

# 5. Trends and Patterns in Public Investment in Spain

## A Medium- and Long-Run Perspective

*José Villaverde<sup>1</sup> and Adolfo Maza<sup>2</sup>*

---

### Introduction

In the last decade, the Spanish economy experienced its most acute crisis since the end of the Second World War. GDP, employment and unemployment were deeply affected after the 2008 Global Financial Crisis and, although the economy registered a certain recovery from 2014 onwards, the levels of these three variables have not made up for the lost ground; that is to say, all of them still remain below pre-crisis levels. Because of this, there have been calls from various quarters for the government (at the central, state and local levels) to play a much more active role in the economy, mainly by means of increasing public spending.

There are several reasons justifying these appeals. As is well known, according to both theoretical and empirical analysis (Aschauer 1989; Abiad et al. 2015; DeJong et al. 2017, among others) there is a positive relationship between the rate of growth of an economy and productive government spending and, more specifically, public investment. This relationship takes place both in the short and long run; in the short run, because public investment adds to aggregate demand; in the medium and long run, because this spending increases the productive capacity of the economy.

Considering the relevance that public investment has for economic growth, this chapter unveils (some of) its main characteristics in Spain. In section 5.1., it pays attention to the levels, evolution and composition of public investment over the period 2000–2017; here, the Spanish performance is compared with that of six key reference areas: the European Union (EU), the euro area (EA) and the four largest economies in the EU (France, Germany, Italy and the United Kingdom). In section 5.2., the focus

---

<sup>1</sup> Departamento de Economía — Universidad de Cantabria.

<sup>2</sup> Departamento de Economía — Universidad de Cantabria.

of the analysis changes in two respects: on the one hand, it refers just to Spain and to a much longer sample period (from 1964 to 2014); on the other hand, attention is paid not only to public investment but also to the public capital stock. Section 5.3. presents the main conclusions.

### 5.1. Trends and Patterns of Public Investment in Spain in the EU Context, 2000–2017

In line with the empirical literature on the topic, total (private plus public) investment and public investment are most commonly approximated through gross fixed capital formation and general government gross fixed capital formation. Using Eurostat's annual government financial statistics as the source of information for these variables, Table 1 shows that, in this respect, Spain experienced a pro-cyclical trend throughout the sample period. While the average rate of growth of total investment in the country between 2000 and 2008 was 4.6%, it fell to an astonishing -6.2% from 2007 to 2014, before gaining momentum, once again, in the next sub-period (2014–2017) with an average increase of 3.6% per year. For the whole period, the average growth rate of investment in Spain was a mere 0.7%; this rate is higher than that of Italy and the UK, both of which recorded negative figures, but similar to that of the EA and lower than those for France, Germany and the whole of the EU.

Expressed as a percentage of GDP, Spanish real total investment experienced a trend similar to the one mentioned above, from an initial level of 25.4% in 2000 to a final level of 21.6% in 2017, with a maximum of 29.6% in 2007 and a minimum of 20% in 2013. Although the trend was rather alike for each one of the six reference areas, two points need to be highlighted. First, the ratio "investment/GDP" was, up until 2010, much higher in Spain than in any other of the benchmarking areas. Second, the decrease in the ratio in the aftermath of the financial crisis was, as in the absolute value of the investment, much greater in Spain than in any one of those six areas.

Regarding public investment, the main trait is that its evolution clearly differs from that of total investment. As shown in the first two blocks of Table 1, there are at least three important differences to account for. First, public investment grew faster than total investment over the boom years of the sample period (2000–2008); second, public investment did not evolve as well as total investment over the next two sub-periods of crisis and recovery; and third, public investment experienced an average annual decline of 1.6% while, as mentioned, total investment increased by an average of 0.7%. Putting it in other words, this means that private investment (see the third block of Table 1) in Spain performed worse than public investment during the boom time but much better over the next years (see second and third periods of Table 1).

Overall, the ultimate result of all the aforementioned developments imply that there have been some changes in the share of public investment in total investment in Spain. First, it remained rather stable between 2000 and 2007; then, it increased rapidly in 2008 and, in particular, in 2009; finally, it decreased very sharply over the next eight

Table 1 Gross Fixed Capital Formation: growth rate (%)

		2000–2008	2008–2014	2014–2017	2000–2017
Total	Euro area	2.0	-2.5	2.9	0.7
	European Union	2.4	-1.9	2.7	1.1
	France	2.4	-1.0	2.1	1.3
	Germany	0.5	0.6	2.0	0.9
	Italy	1.5	-5.2	2.5	-0.6
	Spain	4.6	-6.2	3.6	0.7
	United Kingdom	-1.6	0.5	0.1	-0.6
Public	Euro area	2.7	-3.2	0.6	0.2
	European Union	2.7	-2.1	0.2	0.5
	France	1.3	-0.7	-1.0	0.1
	Germany	0.6	0.9	3.7	1.4
	Italy	1.6	-5.6	-2.6	-1.9
	Spain	6.1	-11.5	-0.1	-1.6
	United Kingdom	6.2	-0.2	-1.8	2.4
Private	Euro area	1.9	-2.3	3.2	0.8
	European Union	2.3	-1.9	3.2	1.1
	France	2.7	-1.0	2.7	1.5
	Germany	0.4	0.5	1.8	0.8
	Italy	1.5	-5.1	3.2	-0.4
	Spain	4.3	-5.4	4.0	0.9
	United Kingdom	-2.8	0.6	0.5	-1.0

Source of data: Eurostat database. Table created by the authors

years, reaching a minimum of 9.6% in 2017. Although public investment in the EU, the EA and the four EU largest economies followed a similar pattern to that of Spain, two points need, once more, to be underlined. On the one hand, none of them experienced such an abrupt increase of public investment from the onset of the financial crisis and such a huge decrease in the consecutive years. On the other hand, although in four of them (the exceptions being Germany and, above all, the UK) the share of public investment in total gross capital formation diminished between 2000 and 2017, the decline was sharpest by far in Spain.

As mentioned in the introduction to this chapter, there tends to be a close and positive correlation between public investment and GDP; there is no doubt, however, that this is quite often disrupted, especially at crisis times, simply because public investment is, everywhere, the most volatile component of aggregate demand. As depicted in Figure 1, this is precisely the case of Spain: against an average of some 3.5%, the share of public investment over GDP has varied greatly over time, in particular immediately after the eruption of the crisis.<sup>3</sup> Initially representing 3.6% of GDP in 2000,

<sup>3</sup> It is also important to note that, on average, public investment in Spain accounted for 8.4% of public expenditure; this average, however, masks the fact that the evolution of the ratio followed the shape of an inverted U, with a maximum of 11.9% in 2007 and a minimum of 4.6% in 2016.

one of the highest values among the reference areas, it increased somewhat steadily to 5.1% in 2009. However, from then on, and because of the efforts imposed to consolidate the very weak Spanish public finances,<sup>4</sup> the share began to decrease continuously (the only transitory exception, and by a little margin, was 2015) to the much lower level of 2.1% in 2017. Once again, despite the fact that this was also roughly the trend followed in all reference areas, it must be pointed out that the extent of the changes (both upwards and downwards) was, as a norm, much higher in Spain than in any one of these areas. Additionally, it must be said that over the boom years of the sample period all reference areas, with the only exception of France — which recorded ratios very like those of Spain — registered levels of public investment that, as shares of their respective GDP, were much smaller than the Spanish ones. Throughout the crisis years, however, things changed dramatically for Spain, to the point of becoming the country in which the fall in public investment as a percentage of GDP was the highest.

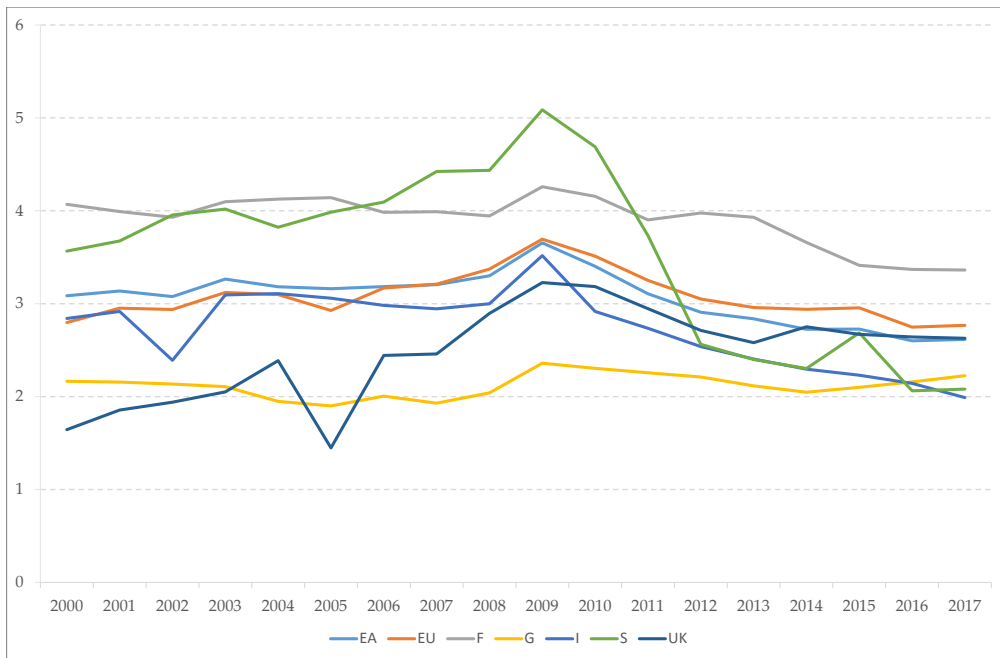


Fig. 1 Public investment effort: public investment over GDP (%)

Note: EA = euro area; EU = European Union; F = France; G = Germany; I = Italy; S = Spain; UK = United Kingdom. Source of data: AMECO database. Figure created by the authors.

Although all public investment contributes to fostering economic growth, not all of its components do it in the same way; in particular, empirical evidence shows that investment in transport infrastructure and investment in R&D are the items that

<sup>4</sup> According to the Bank of Spain, “the contribution of public investment to the recent fiscal consolidation process has exceeded its weight in spending” (Perez and Sotera 2017, p. 4).

contribute the most to the aggregate productivity of the economy. In this respect, it is convenient to remember that, as stressed by the OECD, “investment spending has a high multiplier, while quality infrastructure projects would help to support future growth, making up for the shortfall in investment following the cuts imposed across advanced countries in recent years” (OECD 2016, p. 6).

Therefore, it is always appropriate to ask in which areas or activities does the Spanish Government invest?<sup>5</sup> To answer this question it is convenient to make use of the Classification of the Functions of Government (COFOG), which distinguishes between ten categories: General public services (01), Defence (02), Public order and safety (03), Economic Affairs (04), Environmental protection (05), Housing and community amenities (06), Health (07), Recreation, culture and religion (08), Education (09) and Social protection (10). Considering this classification, it can be seen (Figure 2) that in Spain, and indeed everywhere else, public investment in Economic affairs — which mainly refers to infrastructure — gets, on average for the whole sample period, the

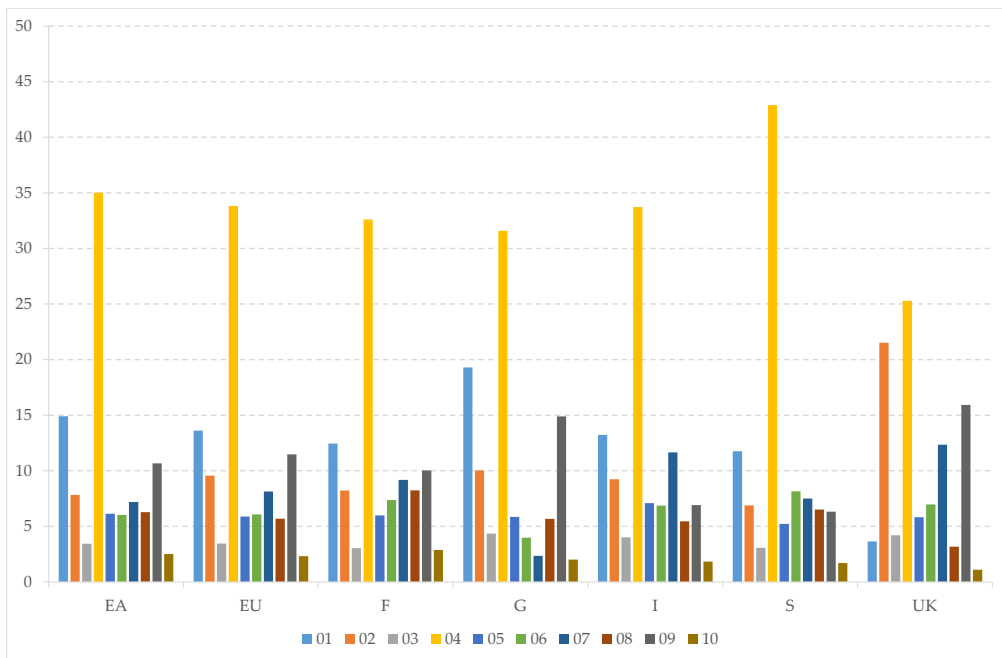


Fig. 2 Distribution of public investment by type of asset: average for the period 2000–2017 (%)

Note: EA = euro area; EU = European Union; F = France; G = Germany; I = Italy; S = Spain; UK = United Kingdom. 01 = General public services; 02 = Defence; 03 = Public order and safety; 04 = Economic affairs; 05 = Environmental protection; 06 = Housing and community amenities; 07 = Health; 08 = Recreation, culture and religion; 09 = Education; 10 = Social protection. Source of data: Eurostat database. Figure created by authors.

5 Although here we do not pay attention to the distribution of public investment by different levels of government, it is worth remembering that, in Spain, the shares of the central, state and local governments were, on average for the period 2000–2017, 31.1%, 42.3% and 26.6%.

highest share: specifically, in Spain it accounts for around 43% of total public investment. Additionally, it should also be appreciated that Spain is the country in which this item is the most important; while in the EU and the EA, the average share of it was 33.8 and 35%, respectively, in all the other four countries of reference the share was even lower, with the UK registering the lowest value (25.3%). This notwithstanding, public investment in Economic Affairs was, after Housing, Social protection and Recreation, culture and religion, in Spain the item that suffered the largest fall in the aftermath of the Great Recession; on average, it declined by 8.9% per year between 2008–2017. Because of this, the share of Economic affairs in total public investment lost about ten percentage points in the last years of the sample period, from a maximum of 48.6% in 2011 to a minimum of 38.8% in 2017.

## 5.2. Public Investment and Public Capital in Spain: A Long-Term Perspective

Having examined in the previous section the dynamics and main characteristics of public investment in Spain relative to that of the whole EU, the EA and the four largest economies in the EU, over the period 2000–2017, we change our focus in this section in two respects. First, we now pay attention not only to public investment but also to the public capital stock in the country; and second, we adopt a much longer time perspective, as the sample covers a period of some fifty years, from 1964 to 2014. All data used in this section are taken from the Valencian Institute of Economic Research (IVIE) dataset on public capital.<sup>6</sup>

According to Figure 3, two main characteristics concerning investment have to be stressed. First, both total and public investment roughly followed the same pattern over time. They grew moderately until the mid-1980s, they accelerated their rate of growth from then on to the second half of the 2000s (in particular public investment), and they experienced an abrupt decline since then up to 2014. Second, the share of public investment in total investment experienced many ups and downs around an average of 11.2%. Here several sub-periods are clearly noted. From 1964 to 1980, the ratio, although very volatile, stood around 9%. The arrival of democracy in Spain, the integration of the country into the EU, and the sharing of power between the central and regional governments brought about a huge increase in the ratio to the point that it reached maximum values in the neighbourhood of 17% at the beginning of the 1990s. Afterwards, the ratio declined for a period of about five years to stabilize approximately at 11% for the whole next decade, between 1996 and 2006. Finally, it experienced a huge rise after the crisis outbreak to reach, in 2009, a near maximum of around 16%. Unfortunately, and once again as a result of the fiscal consolidation

---

<sup>6</sup> Specifically, the database used is 'Stock and Capital Services' ([https://www.ivie.es/en\\_US/bases-de-datos/capitalizacion-y-crecimiento/el-stock-y-los-servicios-de-capital/](https://www.ivie.es/en_US/bases-de-datos/capitalizacion-y-crecimiento/el-stock-y-los-servicios-de-capital/)).

efforts previously mentioned, it decreased markedly from then on to a level close to the minimum of the 1970s; in fact, between 2008 and 2014 public investment in Spain fell by nearly 60%, which implies a negative rate of growth of 13.8% per year.

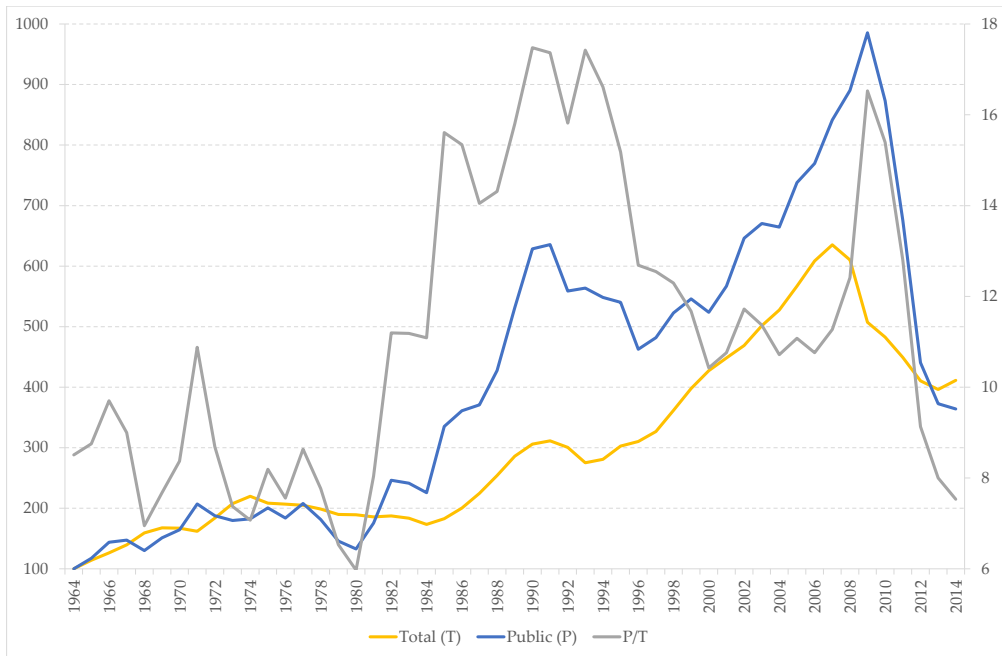


Fig. 3 Investment (1964 = 100): total and public

Note: the ratio P/T is measured (in percentage points) in the right-hand axis. Source of data: IVIE database. Figure created by the authors.

This last point is confirmed (Figure 4) if we consider the evolution of the public investment effort, as measured once again by the “public investment/GDP” ratio, over time. This ratio, being between 2 and 2.5% for over the first twenty years of the sample period, increased very rapidly in the second half of the mid-1980s to reach a maximum above 4%. Afterwards, it declined also very sharply until the mid-1990s to keep a level around 3% up to the 2008 Global Financial Crisis, when it increased to achieve, once more, a level of 4%; this, however, was only a very transitory increase as in 2010 it began to decrease to reach a level of just 1.5% in 2014. On average, the public investment effort in Spain has been 2.8%.

Figure 5 shows the distribution of public investment by type of assets. Although IVIE offers a very rich classification, we have reduced it to just five types for reasons of simplicity: Dwellings, Non-residential structures (Infrastructures), Transport equipment, Machinery and other equipment,<sup>7</sup> and Intangible assets (Information and

<sup>7</sup> Considering its limited relevance, we have included “Biological property assets” within the “Machinery and other equipment”.

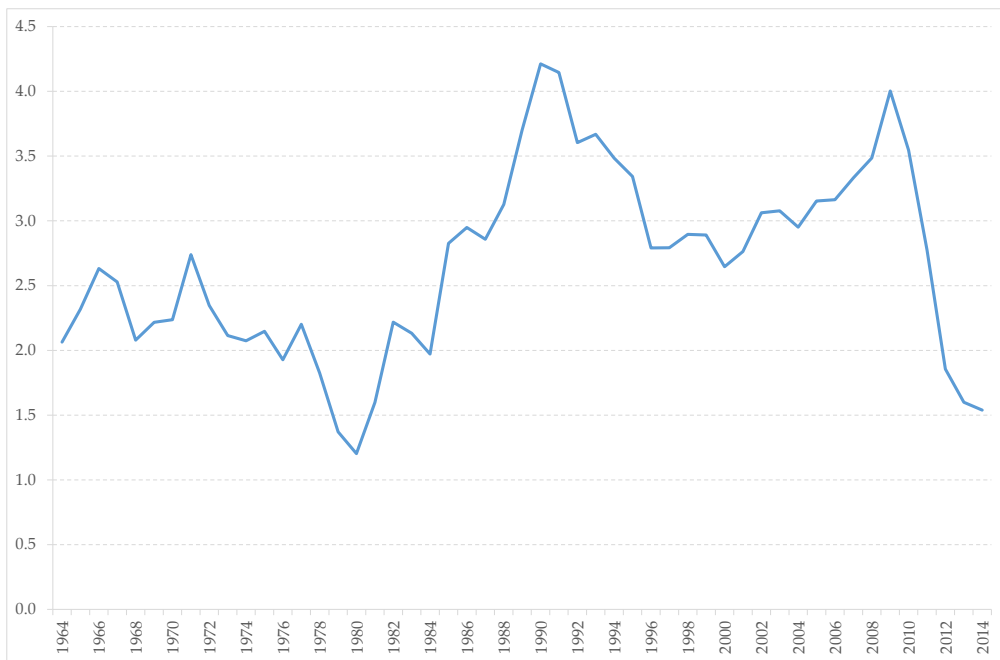


Fig. 4 Public investment effort: public investment over GDP (%)

Source of data: IVIE database. Figure created by the authors.

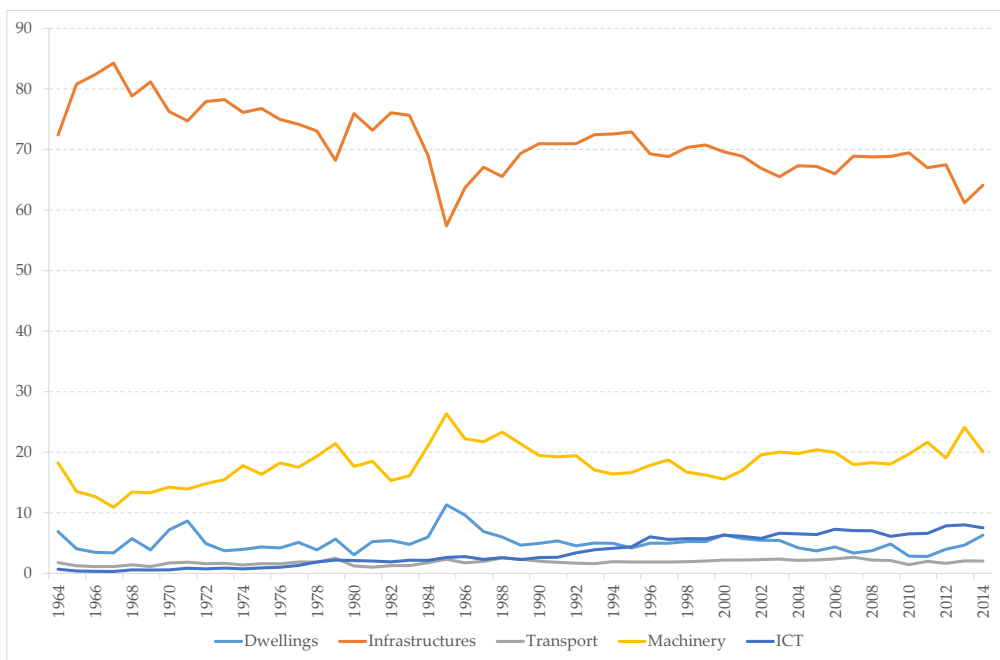


Fig. 5 Distribution of public investment by type of asset (%)

Source of data: IVIE database. Figure created by the authors.



communication technology, ICT). As can be seen, the lion's share of public investment corresponds to one single asset, Infrastructures, to which roughly between 60 and 80% of total public investment is devoted. Additionally, Machinery and other equipment is also relevant, as it contributes to around 20% of total public investment. Albeit still very low in relative terms, it is important to note that the share of public investment in Intangible assets grew slowly but steadily until the beginning of the nineties but that, since then, it has grown more rapidly, reaching levels of around 8% in the last final years. In fact, investment in Intangible assets grew much more rapidly than any other type of public investment; it is also true, however, that this investment is the one that was most negatively affected by the outbreak of the crisis (its annual average rate of growth between 2008 and 2014 was -12.9%).

As is well known, the stock of capital of an economy is the result of investment accumulation and de-accumulation over time. As mentioned before, in addition to offering information about investment, IVIE also provides information about the stock of capital (both net and productive) in the economy. Net capital is the result of net investment accumulation while productive capital is equal to net capital minus the loss of capital efficiency due to the ageing of capital assets. As the estimation of the loss of efficiency always implies making some arguable assumptions and, additionally, the evolution of net and productive capital has moved along very similar paths, here we decided to focus exclusively on net capital (referred to henceforth in short, as simply "capital").

Total and public capital in Spain increased a lot over time. Initially and until the mid-1980s, both grew steadily at a similar rate, but afterwards public capital rose much faster. Consequently, the share of public over total capital was very stable over the first twenty years of the sample period at a level of 8%; afterwards, however, it increased sharply to up a maximum of around 12% in the mid-1990s, to remain stable since then at a level between 11 and 12%. Regardless, this performance cannot obviate the fact that public capital suffered a little decrease during the crisis years: while, taking 1964 as the base year with a value of 100, the index rose from 100 to 804.5 until 2011, it declined from 2011 to 2014 to a level of 764.3.

When we consider the ratio public capital/GDP (Figure 6), the most salient trait is that, after long periods of relative stability (1964–1980 and 1994–2008), it increased very markedly. That is to say, the two most expansionary phases took place, roughly, between 1980 and 1995; and immediately after the burst of the Great Recession. Consequently, the ratio rose from slightly more than 20% of GDP in 1980 to around 36/37% at the end of the sample period. Regarding public capital per inhabitant, its evolution differs from that of net capital over GDP in that now, with the exception of the first fifteen years of the sample, the ratio increased almost continuously over time. In any case, its evolution mimics that of public capital/GDP in that the average for the second half of the period (close to €8,000 per inhabitant) was much higher than that for the first (€3,500).

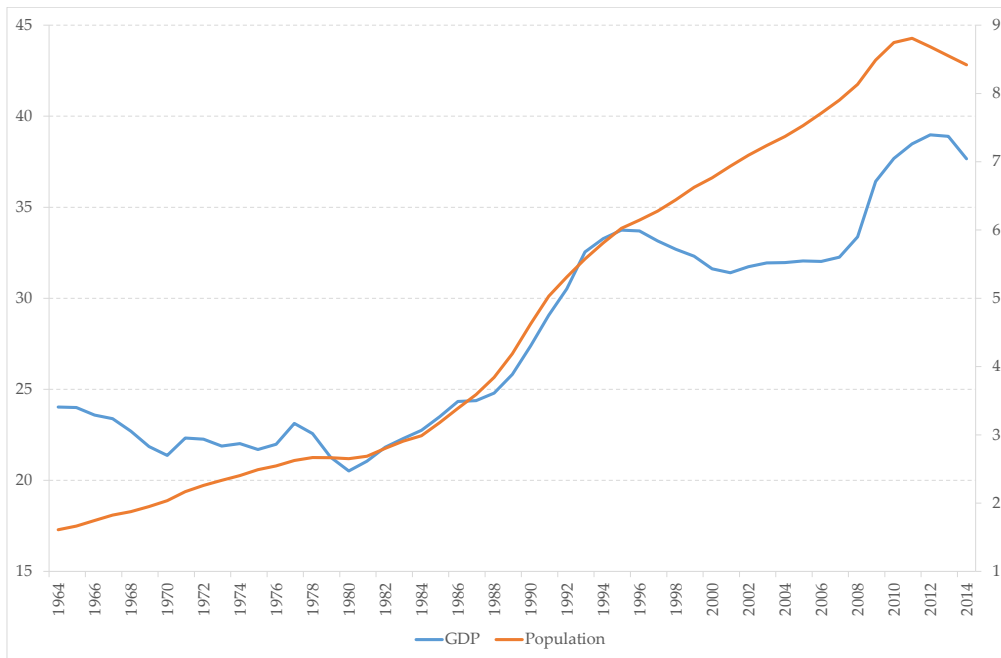


Fig. 6 Public capital ratios: over GDP (%) and population (thousand euros per inhabitant)

*Note:* the ratio public capital/population (in thousand euros) is measured on the right-hand axis.

*Source of data:* IVIE database. Figure created by the authors.

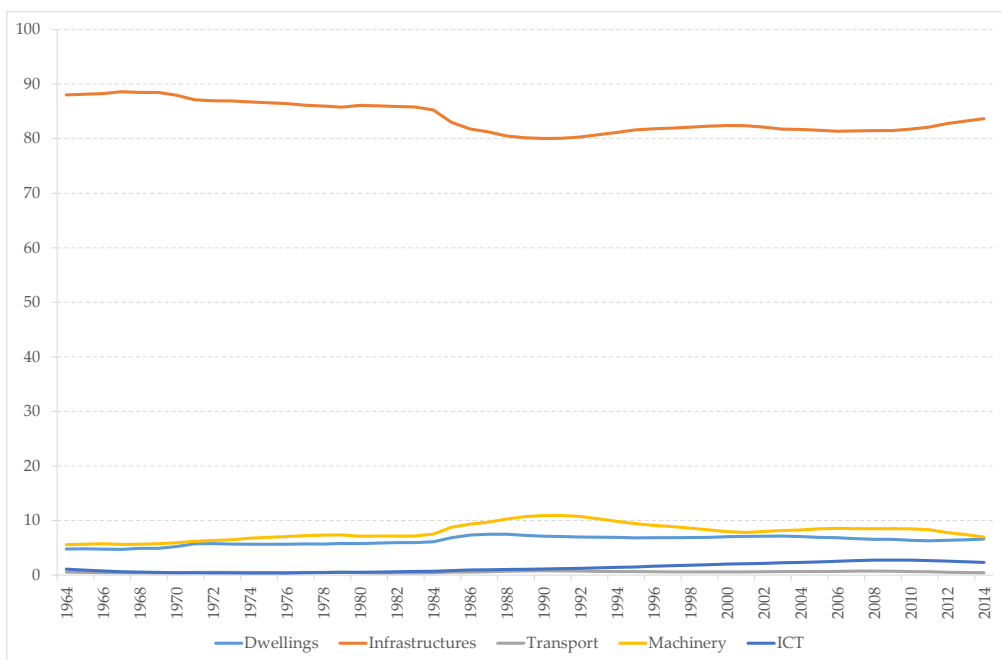


Fig. 7 Distribution of public capital by type of asset (%)

*Source of data:* IVIE database. Figure created by the authors.

Regarding the distribution of the public capital stock by type of asset (Figure 7), it is important to stress that, naturally, it is much in line with that of the public investment previously mentioned. Once again, it happens that Infrastructures is, by far, the most important type of capital asset of the five here considered; it represents, on average, nearly 84% of public capital. As is obvious, this implies that the other types of capital assets contribute with very low percentages to the total; in particular, these contributions were of some 8% for Machinery, 6.3% for Dwellings, 1.3% for ICT, and 0.6% for Transport equipment. What cannot be seen in Figure 7, is that there are three additional relevant characteristics related to this distribution. First, as expected, all types of capital assets increased in net terms over time. Second, ICT is the type of capital asset that grew more rapidly since the early 1990s (between 1990 and 2007/2008 it grew at an average yearly rate of 8.9%). Third, capital for all types of assets declines (in three out of the five cases very abruptly) from the outbreak of the financial crisis.

### 5.3. Conclusions

Like some other European countries, namely Greece, Spain was hit badly by the 2008 Global Financial Crisis. Because of this, the country faced some important constraints in its public finances; namely, public investment experienced a severe blow after the outbreak of the crisis. In fact, during the period 2000–2007, Spain was the country that registered the second highest increase in public gross fixed capital formation among the five biggest European countries, a rate (6.8% per year) that was also much higher than that of the EU (2.3%) and the euro area (2.6%). However, over the next period, 2008–2013, the situation changed completely: public investment dropped, on an annual basis, at a rate close to 11%. Thus, Spain became the country that suffered the most acute decline in public investment among the big five.

In relative terms, the situation did not improve. Although Spanish GDP also registered a large drop in the aftermath of the recession, public investment decline was even larger. Therefore, the ratio “public investment/GDP”, that had been among the highest of the EU, also recorded an intense fall to the point of becoming one of the lowest of the EU. In fact, from being at a level closer to or over 4% between 2000 and 2009 (when it reached a maximum over 5%), the ratio decreased to a minimum of around 2% in 2016 and 2017.

From the point of view of the asset composition of public investment, two results are worth mentioning. On the one hand, the Economic affairs category is clearly the most important category, even to a much higher extent than in any of the reference areas: it represents, on average, around 43% for Spain against less than 35% in both the EU, the euro area and the other four big countries. On the other hand, the share of this category of investment declined, because of the crisis, from 2007/2008 onwards.

However, a longer, although less updated, time perspective (1964–2014) offers a somewhat different picture of the evolution of public investment in Spain. After

having experienced a more or less stable increase between 1964 and 1980 (it rose from an index of 100 to one of 200), this type of investment scored an impressive increase in the next decade, to reach an index level over 600. The first half of the 1990s was more turbulent (the index declined below 500), but afterwards and up until 2008 it achieved another impressive increase, registering an index value close to 1000. Unfortunately, and as mentioned before, the Great Recession very negatively affected Spanish public investment, to the point that the index fell to a minimum of less than 400 in 2014.

Regarding the public investment effort, there are three results, somewhat in tune with the evolution previously mentioned, that should be highlighted: first, its continuous ups and downs, reflecting a high volatility; second, the huge increase recorded in the 1980s; third, the even stronger decline underwent from 2008 to 2014.

As for the composition of public investment, there are also two important facts that should be stressed: on the one hand, the huge (albeit declining) share of public investment devoted to infrastructure, and, on the other, the low but increasing share devoted to ICT.

The results for (net) public capital roughly mimic those of public investment. The main difference is that, as expected, public capital has been growing constantly over time (from an index of 100 in 1964 to one of more than 750 in 2008); the only exception to this positive evolution took place in the last few years, in which the index declined to around 720 in 2014. A very similar evolution was registered by the ratios “public investment/GDP” and “public investment/population”.

To sum up, the following points should be stressed:

1. Public investment in Spain has been very volatile and pro-cyclical over time. It has experienced large increase periods during boom times and huge fall periods during recessions.
2. Public capital has been increasing fairly constantly (but not always at the same rate) over time, with the only exception being developments during the most acute phase of the financial crisis.
3. Investment in infrastructures always represents the main component of public investment, but the most expansive item has been investment in ICT. This is also true regarding public capital.

Considering all of this, it seems that the agenda for public investment in Spain in the future should have three main goals:

1. To reduce the level of volatility, for which the development of long-run investment strategies would be an important instrument.
2. To adopt a more anti-cyclical stance. As part of the aforementioned strategies, public investment should be considered as an anti-cyclical policy tool, in particular to smooth future drops in the business cycle.

3. To increase the share devoted to ICT. Without forgetting the importance of physical infrastructure, it is clear that improving access to ICT infrastructure should become a priority for policy makers, since ICT may act as a remarkable enabler of economic development. In other words, the growing trend in this type of public spending should be consolidated and, if possible, expanded in the coming years.

Although there is no doubt that this is a hard agenda to accomplish, it should obviously be pursued. The fate of public investment and public capital in Spain (and, for that matter, of economic growth) is, to a great extent, in the hands of policy makers, as it ever has been.

## References

- Abiad, A., D. Furceri and P. Topalova (2015) "The Macroeconomic Effects of Public Investment: Evidence from Advanced Countries", *IMF Working Paper* 15(95), <https://doi.org/10.5089/9781475578874.001>
- Aschauer, D. A. (1989) "Is Public Expenditure Productive?", *Journal of Monetary Economics* 23(2): 177–200, [https://doi.org/10.1016/0304-3932\(89\)90047-0](https://doi.org/10.1016/0304-3932(89)90047-0)
- de Jong, J., M. Ferdinandusse, J. Funda and I. Vetlov (2017) "The Effect of Public Investment in Europe: A Model-Based Assessment", *ECB Working Paper* 2021, <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp2021.en.pdf>
- OECD (2016) *OECD Economic Outlook*. Paris: OECD Publishing.
- Perez, J. J. and I. Sotera (2017) "Developments in Public Investment during the Crisis and the Recovery", *Bank of Spain, Economic Bulletin* 4: 1–11, <https://www.bde.es/f/webbde/SES/Secciones/Publicaciones/InformesBoletinesRevistas/NotasEconomicas/T4/files/bene1704-nec10e.pdf>