The Role of Capital Accumulation in the Evolution of Total Factor Productivity in Spain

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ABSTRACT

GDP growth in Spain was strong for much of the last half century, whereas the country's productivity performance during these years has been mediocre. The reasons for this situation have frequently been analysed with the focus on labour productivity. But, as this article highlights, the evolution of capital productivity should also be taken into account when looking for explanations for poor productivity performance. This article analyses the sources of growth in the Spanish economy, in comparison with major economies, and takes into account the effects that the improvements in the measurement of inputs (labour and capital) have on TFP estimates. Once problems are identified and the role played by labour and capital is evaluated, the paper analyses the possible causes for the negative results in terms of productivity in Spain and what policies can be considered to improve it.

For much of the last half century, GDP growth in Spain has been strong, while productivity growth has been mediocre. The reasons for this situation have frequently been the subject of analysis, with the focus on labour productivity. Nevertheless, the abundant data available on trends in physical and human capital deserves attention, particularly during the later stages of expansion (1995-2007) and the economic crisis (2008-2013).[2] This article analyses this topic, examining the impact of measurement improvements on estimates of labour and capital inputs. These improvements capture changes in quality, which can increase new productive services, with implications for both labour and capital growth.[3] These changes are already incorporated into the estimates developed within the framework of the EU KLEMS and WORLD KLEMS research programs.[4]

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2 The capital stock database on the Spanish economy was created by the BBVA Foundation and the IVIE. The most recent estimates are found at http://www.fbbva.es/TLFU/microsites/stock09/fbbva_stock08_index.html. An analysis of the results is provided by Serrano, Pérez, Mas and Uriel (2017).

3 See Jorgenson, Ho and Stiroh (2005a, 2005b), OECD (2009), Jorgenson and Schreyer (2013) and Hulten (2006).

4 The WORLD KLEMS project aims to promote and facilitate the analysis of growth patterns and evolution of productivity throughout the world, based on growth accounting. To do this, one of its objectives is to offer users databases with the necessary variables to carry out these analyses. Within this framework, the EU KLEMS project is dedicated to analysing and collecting data for European countries. See http://www.worldklems.net/ and http://www.euklems.net/ for more information on these two initiatives.

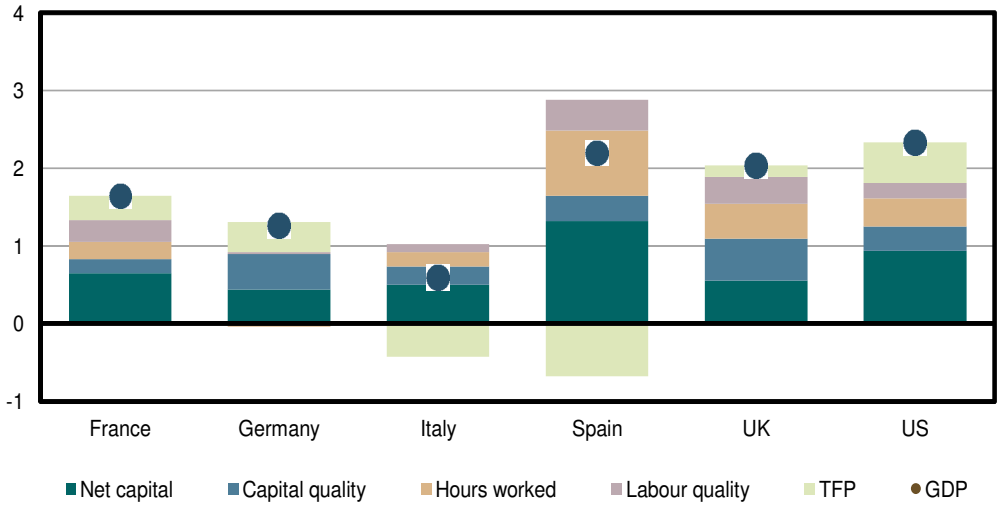
When we measure the sources of growth taking into account the composition of labour and capital (that is, considering labour and capital services instead of hours worked and net capital stocks), part of technical progress is embodied in both factors and the exogenous part of technical progress, which is called total factor productivity (TFP) and computed as a residual, is reduced. The exercise is important for clarifying the origin and scope of efficiency improvements in economies, and especially for reviewing the traditional interpretation of productivity problems in Spain. The low or negative growth rates in TFP are almost always attributed to poor labour performance (lower contribution of workers to growth than what would be expected based on their educational attainment), labour market malfunctioning and low educational results (elevated high school drop-out rates as well as low PISA scores). This study underlines why capital productivity should also be considered.

Capital productivity in the Spanish economy has not received a great deal of attention, with only a few exceptions.[5] However, for more than two decades the available capital series have shown that the trajectory of capital productivity is indeed worrying, as the series have illustrated a generally decreasing trend. This fall is accentuated when productive capital (capital services) is used for the calculation of capital productivity instead of net capital, as changes in the composition of capital stock by asset type are acknowledged.

This article analyses the sources of growth in the Spanish economy to answer three questions. First, what role does the orientation of investments and capital productivity play in the evolution of TFP in Spain? Second, what are the causes of the negative evolution of capital productivity? Third, what productivity improvement policies should be considered in Spain? And how can the investment orientation, as well as labour market reforms, contribute to them?

The article contains five sections. Section 1 analyses (in a comparative perspective) how the sources of growth have evolved in Spain and the intensity of physical and human capitalization processes. Section 2 studies the trajectory of

Chart 1: Contributions to GDP Growth in Major European Countries and the United States, 1995-2012 (average annual percentage points contribution)



Source: EU KLEMS (2012), Jorgenson and Vu (2016), The Conference Board (2015) and authors' estimates.

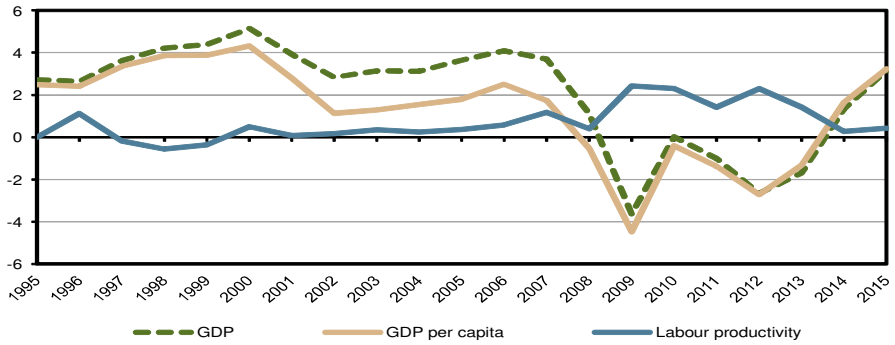
5 See Pérez and Benages [2014], Pérez *et al.* [2011]; and Timmer *et al.* [2010] for an international perspective.

Table 1: Contributions to GDP Growth in Major European Countries and the United States,1995-2012 (percentage point contributions per year)

	France	Germany	Italy	Spain	United Kingdom	United States
GDP	1.65	1.27	0.60	2.20	2.04	2.33
Net capital	0.65	0.44	0.50	1.32	0.56	0.94
Capital quality	0.18	0.45	0.24	0.33	0.54	0.31
Hours worked	0.22	-0.04	0.19	0.84	0.45	0.36
Labour quality	0.28	0.02	0.10	0.40	0.35	0.20
TFP	0.31	0.39	-0.43	-0.68	0.15	0.52

Source: EU KLEMS (2012), Jorgenson and Vu (2016), The Conference Board (2015) and authors' estimates.

Chart 2: GDP, GDP Per Capita and Labour Productivity in Spain, 1995-2015 (per cent change)



Source: INE (2016) and authors' estimates.

TFP and its determinants. The possible causes of the slowdown in TFP are explored in section 3, while section 4 analyses the factors explaining the negative trajectory of capital productivity. The fifth and last section reflects on the implications of the different hypotheses considered for the orientation of productivity improvement policies.

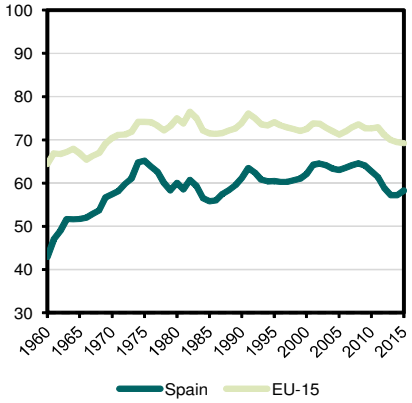
Sources of Spanish Growth

Compared to the main European countries (Germany, France, the United Kingdom and Italy), Spain's economic growth has been strong in the last decades. Indeed, Spain is the only country that equals the United States in terms of the growth rate of real GDP. But what is different about Spanish growth in comparison with the other reference countries is the very different composition of its sources. This is the case in three respects: a) the more intense accumulation of net capital; b) the intensity of labour factor contributions to GDP, both in terms of hours and quality improvements: and c) like Italy (but with greater intensity), the sharp decline in TFP, which has been more than half a percentage point a year for nearly two decades.

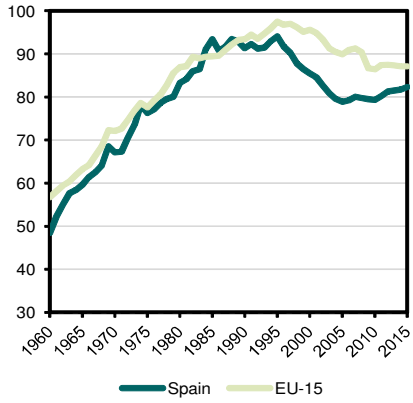
The most common interpretation of the productivity trajectory in Spain, provided by Chart 1 and Table 1, focuses on the evolution of labour productivity defined as output per hour worked. Chart 2 offers this perspective, showing annual growth rates from 1995 to 2015 for gross domestic product (GDP), GDP per capita and labour productivity defined as output per hour worked. In this trajectory there are three trends which stand out: a) GDP growth and GDP per capita evolved in a similar way at the beginning of the period, but between 2000 and 2009 they diverged, as a result of the significant population growth arising from the intense immigration in

Chart 3: GDP Per Capita and Labour Productivity in Spain and the EU-15 Relative to the United States, 1960-2015 (United States = 100)

Panel A: GDP per capita



Panel B: Labour productivity



Source: BBVA Foundation-IVIE (2017), European Commission (2016), World Bank (2016), EU KLEMS (2012), The Conference Board (2015) and authors' estimates.

the first decade of this century; b) the growth rates of GDP and GDP per hours worked dropped sharply from 2007, reflecting an intense W-shaped crisis which saw the economy experience negative growth rates at two different points between 2009 and 2013; c) hourly labour productivity growth followed a less irregular trajectory than that of GDP, but was usually between 0 and 2 per cent, a moderate improvement given the important capitalization processes of those two decades.

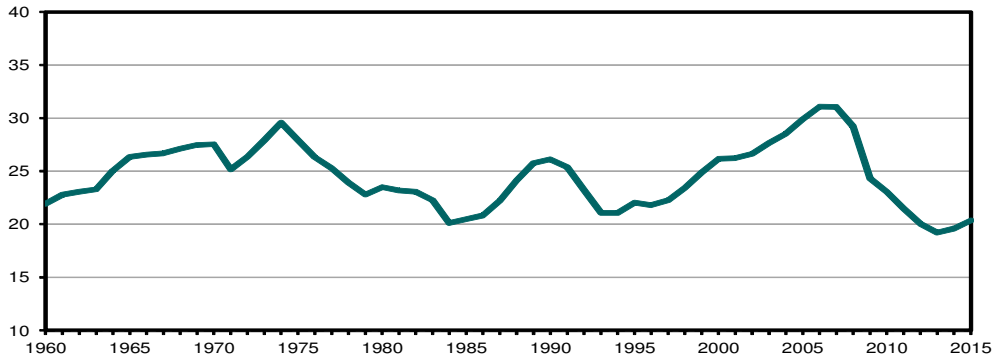
The trend in output per hour worked in Spain is weak when compared to that of the more developed countries and the higher income levels of these economies is taken into account. Panel A in Chart 3 confirms that since 1960 Spanish GDP per capita has always been in the range of 45 per cent to 65 per cent of that of the United States and roughly 10 percentage points below the EU-15 average.[6] This Spanish delay fostered an intense convergence process in labour productivity with the United States and to a lesser degree with the European Union from the beginning of the 1960s until Spain joined the European Union (EU) in 1986. After 1986 convergence ended with the United States as it did with the EU-15 a decade later.

The last cycle of positive growth in Spain began in 1995 and turned out to be a period of divergence in labour productivity with Europe, and even more so with the United States. This divergence slowed down with the onslaught of the crisis but the disadvantage compared with the American economy remained at levels similar to those of 1980, putting labour productivity once again at 80 per cent of the US level. The gap with the EU-15 is currently small, just over 5 per cent, but Europe has also accumulated labour productivity disadvantages in comparison with the United States since 1995 (Chart 3, Panel B).

The stagnation in the convergence of GDP per capita in Spain with respect to the reference economies derives from a combination of sources of growth which failed to simultaneously bring about improvements in employ-

6 EU15 comprised the following 15 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom.

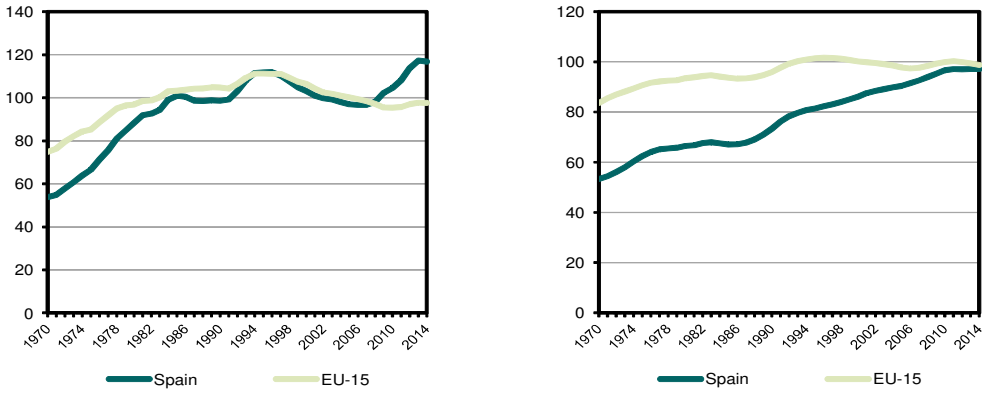
Chart 4: The Spanish Investment Effort, 1960-2015 (gross fixed capital formation/GDP)



Source: BBVA Foundation-IVIE(2017) and INE (2016a).

Chart 5: Net Capital Stock Per Employed Person and Per Capita in Spain and the EU-15 Relative to the United States, 1970-2014(United States= 100)

Panel A: Net Capital Stock Per Employed Person Panel B: Net Capital Stock Per Capita

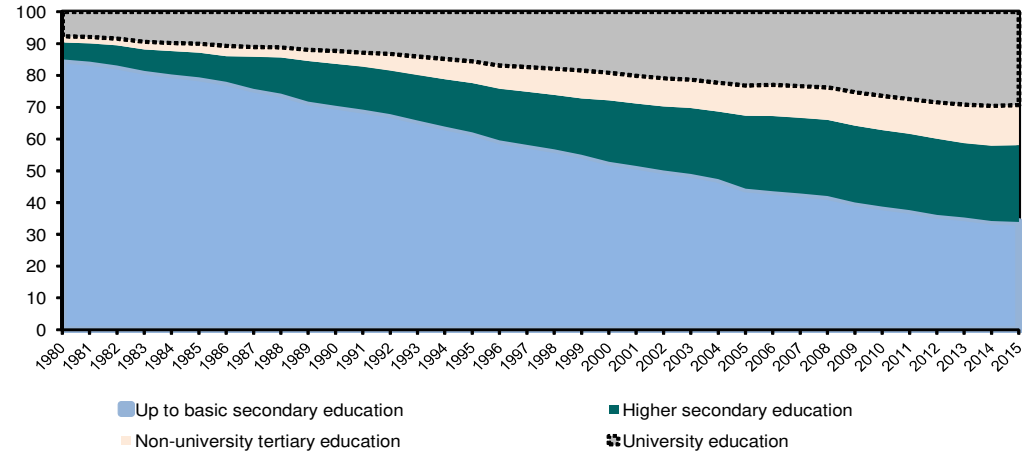


Source: BBVA Foundation-IVIE (2017), European Commission (2016), EU KLEMS (2012), The Conference Board (2015) and authors' estimates.

ment and labour productivity. On the contrary, labour productivity often improves when employment is destroyed, and when employment grows labour productivity stagnates and diverges from that of other countries. This evolution of labour productivity is striking for two reasons. First, the investment effort of the Spanish economy has been strong, with the gross fixed investment/GDP ratio always above 20 per cent, even exceeding 25 per cent between 2000 and 2007 (Chart 4). Second, because of this intense process of accumulation, the capital endowments per worker have continuously improved, to the point that they are not below those of the United States and EU-15 (Chart 5).

The high intensity of gross fixed capital formation which has taken place over several decades has multiplied by almost six times Spanish capital endowments in the last fifty years and by four the ratios of capital per worker. The net capital endowments per worker in Spain were low half a century ago in relation to those of the EU-15 and the United States, but they have since converged completely with those of these economic areas, even surpassing that of the United States (Chart 5, Panel A). Compared with the United States and the EU-15, the Spanish disadvantages in capital endowments per capita are also very small if not nonexistent (Chart 5, Panel B).

Chart 6: Educational Attainment of the Employed Population in Spain, 1980-2015 (per cent of total employed population)



Source: Encuesta de Población Activa (EPA), Instituto Nacional de Estadística, and authors' estimates.

Growth theory predicts that increasing capital endowments per worker will improve labour productivity by allowing workers to develop their productive capacity, relying on more equipment until a stationary state is reached. In this sense, the intense stock accumulation in Spain since 1995 would predict strong increases in labour productivity which, to date, have not been seen. Reaching similar levels of capital per worker to the EU or the United States but not converging in labour productivity implies that resources are used less efficiently in Spain. This less efficient labour factor would serve (given a certain level of wages) to slow down employment growth.

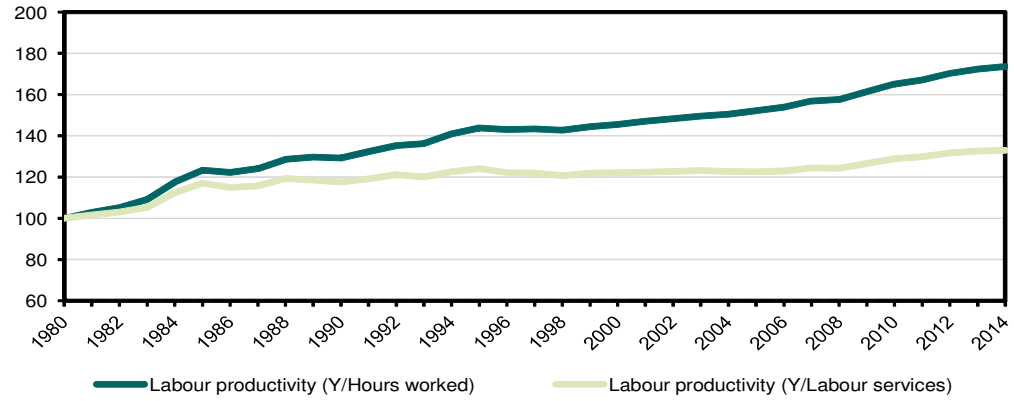
The rate of net capital accumulation is not the only variable to be considered when analyzing the path of labour productivity: changes in the composition of labour and capital stock are also relevant, since these changes affect the productive potential of both factors. Changes in the composition of factors are ways in which technical progress is embodied, thereby reducing the Solow residual which measures disembodied technical progress. The data now available makes it possible to assess more accurately past changes in the quality of factors[7] and how embodied technical progress is greater and disembodied technical progress (TFP) is lower.

Changes in the composition of productive resources in Spain are significant. First, accumulated educational improvements have substantially improved the level of educational attainment of the working-age population. As shown in Chart 6, the employed population over the 1980-2015 period has gone from most workers generally having only basic studies to most workers now having formal education beyond the compulsory minimum, and up to 40 per cent of those employed having a university degree or vocational training.

This progress in education means that labour services per hour increase, on account of the quality improvements which come with having more qualifications. The importance of this trend for labour productivity can be estimated

7 See the available databases on human capital and capital services (Jorgenson (2009), Jorgenson and Vu (2016), Jorgenson, Ho, and Samuels (2016), EU KLEMS (2012 and 2016) and the databases which are part of the WORLD KLEMS initiative). For Spain, see those developed by the IVIE: Bancaja Foundation and IVIE (2014) and BBVA Foundation and IVIE (2017).

Chart 7: Labour Productivity in Spain, 1980-2014 (1980 = 100)



Source: European Commission (2016), EU KLEMS (2012), The Conference Board (2015), World Bank (2016) and authors' estimates.

based on the data on wage differences according to education levels. Growth in labour input (estimated by correcting hours worked in proportion to changes in the quality reflected by wages) is greater than that calculated without making such a correction. Consequently, when human capital improves, the equivalent amounts of simple or basic labour used are greater and progress in labour productivity is slower if the capacity to generate value from human capital does not progress sufficiently.

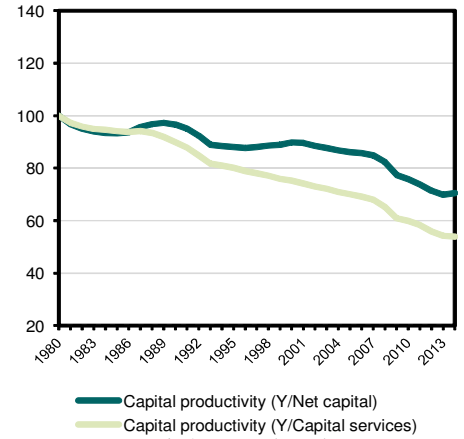
The above-mentioned is what occurs in Spain, to the point that the increase in labour productivity measured as output per hour worked (not corrected by quality improvements) becomes stagnant in terms of output per unit of labour services. Then, when we include also the improvements in their quality (using the salaries paid to workers with different skill levels as index of quality) the evolution of labour productivity worsens. Almost since Spain joined the EU until the onset of the crisis (nearly two decades), labour productivity in the Spanish economy barely improved once the productive potential of the salaries attributed to the most skilled workers was taken into account (Chart 7). Almost since Spain joined the EU in 1986 until the onset of the crisis (almost two decades), labour productivity in the Spanish economy barely improved once the productive potential of the salaries attributed to the most skilled workers was taken into account (Chart 7).

In terms of the performance of capital productivity, Spain does not fulfil the old hypothesis of Harrod neutral technical progress, according to which the capital/output ratio (and its inverse, capital productivity) tends to be constant. This ratio has been continuously increasing for 25 years in the Spanish economy, which is equivalent to a continuous decline in capital productivity. This fall is even more intense if, instead of calculating it using net capital, we consider changes in the composition of capital and the different capacity of each asset to produce services.[8] Given that there have been quality improvements in capital stock, by reducing the weight of less productive assets such as housing, productive capital has grown more than net capital, and productivity of productive capital (per unit of capital services) has fallen more than that of net capital (Chart 8). If we compare this evolution with that in the United States, a clear pro-

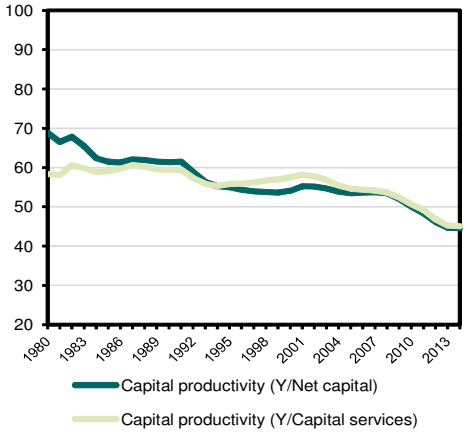
8 See OECD (2009) for a detailed explanation about the differences between net and productive or quality-adjusted capital and the methods for calculating both.

Chart 8: Capital Productivity in Spain, 1980-2014

Panel A: Spain = 100 in 1980



Panel B: United States = 100



Source: BBVA Foundation-IVIE (2017), European Commission (2016), EU KLEMS (2012), The Conference Board (2015), World Bank (2016) and authors' estimates.

cess of divergence in capital productivity is observed, with the capital productivity in the United States more than twice the figure for Spain in 2014 (Chart 8, Panel B).

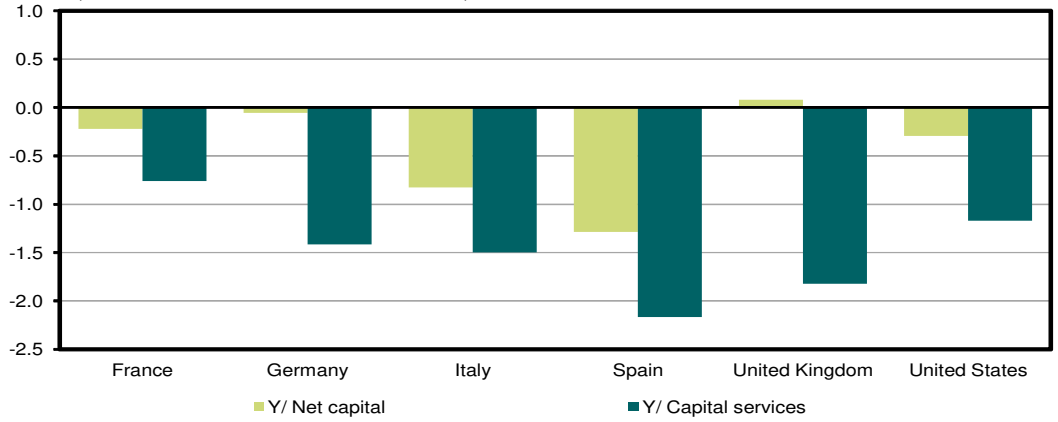
The path of capital productivity in Spain is so negative (in the case of productive capital productivity, it recorded a decline close to 50 per cent) and continuous (occurring uninterruptedly over several decades) that it deserves to be reflected upon. It also deserves to be examined as to whether it is an exceptional case at the international level. As for the first question, a partial productivity measure such as capital productivity or labour productivity is an imperfect indicator of efficiency because it depends on the endowments of other factors. For this reason, its decline does not necessarily mean a slowdown in efficiency per se because the intensification in capital use could be explained by a type of technological progress biased towards capital, given that this is very advantageous and replaces labour. In this case, Harrod-neutral technical change is not fulfilled and improvements in labour productivity alone do not guarantee improvements in TFP, as they could be offset by the decline in capital productivity.[9] This possibility is confirmed in an economy such as Spain's where labour productivity is stagnant (when human capital is considered) and capital productivity is decreasing.

Concerning the evidence of trends in capital productivity over relatively long periods, Chart 9 shows that growth rates differ when measured in terms of net capital or capital services. The productivity of net capital in France, Germany, the United Kingdom and the United States hardly changed between 1995 and 2012, and thus with such data we can say that the fulfilment of the hypothesis of a constant capital/output ratio has been fairly exact. However, the hypothesis is not fulfilled in Italy and Spain, where in both cases the capital/output ratio increases or, in other words, capital productivity decreases.

However, when we consider changes in the composition of capital and use productive capital as a measure of the existing stock and the ability to produce services from accumulated

9 According to Harrod's definition, neutral technical progress is one which leaves capital-output ratio unchanged. Thus, according to Harrod's neutrality of technical progress, labour productivity will increase whereas capital productivity remains constant.

Chart 9: Capital Productivity in Major European Countries and the United States, 1995-2012 (average annual per cent change)



Source: BBVA Foundation-IVIE (2017), European Commission (2016), EU KLEMS (2012), The Conference Board (2015), World Bank (2016) and authors' estimates.

capital, Harrod's hypothesis of neutrality is not fulfilled in any of the countries studied and the slowdown in capital productivity occurs across the board, as can be seen in Chart 9. Improvements in the measurement of capital, by incorporating part of technical progress into capital and quantifying a flow of capital services, indicate that the greater productive potential attributed to capital accumulated as a result of the increasing investment toward more productive types of assets does not lead to a proportional increase in the value added generated. In other words, productive capital increases more than output, and thus if there are to be efficiency improvements, (partial) labour productivity has to increase sufficiently to compensate for the decrease in (partial) capital productivity.

Efficiency: Total Factor Productivity

In a Cobb-Douglas production function, where Y is GDP, L is labour, K is capital, α and β the respective income shares of the two factors of production and A is TFP:

$$Y = AL^{\alpha}K^{\beta} \qquad (1)$$

the variable that indicates whether efficiency improvements are achieved is the growth rate of A. TFP can be expressed as the product of labour and capital productivity raised to their respective share of income:

$$A = \left(\frac{Y}{L}\right)^{\alpha}\left(\frac{Y}{K}\right)^{\beta} \qquad (2)$$

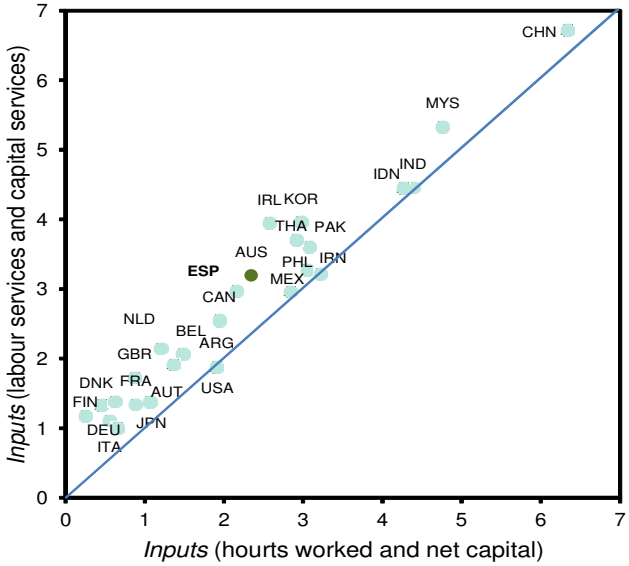
Generalizing the Cobb-Douglas production function to a translog function, which allows the input shares to vary through time and taking logarithms and differences with regard to time, the growth rate of TFP can be expressed as the sum of labour and capital productivity growth rates, weighted by the average of their share in income in (t) and (t - 1):[10]

$$\Delta ln A_t = 0.5(\alpha_t + \alpha_{t-1}) \times \Delta ln\left(\frac{Y_t}{L_t}\right) + 0.5(\beta_t + \beta_{t-1}) \times \Delta ln\left(\frac{Y_t}{K_t}\right) \qquad (3)$$

In the absence of drastic changes in income shares, if capital productivity is relatively constant, TFP follows the path determined by

10 For a more extensive explanation see Jorgenson, Gollop and Fraumeni (1987) and Jorgenson, Ho and Stiroh (2005b).

Chart 10: Inputs Contribution to GDP: Effect of Quality Improvements: An International Perspective 1985-2012 (average annual per cent per year)



ARG: Argentina; AUS: Australia; AUT: Austria; BEL: Belgium; CAN: Canada; CHN: China; DEU: Germany; DNK: Denmark; ESP: Spain; FIN: Finland; FRA: France; GBR: United Kingdom; IDN: Indonesia; IND: India; IRL: Ireland; IRN: Iran; ITA: Italy; JPN: Japan; KOR: South Korea; MEX: Mexico; MYS: Malaysia; NLD: Netherlands; PAK: Pakistan; PHL: Philippines; THA: Thailand; USA: United States.

Source: BBVA Foundation-IVIE (2017), European Commission (2016), Asian Productivity Organization (2015), EU KLEMS (2012), The Conference Board (2015), OECD (2016), World Bank (2016) and authors' estimates.

labour productivity. And similarly, if labour productivity is relatively constant, TFP follows the path determined by capital productivity. This is the scenario in which we have been in Spain since the mid-1980s, as shown in Chart 7.

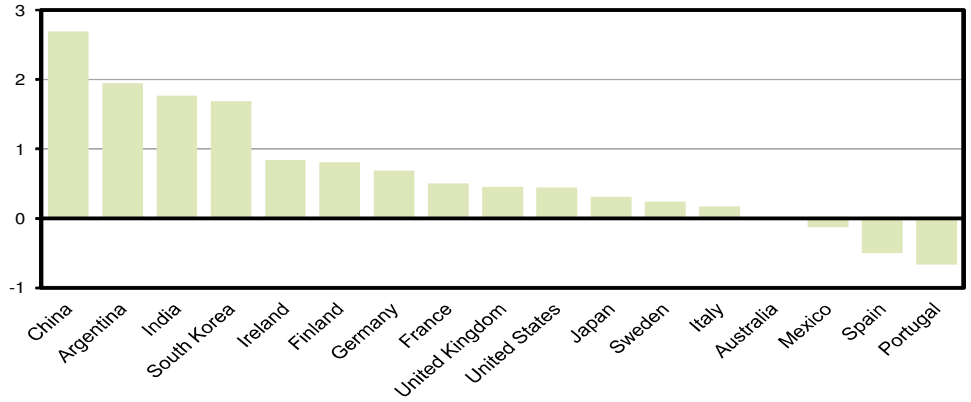
In sum, ceteris paribus the productivity of one of the two factors, a higher (lower) productivity of the other leads to a larger (smaller) increase in TFP. But since this last variable is calculated from the previous ones in expression (3), the estimation criteria of the first ones are decisive for the values of TFP and their meaning. Thus, labour and capital estimates have embodied part of the technical progress into the factors by acknowledging changes in the composition of labour and capital which have led to improvements in their quality. As a consequence of these improvements, the growth rates of estimated labour and capital endowments have increased according to the metrics designed to calculate the productive services of both factors.[11] The outcome of this measurement improvement is that the growth rates in the productivity of factors are lower and the growth rates in TFP have also decreased.

Chart 10 shows the contribution of labour and capital to output growth across a broad set of countries between 1985 and 2012. On the x-axis is the contribution of inputs to output growth when labour is measured in hours worked and capital is measured as net capital, i.e. without including quality improvements in the estimates. On the y-axis the factors are based on labour and capital services, that is quality adjusted labour and capital. In all countries the quality-adjusted input growth rates are above

11 See Jorgenson (1966, 2017), Pérez (2016), Timmer *et al.* (2010) and OECD (2009).

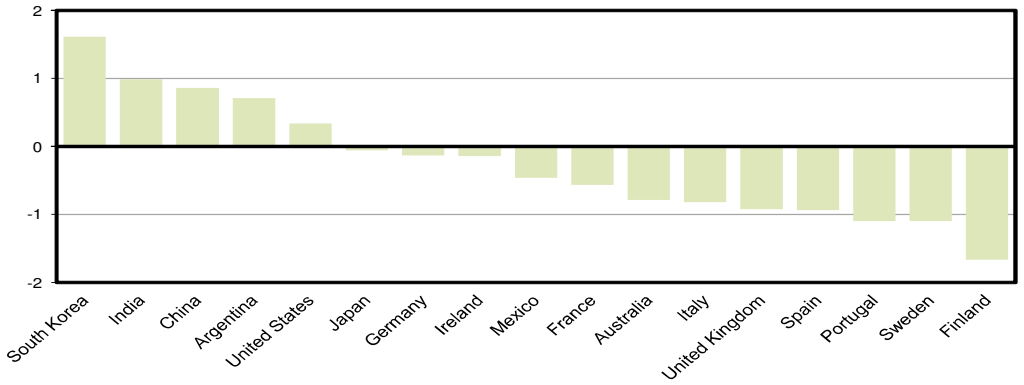
Chart 11: An International Comparison of Total Factor Productivity Growth, 1985-2012 and 2007-2012 (average annual rate of change)

Panel A: 1985-2012



Note: For China, India, Indonesia, Iran, Malaysia, Mexico, Pakistan, Philippines, South Korea and Thailand the period is 1989-2012. For Argentina the period is 1989-2010.

Panel B: 2007-2012



Note: For Argentina the period is 2007-2010.

Source: BBVA Foundation-IVIE (2017), APO (2015), European Commission (2016), EU KLEMS (2012), Jorgenson and Vu (2016), OECD (2016), The Conference Board (2015) and authors' estimates.

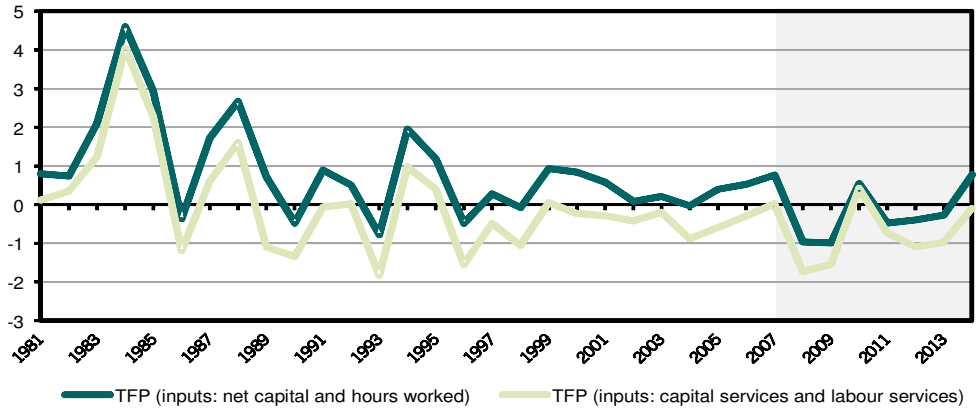
the 45 degree line, indicating that they exhibit faster growth than unadjusted inputs. The vertical distances to the 45 degree line indicate the magnitude of the contribution of quality improvements in inputs to growth.

The larger increases in inputs accounted for by considering the quality improvements of factors do not explain all the output growth, and therefore improvements in total factor productivity continue to account for a share of GDP growth.[12] This can be seen in Panel A in Chart 11 for a selection of 17 countries whose statistics make this estimate possible over a period of almost three decades. But there are some exceptions to this general trend: in Mexico, Spain and Portugal[13] the growth derived from increases in the productive services of inputs surpasses that of the product, so that when the technical progress embodied into factors is computed there is a fall in TFP.

12 See Oulton (2016) for a summary of the effects that measurement changes in inputs can have on TFP.

13 See Pinheiro Alves (2017) for more details on the slowdown in productivity growth in Portugal and its main causes.

Chart 12: Total Factor Productivity Growth in Spain, 1981-2014 (per cent change)



Source: BBVA Foundation-IVIE (2017), European Commission (2016), EU KLEMS (2012), The Conference Board (2015) and authors' estimates.

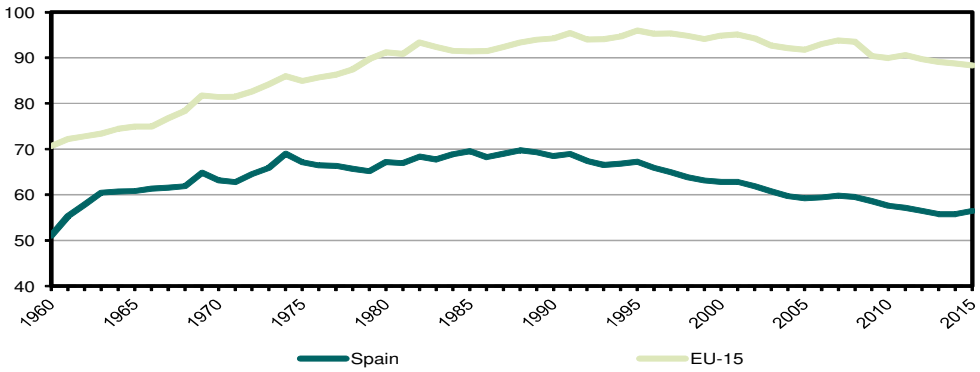
Details of the TFP trajectory in Spain are presented in Chart 12, which shows annual growth rates from 1981 to 2014 for TFP, first estimated without quality improvements in labour and capital (hours worked and net capital), and then with such improvements. The first estimate shows smaller increases in inputs, which leads to improvements in TFP over most of the period. In this case, there are negative changes in TFP in specific years, which become frequent after the crisis started in 2008. On the other hand, by considering quality improvements in labour and capital, the estimated contributions of inputs quite clearly explain GDP growth in most of the years. Consequently, the growth rates of TFP are generally negative since 1986, the year of Spain's entry into the EU.

There can be various explanations for the negative trajectory of total factor productivity in a given year or period (the first of which can be excess capacity arising from a fall in demand). In fact, during the five-year period 2007-2012, where most developed countries were hit by the economic crisis, the slowdown in TFP of many economies can be explained by underutilization of installed capital and employed workers,[14] as can be seen in Panel B in Chart 11. But when a longer period of time is considered, as seen in Panel A, these economies show improvements in their TFP, i.e. they improve their productive efficiency.

A different problem arises when there are continuous declines in TFP over the last three decades, as in Spain. A trajectory such as the one observed in Chart 12 means that the productive capacity of the services providing the labour employed and the capital increases greatly, due to the investment effort and the creation of employment, as well as to the quality improvements of both factors. However, this capacity is systematically under-used. In other words, it does not generate enough value added to take advantage of the productive potential of the factors, and therefore the efficiency of the economy does not improve but rather declines.

14 In the case of labour, the problems of underutilization occur if firms do not automatically adjust their workforce when demand falls, due to their interest in retaining human capital or strict labour legislation. In the case of capital, rigidity is greater because the estimates of services derived from capital endowments are not corrected for excess capacity. Although rented capital can be disposed of by the user in a period of recession, macroeconomic estimates continue to include it.

Chart 13: The Level of Total Factor Productivity in Spain and the EU-15 Relative to the United States, 1960-2015 (United States = 100)



Source: BBVA Foundation-IVIE (2017), European Commission (2016), EU KLEMS (2012), The Conference Board (2015) and authors' estimates.

Given that this problem is not present in other economies, the relative efficiency of the Spanish economy decreases in comparison with that of the major economies. This is confirmed by Chart 13, which shows the levels of TFP in Spain and the EU-15 during the last half-century, using the United States as the benchmark. Until the mid-1990s, Europe converged significantly with the United States in efficiency, cutting its total factor productivity level gap with the United States from 25 percentage points to just 5 points. However, in the 21st century the gap widened once again and in recent years the level of TFP in the EU-15 has been below 90 per cent of that of the United States.

Spain shares certain characteristics with the European TFP trajectory, but with several more negative features. It started from a significantly lower TFP level — in 1960 it barely reached 50 per cent of the United States level and was 20 percentage points below the European level. Its trajectory of convergence in TFP was similar to the European one until the arrival of the oil crisis in the mid-1970s. Subsequently, TFP convergence weakened to stagnation in the early 1990s and diverged continuously thereafter, moving away from the United States and from the EU-15. The end result is that in more than half a century the Spanish economy has barely reduced its total factor productivity gap with the US economy and has widened it in relation to Europe's.

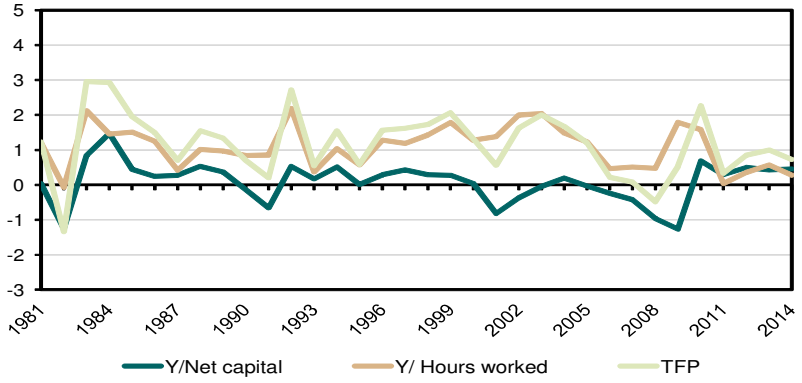
Causes of the Negative Evolution of TFP: Low Productivity of Labour or Capital?

The trajectory of TFP in Spain was not solely caused by excess capacity during the crisis, but rather is a structural problem. The most common interpretation focuses on the performance of labour productivity, although the low productivity of some investments seems to be a very relevant factor. The reason for the fall in capital productivity is that certain projects are never sufficiently productive, which is equivalent to suffering the consequences of underutilization of capacity permanently and not only in unfavourable situations.

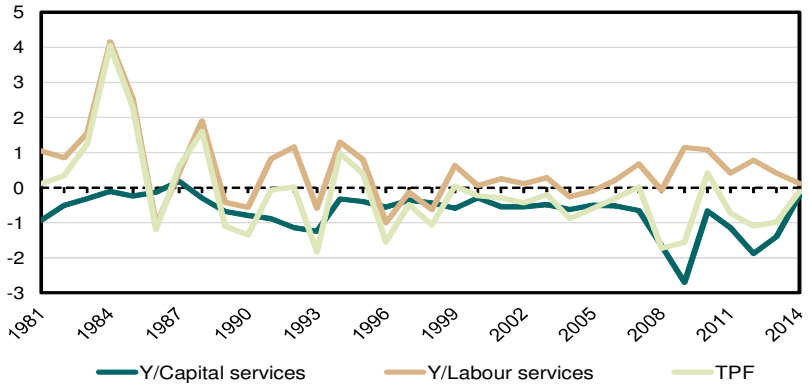
To explore the significance of labour productivity and capital productivity trajectories in explaining TFP growth rates, let us consider as a whole the differences between Spain and the United States. Recall that, according to expression (3), when capital productivity is relatively constant the evolution of TFP follows the path

Chart 14: Contributions of Capital Productivity and Labour Productivity to TFP Growth in the United States and Spain, 1981-2014 (per cent change)

Panel A: United States



Panel B: Spain



Source: BBVA Foundation-IVIE (2017), European Commission (2016), EU KLEMS (2012), The Conference Board (2015), Jorgenson and Vu (2016), OECD (2016), World Bank (2016) and authors' estimates.

determined by labour productivity. Chart 14, Panel A illustrates that this is approximately the case of the United States, whose TFP shows almost the same improvement as labour productivity.

To better observe the association in Spain between the evolution of TFP and the productivity of one of the factors, let us consider the human capital and capital services in Panel B of Chart 14. TFP and labour productivity evolve together in the early years of the series, but they soon diverge with TFP below labour productivity. The reason for this situation is that capital productivity growth rates are generally negative, and this accumulation of inefficient capital leads to a slowdown in TFP growth. In addition, the change in partner which we can observe in the trajectory of TFP should also be highlighted: until the end of the twentieth century TFP evolved alongside labour productivity, but in the twenty-first century it distanced itself and followed more the capital productivity path, given that human capital productivity progressed very little during the last expansion.

Table 2 sets out the productivity contributions of productive capital and labour services in the two economies studied. Calculations of the decomposition of expression (3) are made for the period 1980-2014 and for the two sub-periods before and after 2000. In Spain, the average

Table 2: Contributions of Capital Productivity and Labour Productivity to TFP growth in Spain and United States, 1980-2014 (percentage points per year)

		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
United States	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
Differences Spain - USA	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: BBVA Foundation-IVIE (2017), European Commission (2016), EU KLEMS (2012), The Conference Board (2015), Jorgenson and Vu (2016), OECD (2016), World Bank(2016) and authors' estimates.

annual growth rate in TFP was slightly negative (-0.17 per cent) over the period as a whole, and the main cause was the negative contribution of capital productivity. Productivity performance worsens by moving to the second sub-period in the case of the two components and also for TFP. On the other hand, TFP significantly improved on average annually in the United States during the whole period (0.53 per cent per year) and in the two sub-periods, with no apparent worsening in the second. There were also declines in capital productivity over the whole period, but they were lower than in Spain and accompanied by much larger improvements in the productivity of labour services, which are corrected to take into account human capital improvements.

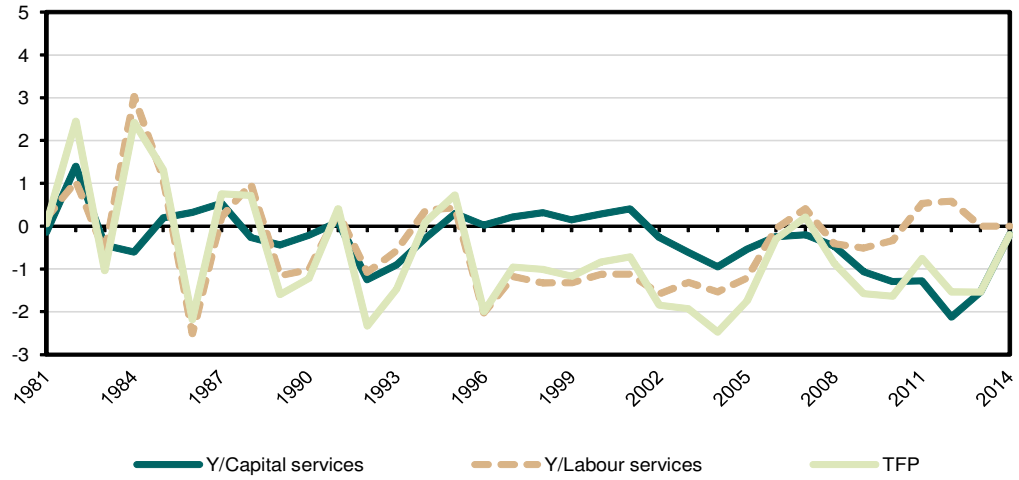
The lower part of the table shows that the negative differences between Spain and the United States in TFP over the entire period were caused by lower labour and capital productivity, both factors contributing almost equally. When the sub-periods are considered, negative differentials were larger in the 21st century in all factors, although the most significant deterioration occurred in capital productivity which, in the most recent decades, accounted for 60 per cent of the decline in Spanish TFP in comparison with that of the United States. It could therefore be said that the worst results in Spain up to the year 2000 were due to the slower progress in labour productivity, as is usually pointed out in the common interpretation of the productivity problems in our economy. Up until that date, the difference in the contributions of capital productivity was insignificant. However, after the year 2000 there are productivity disadvantages in both labour and capital, with the latter being the most important factor.

Chart 15 compares the yearly trajectories of these differences. The relative slowdown in TFP in Spain with respect to the United States is the norm throughout the period. But while this difference is clearly explained over most of the period by the negative differentials of Spain in labour productivity contributions, in the 21st century it is the differentials in capital productivity contributions which explain the relative losses of efficiency in the Spanish economy and the trajectory of the differential in TFP, especially from the onset of the crisis.

Why Has There Been a Capital Productivity Decline in Spain?

The increase in the capital-output ratio (and the consequent fall in capital productivity) does not necessarily imply a slowdown in efficiency. The substitution of labour for capital and the consequent improvement in labour productivity

Chart 15: Differences in Contributions of Capital Productivity and Labour Productivity to TFP Growth in Spain and the United States, 1981-2014 (percentage points)



Source: BBVA Foundation-IVIE (2017), European Commission (2016), EU KLEMS (2012), The Conference Board (2015), Jorgenson and Vu (2016), OECD (2016), World Bank (2016) and authors' estimates.

can lead to a decrease in the use of factors in relation to value added and thus, an increase in TFP. However, in Spain this has not been the case, since labour productivity barely improved (in fact, it did not do so at all when quality improvements are considered), while capital productivity clearly decreased, and thus TFP declined. In these circumstances, one can question the reasons for the productivity trajectories of each of the factors.

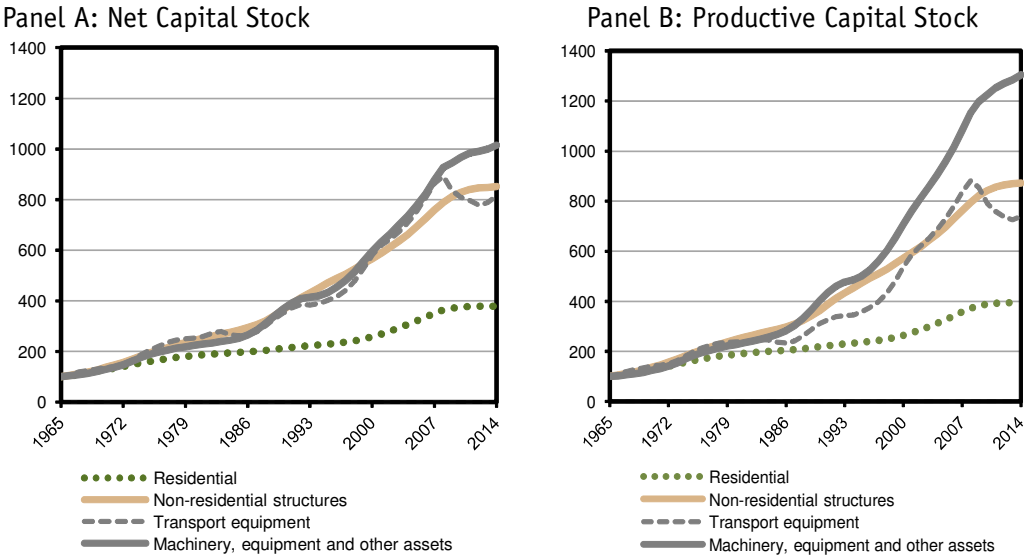
The possible causes of the modest progress in labour productivity in Spain have often been analysed, stressing, in many cases, that they are related to education quality, the functioning of the labour market or the use of human capital by companies.[15] However, it seems also necessary to consider the possible causes of the slowdown in capital productivity, which have been much less studied.[16] This section puts forward the following three hypotheses:

- Capital productivity declines because the intensity of real estate investment (particularly residential) has reduced investment in other assets and the weight of these assets in productive capital.
- Capital productivity declines because there has been unproductive overinvestment in non-residential real estate assets (industrial buildings, commercial premises, infrastructure) in many sectors, arising from the accumulation processes in these assets being driven by short-term profitability and not by productivity.
- Capital productivity is low because the composition of the productive fabric does not foster its use, due to the excessive weight of traditional sectors, the low weight of large firms and the importance of micro enterprises, and the low investment in essential intangible assets to make the other factors productive.

15 See Serrano (2010); Hernández and Serrano (2012), among many others.

16 Approaches to the issue of capital productivity can be found in Pérez and Benages (2014), Mas *et al.* (2013), and Pérez and Robledo (2010).

Chart 16: Index of Capital Stock by Asset Type in Spain, 1965-2014(1965=100)



Source: BBVA Foundation-IVIE (2017).

First hypothesis: Crowding out of machinery and equipment

The hypothesis that the intensity of residential investment or other assets produced by the construction sector has prevented the accumulation of other more productive physical assets (such as machinery and different types of equipment) cannot go very far since the empirical evidence does not support it. The capital stock series confirm that there was a great deal of real estate investment, but also show that the accumulation rate of the most productive assets has been even stronger than that of real estate assets, both residential and non-residential (Serrano *et al.*, 2017 and BBVA Foundation-IVIE, 2017).

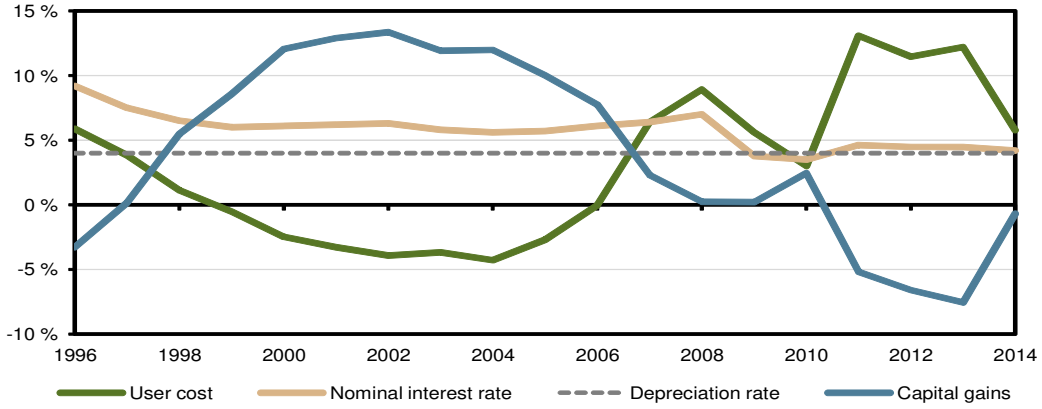
Panel A in Chart 16 shows that throughout the whole of the last half century as well as in the expansion that began in 1995, net capital accumulated in machinery and equipment grew more than non-residential structures and much more than residential structures. If one takes into account the changes in composition of each of the aggregates represented in the chart, as does productive capital, the growth rate of machinery and equipment has been even stronger. Thus, the reason why the aggregate capital productivity did not advance cannot be a lack of potential generator of services by the accumulated assets, but rather that for some reason this potential has not been realized in the form of value added. Thus, the investment effort has been partially wasted and the productivity of capital has been affected by it.

Second hypothesis: Unprofitable investments in real estate assets

The second explanation for the negative trajectory of capital productivity in Spain relates to the under-use of the capital assets. Firms make investments without expecting returns on projects through productivity improvements. Rather, they invest on the expected profit from the revaluations of the assets.

When the expected capital gains are high, the user cost of capital can be negative. This situation is more likely when interest rates and depreciation rates are low — as is the case with assets with long service lives such as real estate. If the user cost is negative, investments can be profitable in the short term even if they are tem-

Chart 17: User Cost of Private Non-residential Real Estate Capital and its Components in Spain, 1996-2014 (per cent)



Note: In this figure the non-residential real estate capital includes land.
Source: Alonso and Marqués (2006), Sánchez, Sánchez and Urtasun (2008), BBVA Foundation-IVIE (2017), IPC (INE, several years) and authors' estimates.

porarily unproductive.[17] Under these conditions, if investors (and their funders, mainly banks) work with relatively short horizons in which drops in asset prices are considered unlikely, the volume of such profitable but unproductive investments can be high, as well as the excess capacity accumulated because of them.

The hypothetical situation described may have occurred in Spain in certain periods when real estate investments were driven by the housing bubble in which land prices grew at very high rates. The excess capacity accumulated during that period had a lasting impact because the service lives of real estate assets are very long.

We examine the data to assess whether the orientation of investment decisions in real estate assets are in accordance with the logic described, with a focus on non-residential construction.[18] Chart 17 shows the evolution of the variables which affect the user cost of capital during the last expansion in the Spanish economy and the subsequent crisis. It shows that interest rates were low, as were depreciation rates, while increases in asset prices were considerable for a decade, generating guaranteed expectations of considerable revaluation. Consequently, the user costs of these capital assets were very low from 1997 to 2007, to the point of being negative for much of that period.[19] Investments in these assets over the course of those years grew at a high rate and represented a significant part of total investment, putting in place capacity which was only partially used because the depreciation of real estate assets is very slow.

However, the evaluation of investment decisions cannot be made solely in the short term when the service life of an asset is long and the long-term profitability expected of an invest-

17 On the arithmetic of the user cost and the key contribution of Jorgenson to the measurement improvement of capital values, see Jorgenson, Ho and Stiroh (2005b), Jorgenson, Gollop, and Fraumeni (1987), Timmer *et al.* (2007, 2010) and OECD (2009).

18 Investments that are mostly related to family decisions are excluded.

19 The capital user cost of all assets in the economy was not negative during those years, but positive and increasing (from 8 per cent to 14 per cent) due to the increase in the average depreciation rate of a capital stock in which assets with shorter lives have a greater weight. This composition shift was related to the falling prices of certain assets, in particular those related to ICT.

ment (which turns out to be unproductive) is negative, except when the capital gains are consolidated because the price levels reached by real estate assets do not fall.[20] For this expectation to be fulfilled, the non-depreciating share of the real estate assets (land) must be revalued to compensate for the fall in value of the depreciating part of the asset (that is, the building or structure), even if it is depreciating slowly.

This appears to have been the expectation in Spain, a country with a tradition of high inflation and intense urbanization during the last half century. Based on that experience, many people (including many professionals) believed that real estate assets never went down in price and were considered a safe haven. Their long useful lives served as a protection against occasional episodes of decreasing prices, allowing people to wait until prices rose again. However, the ability of real estate assets to retain their real value while not being productive (such as gold) is a hypothesis not always supported by the data from previous periods, not even in the case of Spain.[21]

The impact of unproductive real estate investments is not limited to the construction and real estate sectors, as real estate assets make up an important share of the capital formation in many sectors, which use industrial buildings, commercial premises, and industrial and commercial infrastructures in their production processes. In addition, the equipment and facilities which accompany these assets as a condition of their use is also important, in that overinvestment and overcapacity of real estate assets also mean overinvestment and low utilization of related assets, which are also not used productively.

The hypothesis that the effects of unproductive investments in real estate assets have spread to many other sectors is supported by the poor productivity gains encountered in many sectors. In this respect the evidence can be synthesized with the help of a Harberger diagram (Harberger, 1998) shown in Chart 18. It represents sector contributions to TFP growth in the Spanish economy, ordered from the highest to lowest growth rate of the sector's corresponding TFP. The first of the panels shows the final phase of the expansion while the second shows the years of crisis. The x-axis represents the share of each sector in GDP and the y-axis its contribution to TFP growth. The curve represents the accumulation of these contributions, rising while sector TFP is positive, and falling once the contributions of sectors with negative TFP growth have been incorporated.

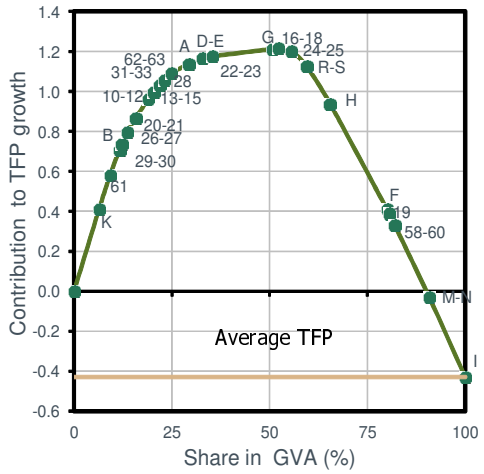
In the period of expansion (2000-2007), the average annual growth rate of aggregate TFP was negative (-0.4 per cent per year). Of the 24 (market) sectors considered, eight (representing 65 per cent of gross value added or GDP) showed negative contributions to the aggregate TFP. Among them, hotels and restaurants, professional, scientific, technical and administration activities, construction, and transport and storage, stood out for their weight in GDP and

20 It is difficult for measurements of capital productivity to estimate certain components of the user cost, such as capital gains. These estimates reflect different assumptions which can affect the results. If the user cost is computed from the capital gains in the past (reflecting adaptive expectations), then during the boom years possible future losses will not be captured. Under these conditions, the user cost could be negative (as we have seen in Chart 17) and any investment project could be considered profitable, even if it were not productive. If we assume that we are in equilibrium (user cost equal to the marginal productivity of capital) and the cost of capital is calculated from the gross operating surplus (i.e. endogenous rate of return), it will be impossible to observe negative user costs, even if they exist and are the cause of unproductive investments. Third, if the evolution of the income shares of factors of production found in the National Accounts do not only reflect changes in their productivity, but also other influences of a different nature (linked to labour market regulation or intense competition), our measures of productivity will be affected.

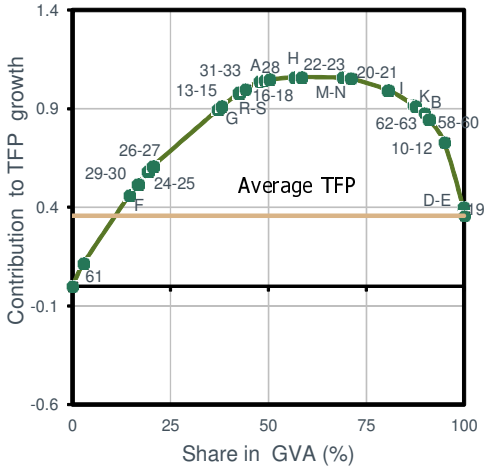
21 See, for example, the analysis of the Spanish case carried out by the International Monetary Fund (IMF, 2009).

Chart 18: Harberger Diagrams for Market Economy TFP Growth in Spain, 2000-2007 and 2007-2014

Panel A: 2000-2007



Panel B: 2007-2014



Sector codes: A: Agriculture, livestock, forestry and fisheries; B: Extractive industries; D-E: supply of electricity, gas, steam and air conditioning; Water supply, sanitation activities; 10-12: Food, beverage manufacturing and tobacco industry; 13-15: Textile industry, garment making and leather and footwear industry; 16-18: Wood and cork industry, paper industry and graphic arts; 19: Oil coke and refining; 20-21: Chemical industry and manufacturing of pharmaceuticals; 22-23: Manufacture of rubber and plastics products and other non-metallic mineral products; 24-25: Metallurgy and manufacture of metal products, except machinery and equipment; 26-27: Manufacture of computer, electronic and optical products; Manufacture of electrical equipment and equipment; 28: Manufacture of machinery and equipment n.e.c.; 29-30: Manufacture of transport equipment; 31-33: Manufacture of furniture; Other manufacturing industries and repair and installation of machinery and equipment; F: Construction; G: Wholesale and retail trade; Repair of motor vehicles and motorcycles; H: Transport and storage; I: Hospitality; 58-60: Cinematographic editing and activities, video and television programs, sound recording and music publishing; Programming and broadcasting activities; 61: Telecommunications; 62-63: Programming, consultancy and other activities related to information technology; Information services; K: Financial and insurance activities; M-N: Professional, scientific and technical activities; Administrative activities and ancillary services; R-S: artistic, entertaining and entertainment activities; Repair of household articles and other services.

Note: Residential capital and labour quality is not taken into account in the estimate of TFP. The market economy excludes the non-market sectors (Real estate activities, Public Administration, Education, Health and Household activities as employers of domestic personnel or as producers of goods and services for their own use).

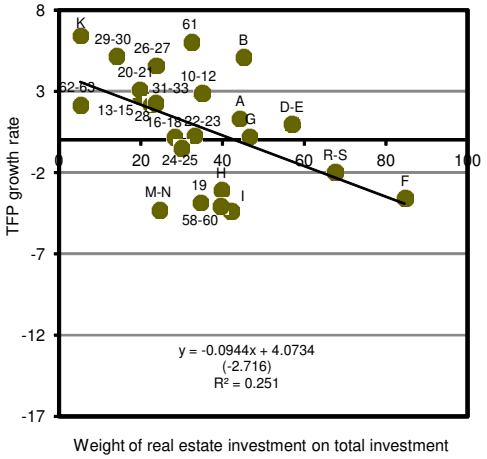
Source: EU KLEMS (2012), BBVA Foundation-IVIE (2017), INE (2016) and authors' estimates.

the significant slowdown in total factor productivity. During this period, industries representing only a third of the market economy improved their TFP, at an average rate of 2 per cent per annum: in general, industrial activities and the advanced tertiary sector. The negative performance of TFP by industries is correlated with the greater concentration of their capital in real estate assets. Thus, the hypothesis that when real estate assets were revalued some of the investments were most likely guided by short-term profitability criteria, regardless of capital productivity, appears to be supported by the evidence.

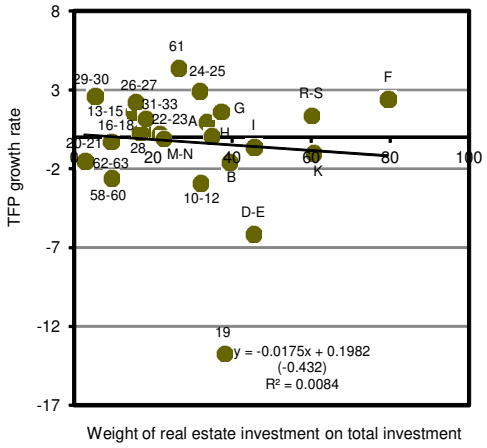
Panel B in Chart 18 shows that, after the boom, when there are no longer incentives to accumulate capital in real estate, the industries with negative TFP reduce their weight in GDP. The sectors with negative contributions (energy and extractive industries, manufacture of food products and beverages, publishing and film activities, financial activities and chemical industry) do not correspond to activities which accumulate more real estate capital. Falls in TFP could be related to a slowdown in demand

Chart 19: Real Estate Investment and TFP Growth in Spain, 2000-2007 and 2007-2014

Panel A: 2000-2007



Panel B: 2007-2014



Note: See the sector codes in Chart 18.
Source: BBVA Foundation-IVIE (2017), INE (2016) and authors' estimates.

or excess capacity in all types of facilities and/or assets.

Chart 19 shows that the relationship between the intensity of real estate investment and TFP growth by industry was negative and statistically significant during the real estate boom (Panel A), but was no longer significant in the years thereafter (Panel B).

Third hypothesis: Unproductive business fabric

The negative trajectory of productivity in Spain reflects that a large part of capital and labour is used by companies that are unproductive due to their specialization in traditional activities, their small size and their organizational weaknesses. But in this area, it must be said again that the problems regarding the low use of resources not only affects labour but also capital, reducing the potential profitability of the investment effort.

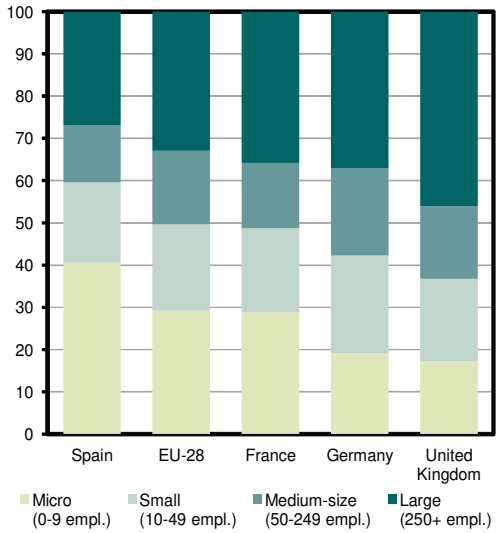
There is abundant evidence regarding the characteristics of the productive fabric and its implications for productivity.[22] In Spain, a large part of the nation's human resources is managed by very small companies: in 2015 40 per cent of employees were employed in micro-enterprises with less than 10 workers, while those percentages are less than half in Germany and the United Kingdom (Chart 20, Panel A). The disadvantage of having such small business units for labour productivity is confirmed in Panel B of Chart 20, which shows that larger firms generate more value added per person employed in all countries. In the Spanish case, this handicap is more severe, since micro enterprises are very unproductive, both in comparison with other countries as well as with large Spanish companies.

One of the underlying causes of lower productivity of smaller enterprises is that they are often managed by persons with a lower level of skills. This is due both to the educational profile of the owners and to the fact that in micro-enterprises the management is often not professional, which usually entails having higher education. The fact that there is less human capital in the management of small firms in an important part of the productive fabric, has consequences for the specialization of companies, the jobs they offer, the

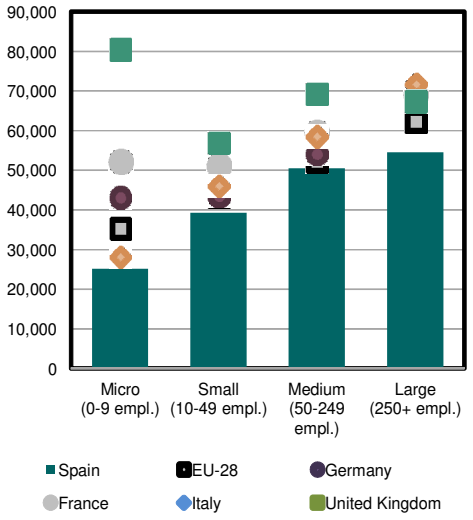
22 See Pérez *et al.* (2012) and Reig (2016), and the bibliography cited there.

Chart 20: International Comparisons of Employment and Labour Productivity by Business Size Class, 2015

Panel A: Employment by Business Size Class (Per Cent)



Panel B: Labour Productivity by Business Size Class (Euros Per Person Employed)



Note: Data refer to the market sector, excluding agriculture and the financial sector.
Source: European Commission (2016).

use of human capital, and the orientation and exploitation of investments in physical and also intangible assets.

This last issue is particularly relevant because intangible capital is made up of a wide variety of assets which are accumulated, to a great extent, because of the activities of skilled workers, and are therefore closely related to the use of human capital.[23] Their productivity potential stems from operating as catalysts for productivity gains. Intangibles allow for a better use of other assets by encouraging the development of product and process innovations and improving the efficiency of organizations. In business units and territories where there are more intangible resources, the owners of these particular assets and also the remaining assets obtain better returns, reflecting overall productivity improvements.[24]

To sum up, insufficient investment in intangibles can lead to a low productive use of tangible capital if lack of the former generates low value added. If firms do not have the appropriate intangible assets, their managerial, organizational and innovative capacity will be weaker, investment effort is at greater risk of not being well directed and not achieving full advantage, and the value added generated is more likely to be lower. Thus productivity suffers.

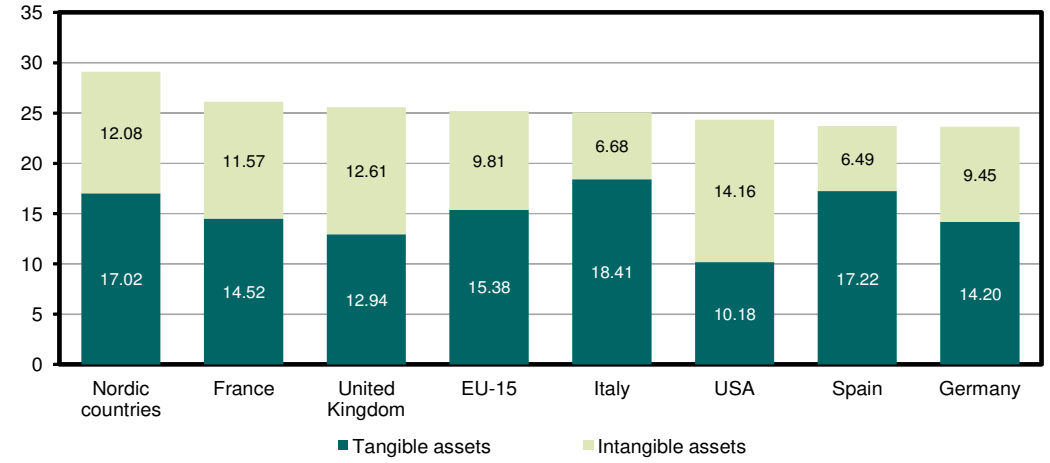
According to evidence on the investment in these types of intangibles related to company skills, the level in Spain is low (Mas and Quesada, 2014). Over the 1995-2010 period, the Spanish economy invested 70 per cent of its private investments in tangible assets and only 30

23 Intangible assets can be grouped into three broad categories: software and databases, investments in R&D and innovative property, and investments in economic competencies (company training, organizational capital, brand, advertising, etc.). See Corrado *et al.* (2012, 2014) and for the Spanish case, Mas and Quesada (2014).

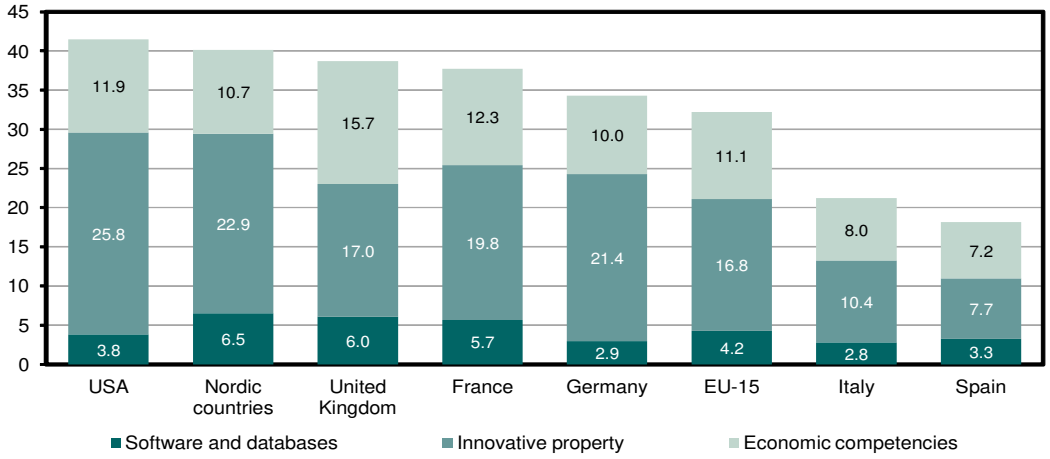
24 On the externalities/spillover effects of well-used knowledge, see Moretti (2012).

Chart 21: International Comparisons of Intangible Assets in the Market Sector, 1995-2010 (per cent of gross value added)

Panel A: Tangible and intangible assets (GFCF/GVA)



Panel B: Intangible capital stock over GVA by type of asset



* Nordic countries: Sweden, Finland and Denmark. ** EU-15 does not include Greece, Luxembourg and Portugal.

Source: INTAN-Invest (2014), BBVA Foundation-IVIE (2017), INE (2016) and authors' estimates.

per cent in intangibles. In contrast, over half of market sector investment in the United States was in intangible assets (Chart 21, Panel A). During this period, tangible relative capital endowments in Spain became similar to those of the developed countries, but those of intangible assets were much lower (Chart 21, Panel B). In all likelihood, this characteristic is one of the keys to explaining the poor capacity of the Spanish economy to take full advantage of its investments and reflects weaknesses in the productive fabric along with the smaller size of the majority of Spanish companies.

The implications that the business structure has for productivity have been receiving increasing attention from the literature, thanks to the greater wealth of data available on the capital used. First, capital stock statistics by asset type and sector have improved, thanks to projects associated with the WORLD KLEMS initiative. Second, microeconomic or firm-level data are available which, while not allowing computation of the effect of composition by asset type (as we

do with sectors and countries), do provide data on the net capital for millions of companies. This set of information provides evidence corroborating the hypothesis of lower capital productivity levels in smaller firms, as well as those in service sectors (especially traditional ones) compared with manufacturing (Dabla-Norris *et al.*, 2015 and IMF, 2016).

The fundamental conclusion of these recent studies is that the potential TFP gains of many companies are significant in that they are far from the best practices observed. But the lower productivity levels of smaller firms are due to their characteristics, and therefore as long as the largest share of capital and labour is concentrated in Spain in these units, the productivity of both factors will be diminished.[25] The improvement of these results requires an increase in company size that leads to productivity gains and a higher rate of investment in intangible assets.

Implications of Capital Productivity Analysis

At the beginning of this article we posited three questions: what role does the orientation of investments and capital productivity play in the evolution of TFP in Spain? What are the causes of the negative evolution of capital productivity? What productivity improvement policies should be considered in Spain and how can investment contribute to them?

The answers to the first two questions can be summarized as follows. The orientation of investments plays an important role in the unsatisfactory evolution of TFP in Spain, since it has generated excess capacity and the limited use of a significant share of the capital stock. The negative evolution of capital productivity results from the fact that the generation of value added based on the investment effort made has been less than its potential, due to the misallocation of resources related to two occurrences: First, many investment projects have been guided by short-term profitability deriving from the expected capital gains from the revaluation of assets, rather than the medium and long-term productivity of assets; Second, many units that manage the resources are too small to be efficient and do not have certain assets which are necessary to be productive, mainly intangible assets.

Based on these two conclusions, the answer to the third question on how to ensure that the accumulation of quality employment and the expansion of capital endowments does not lead to a slowdown in TFP as in the past is as follows. Improvements in TFP depend on the ability of capital and labour to generate more value per unit used of equal quality factor. Therefore, the objective should be to achieve synergies between both and this is, most likely, the only way in which growth can be productive.

In this sense, human capital productivity can contribute to improving capital productivity by improving how it is used in companies. To achieve this, educational skills must be improved, so that education is more effective: reducing school failure and dropout rates, improving educational performance and investing in life-long learning.[26] The second way forward is to improve the use of human capital in

25 It should be noted, however, that microeconomic studies use data on capital (book values) and labour (employees, hours) which do not incorporate quality of factors, as do recent sectoral and macro studies. This has two consequences: average TFP improvements are overestimated; and TFP differences between large and small firms could be overestimated if larger firms use higher quality resources than smaller firms.

26 In the case of Spain there are lights and shadows in this area. On the one hand, it is noted that the state spends little on employee training and that companies spend little on education, especially small ones, which are the majority. On the other hand, the spending of medium and large companies on training within the company has grown strongly. See Pérez and Uriel (2016).

companies by placing better prepared managers in leadership positions, an objective that is conditioned by the size of the company and the decision of the owners to improve in the professionalization of their management.

Furthermore, in order to improve capital productivity, the misallocation of investments must be reduced, which can then contribute to improving labour productivity by allowing labour to be better used in companies. There are several ways forward in this direction: increasing the size of companies and improving the quality of their management, extending the time horizon in decision-making; transforming a financial system which invests primarily in real estate guarantees focusing on the short term, to one which caters to the productivity of long-term projects; and fostering an institutional environment which favour the achievement of these objectives, enhancing resource allocation.

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