FOURTH
WORLD KLEMS
CONFERENCE
MADRID May 23rd-24th
2016

Measuring Progress in the Spanish Economy: a World KLEMS - Ivie Approach

Francisco Pérez
University of Valencia & Ivie

Madrid May 24th, 2016

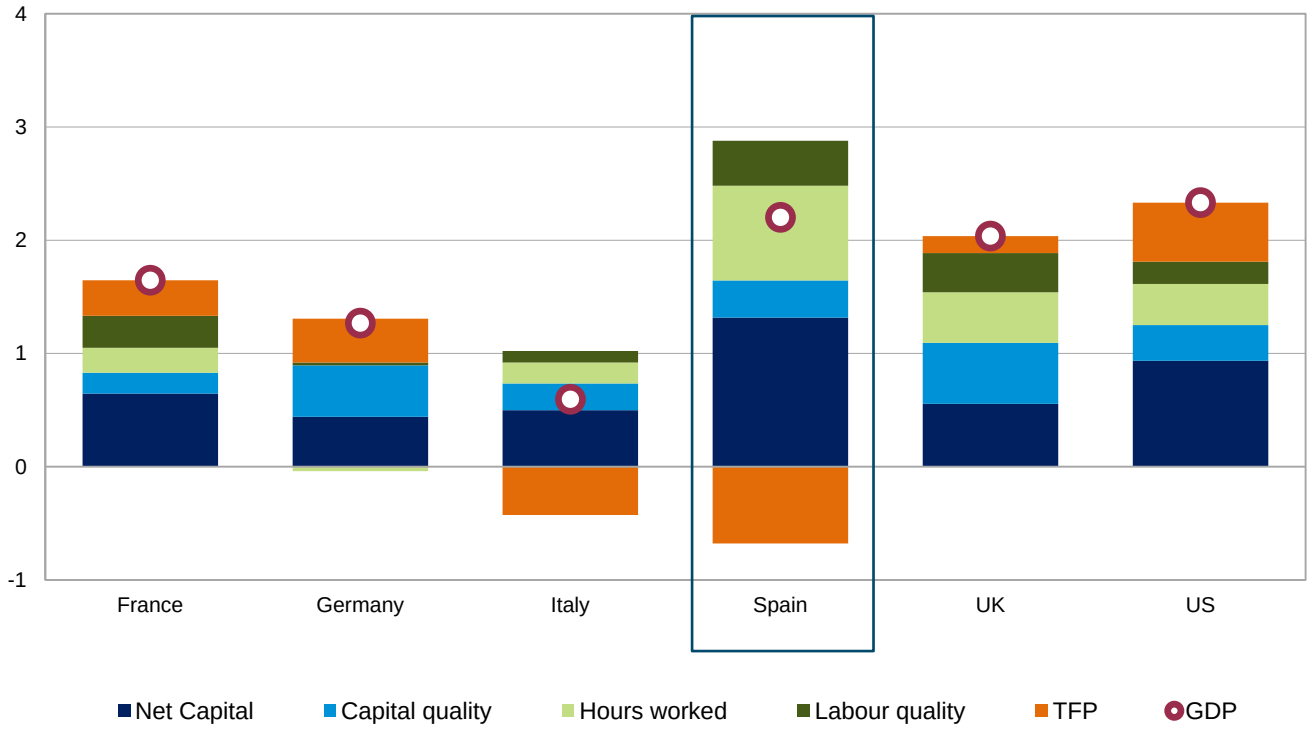
Fundación BBVA

25 Anniversary 1990 - 2015 Ivie

Growth, accumulation and productivity in Spain

- During the last decades Spanish growth has been intense, but the evolution of its productivity has been negative

Figure 1. Contributions to GDP growth. 1995-2012 (percentage)

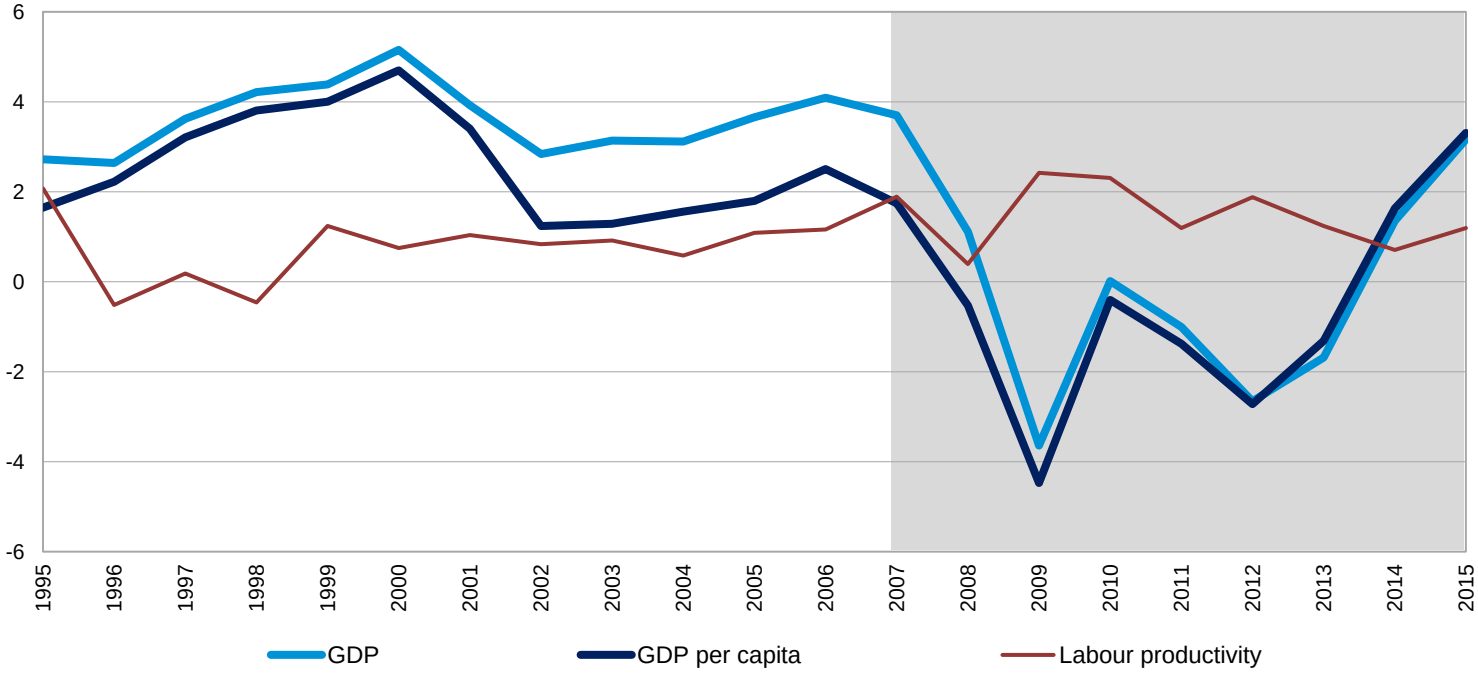


Source: AMECO, BBVA-Foundation-Ivie, EU KLEMS, TCB and own elaboration.

Labour productivity in Spain

- The evolution of productivity per hour in Spain has been moderate during decades when compared with that of most developed areas.

Figure 2. GDP, GDP per capita and labour productivity. Growth rate. Spain, 1995-2015
(percentage)



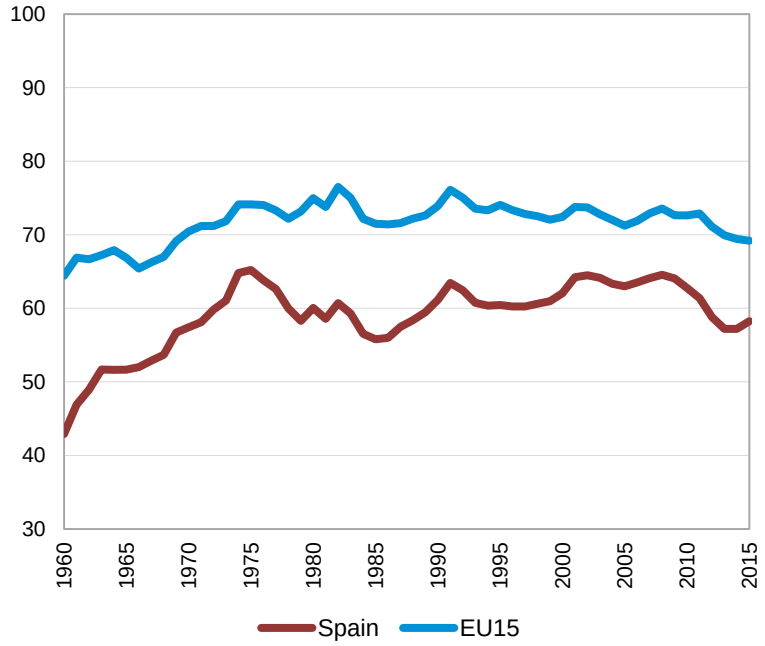
Source: AMECO, World Bank, EU KLEMS, TCB and own elaboration.

Labour productivity in Spain

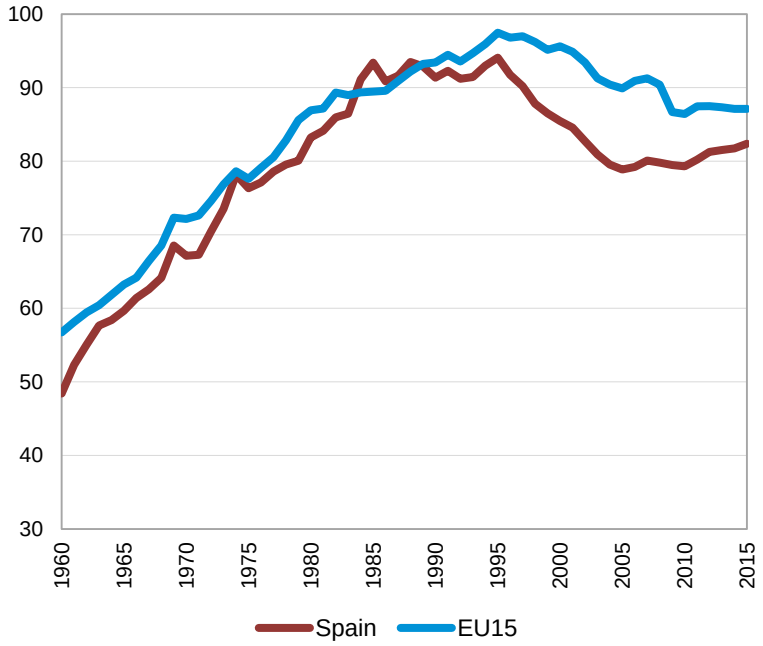
- Labour productivity and the difficulty of creating new jobs have contributed to Spain´s stagnant convergence with advanced economies

Figure 3. GDP per capita and labour productivity. Convergence, 1960-2015 (US=100)

a) GDP per capita



b) Labour productivity



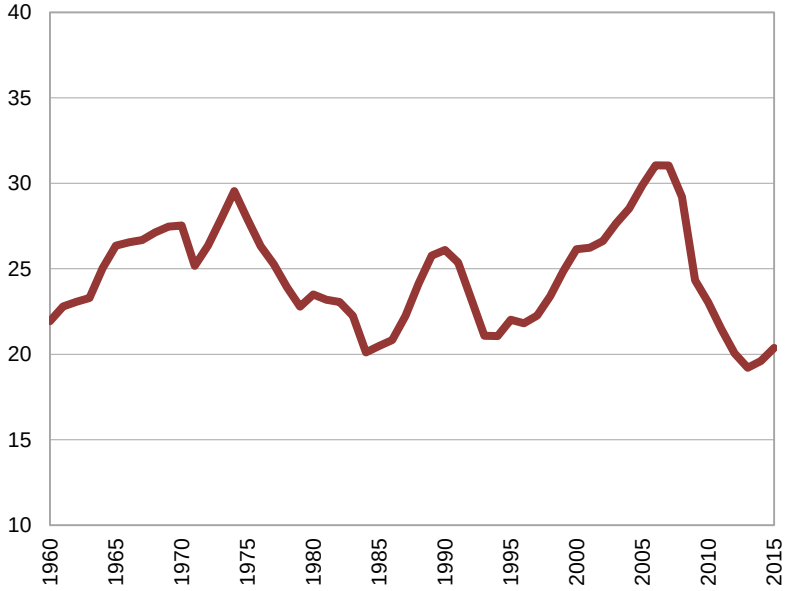
Source: AMECO, World Bank, EU KLEMS, TCB and own elaboration.

Capital deepening

- The investment effort of the Spanish economy has been strong, increasing capital endowments per worker

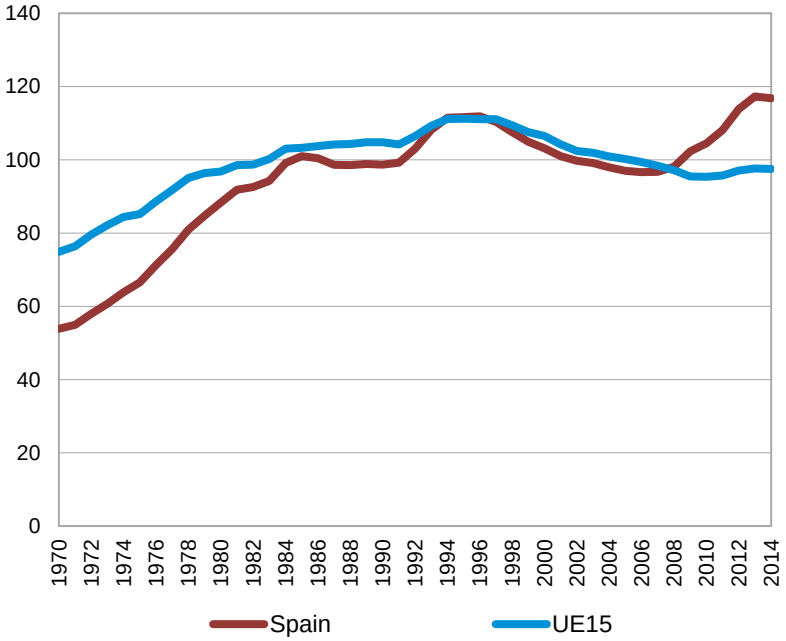
Figure 4. Investment effort (GFCF/GDP) and convergence in net capital per person employed

a) GFCF/GDP. Spain, 1960-2015 (percentage)



Source: BBVA-Foundation-Ivie, INE and own elaboration.

b) Net capital per employed person, Spain and EU15, 1970-2014 (US=100)



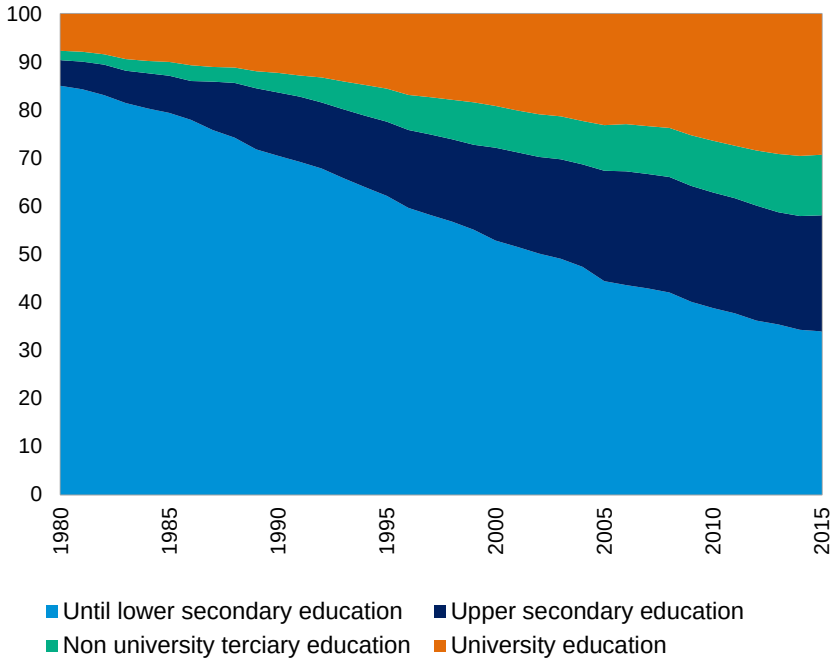
Source: AMECO, BBVA-Foundation-Ivie, EU KLEMS, TCB and own elaboration.

Improving human capital

- Improvements in educational levels have been substantial, but labour productivity stagnated from 1985 until the arrival of the crisis.

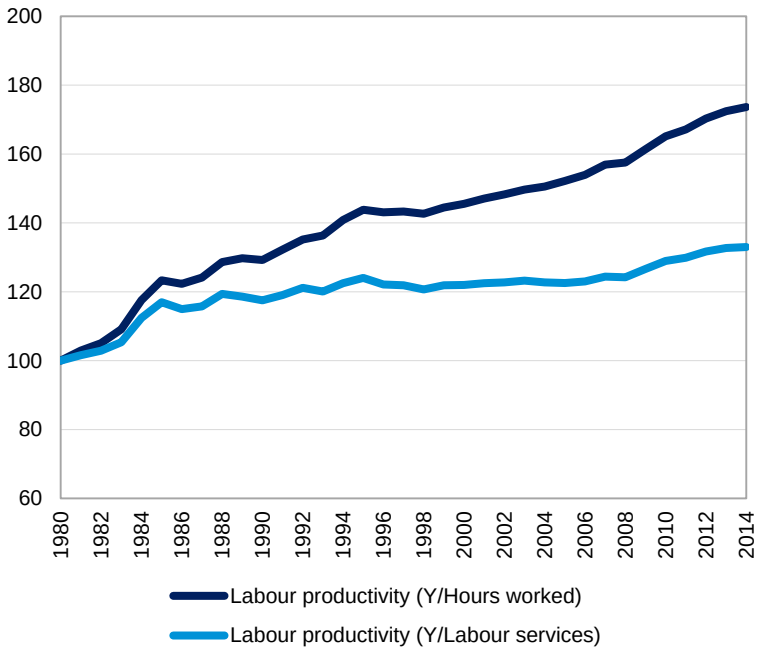
Figure 5. Employment and labour productivity. Spain, 1980-2015

a) Employed population by educational attainment



Source: INE and own elaboration

b) Labour productivity (1980=100)



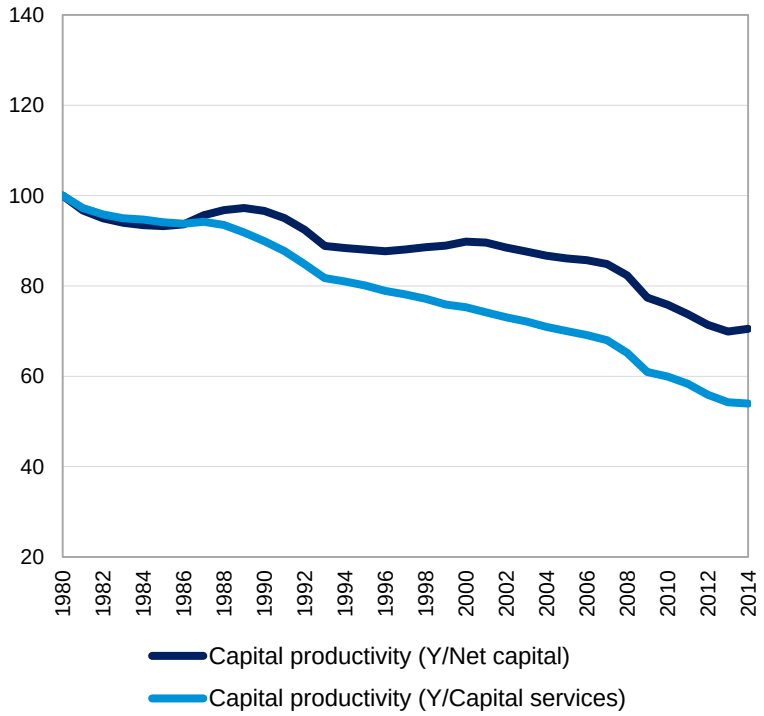
Source: AMECO, BBVA Foundation-Ivie, EU KLEMS, TCB, World Bank and own elaboration.

Looking into the capital productivity in Spain

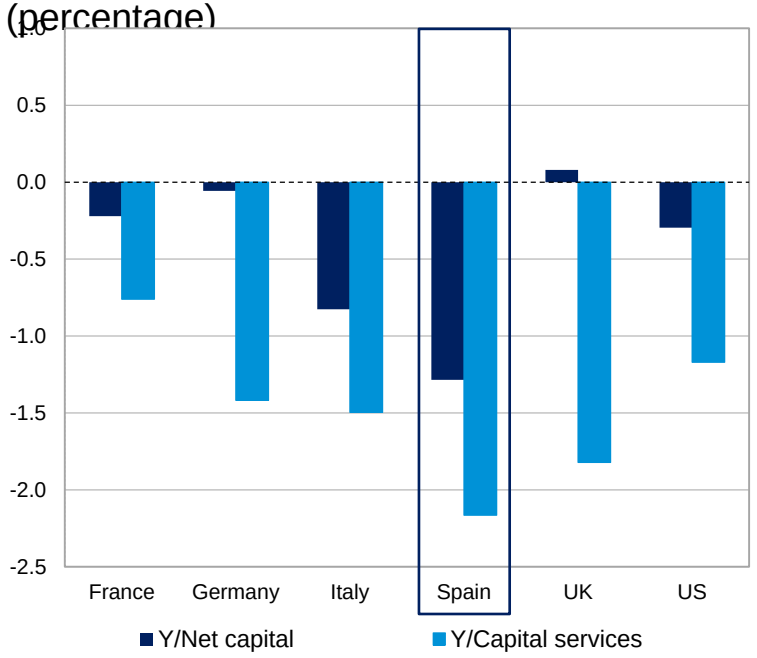
- The fall in capital productivity starts earlier and becomes more intense than in other economies when the productive capital measurement is considered

Figure 6. Capital productivity

a) Capital productivity. Spain, 1980-2014
(1980=100)



b) Capital productivity. Growth rates. International comparison, 1995-2012
(percentage)

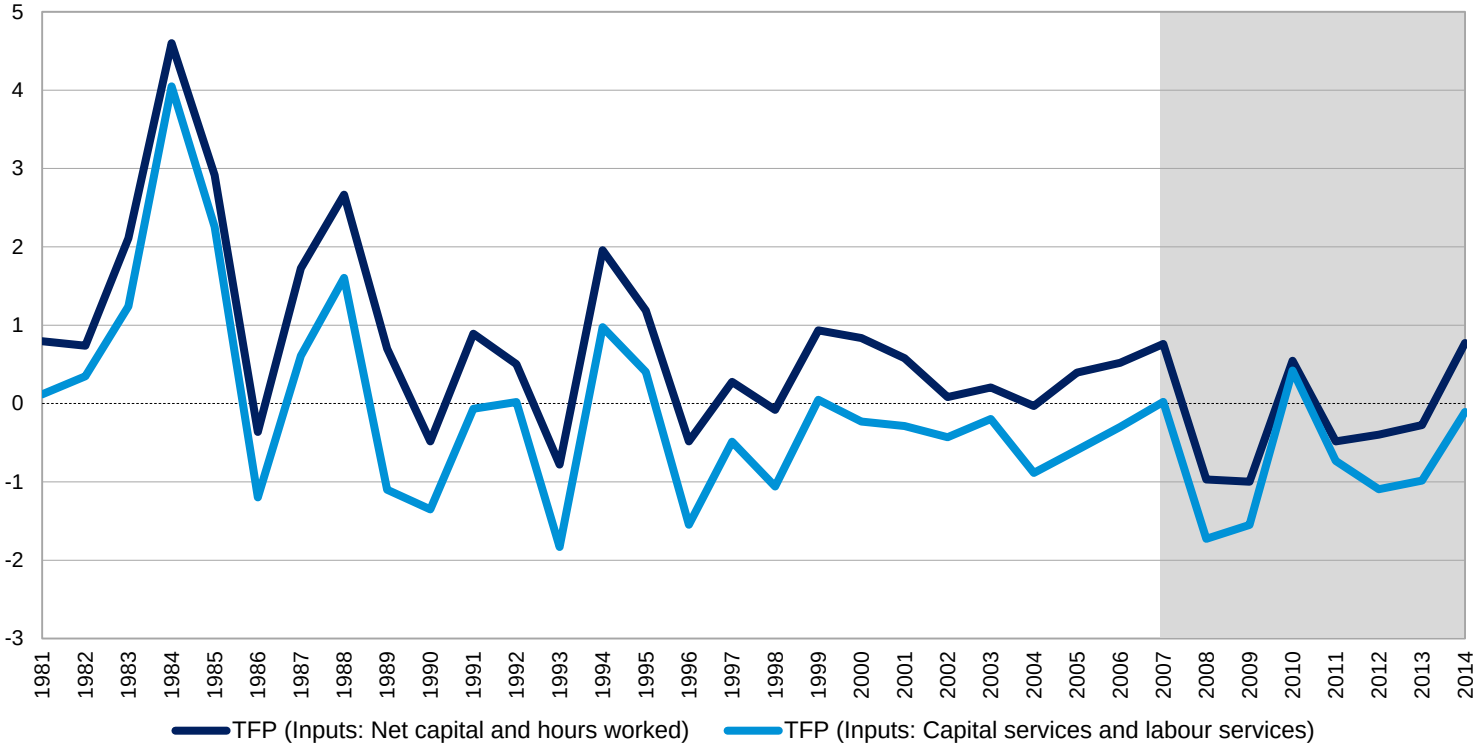


Source: AMECO, BBVA Foundation-Ivie, EU KLEMS, TCB, World Bank and own elaboration.

TFP growth in Spain: two estimates

- Growth rates of TFP are close to zero when quality improvements of factors are not accounted for, and negative when these are considered

Figure 7. TFP. Growth rate. Spain, 1980-2014
(percentage)



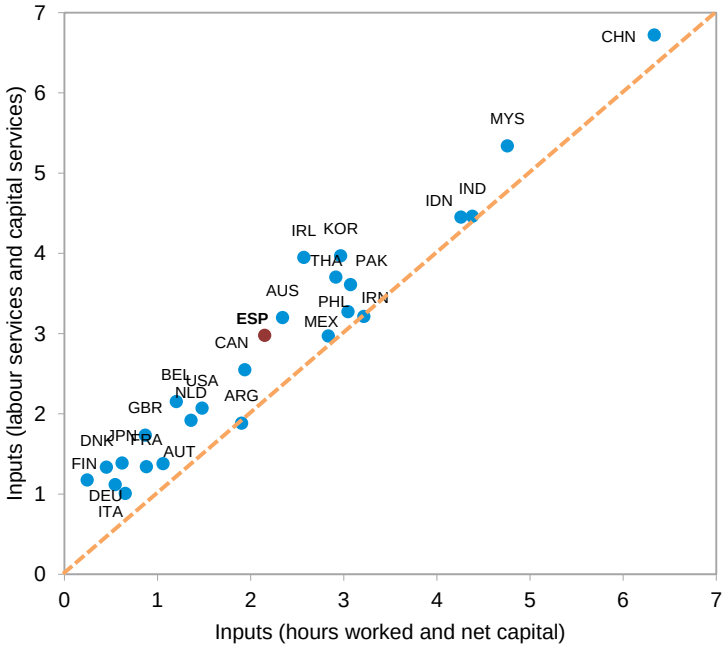
Source: AMECO, BBVA Foundation-Ivie, EU KLEMS, TCB, World Bank and own elaboration.

Inputs contributions and TFP growth: international perspective

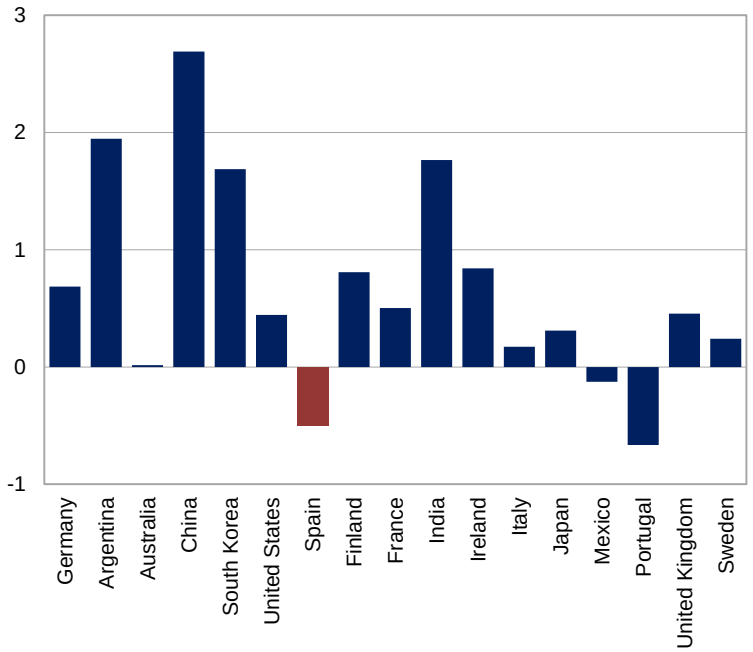
- Improvements in the quality of labour and capital services increase the contributions of factors but, despite these changes, many countries present significant TFP growth rates in recent decades.

Figure 8. Contributions to GDP, 1985-2012 (percentage)

a) Inputs contribution



b) Growth rate of TFP



Note: for Argentina the period is 1985-2010

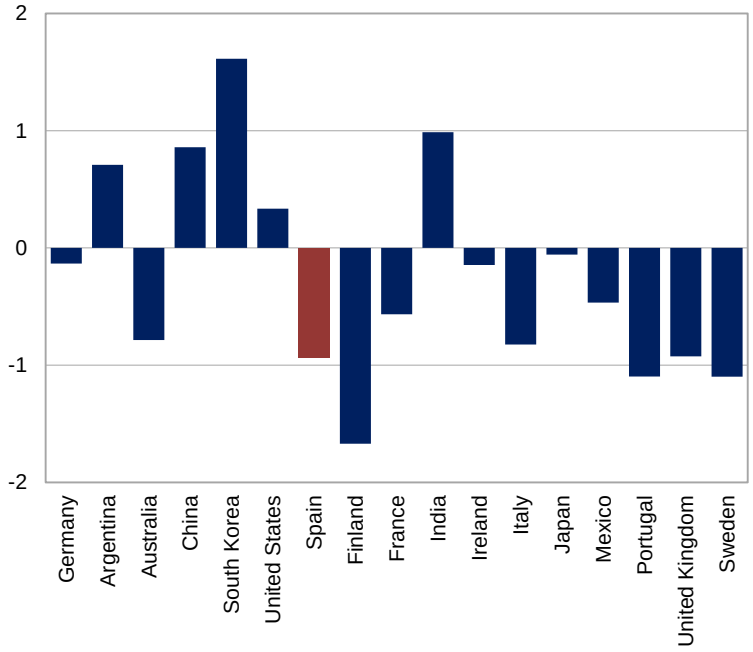
Source: AMECO, APO, BBVA Foundation-Ivie, EU KLEMS, TCB, Jorgenson and Vu (2016), OECD, World Bank and own elaboration.

Crisis, overcapacity and TFP divergence

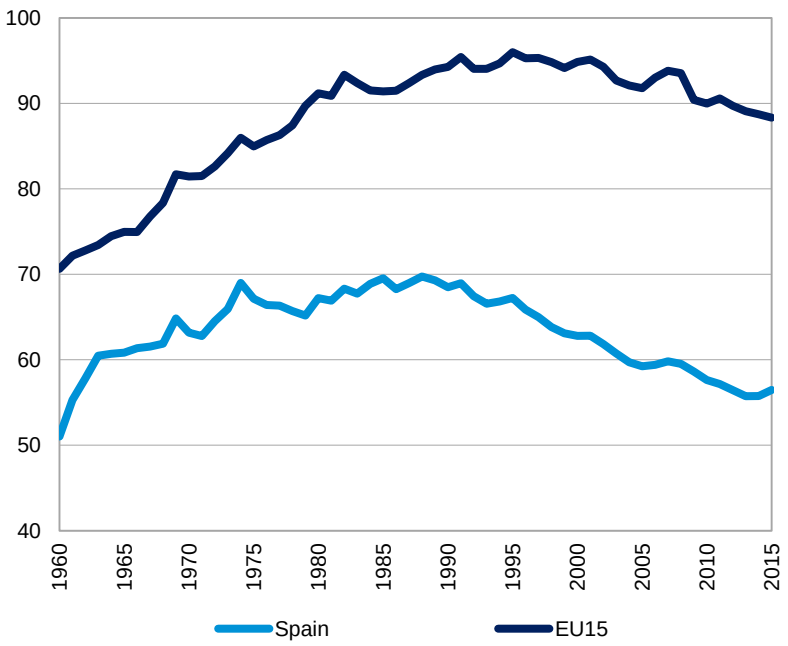
- The low level of activity has caused significant excess capacity in many economies. However, in Spain this problem exists in the recent real estate boom years and TFP has been diverging with developed economies since 1995

Figure 9. TFP: Growth rate and levels. International comparison

a) TFP. Growth rate, 2007-2012 (percentage)



b) TFP. Levels, 1960-2015 (US=100)



Note: for Argentina the period is 2007-2010

Source: AMECO, APO, BBVA Foundation-Ivie, EU KLEMS, TCB, Jorgenson and Vu (2016), OECD, World Bank and own elaboration.

TFP vs Labour and Capital Productivity

- TFP can be expressed as the product of labour and capital productivity raised to the power of their respective shares:

$$A = (Y/L)^{\alpha} (Y/K)^{\beta}$$

- Thus, the evolution of TFP depends on the evolution of labour and capital productivity, weighted by their shares:

$$\Delta \ln A_t = 0.5 \cdot (\alpha_t + \alpha_{t-1}) \cdot \Delta \ln (Y_t/L_t) + 0.5 \cdot (\beta_t + \beta_{t-1}) \cdot \Delta \ln (Y_t/K_t)$$

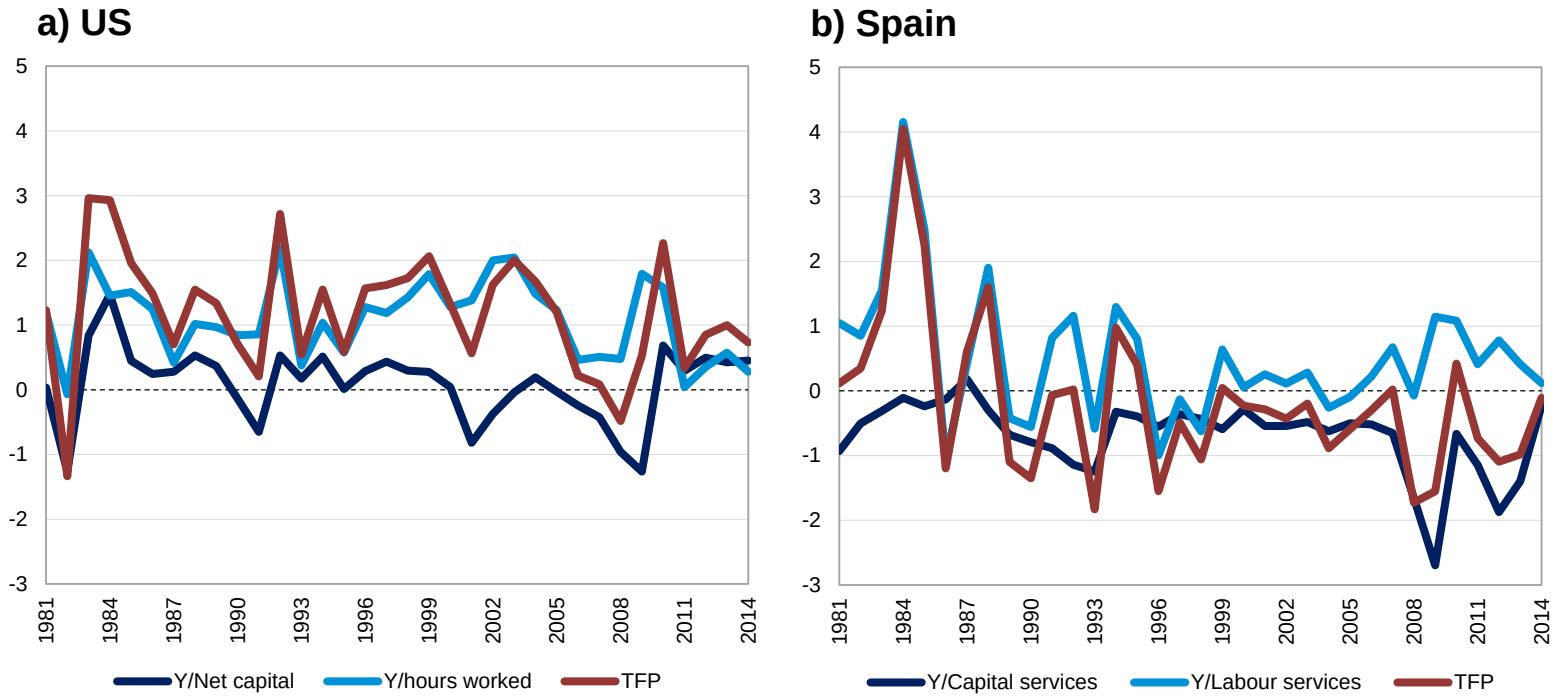
  - If capital productivity is relatively constant, TFP follows a path that is mainly determined by labour productivity
  - If labour productivity is relatively constant, TFP follows a path that is mainly determined by capital productivity

- Ceteris paribus, higher labour productivity contributes to higher TFP growth. But, given the moderate labour productivity growth, lower capital productivity results in an even lower TFP growth

A permanent excess of capacity in Spain?

- Capital productivity always contributes negatively to the evolution of TFP and the evolution of TFP in the 21st century is increasingly associated with capital productivity trajectory

Figure 10. TFP growth rates: contributions of capital productivity and labour productivity, 1980-2014 (percentage)



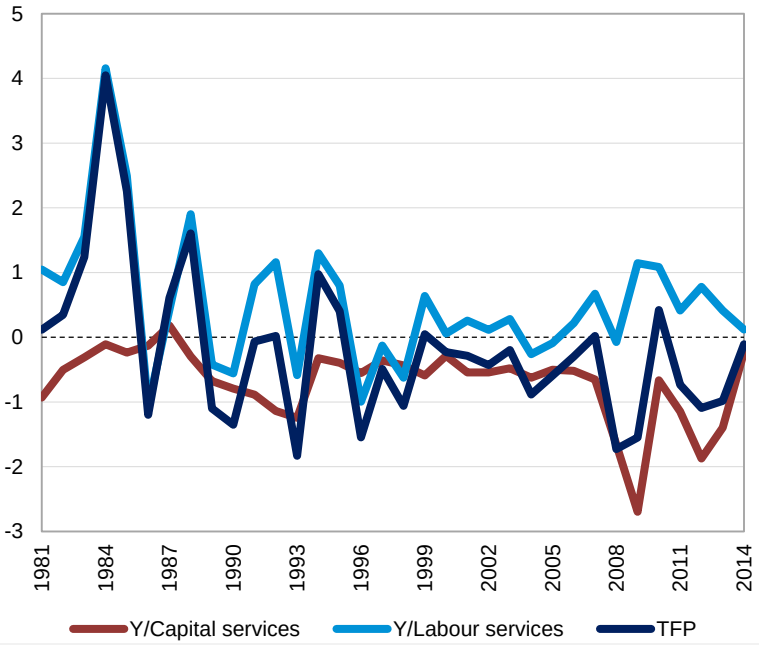
Source: AMECO, APO, EU KLEMS, TCB, Jorgenson and Vu (2016), OECD, World Bank and own elaboration.

Which are the drivers of TFP: Labour productivity or Capital productivity?

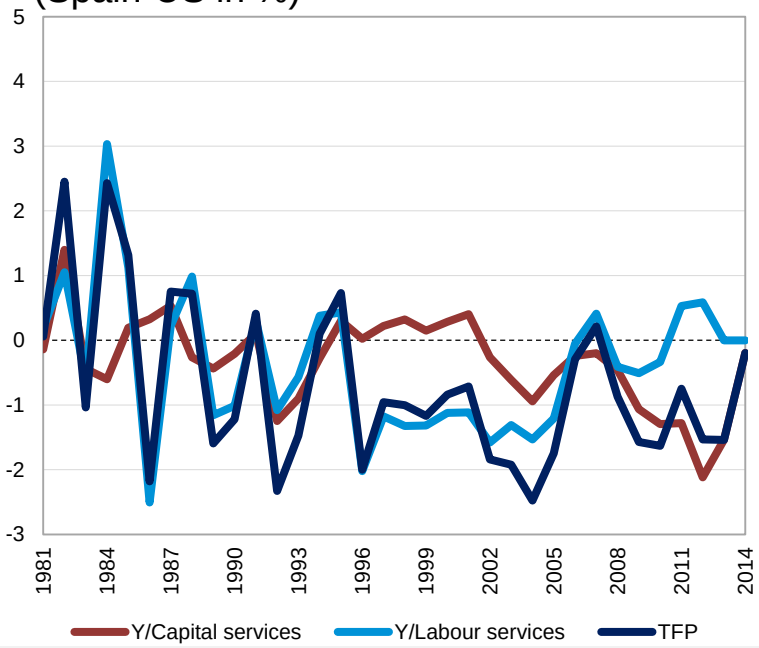
- Compared with the US, the negative differential that the Spanish TFP showed in the past was due to labour productivity differences.
- However, from the beginning of the 21st century onwards the negative differential in capital productivity has increasingly become more important

Figure 11. TFP growth rates: contributions of capital productivity and labour productivity, 1980-2014 (percentage)

a) Spain



b) Differences between Spain and US
(Spain-US in %)



Source: AMECO, APO, EU KLEMS, TCB, Jorgenson and Vu (2016), OECD, World Bank and own elaboration.

Which are the drivers of TFP: Labour productivity or Capital productivity?

- Compared with the US, the negative differential that the Spanish TFP showed in the past was due to labour productivity differences.
- However, from the beginning of the 21st century onwards the negative differential in capital productivity has increasingly become more important

Table 1. TFP growth rates: contributions of capital productivity and labour productivity, 1980-2014 (percentage)

		1980-2014	1980-2000	2000-2014
Spain	TFP	-0.17	0.14	-0.60
	Y/Capital services	-0.69	-0.50	-0.97
	Y/Labour services	0.53	0.64	0.36
US	TFP	0.53	0.48	0.60
	Y/Capital services	-0.37	-0.47	-0.23
	Y/Labour services	0.90	0.95	0.83
Spain-US	TFP	-0.70	-0.34	-1.21
	Y/Capital services	-0.32	-0.03	-0.74
	Y/Labour services	-0.37	-0.31	-0.47

Source: AMECO, APO, EU KLEMS, TCB, Jorgenson and Vu (2016), OECD, World Bank and own elaboration.

Why does capital productivity step back?: Hypothesis

- H.1: Real estate investment (including residential) crowds-out investment in other assets → Does it block the pace of capital accumulation in machinery and equipment?

- H.2: Unproductive overinvestment in non-residential real estate assets → Is accumulation guided by profitability in the short-term and credit facilities, and not by productivity?

- H.3: Insufficient investment in intangible assets → Are they essential to value other factors?

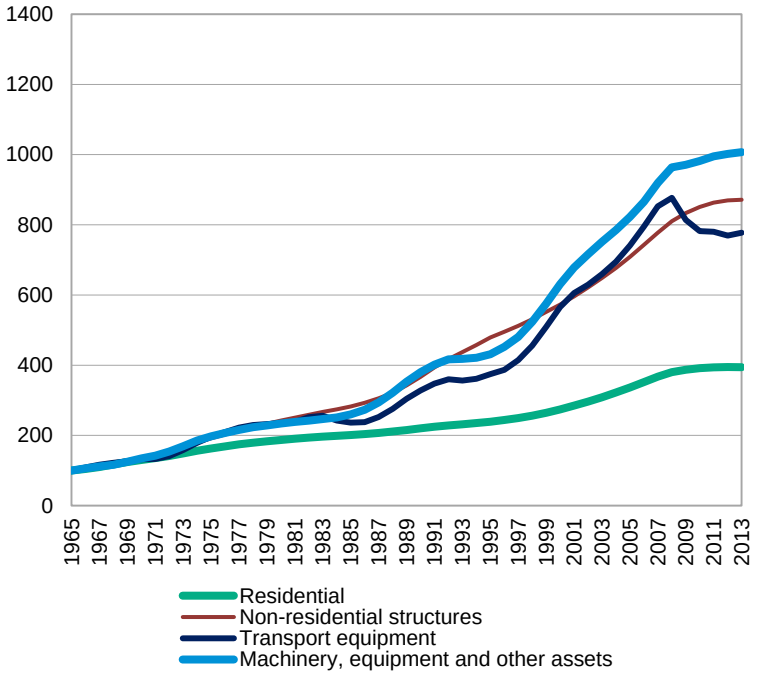
- H.4: Business sector structure in the economy → Low weight of large companies + weaknesses of micro enterprises?

H.1:Crowding out of machinery and equipment investment?

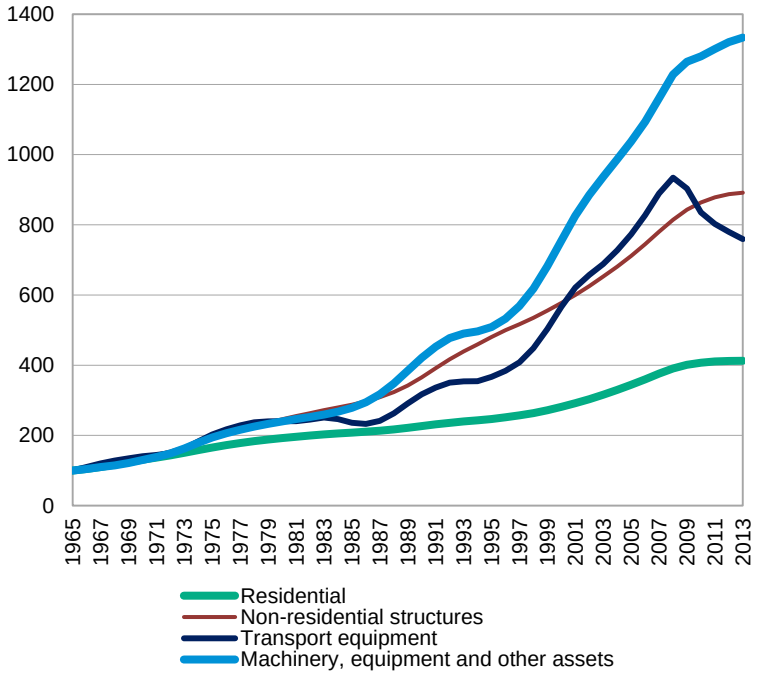
- The accumulation rate of the most productive capital has been more intense than that of real estate assets, residential and non-residential

Figure 12. Capital stock by assets. Spain, 1965-2013 (1965=100)

a) Net capital by assets



b) Productive capital by assets



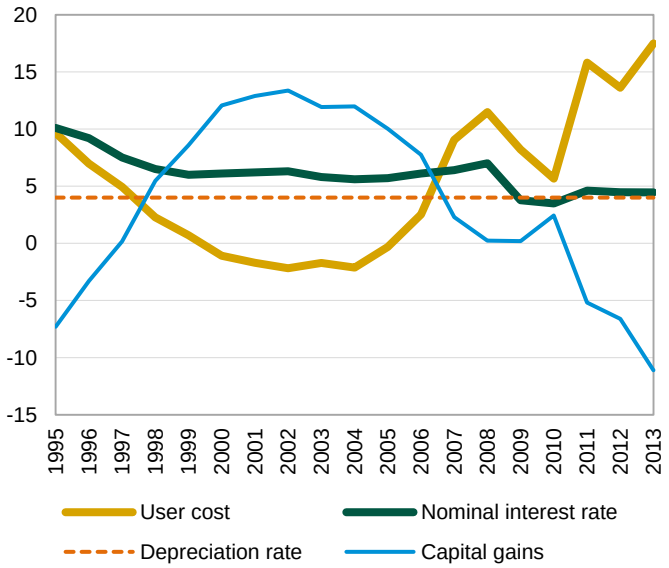
Source: BBVA Foundation-Ivie.

H.2: Unproductive investments during the boom?

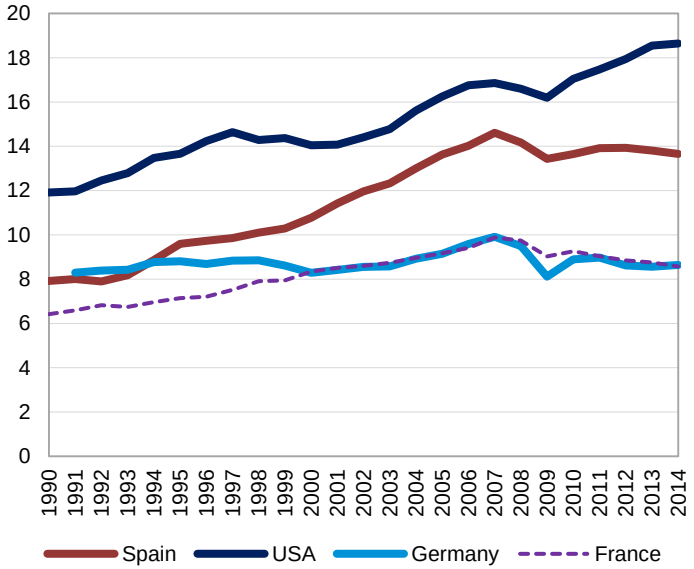
- The high capital gains of non-residential real estate assets in the last boom resulted in negative costs of using warehouses, offices and premises: these investments can be profitable in short term, but unproductive

Figure 13. User cost of capital and its components. Spain (percentage)

a) Private non-residential real estate capital, Spain, 1995-2013



b) Total economy, international comparison, 1990-2014



Note: Non-residential real estate capital includes land.
Source: Bank of Spain, BBVA Foundation-Ivie, ECB, INE and own elaboration.

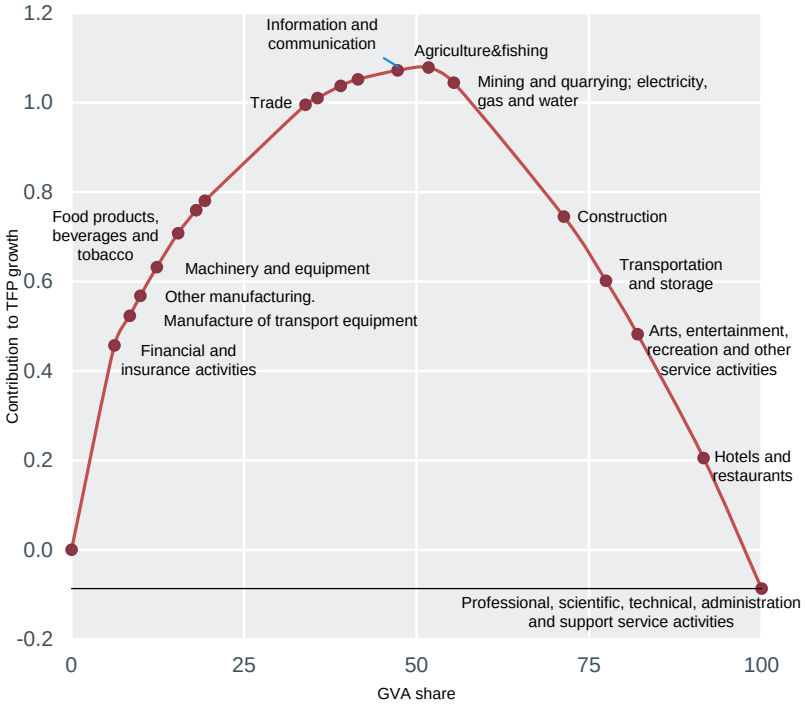
Source: EU KLEMS and own elaboration

Evidence for the existence of unproductive investments

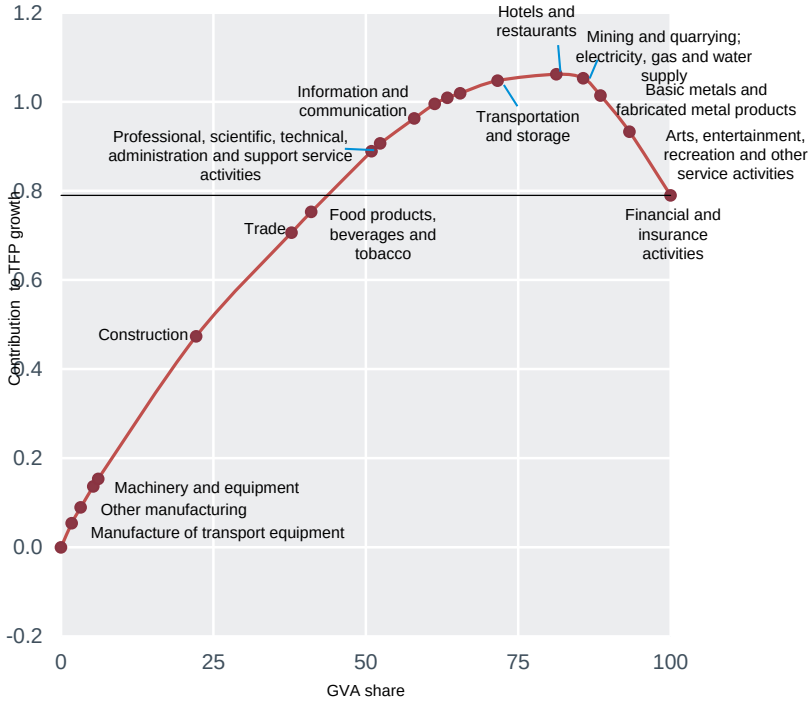
- TFP worsening in sectors more concentrated in real estate assets: it is more likely that their investments have been guided by short-term profitability rather than long-term productivity

Figure 14. Harberger diagram of market economy TFP growth in Spain, 2000-2007 and 2007-2011 (percentage)

b) 2000-2007



c) 2007-2011



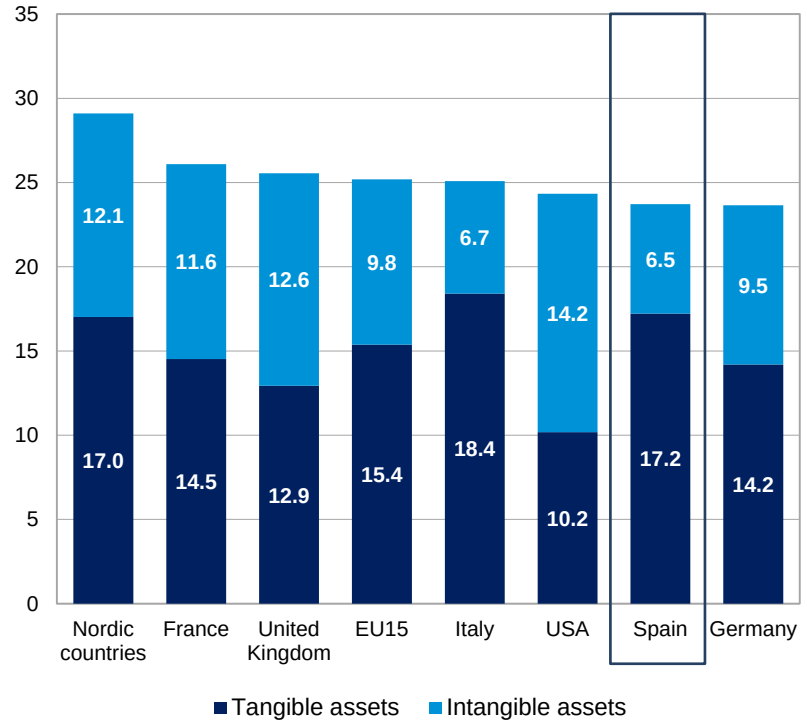
Source: BBVA Foundation-Ivie, INE and own elaboration.

H.3: Weak investment in intangible assets?

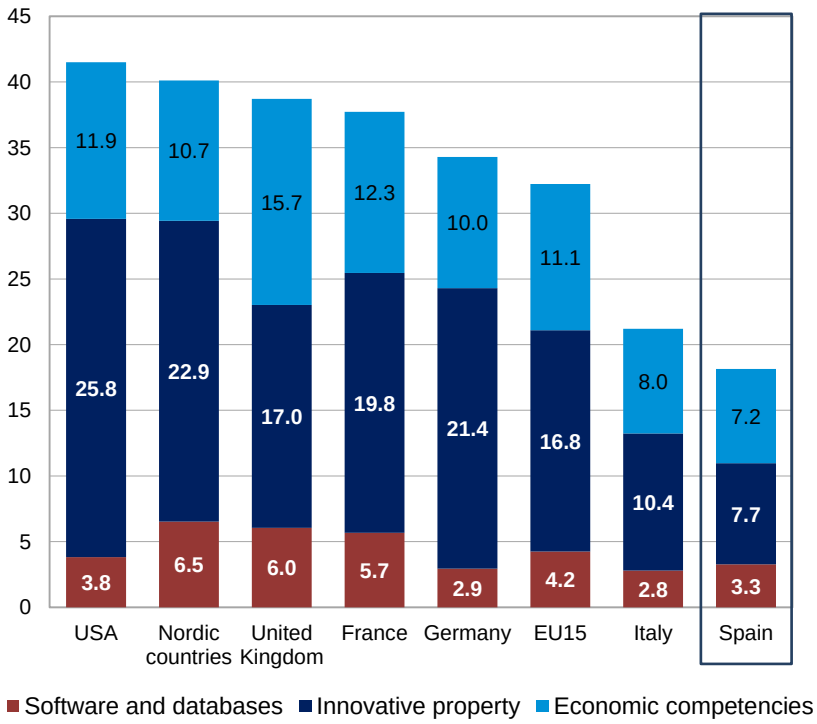
- Intangible capital acts as a catalyst of potential productivity gains, but the weight of intangible investment in Spain is still low

Figure 15. Intangible assets in the market sector. International comparison, 1995-2010
(percentage of GVA)

a) Tangible and intangible GFCF over GVA



b) Intangible capital stock over GVA by asset



Notes: EU15 does not include Greece, Luxembourg and Portugal in panel b). Nordic countries: Sweden, Finland and Denmark.

Source: INTAN-Invest, BBVA Foundation-Ivie, INE and own elaboration.

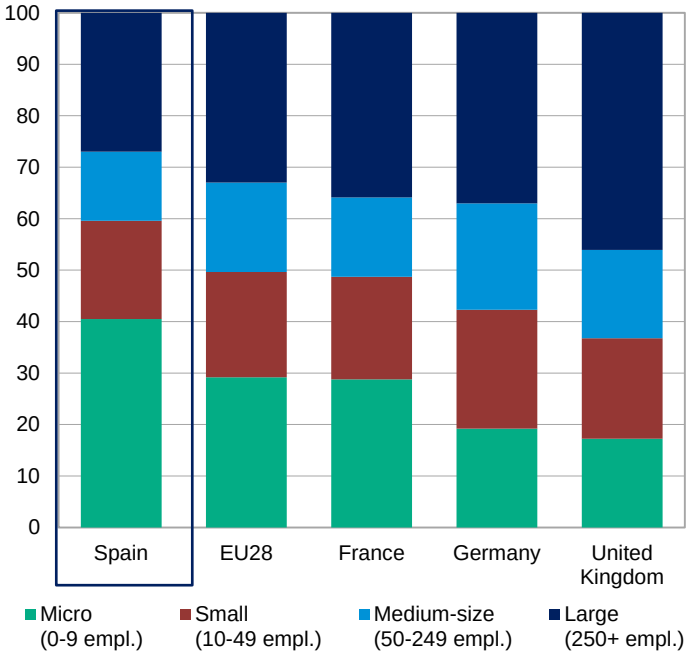
.

H.4: Many inefficient firms?

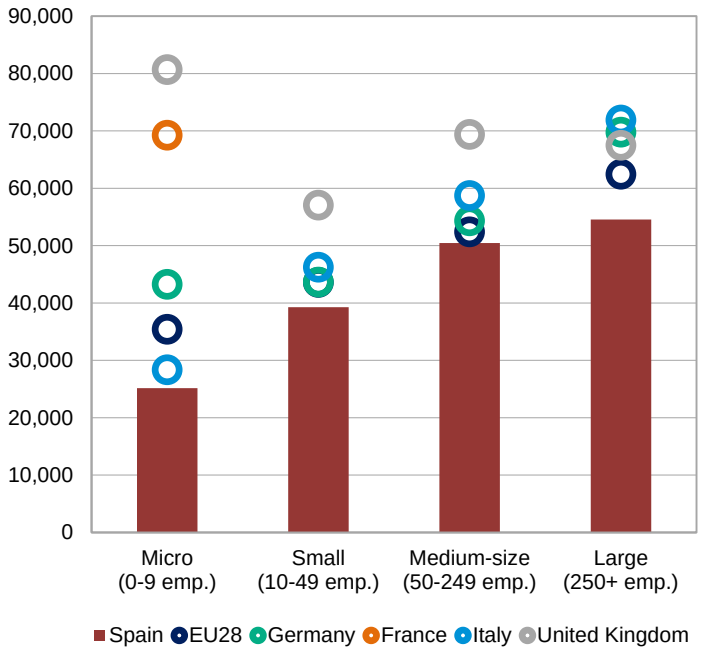
- The negative productivity trend reflects that capital and labour are used by unproductive firms: the business sector structure favours the misallocation of capitals

Figure 16. Employment and labour productivity by business size class. International comparison, 2015 (percentage)

a) Employment by business size class (percentage)



b) Labour productivity by business size class (euros per person employed)



Note: Data refers to the market sector, without Agriculture and Financial sector.
Source: European Commission (2015).

.

Future Challenges

- Improvements in TFP depend on the ability of capital and labour to generate more value per unit used of equal quality factor

- The **productivity of human capital** must be driven in two ways:
  - To improve educational skills to make education more effective:
    - Reducing school failure and improving educational performance.
    - Investing more in life-long learning: because the government spends little on unemployed skills upgrading and companies on training employees (especially small ones, which are the majority).
  - To improve the use of human capital and to take advantage of it in enterprises, an issue which is conditioned by the size of the company, occupations and specialization.

- Improving the **productivity of capital**: the big challenge is to reduce the consequences of misallocation of investment:
  - Changing business sector structure, composed of very inefficient units: it is necessary to increase the size of firms and improve the quality of management, boosting its professionalization.
  - Reorienting the financial system practices, particularly of banks, looking to the productivity of investment projects and the long term instead of the real estate collateral and the short term.
  - Changing the institutional framework to promote competition and combat crony capitalism.

FOURTH
WORLD KLEMS
CONFERENCE
MADRID May 23rd-24th
2016

Measuring Progress in the Spanish Economy: a World KLEMS - Ivie Approach

Francisco Pérez
University of Valencia & Ivie

Madrid May 24th, 2016

Fundación BBVA

25 Anniversary 1990 - 2015 Ivie