Measuring Intangible Investment: French Methods, Estimations and Issues

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The COINVEST Project

- Properly assess productivity and growth in the EU
- Why including intangibles in GDP evaluation ?
  - Service industries tend have a larger share in economies
  - Spending in intangibles is far from negligible
  - Intangibles can be comparable to tangibles in their duration
- Implement a common evaluation framework
  - Need for reliable and comparable data
  - Assess the compatibility of international and national statistics
  - Use common evaluation methods

Baseline: Corrado, Hulten and Sichel (2005)

- Work based on the US economy
  - Capture the effect of the “new economy” on growth
  - Explain the fall in services industries productivity
- Accounting for intangibles as GFCF rather than IC
  - Because some spending in intangibles can increase productivity for a longer period than one year
  - IC does not appear in GDP evaluation whereas GFCF does

Baseline: Corrado, Hulten and Sichel (2005) *(cont'd)*

- CHS identify the following intangibles as GFCF:
  - Computerized information
    - Computer software
    - Computer databases
  - Innovative property
    - Scientific and non-scientific R&D
    - Mineral exploration
    - Copyright and Licence costs
    - Financial innovation
    - Architectural and engineering design
  - Economic competencies
    - Brand equity (advertising and market research)
    - Firm-specific Human capital (training)
    - Organisational structure

The regulatory framework (1)

- International standards already require the inclusion of intangibles in the National Accounts
- System of National Accounts,UN (1993, 2008)
  - Mineral exploration and evaluation
  - Computer software and databases
  - Entertainment, literary or artistic originals
  - Other intellectual property products

The regulatory framework (2)

- European System of Accounts, EU (1995)
  - Mineral exploration
  - Computer software (includes databases)
  - Entertainment, literary or artistic originals
  - Other intangible fixed assets

- European national statistics should include these items in the National Account as GFCF

The French Case

- Recorded as GFCF:
  - Computer software
  - Copyright and licence costs
  - Mineral exploration
  - Architecture and engineering design
- Still in IC but recorded as a distinct item:
  - Scientifc and non-scientifc R&D
  - Computer databases
  - Advertising and market research
  - Organisational structure (purchased)
- Not distinct IC:
  - Training
  - Organisational structure (own-account production)
  - Financial innovation

Computer software (1)

- Based on SNA93, ESA95 and OECD task force 2008, INSEE evaluates software GFCF.

- Purchased software evaluation:
  - NACE 72.1 (NAF 72.1Z): Hardware and software consultancy
    - GFCF: 45%
    - IC: 55%
  - NACE 72.2 (NAF 72.2Z): Software production and supply
    - GFCF: 60.6%
    - IC: 39.4%

Computer software (2)

- Own-account Software evaluation:
  - Using a Employer-employee database (DADS)
  - Two occupations are retained:
    - “Engineers and software technical managers” (PCS 388a, b and c)
    - “Programmers and software technicians” (PCS 478a, b and c)

    - Wage taxes = 108% of wage
    - Time spent on programming software = 50%
    - Non-labour costs = 85% of labour costs

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Databases

- Purchased databases are not in GFCF. However, they are identified as intermediate consumption (NACE 72.4, NAF 72.4Z).
  - In 2004, INSEE recorded 778 million Euros as intermediate consumption in database (excluding sub-contracting, data from Supply and Use Table)

- Own-account database production is already included in own-account software production. It is not clear whether we can disentangle between software and database producers.

Copyright and licence costs

- In 2004 INSEE recorded 2 538 million euros in motion picture, radio and sound recording (NACE 92).
  - Copyrights GFCF is considered to be the total amount of production for own final use in the following NACE:
    - 9211. Motion picture and video production
    - 9212. Motion picture and video distribution
    - 9213. Motion picture projection
    - 9220. Radio and television activities
    - 9231. Artistic and literary creation and interpretation
    - 9232. Operation of art facilities
    - 9233. Fair and amusement parc activity
    - 9240. News agency activity
    - 9251. Library and archives activities
    - 9252. Museums
    - 9253. Botanical and zoological
    - 9261. Operations of sport arenas and stadiums
    - 9262. Other sporting activities
    - 9272. Other recreational activities
    - 9271. Gambling and bettig activities

Mineral exploration, Architecture and Engineering design

- In 2004 INSEE recorded 13 431 million euros in architecture & Engineering (Excluding households)
  - This includes all uses of NAF 74.2A and 74.2B and a variable share of NAF 74.2C (sub-sections of NACE 74.2)

- In 2004 INSEE recorded 18 million euros in mineral exploration, 0.001% of GDP and 0.005% of total GFCF

Advertising and market research (1)

- Total IC in 2004 = 27 000 million Euros, minus:
  - Public sector
  - Intra-industry consumption
- Private IC = 20 031 million, divided into:
  - Market Research 8.94%
  - Advertising 91.06%
- Ad. Private IC = 18 240 millions, minus classified ad. and non brand-forming ad.
  - According to Rooijen-Horsten, Bergen et Tanriseven (2008) and restricted sources, 82% of advertising could be brand-forming
- Total accountable advertising GFCF = 14 959 million Euros

Advertising and market research (2)

French advertising expenses distribution

	1995	2000	2004	2005	2006
Media	**36.57**	**37.56**	**34.83**	**34.46**	**34.61**
Press	16.02	15.74	14.04	13.91	13.86
TV	11.84	11.84	12.81	12.65	12.94
Radio	3.15	3.15	3.11	3.10	3.08
Display	5.29	5.29	4.53	4.43	4.35
Cinema	0.28	0.28	0.33	.038	0.39
Internet	0.00	0.50	0.57	1.19	1.67
Non-media	**63.42**	**62.44**	**65.17**	**65.54**	**65.39**
Promotion	15.73	15.56	15.46	15.51	15.61
Direct marketing	30.78	30.88	32.21	31.67	30.69
Directories and guidebooks	3.76	3.01	3.46	3.56	3.66
Marketing events	7.58	7.12	8.10	8.11	8.20
Public relation	5.57	5.38	5.36	5.49	5.56
Total	100	100	100	100	100

Organisation capital

- Purchased OC can be proxied by spending in *business and management consultancy* (NACE 74.14 and NAF 74.1G)

- In Supply and Use Table, total IC amounted 19 693 million Euros in 2004. Including:
  - Purchase for resale: 451m.e.
  - Purchased by public administrations: 4 356m.e.
- 14 886 million Euros remain.

Human capital (1)

- Spending by funding in 2004 (Source: DARES)

	Million Euros	Share	% of GDP
State	4 550	0.180	0.27%
Region	2 715	0.108	0.16%
Other territory	45	0.002	0.00%
Other public	1 447	0.057	0.09%
Firms	10 060	0.398	0.61%
Firms (excluding apprentice)	*7 906*	*0.313*	*0.48%*
Public adm. (for their won civil servant)	5 470	0.217	0.33%
Households	960	0.038	0.06%
Total	25 247	1	1.52%

Human capital (2)

- Spending by beneficiary in 2004 (Source: DARES)

	Million Euros	Share	% of GDP
Young (below 26)	5 920	0.234	0.36%
Apprentice	*3 796*	*0.150*	*0.23%*
Alternate	*1 270*	*0.050*	*0.08%*
Training and follow-up	*854*	*0.034*	*0.05%*
Unemployed	3 609	0.143	0.22%
Civil servants	5 128	0.203	0.31%
Market sector	9 976	0.395	0.60%
Investment	614	0.024	0.04%
Total	25 247	1	1.52%

Measurement Issues (1)

- Training (work in progress)
  - Which type of training should be retained ? Initial, continuing vocational training
  - “Purchased” training will be evaluated using firms tax bills
  - How to account for “internal training”?. Managers spend some time training their employees
- Organisational Capital
  - We lack precise definition
  - According to the literature, OC could be :
    - A consequence of other intangibles (should not be accounted for)
    - A residual of a macro production function (can be calculated, but erratic)

Measurement Issues (2)

- Financial innovation
  - What is financial innovation?
  - Corrado, Hulten and Sichel (2005), Hao, Manole and Van Ark (2008)… use the same rough proxy for financial innovation (20% of fin. industry intermediate inputs).
  - In the US, data on financial R&D provided by National Science Foundation (NSF) R&D survey, but underestimated due to the inability of financial firms to assess their own R&D activity
  - Large differences between the two results, 75 billion USD with CHS and 1.6 billion USD with NSF
  - In the US, Business Method patenting does not fully account for financial innovation yet.

Measurement Issues (3)

- Financial innovation *(cont'd)*
  - Hunt (2008) proposes an estimation based on employment.
  - Assuming that the following are "research occupations":
    - Software engineers
    - Computer programmers
    - Scientists (including social scientists)
    - Research managers
    - Actuaries
    - Mathematicians
    - Operation researchers
    - Statisticians
    - Architects
    - Cartographers
    - Surveyors

2/3 of « research occupations »

147 000 research workers in the fin. industry

Measurement Issues (4)

- Hunt's method applied to the French case

Code	Label	Employees in all industries (units)	Share of fin. indus. within total.	Employees in financial industries (units)	Share in fin. Innov. activity	Monthly salary (in Euros)
372a	Economic, financial and commercial research manager	20 643	18%	3 789	14%	3 555
376a	Managers in financial markets	3 300	93%	3 072	11%	2 218
376e	Managers in insurance	41 499	14%	5 722	21%	3 262
388a	Engineers, software R&D	211 100	7%	13 808	51%	3 066
388b	Engineers and executives	8 382	0%	0	0%	-
388c	Project manager, ICT manager	1 865	36%	663	3%	2 266
		283 819	19%	53 969	100%	

Measurement Issues (5)

- Differences in occupation nomenclature may lead to not fully comparable data when GFCF measurement is based on employment
  - Example: ILO's ISCO vs INSEE's PCS

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COINVEST items	*Computer software and database*			
Nomenclature	Code	Label	Includes	
ISCO 2008 (ILO)	251	Software and applications developers and analysts	o System analysts o Software developers o Web and multimedia developers	
	252	Database and network professionals	o Database designers and administrators o Computer network professionals	
PCS 2003 (INSEE, France)	388a	Engineers, software R&D	o Programmers o Software engineers o Development engineers	
	388b	Engineers and executives, maintenance and users support	o Database manager o Network manager o Technical support o Maintenance manager	
	388c	Project manager, ICT manager	o System designer o Project manager o ICT manager	
	478a	Software development technicians	o Programmer o Technical engineer	
	478b	Production and operation technicians	o Production manager o Operation technician o Operation manager	
	478c	Support, maintenance and installation technicians	o Technical agent o Office assistant o Maintenance programmer	

Ranges

	Recorded / *assessed*		Intermediate consumption		Estimates			
					Min		Max	
	Million euros	% GDP	Million Euros	%GDP	Million Euros	%GDP	Million Euros	%GDP
Software	22 076	1.32						
Databases			778	0.06				
R&D	*24 335*	*1.46*						
Mineral exploration	18	0.001						
Copyrights & License costs	2 538	0.15						
Financial innovation					728	0.04	1 806	0.10
Architecture & Engineering	13 431	0.81						
Advertising					14 959	0.90	18 240	1.09
Market research			2 366	0.14				
Human capital					9 976	0.60	20 119	1.21
Organisational structure			14 886	0.89				
Total					81 756	4.92	104 796	6.31

French estimations

In 2004	HMA (2008)		INSEE	
	Million euros	% GDP	Million euros	% GDP
Software	14 211	0.86	22 076	1.32
Databases	738	0.04	778	0.06
R&D	34 724	2.09	24 335	1.46
Mineral exploration	0	0	18	0.001
Copyrights & License costs	3 144	0.19	2 538	0.15
Financial innovation	9 666	0.58	728	0.04
Architecture & Engineering	14 927	0.90	13 431	0.81
Advertising	22 763	1.37	14 959	0.90
Market research	4 444	0.27	2 366	0.14
Human capital	24 986	1.51	9 976	0.60
Organisational structure	37 496	2.26	14 886	0.89