.26	0.32	0.10		
c) Organizational structure	1.00	0.81	0.45	0.68	2.14	
Purchased	0.54	0.32	0.15	0.27	0.51	
Own account	0.46	0.49	0.3	0.41	1.63	
Total Investment	**7.16**	**7.90**	**5.04**	**5.47**	**10.54**	**11.48**
pro memoria						
Total Spending	**7.55**	**8.51**	**5.43**	**5.70**	**11.56**	

Table 4 – Average annual change in labour productivity in the market sector and contribution of tangible and intangible capital deepening , labour quality and MFP growth, 1995-2006.

	Germany	France	Italy	Spain	Austria	Denmark	Average	Czech Rep	Slovakia	Greece	UK	USA
	95-06	95-06	95-06	95-06	95-06	95-06	95-06	97-06	00-06	95-06	95-06	95-06
Excluding Intangible Capital (percent)												
Labour productivity growth	1.61	1.83	0.26	0.36	1.99	1.54	**1.18**	4.50	6.30	3.21	2.90	2.75
Contributions												
ICT cap. deep. (ex. software)	0.23	0.14	0.12	0.21	0.29	0.50	**0.20**	0.38	} 2.85	0.46	0.74	0.47
Non-ICT cap deep.	0.57	0.37	0.31	0.56	-0.03	0.28	**0.39**	1.76		1.52	0.36	0.30
Labour quality	-0.16	0.44	0.24	0.68	0.24	0.19	**0.23**	0.34	0.49	0.73	0.26	0.20
MFP	0.98	0.88	-0.41	-1.10	1.49	0.57	**0.37**	2.02	2.97	0.51	1.54	1.78
Including Intangible Capital (percent)												
Labour productivity growth	1.79	2.00	0.29	0.47	2.36	2.11	**1.32**	4.60	6.17	3.27	3.06	2.96
Contributions												
ICT-capital deepening	0.20	0.12	0.11	0.19	0.26	0.44	**0.17**	0.35	} 2.72	0.45	0.63	0.40
Non-ICT-cap deepening	0.48	0.31	0.29	0.49	-0.02	0.24	**0.34**	1.62		1.48	0.28	0.24
Intangible-cap. deepening	0.38	0.48	0.12	0.12	0.55	0.72	**0.30**	0.68	0.21	0.24	0.69	0.83
Computerized information	0.07	0.15	0.03	0.05	0.13	0.29	**0.08**	0.06	0.04	0.06	0.16	0.18
Innovative property	0.23	0.18	0.05	0.15	0.29	0.27	**0.16**	0.35	0.07	0.11	0.17	0.35
Economic competency	0.07	0.15	0.04	-0.08	0.13	0.17	**0.06**	0.27	0.10	0.07	0.36	0.29
Labour quality	-0.15	0.40	0.22	0.64	0.22	0.17	**0.21**	0.31	0.46	0.71	0.22	0.18
MFP	0.88	0.69	-0.45	-0.96	1.35	0.53	**0.29**	1.64	2.78	0.40	1.23	1.33

Sources: Employment, value added, and the stock of tangible capital for all countries from 1997 to 2005 from EUKLEMS, version March 2008 (www.euklems.net). EU KLEMS provides the deflators and depreciation rates of tangible assets and the depreciation rates of software and databases. CHS (2005) provides the deflators of all intangible assets and the depreciation rates of intangible assets excluding software and databases. For intangible investment in Austria, the Czech Republic, Denmark, Greece and Slovakia, see Annex 1;. for Germany, France, Italy Spain, the UK and the US, see Table 1.

Notes: We follow the EUKLEMS definition of market sector by excluding the following industries: public administration, health, education and real estate.
Measures of tangible capital exclude land and inventories.

3. Contemporary finance: capture of profit by innovation, leverage and leonine contracts.

Figure 4 – Two indexes of the capture of profit and wealth by finance

A – Profits appropriated by the financial sectors / GDP (1948-2007)

**B – Total financial assets / GDP (1948-2007)**

Source: NIPA Table 6.16, Table 1.15. Corporate profits are adjusted for inventory valuation and capital consumption. Since 1998, definition of the financial sector comprises finance and insurance and bank and other holding companies.

Source: Flow of Funds Table L5, NIPA Table 1.1.5.

Source : CROTTY James and Gerald EPSTEIN (2008), "The costs and contradictions of the lender-of-last resort function in contemporary capitalism: the sub-prime crisis of 2007-2008", WP Political Economy Research Institute (PERI) University of Massachusetts, Amherst, May 2-3.

IV. THE INABILITY TO RIGOROUSLY MEASURE INTANGIBLE CAPITAL TRIGGERS HIGH FINANCIAL VOLATILITY AND MAKES FINANCIAL CRISIS MORE FREQUENT AND SEVERE

1. Stock market might deliver a fluctuation around fundamental values of financial as sets only when the uncertainty is limited

Figure 5 – When uncertainty increases, stock market does not converge anymore towards fundamental value
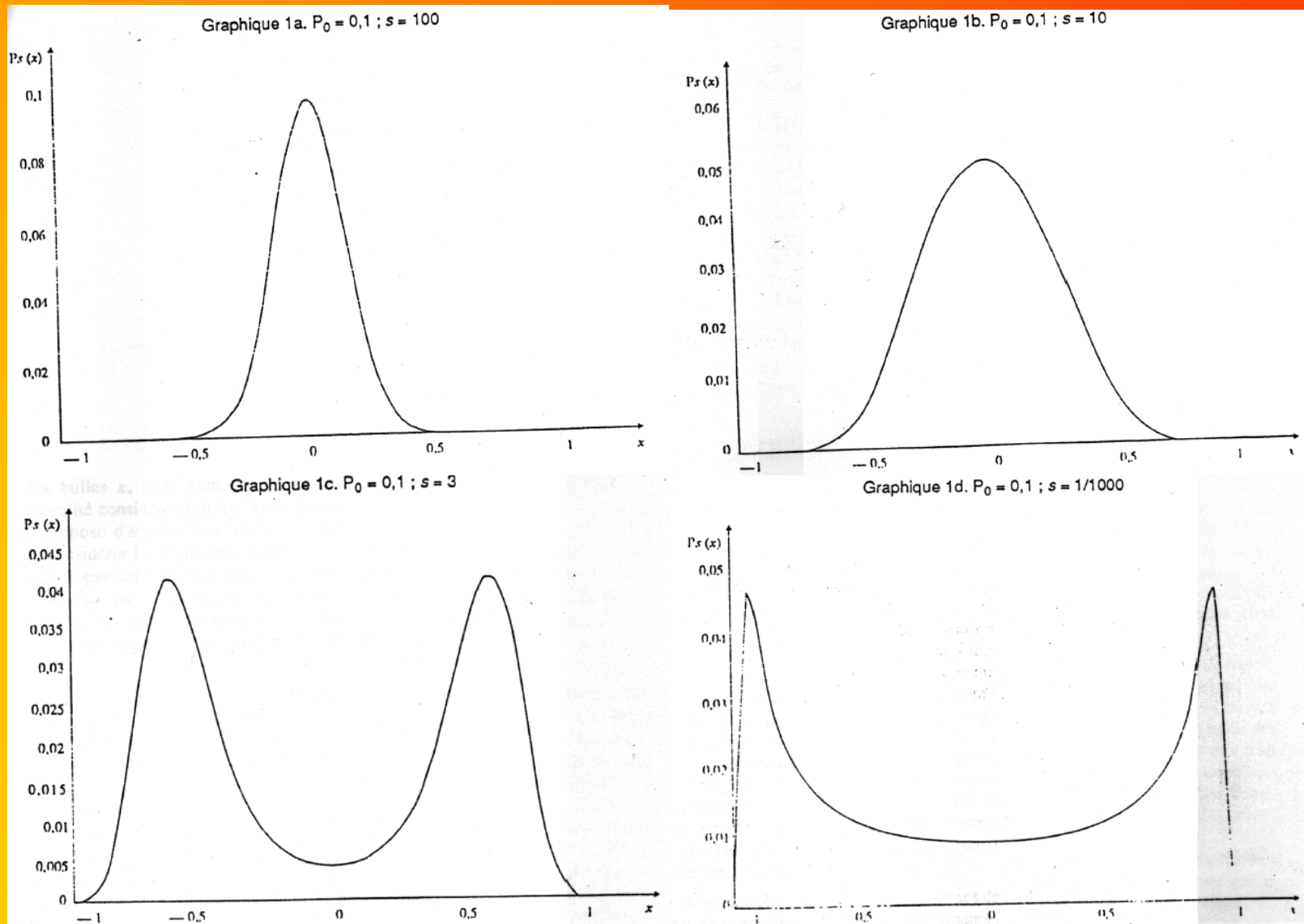
Source: André Orléan (1990)

2. Most of intangible investments are typically uncertain, much more than routine production via equipment goods.

3. Intangible capital is largely driving stock market capitalisation that alternates large and lasting sub-estimations with over estimations

Figure 1 *Relative goodwill and book value from 1983 to 2011 (indexed at 2011 book value = 100; totals for all listed non-financial corporations in France, Germany, the UK, and US; compiled using quarterly accounting and exchange-rate data from Thomson-Reuters)*

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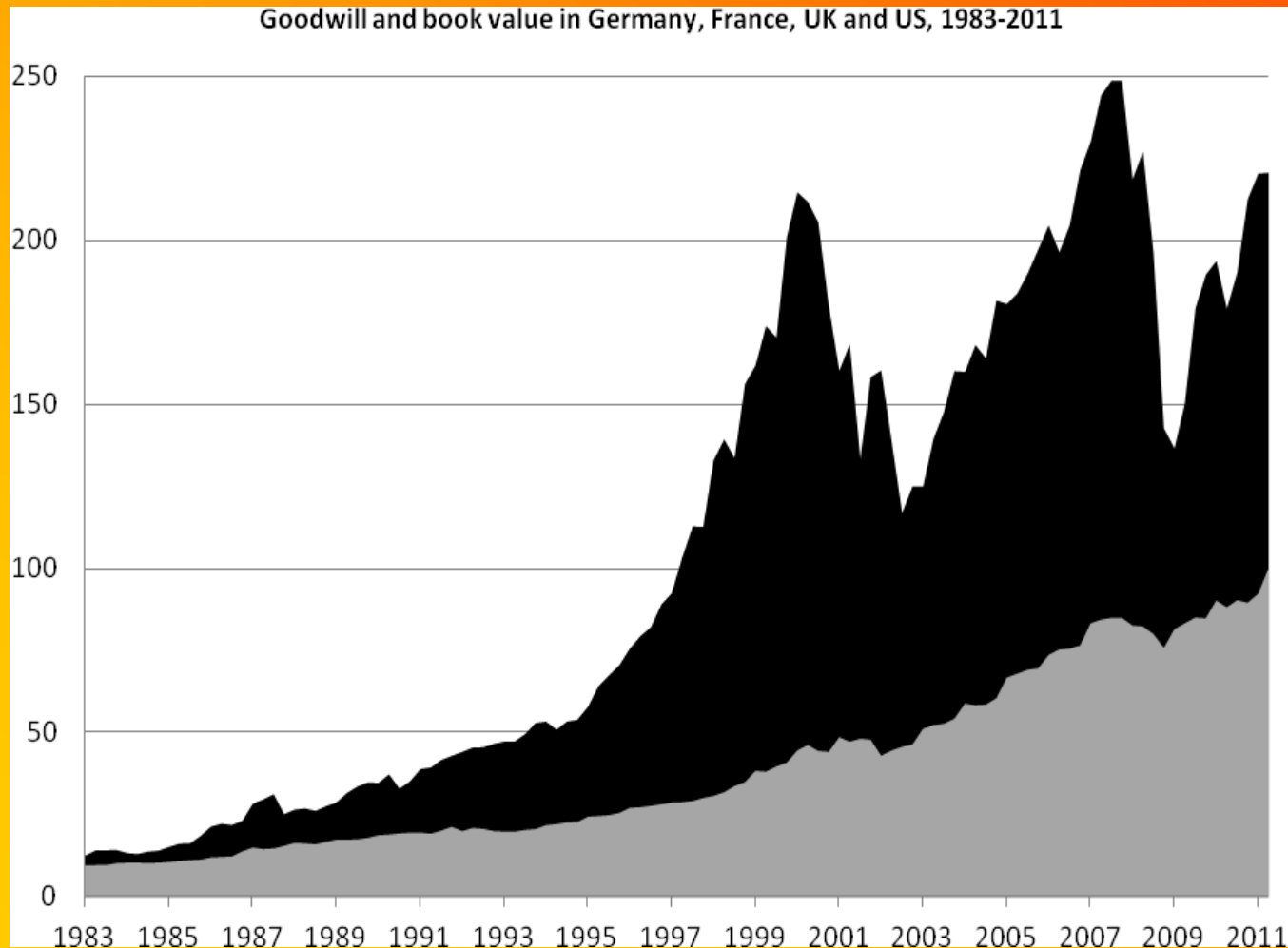
Figure 6 – Intangible investment and market capitalization (2001-04)
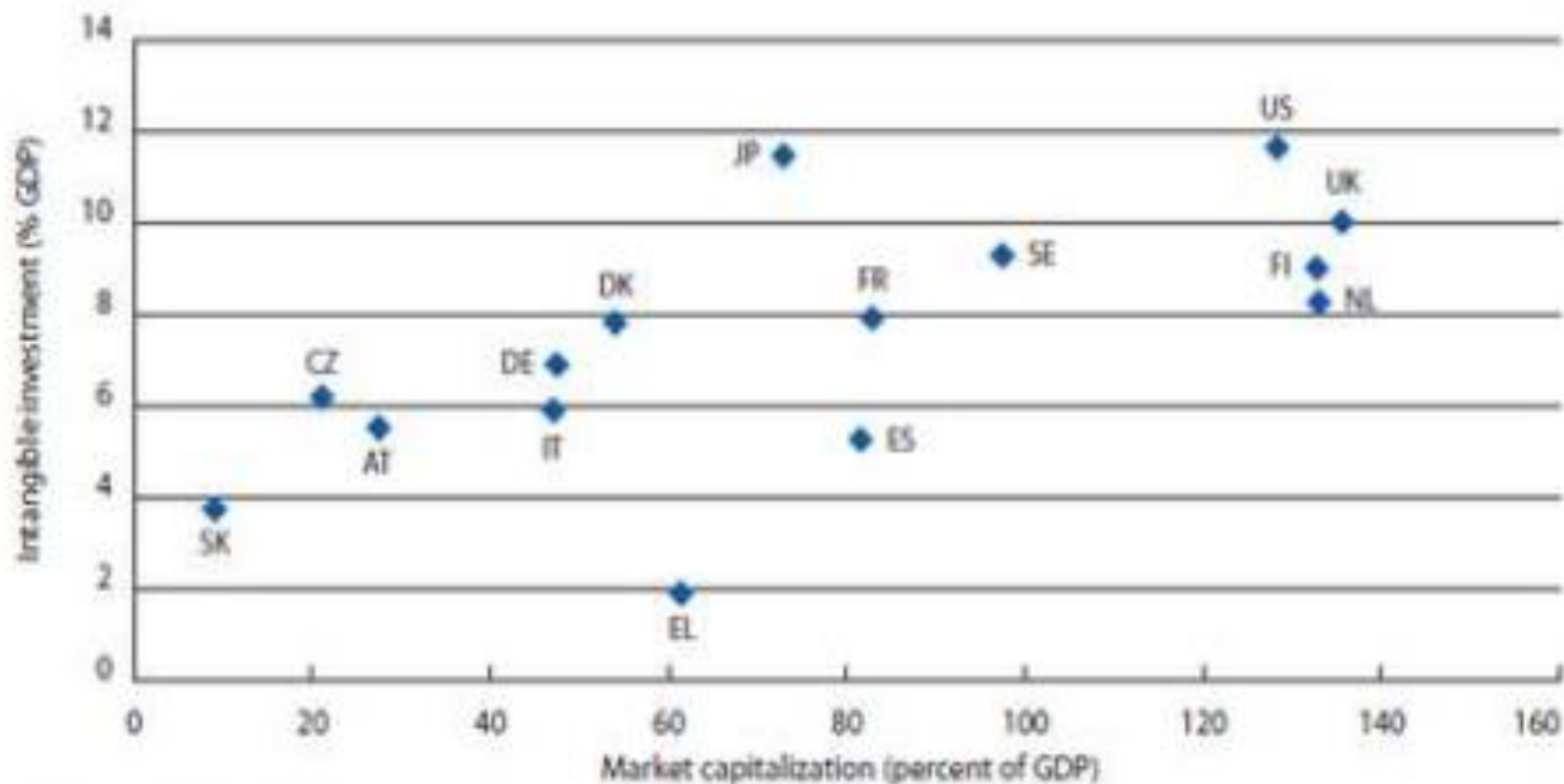
Source: See Figure 5b

Note: Market capitalization is the value of the stock market as a percentage of GDP We use the average percentage from
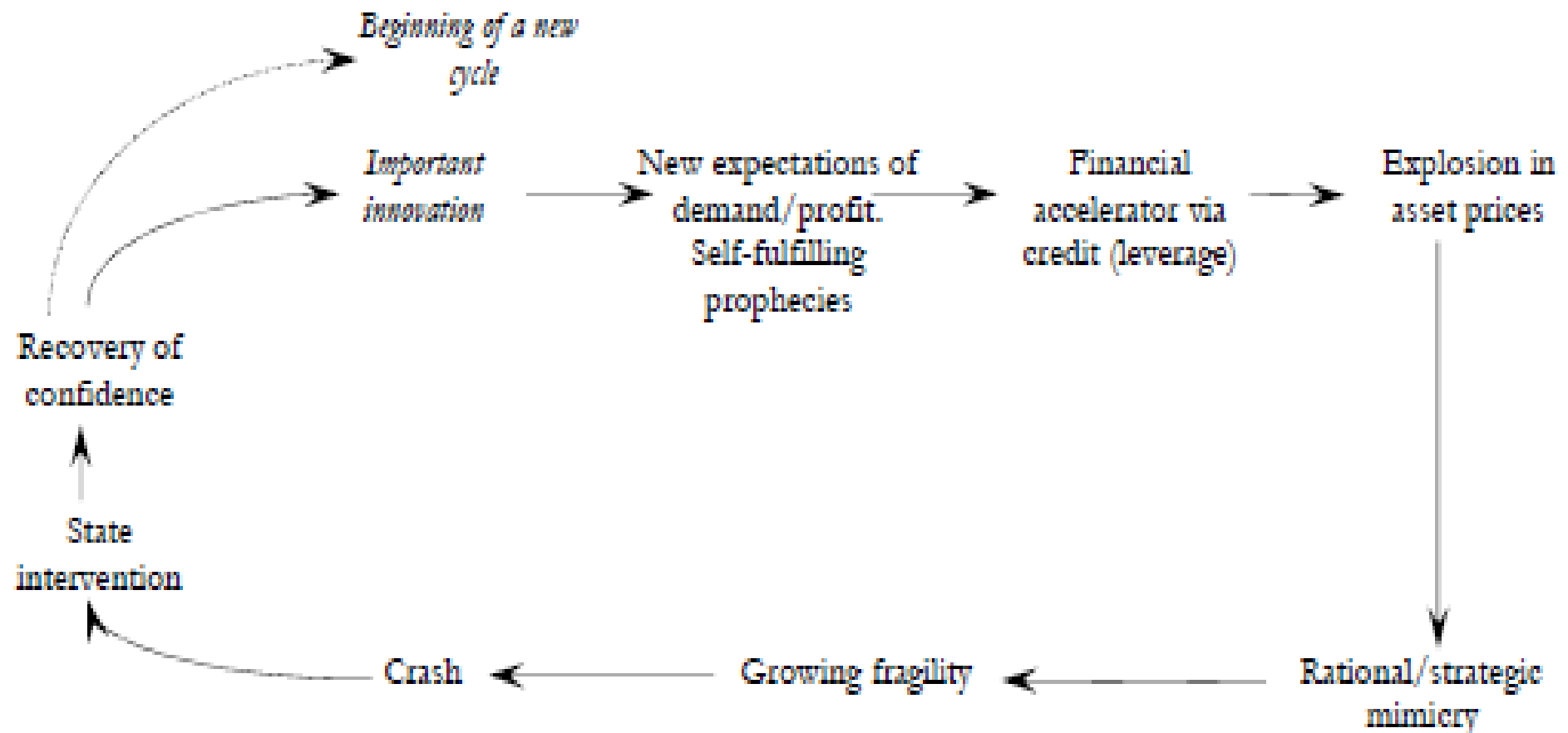
Source: Idem

Figure 7 – Growth of Assets of Four Sectors in the United States (March 1954 = 1) (Log scale) (source: Federal Reserve, Flow of Funds, 1954-2009)
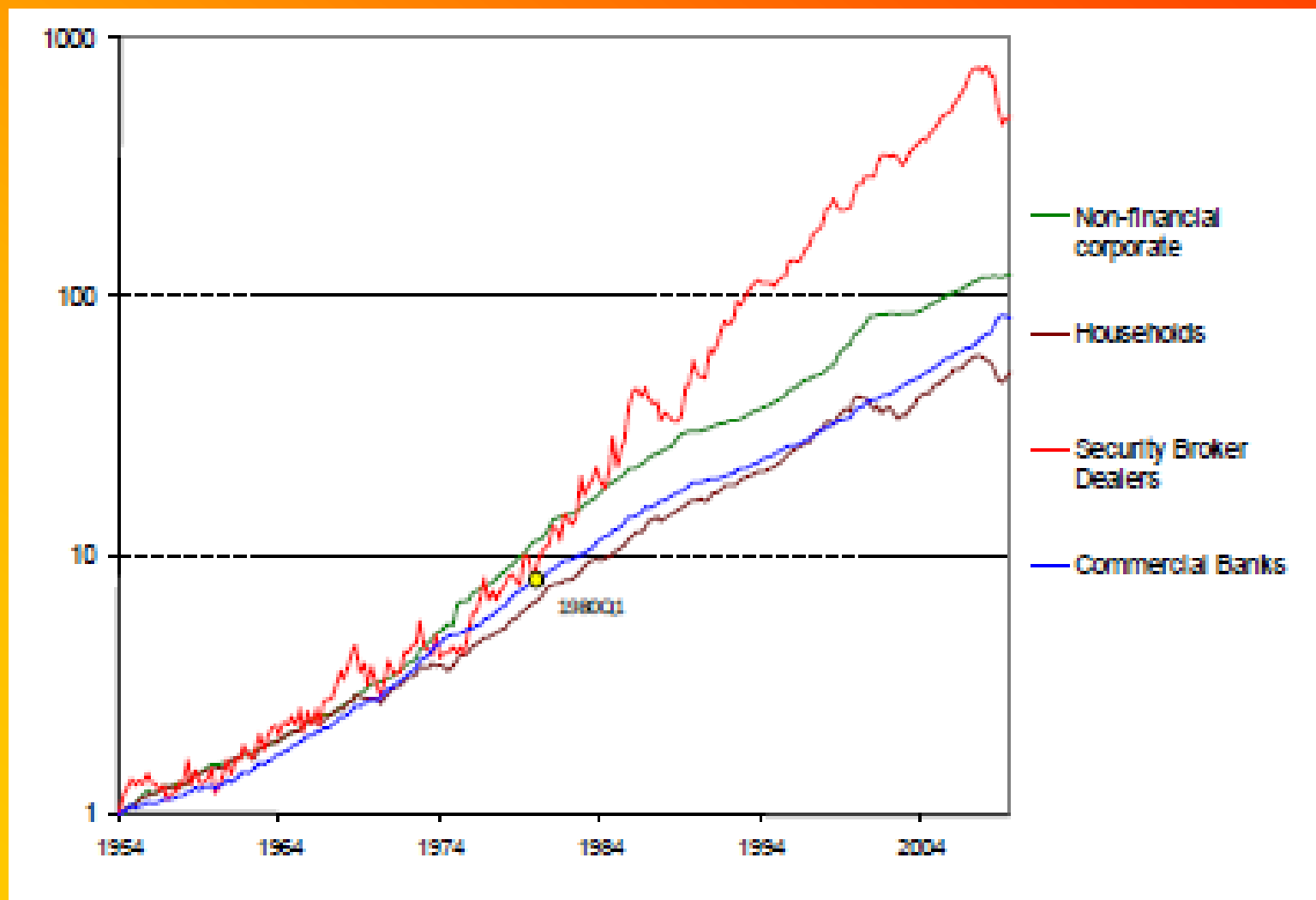
- *The mystery of intangible capital and financial fragility seem largely correlated*

Figure 8 – From a reputedly major innovation to mimicry leading to financial fragility

CONCLUSION

C1 - *The concept of Intangible Capital has been coined in order to capture some of the novelties of contemporary capitalism, based upon innovation, knowledge and learning.*

C2 - *Killing three birds with the same bullet: IC at the crossing of goodwill private accounting, financial theory about market efficiency and growth*

Figure 9 – Intangible capital, Achilles Heel of accounting, finance and macroeconomics
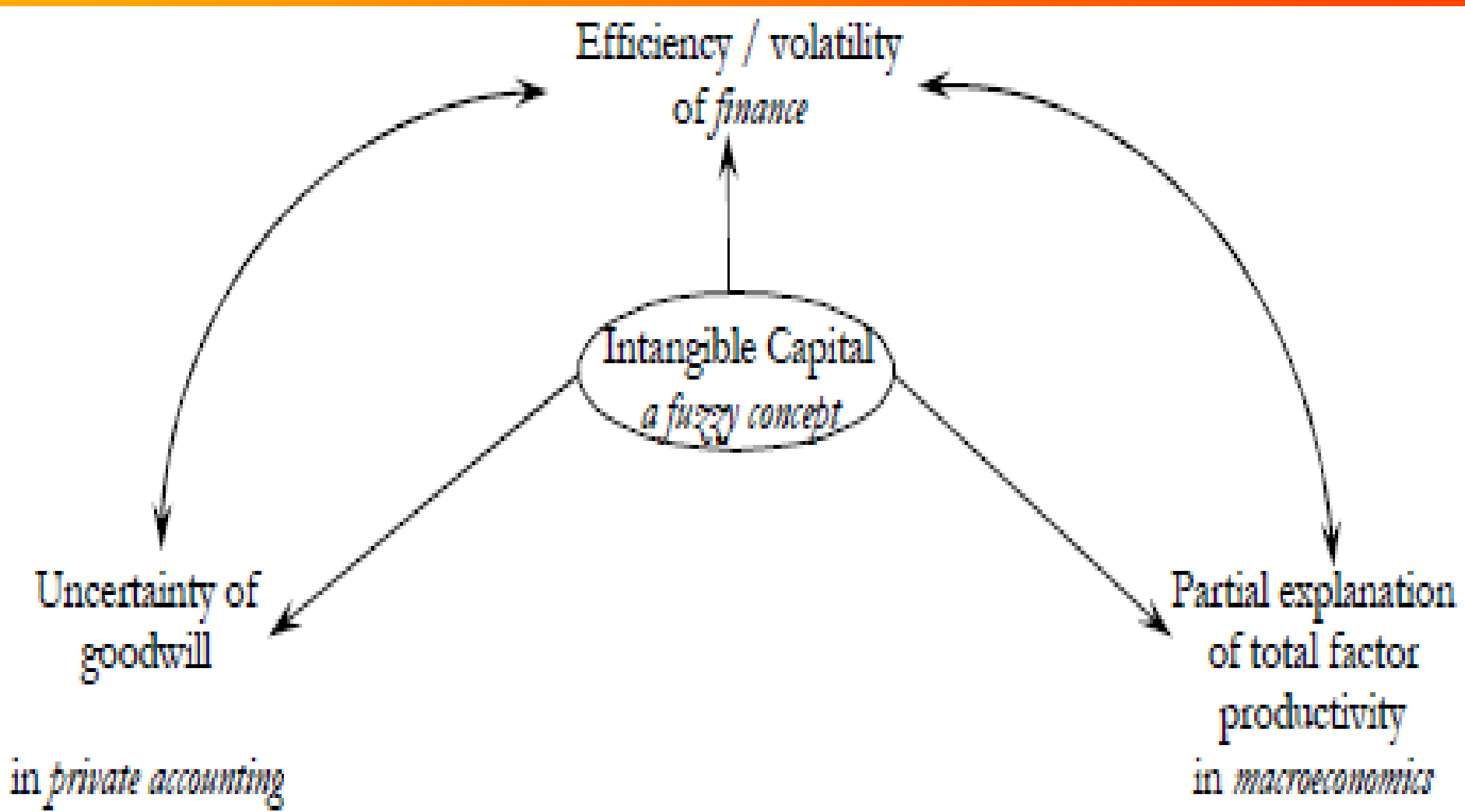
C3 - A rather fuzzy concept: from a laundry list to a pure tautology.

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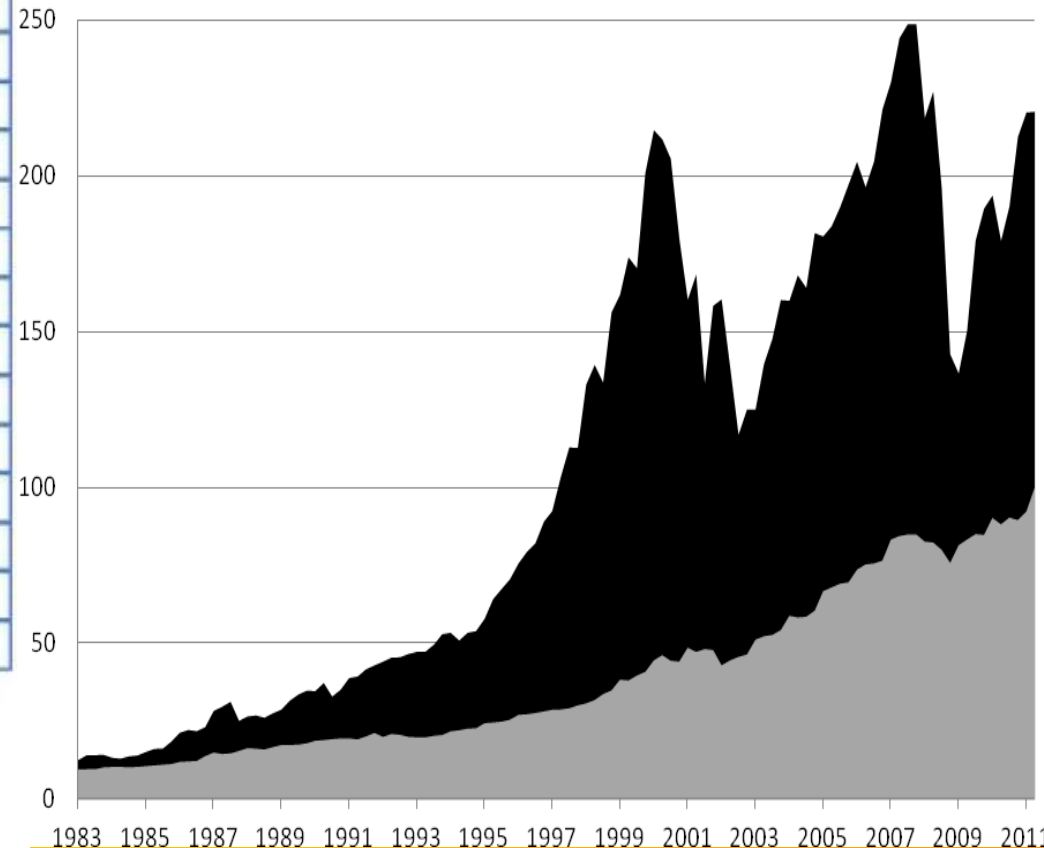
C4 - A first cut analysis about the different national trajectories of mature economies and their mastering of new productive paradigms.

- **The US versus Germany**
- **Nordic economies versus Southern Europe**
- **The French configuration: not so easy to interpret**

C4 - The need for a new theorizing of capital and capitalism:

- **scarcity and physical productivity…**

… or power and appropriation?

Table 5 – Understanding stock market and growth: two approaches

Paradigm	Approaches	
Hypotheses	Intangible Capital	Economic power and radical uncertainty
1. Core explaining factor	• Scarcity of substitutable factors of production	• Power upon remuneration within de facto cooperation, hence complementarity
2. Nature of the future	• Risk (Existence of a probability distribution)	• Uncertainty (consequence of market relations and innovations)
3. Nature of expectations	• Fully rational	• Reflexive, context related, adaptative
4. Core coordinating mechanisms	• Perfect markets (labour, capital, finance)	• Imperfect markets embedded into social norms, organizations and institutions
5. Nature of economic evolution	• Stochastic shocks on productivity • Random walk on stock markets	• Endogenous innovation and growth • Momentum of optimism / pessimism and recurring bubbles

6.	Type of accounting	• Growth accounting at the national level	• Surplus method: interdependence creation / distribution
		• Mark to market, mark to model: private accounting	• Stick to actual transactions
7.	Nature of formalizations and models	• Neoclassical growth model with exogenous technical change	• Multiple heterogeneous agent models
		• Dynamic Stochastic General Equilibrium Models	• Evolutionary models of emergence of norms, techniques

Many thanks

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