

# Developments in public investment during the crisis and the recovery

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### Introduction

In advanced economies, general government tends to adopt a significant role in providing goods and services such as transport, education or health infrastructure. Such provision, whether in full or in part, allows it to prevent the emergence of so-called “market failures” which could lead to an insufficient provision of goods and services of this kind. In this connection, there is a broad set of theoretical and empirical studies evidencing the existence of a positive relationship between aggregate productivity of the economy and so-called “productive government spending”, with a significant impact on potential growth [see, among others, the seminal work of Aschauer (1989) or, more recently, Abiad et al. (2015)].

Productive government spending, which may materialise both in improvements in the economy’s physical and human capital and in an increase in the efficiency of the production system as a whole, includes most notably public investment. The investment capacity of general government usually focuses on infrastructure relating to transport, defence, health, education, and housing and community amenities, components which generally do not display the same degree of complementarity with private activity. In developed economies public investment activity is mainly channelled through direct demand from the different agents comprising general government, i.e. central, regional and local governments, but also through the so-called “corporate public sector”,<sup>1</sup> in particular with regard to transport infrastructure, such as airports, ports, motorways or public transport at local and regional level, and through cooperation agreements with the private sector, such as, for example, those known as “public-private partnership (PPP) agreements”.

Recent academic and economic policy debate has highlighted the role which discretionary fiscal policies pivoting on public investment could play in the process of reinforcing the economic recovery, since the fiscal multipliers associated with discretionary increases in public investment tend to be high, persistent and exceeding those of other instruments (taxes and other expenses) owing to the impact of investment on aggregate demand, the accumulation of productive capital and the economy’s growth potential [see Abiad et al. (2015) and De Jong et al. (2017)]. However, such impact depends on the kind of public investment made, particularly on whether or not it focuses on the development of infrastructure in areas where shortcomings are identified, on project efficiency or on the degree to which it complements or replaces private investment. Also, the use of public investment as a macroeconomic stabilisation tool is limited by delays in implementing the investment, which might condition its scope and effectiveness [see De Jong et al. (2017) or Argimón et al. (1994)].

In the case of the euro area it is also worth noting that the potential positive effects of these policies are not restricted to national economies insofar as they might, according to the evidence available, have a quantitatively significant impact on neighbouring countries’

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<sup>1</sup> In accordance with the European System of Accounts (ESA 2010), commercial law firms, public law entities or consortiums directly or indirectly more than 50%-owned by the central government shall be deemed to be state-owned enterprises outside the general government perimeter.

GDP, greater than that which would arise with other fiscal policy instruments [see Alloza et al. (2017) or Attinassi et al. (2017)]. These results suggest that when public investment is adequately directed at projects able to improve the economy's efficiency and growth capacity, it may be the appropriate instrument on which to build a coordinated budgetary stimulus effort in the euro area, on the basis of its expansion in countries which have sufficient budgetary room for manoeuvre [see Banco de España (2017)].

Against this backdrop, recent papers suggest that public investment has reached historical lows in the advanced and emerging economies as a whole, when compared with the levels recorded during the last four decades [see Abiad et al. (2015)]. Part of the lower weight of the general government's investment activity reflects the increase recorded by public capital stock during the period, which has given rise to saturation processes in some areas or to the existence of alternative channels for the provision of infrastructure and similar goods, such as those described above, including an increase in the private sector's participation. Nonetheless, in general this phenomenon seems to have increased in recent years as a result of the budgetary consolidation processes associated with the economic crisis, especially in the European case [see De Jong et al. (2017)].

Spanish government has also followed this global trend. In 2016 general government investment stood at 1.9% of GDP, lower than the European average and lower than for the period 1970-2016, when it stood at 3.6% on average. In addition, its weight in total economic investment in 2016 was lower than 10%, below the average weight of 15% in the past five decades. Moreover, the contribution of public investment to the recent fiscal consolidation process exceeded its weight in public expenditure. The stock of public capital has decreased in recent years, since investment has not been sufficient to cover its depreciation; however, as a percentage of GDP, the current levels are significantly higher than the average for the period 1970-2015, posting significant heterogeneity by type of infrastructure. In the case of Spain, the investment activity of state-owned enterprises is particularly significant, as it accounts for approximately 40% of total public investment in infrastructure. Also, Spain has used PPPs more than other European countries to channel public investment projects with the cooperation of the private sector.

This note develops the matters outlined in the previous paragraph. To this end, the following section describes developments over time in general government investment and in the stock of public capital, also providing an international comparison. Section three analyses in greater depth the composition of general government investment, with a special emphasis on infrastructure. Section four details public investment in a broader sense, including corporate public sector investment, and describes changes in the accumulation of public capital and its depreciation. Lastly, the final section focuses on describing PPPs and their performance in recent years, and provides an international comparison.

## General government investment from a long-term and comparative perspective

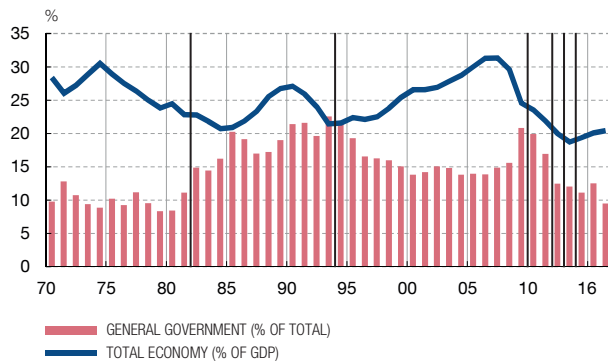
Public sector investment is mainly carried out directly by general government. From a long-term perspective, general government investment in Spain in the period 1970-2016 has, on average, accounted for 15% of total investment in the economy, i.e. 3.6% of GDP and somewhat more than 10% of public expenditure (see Chart 1).<sup>2</sup> These averages are consistent with high cyclical volatility, as occurs with overall economic investment, in that, generally speaking, public investment performed procyclically in the period analysed as a

<sup>2</sup> It should be borne in mind that accounting changes have been implemented over the last few decades which may affect the classification of operations in budget items and the perimeter of the general government sector.

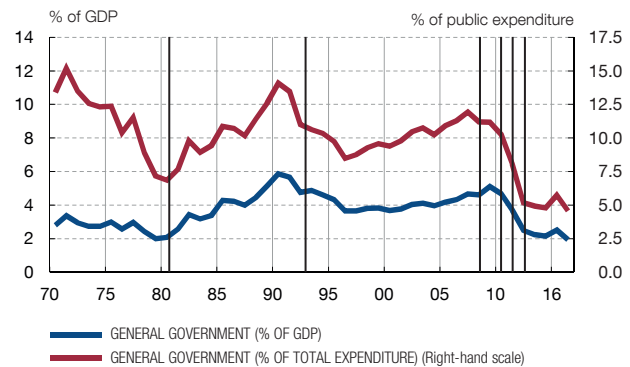
## CHANGES IN INVESTMENT IN SPAIN

CHART 1

1 INVESTMENT IN THE ECONOMY AND WEIGHT OF GENERAL GOVERNMENT (a)



2 INVESTMENT BY GENERAL GOVERNMENT (a)



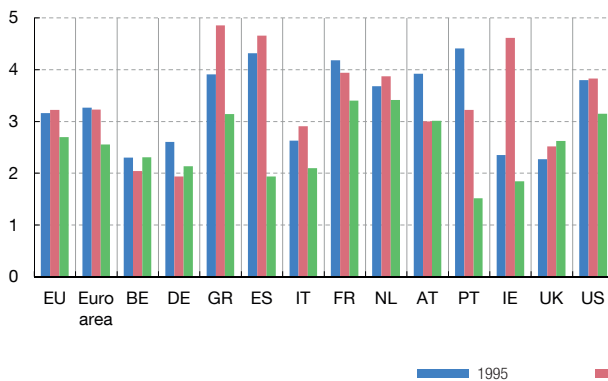
SOURCES: INE and Banco de España.

a The black bars indicate the years in which GDP was negative. Investment denotes the National Accounts item gross fixed capital formation.

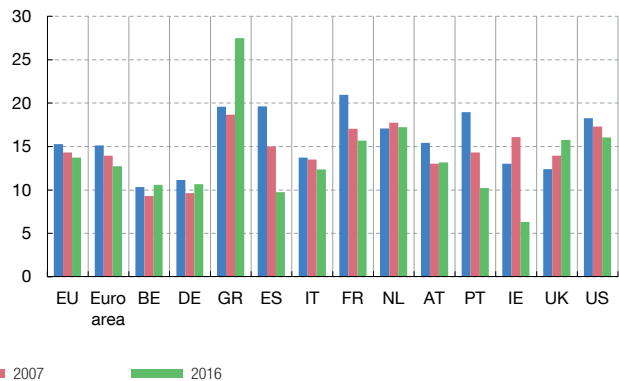
## INTERNATIONAL COMPARISON OF INVESTMENT BY GENERAL GOVERNMENT

CHART 2

1 PERCENTAGE OF GDP



2 PERCENTAGE OF TOTAL INVESTMENT IN THE ECONOMY

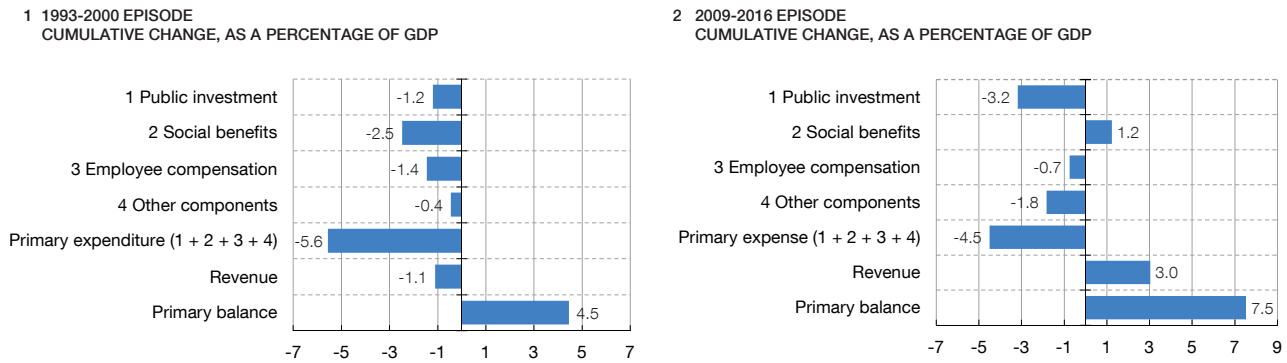


SOURCE: AMECO.

whole [(see De Castro et al. (2017)]. At the same time, public investment tended to lose weight in total public spending during periods of public finance constraints, such as that which took place in the second half of the 1990s or, more recently, from 2011, and to gain weight at certain times when it was used as an economic stimulus instrument, as in 2009-2010. More recently, in 2016 public investment reached its historical low since 1970 as regards its weight both in public expenditure (4.6% of the total) and in GDP (1.9%), while the percentage of investment in the total economy stood at 9.5%, slightly higher than the minimum levels of the series, recorded in the late 1970s. By agent, 45% of general government investment in 2016 was regional, 35% central and 20% local.

From an international perspective, Spanish general government investment spending, measured by its weight in GDP, was higher between 1995 and 2007 than the average for the euro area (see Chart 2). From the onset of the economic crisis, most of the governments in euro area countries reduced their investment activity, although unevenly. Not only did the average ratios of public investment to GDP fall significantly in euro area countries, but so did dispersion across the euro area. There were notable corrections between 2007 and 2016 of around 60% (in terms of GDP) in Spain and Ireland, of slightly over 50% in Portugal, of 30%-35% in Italy and Greece, and of 10%-15% in The Netherlands and France, while





SOURCES: Intervención General de la Administración del Estado and Banco de España.

the governments of other countries such as Belgium, Germany or Austria increased, in percentage terms, their investment effort.<sup>3</sup>

In the case of Spain, the contribution of public investment to the recent fiscal consolidation process has exceeded its weight in spending. If the moment when the highest level of public deficit was recorded (2009) is taken as the reference and the difference from the level recorded in 2016 is calculated, the accumulated fall in investment was 3.2 percentage points (pp) of GDP, while public-sector employee compensation decreased by 0.7 pp, social benefits increased by 1.2 pp and other primary expenditure (i.e. excluding interest payments) decreased by 1.8 pp of GDP (see Chart 3.2). Thus, a budget item accounting for somewhat less than 10% of the total primary expenditure was responsible for nearly 60% of its total adjustment. This percentage is much higher than the 22% assumed during the fiscal consolidation process following the 1990s crisis (see Chart 3.1).

The dynamics of general government investment in the past three decades have resulted in an increase in public capital stock, both as a percentage of GDP and in terms of weight in the total capital stock of the economy (see Charts 4 and 5). Although the measures of fixed capital stock available should be taken with caution, since they are not official statistics and depend largely on the method used,<sup>4</sup> they provide a useful approximation for analysing the accumulation of investment flows and their performance over time. In the case of Spain (see Chart 4), on the basis of the first metrics, the weight of public capital in output increased from 1980, when it stood at 50%, stabilising at around 57% between 1990 and 2007 and increasing during the latest crisis up to a maximum of 72% in 2013. During 2012-2016 the flow of public investment was insufficient to offset depreciation, measured by general government consumption of fixed capital, which explains in part the decrease in stock as a percentage of GDP from 2014. The proportion of public capital stock in the total economy gained weight steadily between 1980 and 1999, to stand at 23.7%, declining from then until 2007 (to 22.4%) and rising during 2008-2015, to peak at

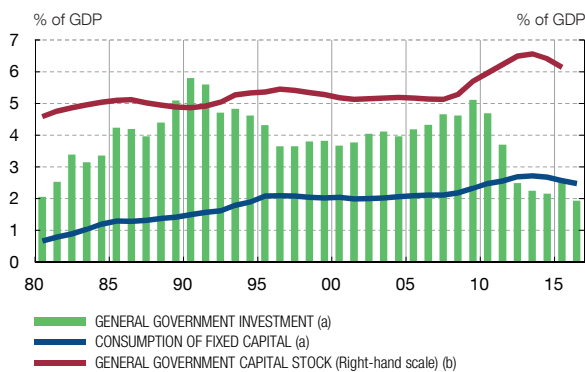
3 The composition of the fiscal adjustment has a bearing on the successful implementation of consolidation processes [see Banco de España (2017) and Hernández de Cos and Moral-Benito (2013)]. In particular, past consolidations were longer lasting when based on an adjustment of expenditure (specifically, in current spending) rather than an increase in revenue. However, the possibilities of consolidation processes being successful may be lower when public investment (if productive in nature) is reduced. Additionally, the adjustment of this variable may have negative implications for the growth of the economy in the long term.

4 Capital stock is constructed on the basis of the accumulation of past investments, subject to the parameters of the perpetual inventory method. For further information see <http://www.imf.org/external/np/fad/publicinvestment/data/info122216.pdf>.

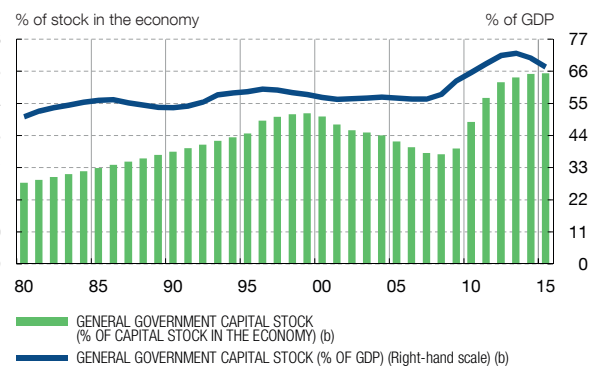
## CHANGES IN GENERAL GOVERNMENT INVESTMENT AND CAPITAL STOCK

CHART 4

1 INVESTMENT, CAPITAL STOCK AND CONSUMPTION OF FIXED CAPITAL



2 CAPITAL STOCK AND WEIGHT OF GENERAL GOVERNMENT



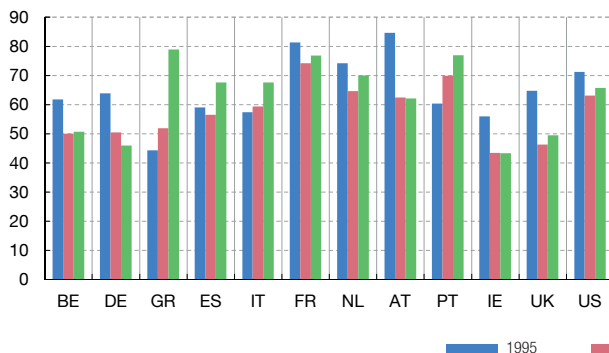
SOURCES: See notes.

- a Intervención General de la Administración del Estado and Banco de España.
- b IMF (2015), Investment and capital stock dataset, 1960-2015.

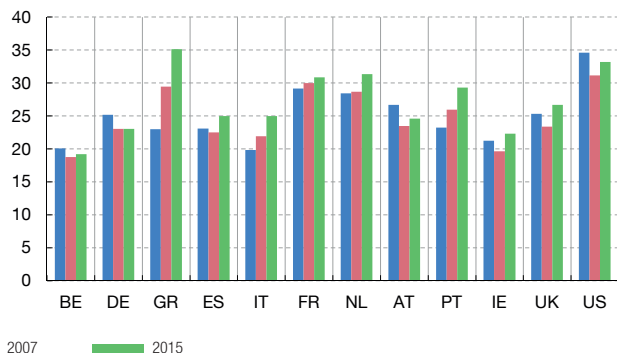
## INTERNATIONAL COMPARISON OF GENERAL GOVERNMENT CAPITAL STOCK

CHART 5

1 PERCENTAGE OF GDP



2 PERCENTAGE OF TOTAL CAPITAL STOCK IN THE ECONOMY



SOURCE: IMF (2015), Investment and capital stock dataset, 1960-2015.

25% in 2015 (per the latest available information). Therefore, based on these statistics, the stock of private capital was more affected than public capital during this last period.

The patterns described in the preceding paragraph for the Spanish case are similar to those observed for other advanced countries (see Chart 5). Public capital stock as a percentage of GDP in Spain stood in 2015 slightly above the average of the ratios in euro area countries, the United Kingdom and the United States, after having been lower in the three previous decades. Conversely, the weight of public capital in the total was lower for Spanish general government than for the benchmark group of countries.

### Composition of general government investment

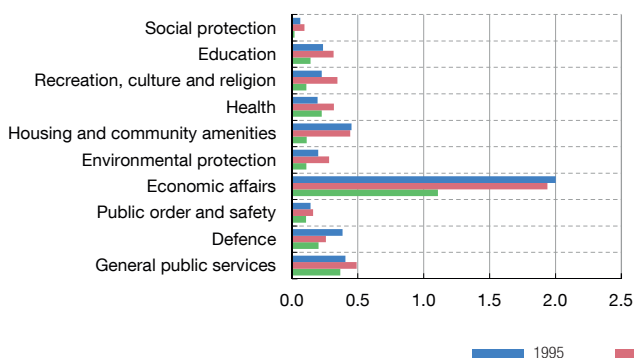
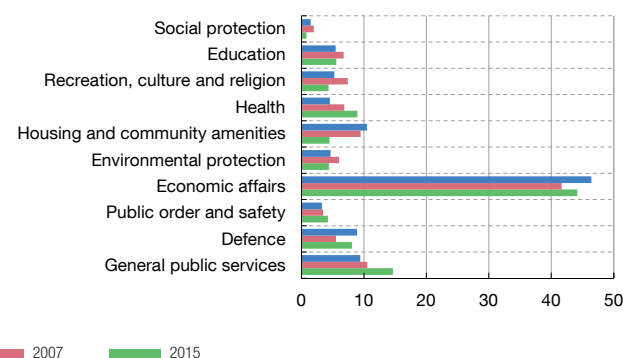
The functions of government investment expenditure may be analysed using the “Classification of the Functions of Government” (COFOG). The COFOG classification divides public spending into 10 categories, each of which is in turn divided into subcategories (see Table 1). Based on this classification, around 45% of total government investment in 2015 was made within the sphere of “economic affairs” (see Chart 6), which includes, in particular, infrastructure spending. Investment in “general public services” accounted for close to 15% of the total, and for nearly 10% in both “defence” and “health”, while standing for the rest of items at levels close to or below 5% of total government

**FUNCTIONAL COMPOSITION OF GENERAL GOVERNMENT INVESTMENT**
**TABLE 1**

	Main subcategories
01 General public services	01.4 Basic research
02 Defence	02.1 Military defence
03 Public order and safety	03.1 Police services
04 Economic affairs	04.5 Transport
	04.8 R&D Economic affairs
05 Environmental protection	05.2 Waste water management
	05.4 Protection of biodiversity and landscape
06 Housing and community amenities	06.1 Community development
	06.2 Housing development
07 Health	07.2 + 07.3 Outpatient and hospital services
	07.5 R&D Health
08 Recreation, culture and religion	08.2 Cultural services
09 Education	09.1 Pre-primary education
	09.4 Tertiary education
10 Social protection	10.2 Old age

SOURCE: Intervención General de la Administración del Estado.

NOTE: The subcategories selected are the most significant ones, in terms of amount, within each category.

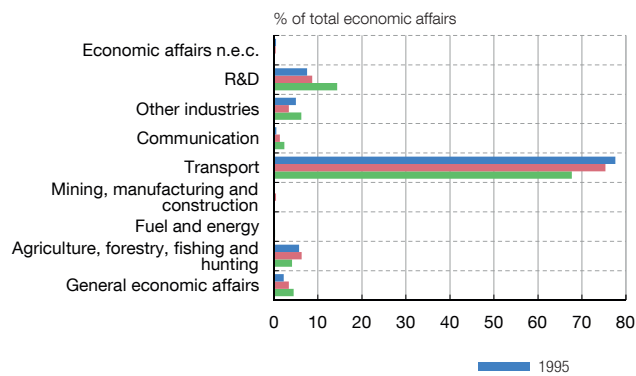
**FUNCTIONAL CLASSIFICATION OF GENERAL GOVERNMENT INVESTMENT**
**CHART 6**
**1 PERCENTAGE OF GDP**

**2 PERCENTAGE OF TOTAL GENERAL GOVERNMENT INVESTMENT**


SOURCE: Intervención General de la Administración del Estado.

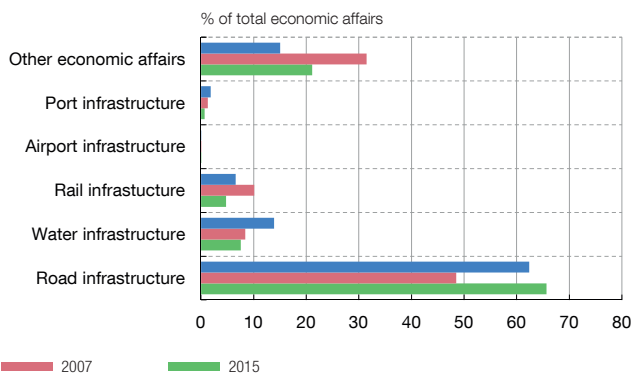
investment. All of these components were affected by the fiscal consolidation process described above. In nominal terms, although aggregate general government investment declined by 51% between 2009 and 2015, the decrease was heterogeneous among items, although across the board, in such a way that the composition by item has changed in recent years (see Chart 6.2). The items which shrunk the most in percentage terms were “housing” and “social protection” (a nominal decline of approximately 80%), while “economic affairs” decreased in line with the total (50%) and “defence” and “public order and safety” did so to a lesser extent (an accumulated nominal decline of between 10% and 20%).

From the viewpoint of its contribution to the aggregate productivity of the economy, the investment item classed as “economic affairs” is especially significant as it includes most notably investment spending on transport infrastructure and R&D expenditure (accounting

1 BY FUNCTION (a)



2 BY TYPE OF INFRASTRUCTURE (b)



SOURCES: See notes.

- a Intervención General de la Administración del Estado.  
 b Instituto Valenciano de Investigaciones Económicas (2015).

for 70% and 15%, respectively, of total “economic affairs” in 2015)<sup>5</sup> (see Chart 7.1). For its part, based on official data, Instituto Valenciano de Investigaciones Económicas (IVIE) provides an alternative classification for the item “economic affairs” which is of particular interest in that it permits differentiating general government investment by infrastructure type (see Chart 7.2). According to this classification, road infrastructure (roads, motorways and toll roads) are the main sub-item of investment spending on infrastructure by general government, ranging between 50% and 65% of the total in the past few decades. For the period available (up to 2013), in the case of transport infrastructure, road infrastructure is the only sub-item in the total whose weight does not seem to have decreased since 2007, as compared with the fall recorded in government spending on water, port, airport or rail infrastructure.

The data provided by IVIE (up to 2013) also permits analysing the difference between general government investment and consumption of fixed capital, by item. Based on this information, the depreciation of capital would have recently stood above investments made in all the categories, except for “economic affairs” (see Chart 8), which covers infrastructure.

### Corporate public sector investment

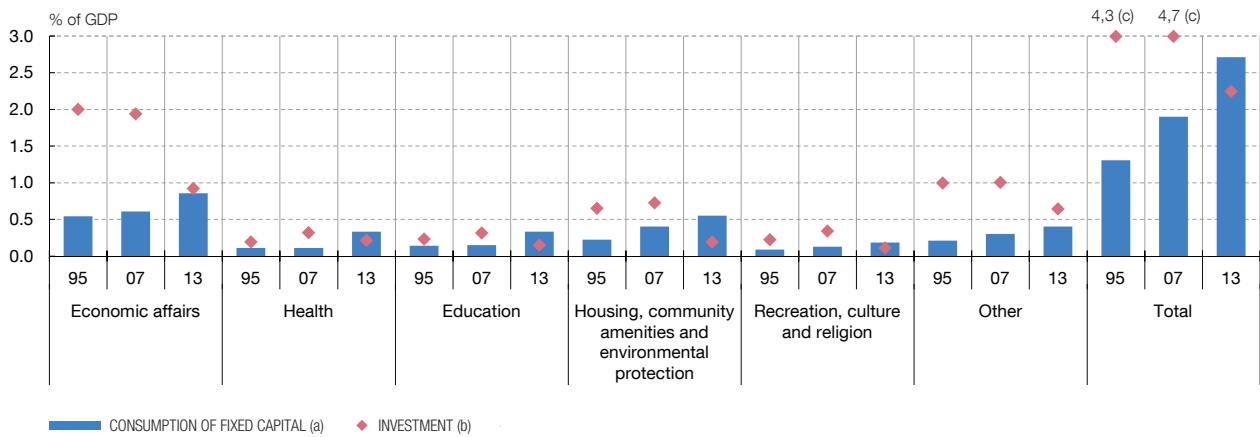
Investment made directly by general government gives an incomplete view of all the investment activity in infrastructure carried out by the public sector. In a broad sense, public investment includes general government investment and investment by other agents not belonging to general government and which play an important role in developing certain types of infrastructure (see Chart 9). In 2013 close to 25% of the Spanish general government’s total investment went to infrastructure (0.67 pp of GDP), as compared with 0.44 pp of GDP earmarked by the corporate public sector in this connection. It should be noted that international comparisons of the public sector’s investment effort are highly conditioned by the classification of public investment activity as general government or corporate public sector. The international statistics available allow for an appropriate comparison of general government investment, but are insufficiently homogenised to perform comparisons in the

<sup>5</sup> It is possible that the application of the new ESA 2010 accounting regulations has had an impact on the increase observed in investment spending in R&D, on account of the reclassification of this item as gross fixed capital formation.



**GENERAL GOVERNMENT INVESTMENT AND DEPRECIATION OF CAPITAL  
(CONSUMPTION OF FIXED CAPITAL), BY FUNCTION**

**CHART 8**



SOURCES: See notes.

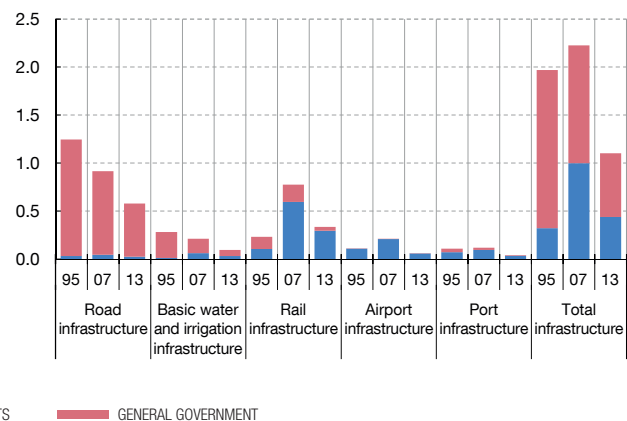
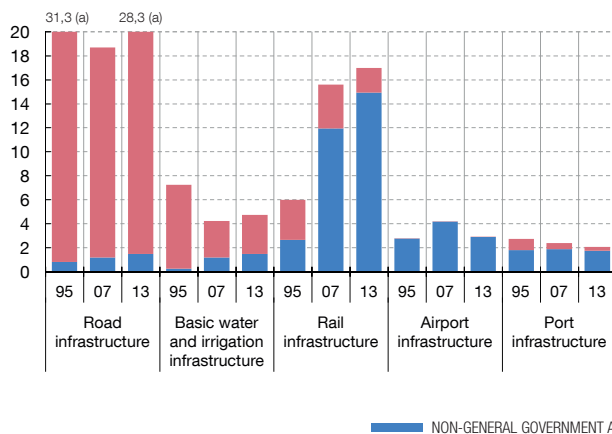
- a Instituto Valenciano de Investigaciones Económicas (2015).
- b Intervención General de la Administración del Estado.
- c Data outside the axis range.

**INVESTMENT IN INFRASTRUCTURE BY GENERAL GOVERNMENT AND NON-GENERAL GOVERNMENT AGENTS**

**CHART 9**

**1 PERCENTAGE OF TOTAL PUBLIC INVESTMENT**

**2 PERCENTAGE OF GDP**



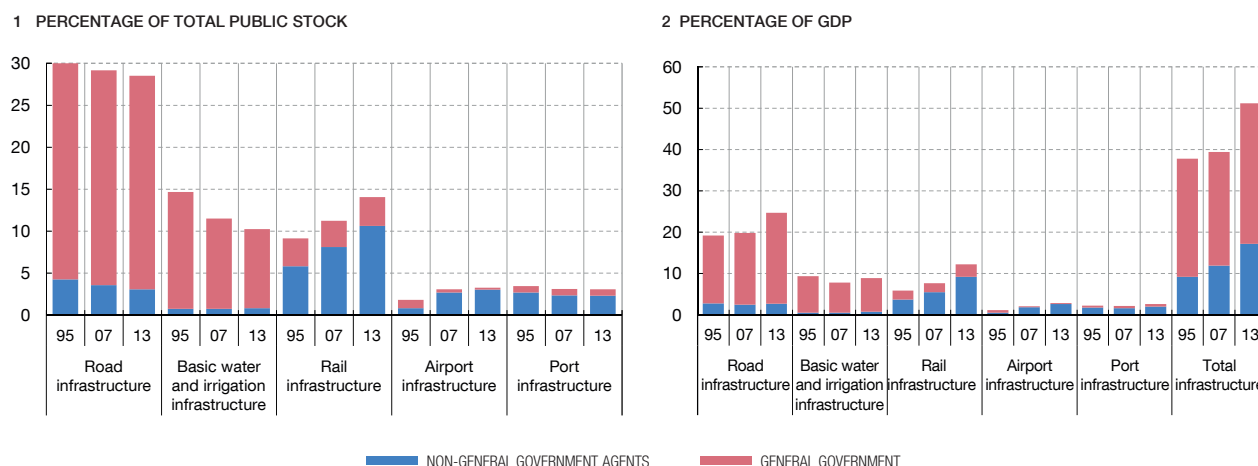
SOURCE: Instituto Valenciano de Investigaciones Económicas (2015).

- a Data outside the axis range.

non-general government corporate sphere in a context where there may be significant differences between countries in investment channelled through each sector.

In the case of Spain, the corporate public sector classified as non-general government includes, among others, national toll road concessionary companies in road infrastructure; RENFE (national railway company), FEVE (narrow gauge Spanish railway company) and other urban rail transport modes (such as underground and trams) in the case of rail infrastructure; river basin management authorities in the case of water infrastructure; AENA (the Spanish airport authority) in airport infrastructure; and autonomous ports in port infrastructure.<sup>6</sup> These agents started to gain importance from the 1990s in rail, airport and

<sup>6</sup> For further information relating to investment by these agents, see Mas Ivars et al. (2015).



SOURCE: Instituto Valenciano de Investigaciones Económicas (2015).

port infrastructure under a public sector activity reconfiguration process and, at present, they account for the majority of this area of public investment (see Chart 9.1).

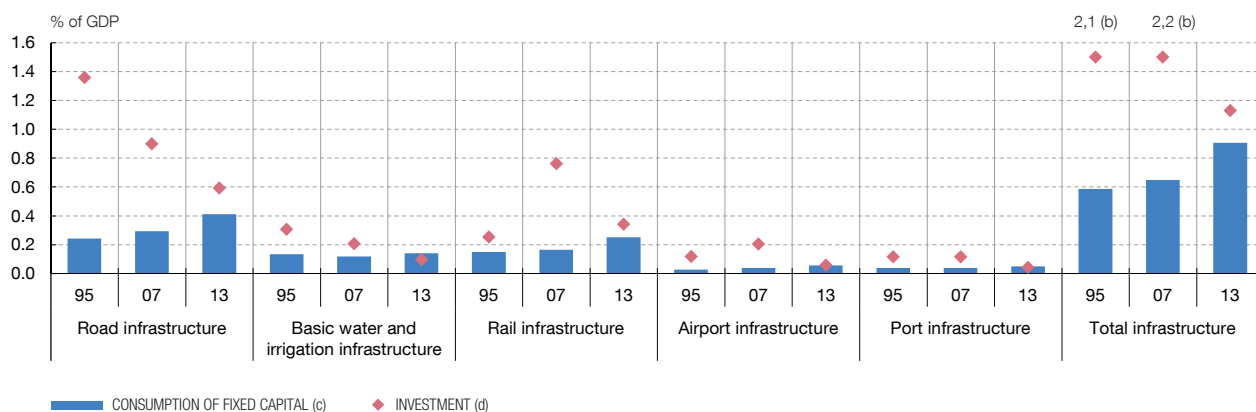
As regards the composition of public sector investment in infrastructure as a whole, road infrastructure continues to have a predominant weight in total investment –close to 30% of the total in 2013–, with that performed directly by general government prevailing. Rail investment gained significance from 2007 and in 2013 it accounted for 17% of total public sector investment, mainly owing to investment in the high-speed segment, with an increase in the weight of the corporate public sector. Basic water and irrigation infrastructure is next in importance, although it has been losing weight over time.

The statistics compiled by IVIE also enable analysing the level and performance of the stock of public capital by expenditure function and by investment agent (general government and other agents not belonging to general government) (see Chart 10). According to this source, in 2013 the corporate public sector's capital stock in infrastructure accounted for 17 pp of GDP vs. 34 pp for general government. As regards the performance of capital stock in the various types of infrastructure between 2007 and 2013, road infrastructure maintains a predominant weight in total accumulated capital, around 30% of the total, with few changes in recent years. Capital in rail infrastructure and, to a lesser extent, in airport infrastructure has increased between 2007 and 2013. This might be justified in part by the specific characteristics of these types of infrastructure, which have lengthy average useful lives, possibly resulting in accumulated capital being less affected against a background of declining investment flows. Conversely, capital has decreased in water and port infrastructure, albeit to a lesser degree in the latter case.

With regard to the relationship between investment in infrastructure and depreciation there is some heterogeneity across items (see Chart 11). Indeed, the level of investment in water, airport and port infrastructure is lower than the depreciation of capital observed. In contrast, investment in road and rail infrastructure is higher than depreciation.

### Public-private partnership agreements

PPPs are vehicles commonly used for the provision of infrastructure and public services. There is no standard definition of PPPs in the international arena, but broadly speaking the idea is to establish a framework of association between public and private partners to develop public infrastructure and/or provide a public service. PPPs main features are: a)



SOURCES: See notes.

- a Includes general government and other non-general government agents.
- b Data outside the axis range.
- c Instituto Valenciano de Investigaciones Económicas (2015).
- d Intervención General de la Administración del Estado.

relatively long-lasting relationships are established between the two partners; b) financing of the project is partially guaranteed by the private sector; and c) risks are shared by the public and private partners, with the latter being transferred risks that are usually borne by the public sector in the absence of this vehicle. Many forms of PPPs have existed for decades in Spain, one of the countries where they have acquired a higher degree of sophistication [see United Nations (2008)]. The more common forms are the concession of public works or public service management agreements with a mixed-economy company.

There are significant benefits to these public- and private-sector cooperation models. First, they enable funds to be raised for investment in infrastructure and to promote efficiency in public services. Second, they may alleviate the immediate pressures on public finances by providing an additional source of capital, and create the possibility for PPP projects not to consolidate debt in terms of public deficit.<sup>7</sup> In turn, the public sector's participation in a project may offer important guarantees for private investors, especially the stability of long-term capital flows from public finances.<sup>8</sup>

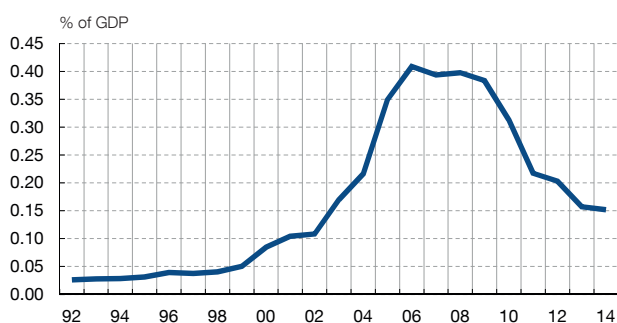
In this connection, the main means of financial support which general government can provide for public-private partnerships include: a) government investment in capital (mixed company); b) guarantees (minimum revenues or debt repayment to the financing sector; c) contractual payments for services (demand fee/per service/availability); d) subordinated debt or equity loans from the government; and e) capital subsidies/construction payments.

The International Monetary Fund (IMF) provides information on PPP investment in certain countries, including Spain, during the 1992-2014 period. In the case of Spain, there was a significant increase in PPPs from the early 1990s (0.03% of GDP) until the onset of the economic crisis, peaking at 0.4% in 2008 (see Chart 12). In comparison with general government investment, which accounted for 4.6% of GDP in 2008, PPP investment

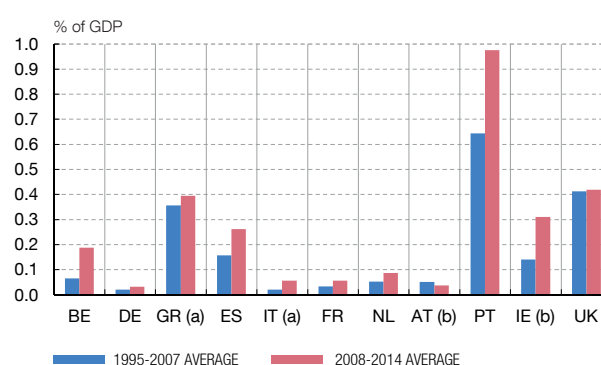
<sup>7</sup> The private or public nature of financing is determined by the European System of Accounts on the basis of the transfer of risks between public and private partners.

<sup>8</sup> The European Commission communication Mobilising private and public investment for recovery and long-term structural change: developing Public Private Partnerships, COM (2009) 615 final of 19 November 2009, describes the advantages of PPPs.

## 1 SPAIN



## 2 INTERNATIONAL COMPARISON



SOURCE: IMF.

NOTE: PPP data include both public and private funding, as well as that provided by international institutions such as the European Investment Bank (EIB) and the European Investment Fund. The data do not allow distinguishing between the various sources of funding. Accordingly, the aggregate value is shown.

- a Data unavailable for 1995.  
b Data available from 2002.

would be equivalent to approximately 10% of general government investment. Compared with other countries, Spain is one of the countries which has most used this investment vehicle. More recently, PPP investment volume in Spain has decreased gradually since 2009, although in 2014 it was still higher than in the 1990s, i.e. recent PPP investment decreased relatively less sharply than public investment as a whole.

17.10.2017

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