

Intangibles: medición y contribución al crecimiento

Experiencia internacional

Matilde Mas

Universidad de Valencia e Ivie

Seminario de Inauguración LA-KLEMS

***Crecimiento, empleo, capital y la heterogeneidad
sectorial en América Latina***

Washington DC, Diciembre 12-13, 2016

Motivation

Robert Solow (1987) statement about computers can be rephrased as: “While knowledge economy is all around us, it is still hard to see it in the official statistics”. Since Solow’s remark, important efforts have been made to capture the knowledge economy in the (official) statistics.

Milestones:

- The new way of **Measuring Capital**, and thus **Productivity**, taking into account the distinction among types of assets (OECD Manuals 2001a, 2001b, 2009)
 - **Relevant projects:** EU/LA/WORLD KLEMS; Productivity Database (OECD)
- The distinction between **ICT and non-ICT** assets and of ICT producing sectors
- The recognition by SNA 1995 of **Software**, Databases and a few more intangibles assets in **National Accounts**, and of SNA 2010 including **R&D**.
- **Corrado, Hulten & Sichel’s** (2005, 2009) proposal to expand NA boundaries to include a selected group of intangible assets
 - **Relevant projects:** COINVEST (7th FP), INNODRIVE (7th FP), **INTAN-Invest**, SPINTAN (7th FP) and KBC (OECD)

Intangibles: Corrado, Hulten & Sichel's proposal

They cut through the conceptual problem of defining intangible assets by referring to a standard inter-temporal framework that leads to the conclusion that “any use of resources that reduces current consumption in order to increase it in the future [...] qualifies as investment”.

Then, all types of capital should be treated symmetrically, for example, “investment in knowledge capital should be placed on the same footing as that of investment in plants and equipment”.

A convenient consequence of the CHS approach and their emphasis on the symmetric treatment of all assets is that one does not have to worry too much about defining “intangibles” by way of specific characteristics. It is more important to reason in terms of capital goods and to check whether spending activity meets the test of being an outlay now to enhance future consumption.

Classification of Intangible assets

Intangible capital asset types

Computerized information

1. Software
2. Databases

Innovative property

3. Mineral exploration
4. R&D (scientific)
5. Entertainment and artistic originals
6. New products/systems in financial services
7. Design and other new products/systems

Economic competencies

8. Brand equity
 - a. Advertising
 - b. Market research
9. Firm-specific resources
 - a. Employer-provided training
 - b. Organizational structure

The major challenges in capitalizing intangibles

- ▶ Intangibles are largely **invisible** and **hard to count**:
 - Companies often do not have exact metrics to separate expenditure on intangibles assets from other expenses.
- ▶ Intangible investments are often **produced within the company** and therefore do not represent a market transaction:
 - However, an increasingly large share of intangibles are traded through markets which allow to impute prices for within-company production and transactions.
- ▶ Intangibles are often **not a direct or continuous input** to current production:
 - Greater emphasis on product innovations represents shift away from Solow to Schumpeterian approach to growth.
- ▶ Intangibles are **largely non-rival** and their **benefits often not appropriable**:
 - While violating marginalist principles at micro-level, the principles are close enough to the reality of market economy.

Consequences

The **main consequences** of including (some) intangibles as investment, instead of following the NA practice of treating them as intermediate consumption goods, are:

1. Gross Value Added (**GVA**) **will increase** by the same amount that the (new) intangible investment.
2. Thus, **the level of labour productivity** will also increase.
3. The **real rate of growth** of GVA when intangibles are included can either increase, decrease, or keep (more or less) constant with respect to the GVA conventionally measured.
4. **Growth accounting results are modified**. The inclusion of intangibles assets in investment **reduces** the contribution of TFP growth.

MARKET SECTOR INTANGIBLES DATABASE. THE INTAN-Invest INITIATIVE

INTAN-Invest (*Cross country intangible investment data*
www.intan-invest.net)

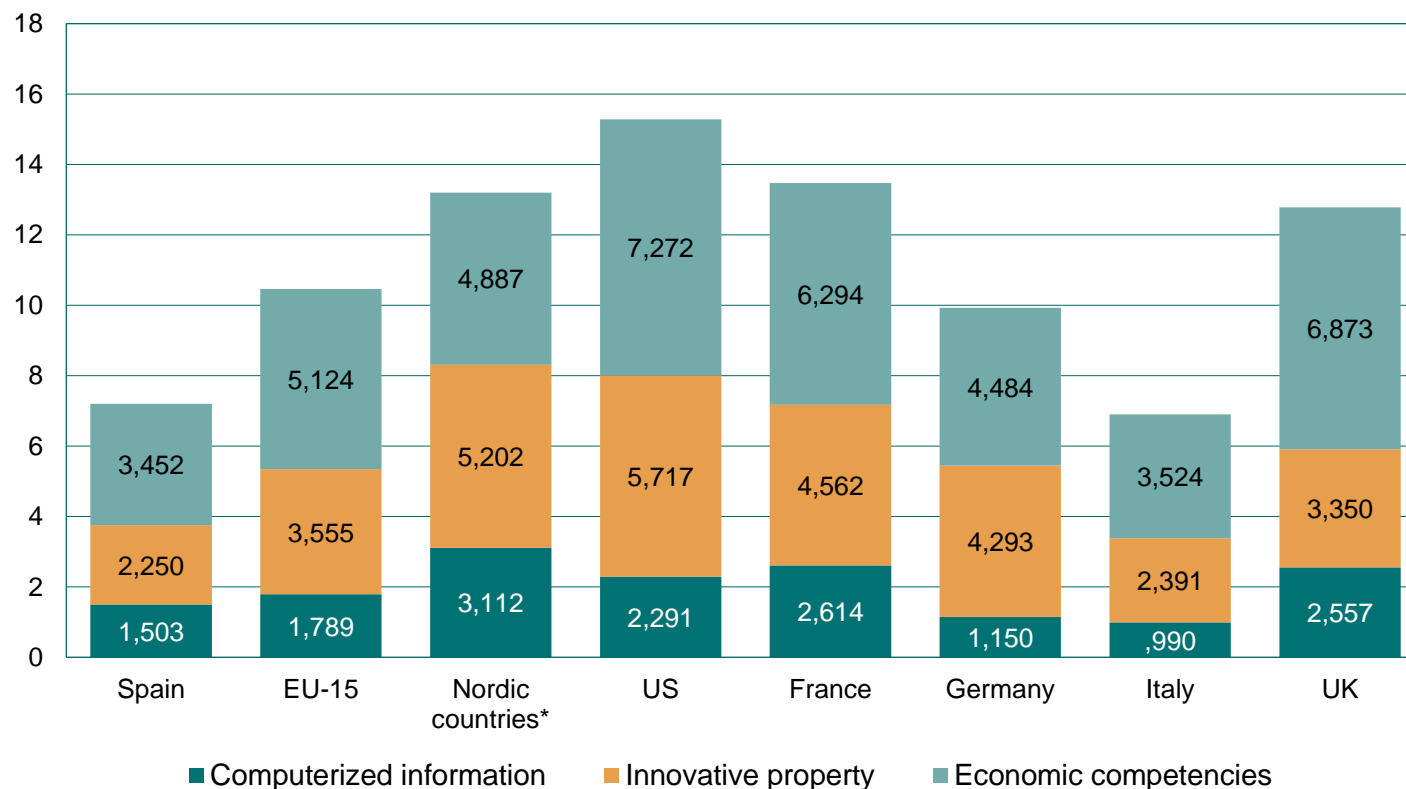
- **Unfunded** project
- **Project coordinators:** Carol Corrado (TCB, US); Jonathan Haskel (IC, UK); Cecilia Jona-Lasinio (LUISS, Italy); Maximiliano Iommi (ISTAT, Italy)
- **Countries:** EU-27 + Norway + USA
- **Period:** 1995-2010 (so far)
- **Private sector** of the economy. 9 industry disaggregation
- **Objective:** Getting an harmonized intangibles database for EU-27 plus Norway & US
- Making use of the information gathered by **INNODRIVE & COINVEST**

Investment in Intangibles: Market Economy

(Intan-Invest and Telefónica Foundation)

Composition of the investment in intangible assets, 2010

Percentage of extended private GVA



* Sweden, Finland and Denmark.

Source: EU KLEMS, INE, INTAN-Invest and author's own calculations.

Smart public intangibles. SPINTAN project

- The SPINTAN Project is **funded by the 7^o Framework Program** of the EU.
- It started November 2013 and it has **just finished (November 2016)**
- It has counted with the participation of **12 institutions** from Spain (**Ivie**, Project coordinator), Italy (**LUISS** and **ISTAT**), UK (**NIESR** and **Imperial College**), Germany (**ZEW** and **DIW**), Austria (**wiiw**), Hungary (**Kopint-Tarki**), Sweden (**FORES**), **TCBE** (Brussels) and the **OECD**.
- The overall **research purpose** of the project has been
 - **to identify** and **measure** public sector **intangible capital**,
 - to **evaluate** its **role as a driver** of firm-industry-country economic growth and
 - **to provide new insights** to the **innovation policy agenda** about the key role of public sector knowledge creation.

Smart public intangibles. SPINTAN project

At the **most practical level**, its goal is **to complete** the coverage of the sources of growth information already existing for the market economy [EU KLEMS (FP 6th), COINVEST (FP 7th), INDICSER (FP 7th), INNODRIVE (FP 7th) and **INTAN-Invest**] **including the Non-Market Sector**, making possible the generation of total economy **growth accounts** with **intangibles as productive assets**.

(www.spintan.net)

EU KLEMS, INTAN-Invest, SPINTAN. A common framework

EU KLEMS (2003-2008 project funded by 6th-7th Framework Programme of the EC)

Industry description	NACE Rev 2	Factors of production				TFP
		Capital		Labour		
		ICT assets	Non-ICT assets	Hours worked	Labour composition	
MARKET ECONOMY						
AGRICULTURE, FORESTRY AND FISHING	A	✓	✓	✓	✓	✓
MINING AND QUARRYING	B	✓	✓	✓	✓	✓
TOTAL MANUFACTURING : : : <i>12 sub-industries</i>	C	✓	✓	✓	✓	✓
ELECTRICITY, GAS AND WATER SUPPLY	D-E	✓	✓	✓	✓	✓
CONSTRUCTION	F	✓	✓	✓	✓	✓
WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES : : : <i>3 sub-industries</i>	G	✓	✓	✓	✓	✓
TRANSPORTATION, STORAGE and ACCOMMODATION AND FOOD SERVICE ACTIVITIES : : : <i>3 sub-industries</i>	H-I	✓	✓	✓	✓	✓
INFORMATION AND COMMUNICATION : : : <i>3 sub-industries</i>	J	✓	✓	✓	✓	✓
FINANCIAL AND INSURANCE ACTIVITIES	K	✓	✓	✓	✓	✓
PROFESSIONAL, SCIENTIFIC, TECHNICAL, ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES	M-N	✓	✓	✓	✓	✓
ARTS, ENTERTAINMENT, RECREATION AND OTHER SERVICE ACTIVITIES	R-S	✓	✓	✓	✓	✓
NON-MARKET SERVICES						
PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL SECURITY	O	✓	✓	✓	✓	✓
EDUCATION	P	✓	✓	✓	✓	✓
HEALTH AND SOCIAL WORK	Q	✓	✓	✓	✓	✓
REAL ESTATE ACTIVITIES	L	✓	✓	✓	✓	✓

EU KLEMS, INTAN-Invest, SPINTAN. A common framework

EU KLEMS + INTAN-Invest

Industry description	NACE Rev 2	Factors of production					
		EU KLEMS (2003-2008, 6th-7th Framework Programme)				INTAN-Invest (2011-2014)	TFP
		Capital		Labour		Capital	
		ICT assets	Non-ICT assets	Hours worked	Labour composition	Intangible assets, market sector	
MARKET ECONOMY (industry approach)							
AGRICULTURE, FORESTRY AND FISHING	A	✓	✓	✓	✓	✓	✓
MINING AND QUARRYING	B	✓	✓	✓	✓	✓	✓
TOTAL MANUFACTURING	C	✓	✓	✓	✓	✓	✓
ELECTRICITY, GAS AND WATER SUPPLY	D-E	✓	✓	✓	✓	✓	✓
CONSTRUCTION	F	✓	✓	✓	✓	✓	✓
WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES	G	✓	✓	✓	✓	✓	✓
FINANCIAL AND INSURANCE ACTIVITIES	K	✓	✓	✓	✓	✓	✓
OTHER SERVICES	H-J, M-N, R-S	✓	✓	✓	✓	✓	✓
NON-MARKET SERVICES (industry approach)							
PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL SECURITY	O	✓	✓	✓	✓	✗	✗
EDUCATION	P	✓	✓	✓	✓	✗	✗
HEALTH AND SOCIAL WORK	Q	✓	✓	✓	✓	✗	✗
REAL ESTATE ACTIVITIES	L	✓	✓	✓	✓	✗	✗

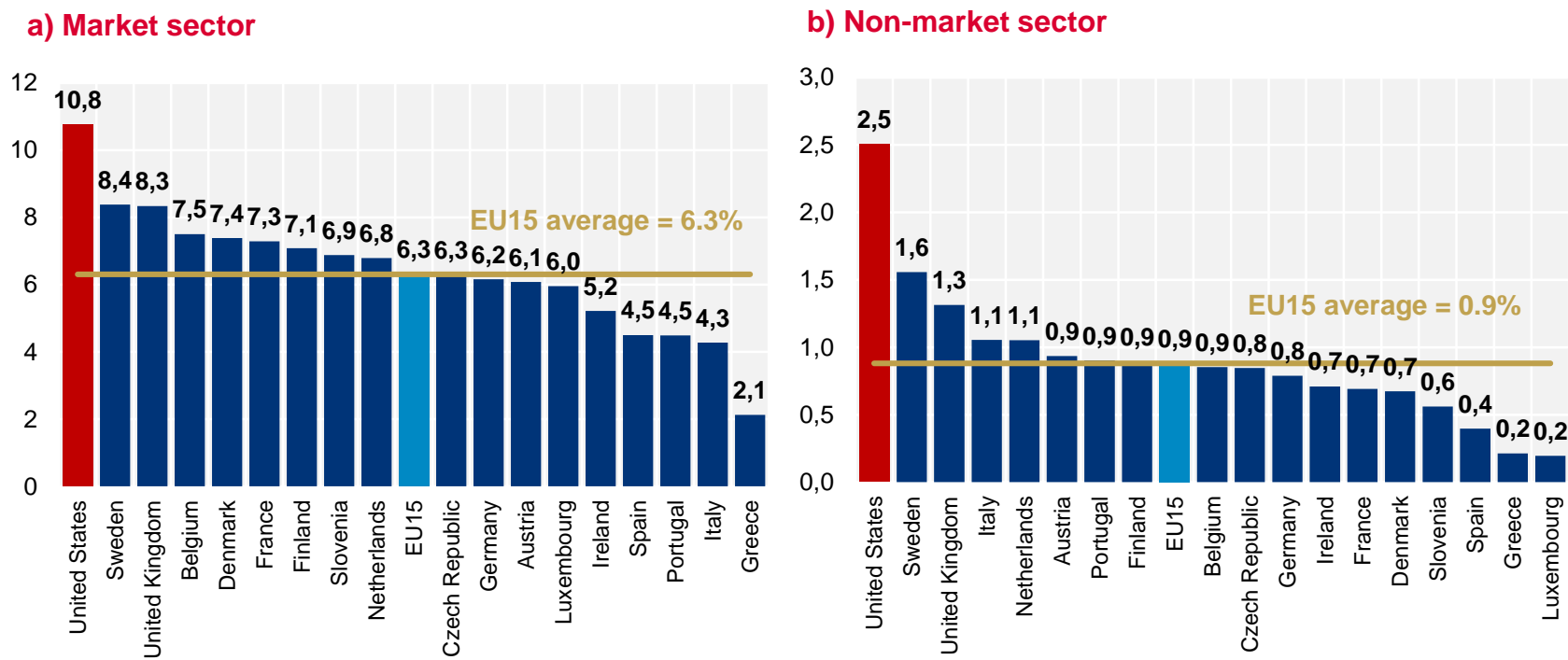
EU KLEMS, INTAN-Invest, SPINTAN. A common framework

EU KLEMS + INTAN-Invest + SPINTAN

Industry description	NACE Rev 2	Factors of production							TFP
		EU KLEMS (2003-2008, 6th-7th Framework Programme)				INTAN-Invest (2011-2014)	SPINTAN (2013-2016, 7th FP)		
		Capital		Labour		Capital	Capital		
		ICT assets	Non-ICT assets	Hours worked	Labour composition	Intangible assets, market sector (industry approach)	Intangible assets, non-market sector (institutional approach)		
MARKET ECONOMY (industry approach)									
AGRICULTURE, FORESTRY AND FISHING	A	✓	✓	✓	✓	✓	✗	✓	
MINING AND QUARRYING	B	✓	✓	✓	✓	✓	✗	✓	
TOTAL MANUFACTURING	C	✓	✓	✓	✓	✓	✗	✓	
ELECTRICITY, GAS AND WATER SUPPLY	D-E	✓	✓	✓	✓	✓	✗	✓	
CONSTRUCTION	F	✓	✓	✓	✓	✓	✗	✓	
WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES	G	✓	✓	✓	✓	✓	✗	✓	
FINANCIAL AND INSURANCE ACTIVITIES	K	✓	✓	✓	✓	✓	✗	✓	
OTHER SERVICES	H-J, M-N, R-S	✓	✓	✓	✓	✓	✓ (only M72 and R92-92 non-market institutional sector)	✓	
NON-MARKET SERVICES (industry approach)									
PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL SECURITY	O	✓	✓	✓	✓	✗	✓	✓	
EDUCATION	P	✓	✓	✓	✓	✗	✓ (only P non-market institutional sector)	✗	
HEALTH AND SOCIAL WORK	Q	✓	✓	✓	✓	✗	✓ (only Q non-market institutional sector)	✗	
REAL ESTATE ACTIVITIES	L	✓	✓	✓	✓	✗	✗	✗	

US outperforms the EU in market and non-market intangible investment . Heterogeneity within EU-15. Sweden and UK in top positions. The four peripheral countries at the tail end.

Figure 3: Share of GFCF on intangible assets over total GDP. EU15 and US. Average 2006-2010 (percentages)

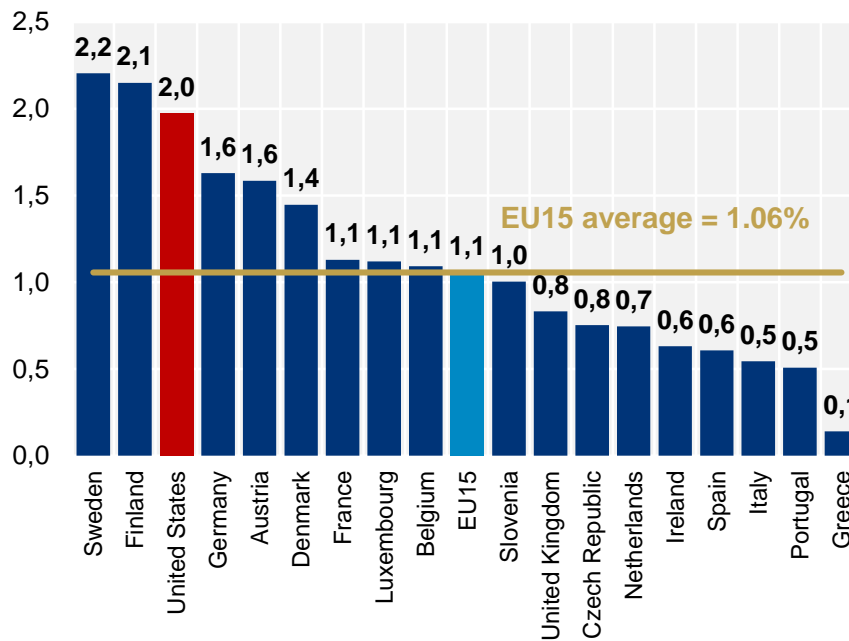


Source: Eurostat, INTAN-Invest, SPINTAN and own elaboration.

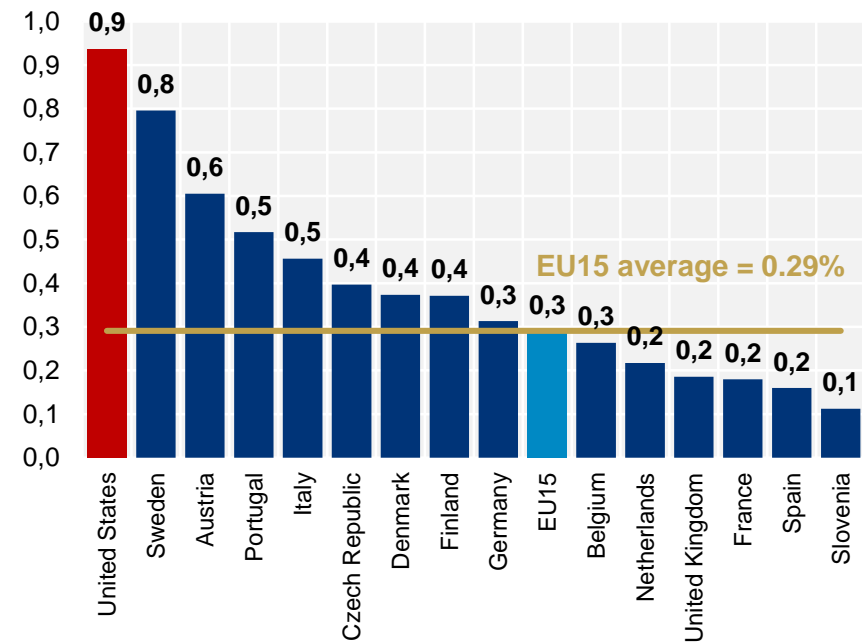
In R&D the gap with US is larger in the non-market sector

Figure 5: Share of GFCF on R&D over total GDP. EU15 and US. Average 2006-2010 (percentages)

a) Market sector



b) Non-market sector

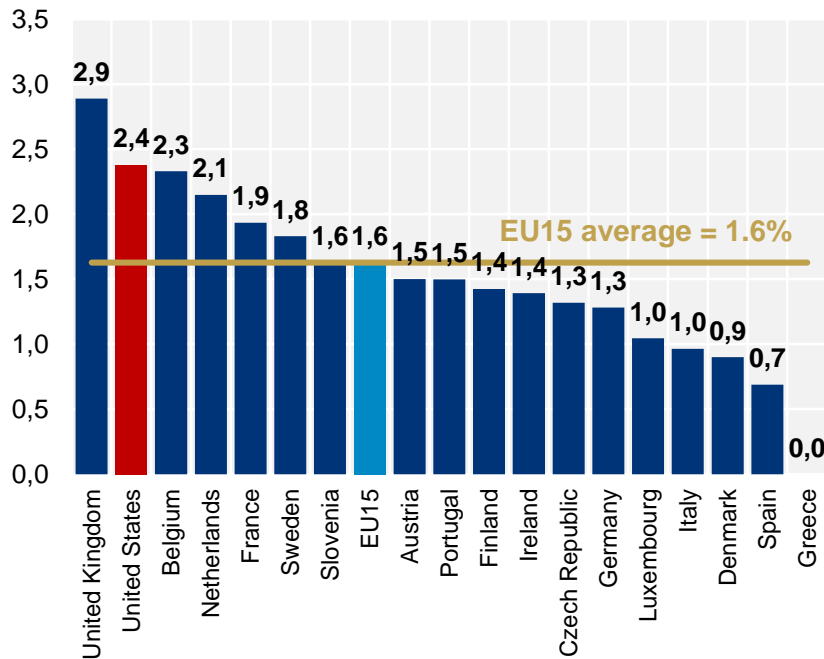


Source: Eurostat, INTAN-Invest, SPINTAN and own elaboration.

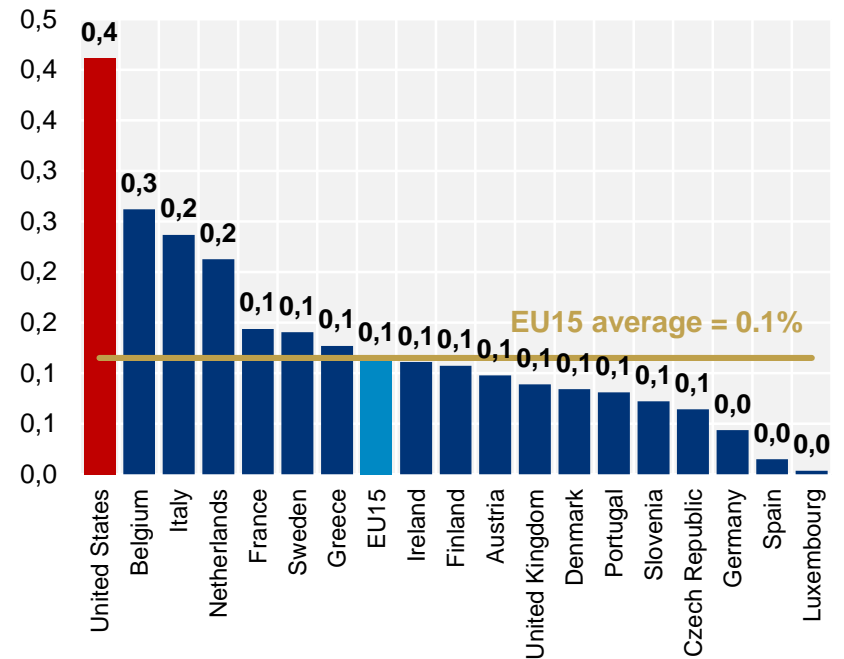
UK leads the ranking in organizational capital investment over GDP in the market sector, while US tops the non-market sector.

Figure 6: Share of GFCF on organisational capital over total GDP. EU-15 and US. Average 2006-2010 (percentages)

a) Market sector



b) Non-market sector

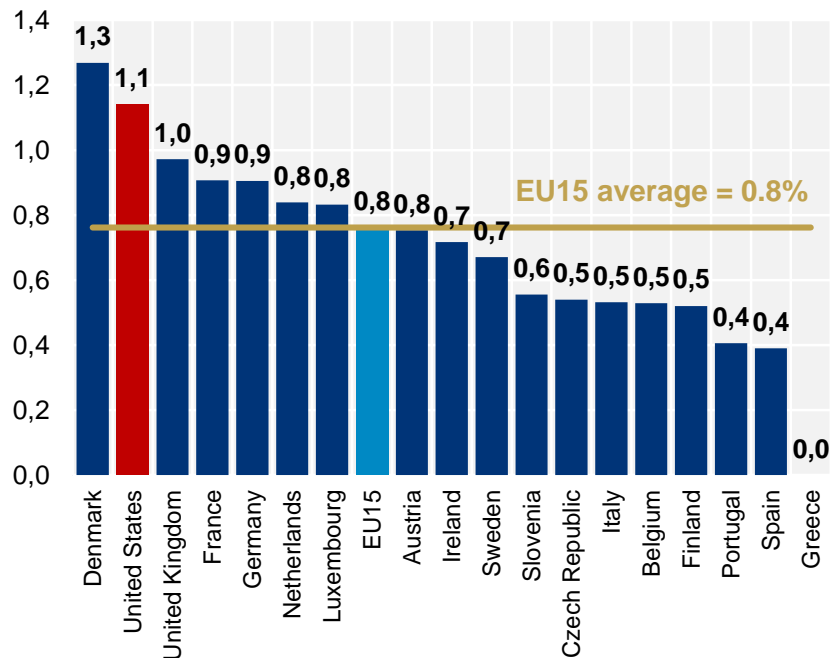


Source: Eurostat, Intan-INVEST, SPINTAN and own elaboration.

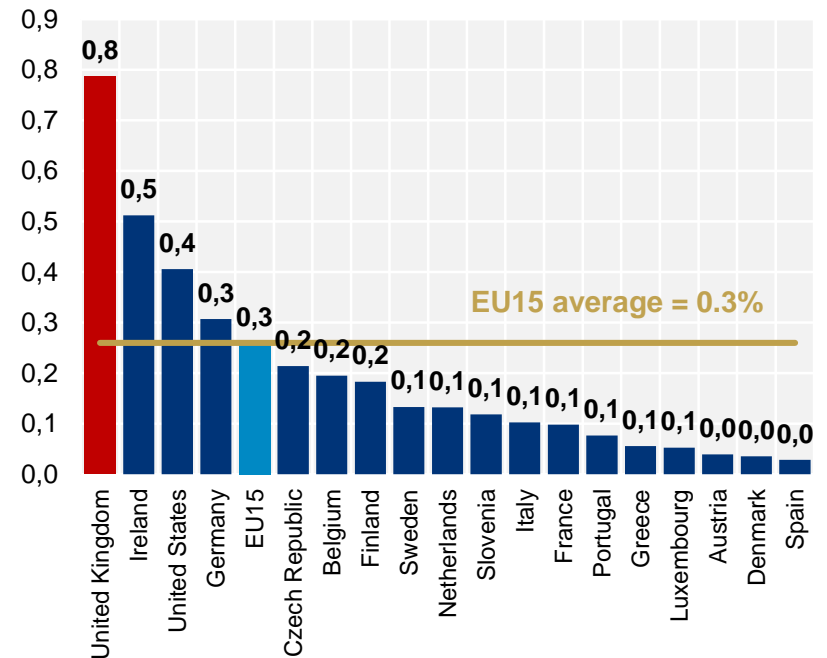
Denmark (followed by US) is the leader in investment in training in the market sector and UK in the non-market sector. US is above the EU-15 average.

Figure 7: Share of GFCF on training over total GDP. EU-15 and US. Average 2006-2010 (percentages)

a) Market sector



b) Non-market sector



Source: Eurostat, INTAN-Invest, SPINTAN and own elaboration.

Implications for economic growth econometric results

A primary characteristic of **intangible capital is to be growth promoting**

Corrado, C., Haskel, J. and C. Jona-Lasinio: “Spillovers from public intangibles” (Mimeo, Spintan)

- Evidence of **spillovers from public sector R&D** to productivity in the market sector.
- Their findings suggest **a rate of return of around 50% to public sector R&D** spending.
- They also find **that market sector investments in non-R&D intangible capital** generate **spillovers to productivity**.
- They do not find evidence that non-market non-R&D intangible investment has spillover benefits to the market sector.

Schiersch, A. and M. Gornig Intangible Capital: “Complement or Substitute in the Creation of Public Goods?” (Mimeo, Spintan)

- First analysis of the elasticity of substitution between intangible capital and other inputs for public sector in Europe
- **Intangible capital is only weakly substitutable with other inputs**; but also not fully complementary

MORE RESEARCH IS NEEDED, together with expanding and updating already existing databases (EUKLEMS, INTAN_Invest) complementary to SPINTAN.

Conclusions

- Intangibles are able to explain better and better the **differences in living standards** among the countries.
- In order to grow and generate employment, **it is not enough to invest in tangible investment** (factories, machinery and equipment...). It is becoming more important **to invest in intangibles assets**. It is precisely in these assets where the differences among countries are larger.
- **Low investment in intangibles** can explain the **sudden stop** in the process of economic **convergence** of the UE with respect the US.
- All firms should invest more on intangibles regardless of the economic sector to which they pertain since empirical evidence warns us that **tangible and intangible capital are complementary**. Furthermore, they **generate spillovers** to other firms and sectors of the economy.
- The **availability of this information** will allow designing public and private policies addressed to improve economic performance.

Intangibles: medición y contribución al crecimiento

Experiencia internacional

Matilde Mas

Universidad de Valencia e Ivie

Seminario de Inauguración LA-KLEMS

***Crecimiento, empleo, capital y la heterogeneidad
sectorial en América Latina***

Washington DC, Diciembre 12-13, 2016