

Part IV

Government investment in the EU: the role of institutional factors

Pease cite this as follows:

European Commission (2017), Government investment in the EU: the role of institutional factors, Report on Public Finances in EMU 2017, 133-186.

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KEY FINDINGS

Short-term budgetary pressures during the crisis may have led to myopic policymaking, in which governments slashed public investment in order to achieve savings. This policy impacted all levels of national governance as half of public investment is carried out by sub-national authorities (regions and municipalities). In this context, this part of the report analyses the main drivers of public investment with a focus on institutional factors and the sub-national level.

Public investment is driven by economic, fiscal, political-economy and institutional factors.

- A survey of the economic literature on the determinants of government investments shows that three broad type of factors influence government investment:
 - (i) economic factors: countries with higher GDP or more developed countries have higher desire for public investments and tend to invest more, often in a pro-cyclical manner. The same holds for countries with younger populations, where a higher value is attributed to future output;
 - (ii) fiscal policy factors: high levels of public debt or deficit seems to weigh on public investment, as constraints from the markets on financing of governments make it more difficult to find resources;
 - (iii) political-economy factors: governments tend to invest more around election times.
- In addition, institutional factors, in particular an efficient and transparent management of public investment projects are key to ensuring value for money. Progress in this respect can be made in the EU according to several institutional studies and surveys.

Institutional quality matters for the provision of public investment.

- The report provides new empirical evidence confirming previous findings that public investment is hampered by higher levels of public debt. Our estimates show that a 1% increase in the debt-to-GDP ratio is followed by a decrease of the investment-to-GDP ratio of close to 0.1%.
- However, for a given level of public debt, this negative effect is smaller for Member States with a better quality of governance and/or stronger national fiscal rules. Depending on the institutional features of the country, a 1% increase in the debt-to-GDP ratio can be followed by a decrease in the investment-to-GDP ratio ranging from -0.2 % to no decrease in the short run and from -0.5% to -0.1% in the long run.

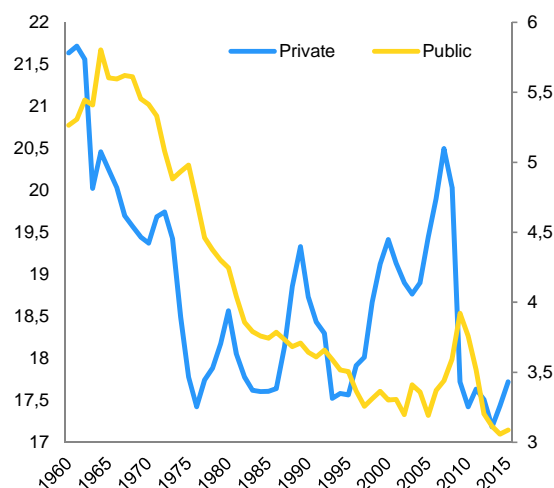
Practical issues for public investment are exemplified in five case studies on selected EU Member States.

- Confirming previous institutional studies and surveys on public investment management, these examples show that there is room to improve the management of public investment in all selected countries.
- The investment process can be decomposed in four main steps: (i) planning, when a strategy is defined and projects are selected; (ii) financing, when the resources to conduct the projects are found and allocated; (iii) implementation, when the actual work is carried out and monitored; and (iv) evaluation, when the outcome and process of the previous phases is critically assessed.
- Various challenges are identified throughout these steps and are in particular related to the coordination and financing across levels of government, the project implementation through more rigorous procurement procedure, and the administrative capacities needed to ensure proper quality control.

1. INTRODUCTION

Investment remains at the top of the economic policy agenda in the EU. ⁽¹⁵⁴⁾ This policy priority aims at tackling the record low investment in Europe since the crisis (Graph IV.1.1). To this end the investment plan for Europe, fostering both public and private investment, has been prolonged to 2020 with an increased financial capacity. In addition, EU Structural and Investment Funds play a prominent role in supporting public investment. ⁽¹⁵⁵⁾ However, while private investments started rebounding, public investments still remain well below pre-crisis levels.

Graph IV.1.1: Investment trend in the EU (per cent of GDP)



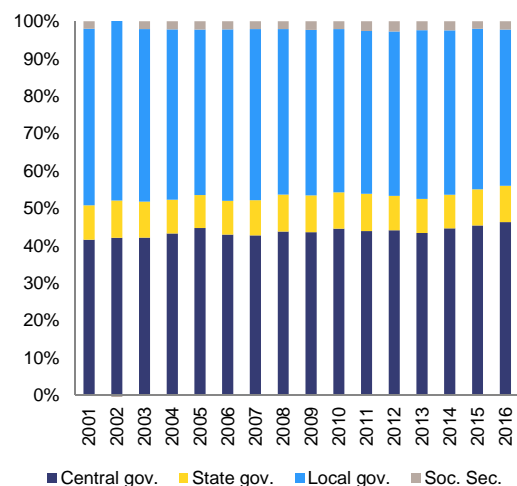
Source: International Monetary Fund, author's calculations.

Sub-national authorities are key to the provision of public investment. Since 2001, in the EU, sub-national government represents slightly more than half of total public investment (Graph IV.1.2).

Both central and sub-national authorities cut their investment during the crisis. Their investment decreased from 1.6% of GDP before

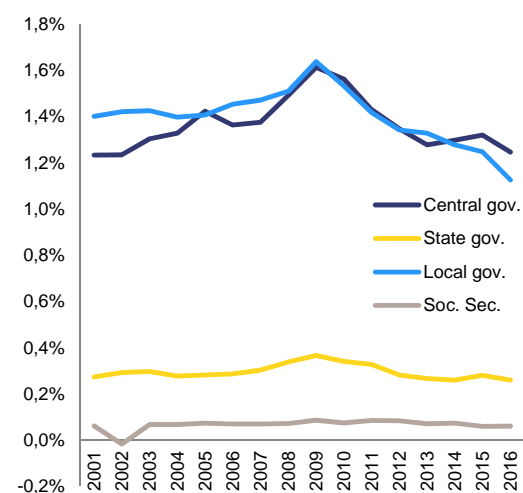
the crisis to 1.0-1.1% of GDP in 2016 (Graph IV.1.3).

Graph IV.1.2: Share of public investment by subsector in the EU



Note: State government is the federated state level where applicable, local government combines regional and municipal authorities. Source: Eurostat.

Graph IV.1.3: Public investment by subsector in the EU as a share of GDP



Note: State government is the federated state level where applicable, local government combines regional and municipal authorities. Source: Eurostat.

The decline in public investment, although made more salient by the crisis, is not a recent phenomenon (Graph IV.1.1). This topic was

⁽¹⁵⁴⁾ See for instance the recommendations for economic policy in the Euro Area https://ec.europa.eu/info/sites/info/files/2017-european-semester-recommendation-euro-area_en_0.pdf or the AGS 2017 <http://data.consilium.europa.eu/doc/document/ST-14357-2016-INIT/en/pdf>

⁽¹⁵⁵⁾ Box III.2.1 of the previous edition of this report. European Commission (2016a).

discussed in last year's edition of the Report on Public Finances in EMU.⁽¹⁵⁶⁾ An investigation of the determinant of public investment will help further understand the elements behind the decline in public investment.

The Commission has identified barriers affecting public investments. As part of the European Semester, particular emphasis has been placed on the identification of investment barriers in EU Member States and the priority reforms to remove them.⁽¹⁵⁷⁾ This identification is based on country-specific profiles on investment challenges at national level in 2015,⁽¹⁵⁸⁾ complemented by further information provided in the country reports published every year. While the highest number of barriers to investment in Member States is related to weaknesses in the business environment, therefore affecting first private investment,⁽¹⁵⁹⁾ in some countries, some barriers affect more directly public investment, such as a lack of administrative capacity or a lack of transparency in planning/coordination or *ex post* assessments, as well as in the implementation of public procurement and public private partnerships. There are also a number of bottlenecks linked to cumbersome and lengthy approval procedures in particular for large infrastructure projects in energy, transport, and broadband.

While there are many factors affecting public investment, improving the management of public investment appears relevant in the EU context. Advanced economies (a category which includes most EU countries) could benefit from improved financial planning to secure pluriennial budgets and a better coordination across levels of government. Emerging market (a category including some of new EU Member States – HU, HR, RO, PL, BG) would benefit from more rigorous and transparent procedures both before and during the implementation phase.⁽¹⁶⁰⁾

This is especially true at the regional level. Sub-national authorities report investment challenges

across the board.⁽¹⁶¹⁾ Some challenges appear more prominent, such as the different dimensions of coordination (across levels of government, neighbouring sub-national authorities, sectors...), administrative burden (compared to sub-national authorities' capacity), the lack of long term strategy, weaknesses in the *ex post* and *ex ante* assessment, but also co-financing requirements from the central government or the EU.⁽¹⁶²⁾

This part of the Report examines the general drivers of public investment and of its efficiency and then focuses on the role of sub-national authorities. It is organised as follows. Chapter IV.2. reviews the literature on the determinants of public investment and its efficiency with a special focus on sub-national investments. It not only surveys the academic literature, but also presents the complementary recommendations for a sound investment management and governance developed by international institutions, which are key to enhancing the efficiency of public investment. Chapter IV.3. provides a novel econometric analysis on the determinant of public investment, using a macro panel. It also takes into account the quality of investment governance and the fiscal rules. This analysis complements the review of the literature, but both remain of horizontal nature. Therefore, there is also a need to analyse country-specific features, in particular regarding relevant governance aspects. Chapter IV.4. presents five country case studies, illustrating the role of institutional factors and nuancing at times the horizontal recommendations. Four boxes provide specific highlights on the share of intangible assets in the definition of public investment, on the interaction between public and private investment, on the measure of governance quality and on the identification of public investment gaps in the EU.

⁽¹⁵⁶⁾ European Commission (2016a).

⁽¹⁵⁷⁾ See in particular the third pillar of the EFSI.

⁽¹⁵⁸⁾ European Commission (2015b).

⁽¹⁵⁹⁾ Examples are a high regulatory burden, the lack of a predictable regulatory framework, or the complexity of the tax system.

⁽¹⁶⁰⁾ IMF (2015).

⁽¹⁶¹⁾ See a joint survey of the OECD with the Committee of Regions OECD-CoR (2015), see also OECD (2013), Chapter 2 for a similar approach.

⁽¹⁶²⁾ See also the Irish case in Sub-section IV.4.2.4.

2. INSIGHTS FROM A SHORT REVIEW OF THE ACADEMIC AND POLICY LITERATURE

The literature has identified several sets of factors influencing public investment of the general government. ⁽¹⁶³⁾ Economic and financial factors affect public investment both within the cycle and in the long run. Beyond the general economic conditions, the conditions of fiscal policy are also a key determinant of public investment. A third set of factors is related to the political economy (election cycle...).

Two dimensions of public investment are worth a closer look: first, the crucial role of sub-national authorities, reflecting the distribution of responsibilities across levels of governments; second, the need to improve quality or efficiency of the investment process.

2.1. THE ECONOMIC DRIVERS OF PUBLIC INVESTMENT

The macroeconomic developments can have a sizeable impact on public investment. This finding holds both for cyclical developments in GDP and structural long-term developments. ⁽¹⁶⁴⁾ Evidence suggests that public investment is pro-cyclical, i.e. typically boosted in periods of high growth and depressed during episodes of recession. ⁽¹⁶⁵⁾

Government investment can be influenced by the level of capital stock or by past government investment. Public investment is characterised by diminishing returns to scale. This implies that a high initial level of capital stock or past cumulated investment is expected to negatively affect new investments. ⁽¹⁶⁶⁾ On the contrary, a positive

dependency of investment with its own past can simply reflect a time-to-build effect. ⁽¹⁶⁷⁾

The relation between private investment and government investment is complex. It is often heard that public investments diminished because they have been substituted for by private ones. ⁽¹⁶⁸⁾ In reality, private and government investments are also found to be complements rather than substitutes. ⁽¹⁶⁹⁾

Measurement difficulties are sometimes invoked to explain the downward trend in public investment. The first argument is related to the difficulty to define its boundaries, with the emergence of contracts such as Public Private Partnerships and of private investors substituting public investors. However, the data show that PPP remains marginal in public investment. Therefore, this is not the primary cause of public investment deterioration. ⁽¹⁷⁰⁾ Another argument is related to the development of intangible assets, some of which may not be properly accounted for. ⁽¹⁷¹⁾

Financial innovations may weigh on the investment trends. Since the eighties, the development of financial instruments for hedging risk may have allowed for the private sector to pursue riskier projects. This mechanism could have favoured the replacement of the government by the private sector in the realization of risky long-term projects. ⁽¹⁷²⁾

Globalisation may also affect government investments. Globalisation, as measured by the inflow of foreign direct investment (FDI) negatively affects public investment. ⁽¹⁷³⁾ This result can be explained by the fiscal competition to attract private investors which takes place through lower taxes rather than better infrastructures. On the contrary, trade is positively associated to public investment. This increase of investment

⁽¹⁶³⁾ See Annex IV.3 for a tabular presentation of the econometric studies since the nineties. Previous studies were country based and can be found in de Haan et al. (1996).

⁽¹⁶⁴⁾ This is either measured by real GDP growth, output gap, unemployment rate or inflation rate. Structural changes in the economy are instead captured by the real GDP per capita.

⁽¹⁶⁵⁾ Mehrotra and Vålilä (2006), Turrini (2004), Kappeler and Vålilä (2008). However, Heinemann (2006) finds that the pro-cyclicality of public investment is not very robust.

⁽¹⁶⁶⁾ Heineman (2006) for the effect of capital stock, while Keman (2010) considers past investment in the context of political majority changes.

⁽¹⁶⁷⁾ See for instance Kappeler and Vålilä (2008) or Chapter IV.3 highlight this progressive change effect.

⁽¹⁶⁸⁾ According to Sturm (2001) while crowding out seems to characterize contemporaneous private and public capital, a complementarity is found when considering lagged private investment.

⁽¹⁶⁹⁾ de Haan et al. (1996), see also Box IV.2.2.

⁽¹⁷⁰⁾ See also Heinemann (2006) and European Commission (2016a).

⁽¹⁷¹⁾ See Box IV.2.1.

⁽¹⁷²⁾ Turrini (2004).

⁽¹⁷³⁾ Heinemann (2006).

accompanying the openness of the economies is interpreted as a social insurance that governments put in place in economies which are more exposed to external shocks. ⁽¹⁷⁴⁾

Demography can play a role in public investment decisions. ⁽¹⁷⁵⁾ A growing population implies larger demand of investment although empirically this result is not really robust. Still, the composition of the population matters. The share of elderly voters is found negatively correlated with public investment rates. This can be explained by the fact that elderly people, discounting more future payoffs, tend to favour current expenditure to investment. Similarly, the fertility rate has a positive relationship with investment, as the return to public investment can be expected to be high for the new generations. ⁽¹⁷⁶⁾

2.2. THE FISCAL DRIVERS OF PUBLIC INVESTMENT

The recent crisis exemplified the sensitivity of public investment to fiscal conditions. The first reaction to the global slowdown was counter-cyclical. Governments supported activity through among other measures– a series of public investment programmes equivalent to 0.7% of GDP in 2009 in OECD countries. ⁽¹⁷⁷⁾ This fiscal stimulus rapidly switched to fiscal consolidation, which affected public investment. ⁽¹⁷⁸⁾ This is a well-known pattern of consolidations. 25 out of 32 lasting and significant budget consolidation episodes, which took place in the EU-15 between 1980 and 1997 were mostly obtained through investment cuts. ⁽¹⁷⁹⁾

Fiscal sustainability matters. Public debt is consistently found to hamper investment. ⁽¹⁸⁰⁾ Moreover, perceived risks to debt sustainability

restrict the ability of the government to finance new investment, and certainly matter in explaining the investment decline, especially for EU high-debt countries. ⁽¹⁸¹⁾ For countries with low debt, efforts to rein in budget deficits have negative impact on public investment. ⁽¹⁸²⁾ However, the borrowing cost does not appear to be determinant for public investment decisions. ⁽¹⁸³⁾ The impact of sustainability variables mentioned above is similar for EU and OECD countries. This suggests that there is no clear and general relationship between the existence of EU fiscal rules and investment developments. ⁽¹⁸⁴⁾ As discussed in Section IV.2.5, along with fiscal sustainability, the design of rules for budget approval also matters, in particular the possibility of having multi-annual budgets can lock in necessary funds for the medium term.

2.3. THE POLITICAL ECONOMY DRIVERS OF PUBLIC INVESTMENT

The role of political factors remains unclear. Some authors find a negative relation between leftist governments and public investment ratio ⁽¹⁸⁵⁾ while others do not find any role for the ideological orientation of the government on investment. ⁽¹⁸⁶⁾ If in the '70s leftist parties typically invoked a larger role for government and so more investment also in relation to social equality reasons, during the '80s and '90s this trend is counterbalanced by the ideological change towards less state intervention in the economy. This trend is more pronounced if leftist governments were in office, for longer periods, before the eighties. ⁽¹⁸⁷⁾

⁽¹⁷⁴⁾ Rodrik (1998).

⁽¹⁷⁵⁾ Jäger and Schmidt (2016).

⁽¹⁷⁶⁾ Heinemann (2006).

⁽¹⁷⁷⁾ See European Commission (2016) and OECD (2011) for details.

⁽¹⁷⁸⁾ Vammalle and Hulbert (2013) Fiscal consolidation plans targeted investment in Austria, Czech Republic, Greece, Ireland, Luxembourg, Portugal, Slovak Republic, Slovenia, Spain, Sweden, and the UK, see also the Spanish country case Sub-section IV.4.2.2.

⁽¹⁷⁹⁾ Balassone and Franco (2000). See also European Commission (2014b). On the contrary, Stančík and Váčilá (2012) find that fiscal tightening boosts the investment-consumption ratio.

⁽¹⁸⁰⁾ See also Chapter IV.3 of this report.

⁽¹⁸¹⁾ Galí and Perotti (2003); Bacchiocchi, et al. (2011); Mehrotra and Váčilá (2006).

⁽¹⁸²⁾ Bacchiocchi, et al. (2011).

⁽¹⁸³⁾ Mehrotra and Váčilá (2006); Heinemann (2006).

⁽¹⁸⁴⁾ Galí and Perotti (2003); Bacchiocchi et al. (2011) and Mehrotra and Váčilá (2006). Fiscal rules and more generally financial arrangements across levels of governments are of particular relevance in the relationship between sub-national and central governments, see Section IV.2.4. The interaction of national fiscal rules with debt levels is further investigated in Chapter IV.3.

⁽¹⁸⁵⁾ Rodrik (1998), Keman (2010), Van Dalen and Swank (1996).

⁽¹⁸⁶⁾ Heinemann (2006), see also Chapter IV.3.

⁽¹⁸⁷⁾ Keman (2010), see also Sub-section IV.4.2.5, regardless of the parties, political considerations seem to interfere with investment projects in Romania.

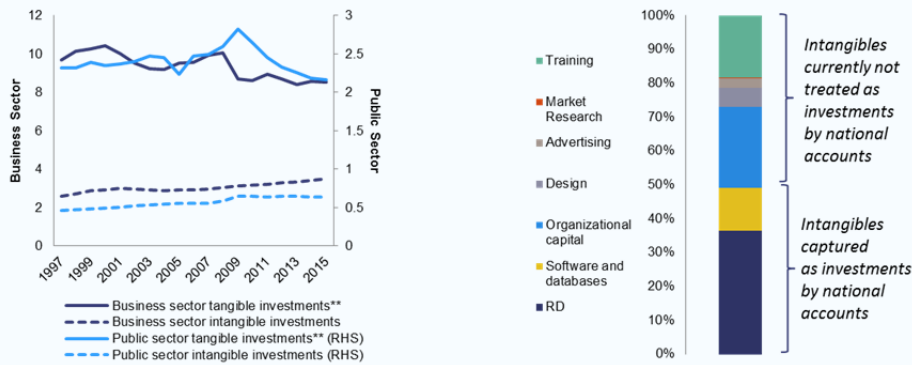
Box IV.2.1: Public sector investments in intangible assets – facts and figures

Investments come in different forms which can differ in dimension and dynamics. Official national accounts broadly distinguish between gross fixed capital formation in tangible assets and intellectual property products, i.e. intangible assets. Tangible investments essentially include machinery and equipment (including, in the case of government, weapons systems), dwellings and other buildings and structures (e.g. roads, bridges, airfields, pipelines) and cultivated biological resources. Intangible assets comprise spending on R&D, mineral exploration, computer software and databases, and entertainment and literary originals.¹

In many countries, investment data by asset category are not available for the general government sector (or the corporation sector). However, using more widely available investment data by industry and grouping public administration and defence, compulsory social security, education, human health and social work activities into a "public" and "business" sector does allow for some approximation of a sector specific distribution by asset type.

Graph IV.2.a depicts tangible and intangible GFCF in the public sector and compares them to the business sector. According to this, intangible investments make on average for a low but steadily growing share, both in relation to overall value added and total investment. Investments in tangible investments, on the other hand, have been declining in relative terms, although they still command the highest share in absolute terms.⁽²⁾

Graph IV.2.a: Investment trends per asset type in the EU* – Graph IV.2.b: Public sector investments in intangibles by asset type - share in % of total investment in intangibles according to SPINTAN data – EU average consisting of 22 Member States



Note: Public sector defined as NACE Rev. 2 activities O, P, Q; business sector covers activities A to N, except L, plus R and S. Source: Authors' calculations based on SPINTAN data (www.spintan.net).

* EU average is based on 23 EU countries (BG, CY, HR, LT, RO not available).

** Excluding investments in dwellings.

Source: Authors' calculations based on Eurostat national accounts.

The increased quantitative relevance of intangible investment and conceptual considerations on their impact on productivity, growth and living standards have led some researchers to call for an expansion beyond the current scope of intangibles in National Accounts. For example, research

(1) The inclusion of intangibles such as R&D, computer software and databases in asset classifications was part of the last revision of the system of national accounts.
(2) For a deeper and mainly business sector oriented analysis of intangible investments in the EU, see European Commission (2017b).

(Continued on the next page)

Box (continued)

conducted in the context of INTAN-Invest and SPINTAN⁽³⁾ propose to also consider the spending on organizational capital, training, designs and brands and, specifically to the public sector, open data and cultural and heritage assets formally as investments. Academic estimates from these projects suggest that the share of public sector intangible investments presently recorded in national accounts could, on average, roughly double in size if following such a definition (Graph IV.2.b).⁽⁴⁾

⁽³⁾ These are two EU-funded projects on measuring intangible assets in the business and public sector, see www.intan-invest.net and www.spintan.net.

⁽⁴⁾ Note, however, that extending the national accounts asset boundary for additional intangible assets and eventually producing official and internationally harmonised data of high quality would depend on solving a range of significant existing conceptual and measurement challenges, e.g. related to the correct definition and valuation of such assets, identifying appropriate price deflators and measuring their depreciation.

Political systems characterised by long mandates have higher investment ratios, especially in crisis periods. Cuts in investment⁽¹⁸⁸⁾ are enacted more often by myopic⁽¹⁸⁹⁾ governments than by governments with longer policy horizon. Myopic policymakers try to avoid voters' frustration, and refrain from cutting government consumption or, restore it in view of re-elections, to the detriment of investment. Still, the role of the electoral cycle is undetermined. Only few authors⁽¹⁹⁰⁾ find significant results confirming the idea of an upward drift affecting public investment, as well as other government expenditure categories, around election times. The role of government typology (coalition, majority government or minority government) is also uncertain. While theoretically politically weak governments are expected to be more subject to lobbying activities and so more inclined to cut capital formation spending than politically strong governments, only few empirical studies confirm the expectations.⁽¹⁹¹⁾

Corruption implies higher public investment spending. This finding is explained by the so-called rent-seeking behaviour, namely that corrupt governments increase investment spending in order to cash-in ransoms.⁽¹⁹²⁾ However, this leads to a higher volatility of investment.⁽¹⁹³⁾ Indeed, good governance would entail more careful planning and therefore a stable outflow of projects, and possibly a higher quality of public capital. This corruption effect also implies that fighting corruption may be associated with a decline in investment. The negative effect of corruption on capital quality is substantiated by theoretical models, showing that corruption could account for a sizeable share of the differences across countries in terms of economic development.⁽¹⁹⁴⁾

⁽¹⁸⁸⁾ de Haan, et al. (1996). Vuchelen and Caekelbergh (2010) on EU countries find similar results by adding to their regressions expenditure gaps, which are equal to the difference between the nearest peak and the latest primary government consumption in GDP (%).

⁽¹⁸⁹⁾ Myopia can be considered as the result of a finite planning horizon of the government (Rieth (2011)), or simply a short-term bias of policymakers who do not fully internalise future costs (Persson and Svensson (1989); Alesina and Tabellini (1990)).

⁽¹⁹⁰⁾ Although supported by Van Dalen and Swank (1996) the political cycle theory is not confirmed by de Haan, et al. (1996) and Sturm (2001) studies. Our analysis in Chapter IV.3 however supports the idea of increased public investment in election years.

⁽¹⁹¹⁾ This hypothesis while is supported in Henrekson (1988) findings, it is not confirmed in de Haan, et al. (1996).

⁽¹⁹²⁾ Grigoli and Mills (2014) Keefer and Knack (2007); Tanzi and Davoodi (1997).

⁽¹⁹³⁾ Grigoli and Mills (2014); IMF (2015).

⁽¹⁹⁴⁾ Chakraborty and Dabla-Norris (2011).

Box IV.2.2: Public and private investment: crowding in or crowding out

In designing economic stimulus (or fiscal consolidation) packages, an important question concerns the effect of public investment on private investment. From a theoretical perspective, a rise in public investment can have ambiguous effects on private investment. On the one hand, boosting public investment may be counterproductive, as it may deepen deficits and potentially hamper private investment (crowding-out effect). On the other hand, public investment can, through its impact on productivity/ private returns, lift private investment (crowding-in effect) and boost growth potential. Short-term and long-term effects may differ as the productive nature of public capital will take time to materialize: ⁽¹⁾

- In the short run, both crowding-in and crowding-out effects on private investment may occur: on the one hand, a short-term, temporary crowding-in effect on private investment can occur through a boost in demand. On the other hand, the increase of public investment needs to be financed, which may imply more taxes – thereby decreasing the capacity of private actors to invest – or cause interest rates to rise due to a higher demand for funds from the government in the capital markets – thereby increasing the cost of borrowing for the private sector. The rise in taxes or in interest rates can both lead to a crowding-out effect on private investment, already in the short run and possibly over an extended period.
- Over the longer run, a crowding-in effect on private investment may also come from increased productivity or profitability of private investment: for instance by providing infrastructures increasing the productivity of private investment, or by bearing additional risks on long term projects that may generate activity.

Empirical studies show heterogeneous results due to a number of elements, including different countries and/or periods considered, as well as methodological aspects (models specifications, treatment of endogeneities issues and of lagged effects). ⁽²⁾ For instance, public investment may have led to expansionary effects on output and crowding-in in a majority of EU countries, but to contractionary effect on output and crowding-out effect on private investment in five EU countries. ⁽³⁾

There are in particular a number of (country-specific) factors that could increase the likelihood of a net crowding-in effect: a sound business climate, overall macroeconomic conditions, confidence, well performing banking and financial markets, low initial stock of capital, high investment needs, the type and efficiency of the public investment implemented and the sectors concerned. ⁽⁴⁾

⁽¹⁾ Aschauer (1989).

⁽²⁾ Bom and Ligthart (2014); Núñez-Serrano and Velázquez (2017).

⁽³⁾ See in particular Afonso and St Aubyn (2016); Afonso and St. Aubyn (2009). While the literature first focused on a production function approach, more recent papers have used a Vector Auto Regression (VAR) or an Error Correction Model (ECM) approach to take into account dynamic interactions among economic variables and lagged effects Voss (2002). Even by considering such approaches, results are heterogeneous across specifications and often not significant.

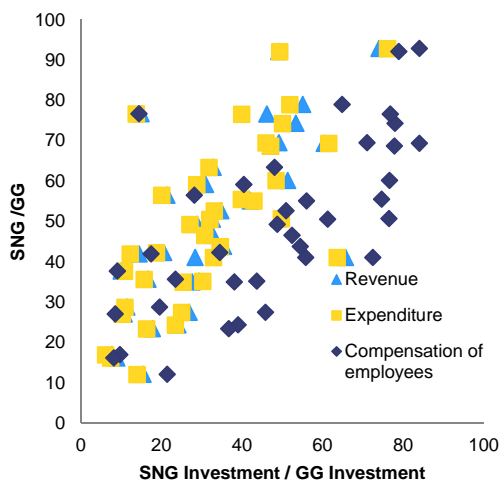
⁽⁴⁾ In Portugal, Andraz and Pereira (2007) show that the effects of public investment in transportation infrastructure tended to crowd-in private investment in most industries.

2.4. THE CRUCIAL ROLE OF SUB-NATIONAL AUTHORITIES IN PUBLIC INVESTMENT

National fiscal arrangements and the level of fiscal decentralisation

The role of sub-national authorities reflects the division of responsibilities between levels of government. There is a clear positive relationship between the relative sizes of sub-national authorities in terms of revenue, expenditure or payroll and their prominence in public investment (Graph IV.2.1). In addition, with the exception of Denmark and Estonia, the share of sub-national authorities in public investment is larger than their expenditure share (Graph IV.2.2) – a stylised fact which also holds in OECD countries.

Graph IV.2.1: Share of sub-national governments in several budgetary items compared to its share in investment



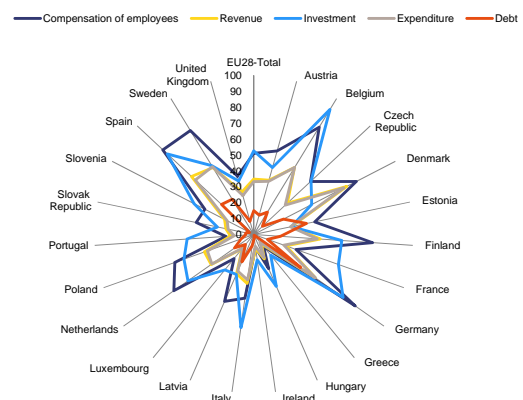
Source: Organisation for Economic Co-operation and Development sub-national government finance dataset, year 2015.

The degree of investment centralisation differs across EU Member States.⁽¹⁹⁵⁾ Investment in some Member States is largely centralised, such as Malta, Cyprus or Greece, but also to some extent Estonia or Croatia. The small size of these countries may explain this situation. Investment is on the contrary largely decentralised in Belgium or Germany, two federal states, or France.

⁽¹⁹⁵⁾ See Annex IV.1 for more details.

Substantial changes in the investment responsibilities of sub-national authorities occurred in some member states over the last 20 years.⁽¹⁹⁶⁾ Trends towards more decentralisation have taken place in Nordic countries (Denmark, Finland, Sweden) and some new member states (Romania, Bulgaria, Slovenia, Slovakia). On the contrary, in Ireland, a drastic centralisation of investment took place over the last decade, and sub-national authorities' share in public investment declined from 75% to 15% in a decade. In Germany and Austria, local authorities have seen their share in public investment decline to the benefit of both the Länder and the federal state in Germany and to the benefit of the federal state alone in Austria.

Graph IV.2.2: Share of sub-national government



Source: Organisation for Economic Co-operation and Development sub-national government finance dataset, year 2015.

To finance such spending responsibilities, sizeable transfers from the central government are implemented. On average in the EU,⁽¹⁹⁷⁾ transfers from the central government represent 36% of the sub-national authorities' revenue, but only a fraction of these (3% of revenues) are directly linked to investment (capital transfers). In a group of Member States fiscal decentralisation in terms of the share of autonomously raised income is very reduced. Sub-national authorities are almost fully dependant on the funds received from the central government in Estonia and Lithuania

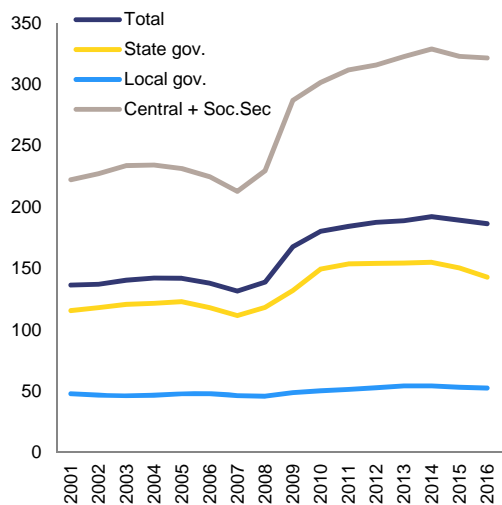
⁽¹⁹⁶⁾ See Annex IV.2 for more details.

⁽¹⁹⁷⁾ Bulgaria, Hungary and Poland are excluded due to non-availability of data.

(>80%), and in Greece, the UK, the Netherlands, Malta and Romania (around 70%).⁽¹⁹⁸⁾

The degree of fiscal decentralisation on the revenue side of sub-national authorities influences their investment behaviour. In the EU, where regions benefit from more fiscal independence (i.e. are able to control their revenues and/or be funded by locally levied taxes), they tend to invest more in productive capital.⁽¹⁹⁹⁾ However, fiscal decentralisation is mitigated by the distribution of earmarked capital grants which tend to limit regional initiative. This result is confirmed by an evaluation on Polish municipalities showing that investment depends positively on both their own resources and received grants, but is hampered by their indebtedness.⁽²⁰⁰⁾

Graph IV.2.3: Debt as a percentage of revenues by levels of governance

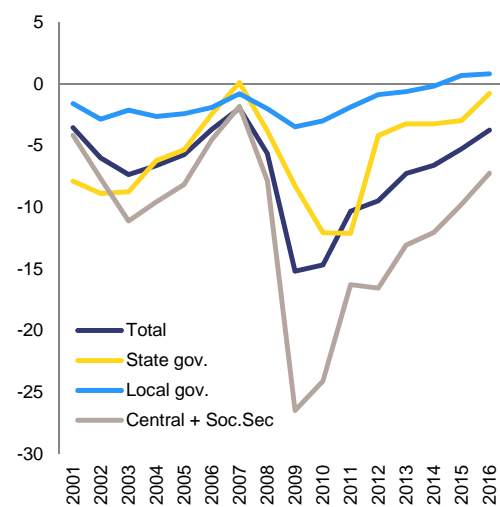


Source: Eurostat.

The sub-national authorities are generally constrained by national rules, making them less prone to indebtedness and deficits.⁽²⁰¹⁾ This is particularly the case for the local level which

operates with a deficit close to balance and little indebtedness (Graphs IV.2.3 and IV.2.4). The constraints imposed on the sub-national authorities by their national authorities are diverse: sub-national authorities can be forced to operate under a balanced budget, subject to stricter fiscal rules than the central level, or constrained in their ability to emit debt.

Graph IV.2.4: Deficit as a percentage of revenues by levels of governance



Source: Eurostat.

Recent developments

The crisis has challenged the financial arrangements between the central and sub-national levels in the Member States. At first, Spain, Austria or Italy have for instance given some slack to the sub-national authorities in the observance of their fiscal rules, or modified the distribution of tax revenue in their favour (Finland, Portugal). Other countries (France, Germany, Spain) and the EU have simplified or frontloaded their transfers to the sub-national governments. But the situation was later reversed in relation to the necessity to consolidate public finances. In some cases deficit targets or expenditure limits were introduced (Belgium, Spain, Denmark) or existing fiscal rules were tightened (Italy, Spain, Germany, Austria).⁽²⁰²⁾ The ECFIN fiscal rule

⁽¹⁹⁸⁾ See also the French country case in Sub-section IV.4.2.3.

⁽¹⁹⁹⁾ Kappeler et al. (2013) study this question on a panel of 20 EU countries, and confirm previous findings Kappeler and Väililä (2008), Sekuła and Basińska (2016) provide similar conclusions in the case of Polish cities.

⁽²⁰⁰⁾ Banaszewska (2017), see also the German country case in Sub-section IV.4.2.1.

⁽²⁰¹⁾ Vammalle and Hulbert (2013); Blöchliger, et al. (2010).

⁽²⁰²⁾ Blöchliger, et al. (2010) first document the expansion policies, three years later, Vammalle and Hulbert (2013)

database also shows new or stricter rules have been enforced on the local or regional level in the recent years in a number of countries. ⁽²⁰³⁾

The crisis could leave a long-lasting footprint on public investment. There were many permanent reforms introduced modifying the fiscal autonomy of the sub-national authorities, their budget constraint and their prerogatives. As a result the crisis may have triggered a structural change in the decisional process on general government investment.

To conclude an increased decentralisation of government investment functions entails trade-offs. On the one hand, local authorities can better identify and respond to the needs of investments than the central level (in the case of Spain this has been shown concerning roads and education expenditures). ⁽²⁰⁴⁾ On the other hand, in many cases central governments seem better placed to resist biases to local companies, avoid duplications, capture network externalities and increase cost-efficiency. For example, in Italy public works procured by the sub-national levels results in longer delays than at the central one even after taking into account administrative capacity.

2.5. GOVERNMENT INVESTMENT EFFICIENCY

Public investment spending does not necessarily translate one-to-one into public capital. ⁽²⁰⁵⁾ The investment process is long and complex and the relationship between public investment spending and the effective public capital stock is not straightforward. Efficiency of public investment management is a multifaceted concept which impacts all stages of public investment projects, for this reason it is also difficult to measure (Box IV.2.3). The academic literature already provides some analysis of the effect of

comment fiscal consolidation measures and the many reforms engaged.

⁽²⁰³⁾ This is the case for BE, BG, ES, FR, IT, LT, NL, PT, see https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/fiscal-governance-eu-member-states/numerical-fiscal-rules-eu-member-countries_en

⁽²⁰⁴⁾ Esteller and Solé (2005) on Spain. Guccio et al. (2014) on Italy.

⁽²⁰⁵⁾ Pritchett (2000) highlights this nuance between the cost and the value of public capital.

inefficiencies on public investment. International institutions have provided a comprehensive framework to analyse the issue of inefficiency in the production process of government investment. Using such framework, some specific recommendations to tackle factors that hamper efficiency in the investment process are laid out in the literature.

Inefficiencies emerging from the literature

Inefficiencies can substantially reduce the value for money of investment projects. Cost overruns are a wide spread issue in public investment projects, affecting 9 transport infrastructures out of 10 for sizeable amounts (20%). ⁽²⁰⁶⁾ The overruns can be explained in particular by the selection procedures which bias the *ex ante* cost-benefit analysis and disregard risks. ⁽²⁰⁷⁾ Improving the cost-benefit analysis and performing *ex post* analysis can mitigate this problem. ⁽²⁰⁸⁾ A final relevant cause of inefficiencies could be long delays in implementing the investment projects. ⁽²⁰⁹⁾

"A minimal level of institutional quality [...] is necessary for recipient regions to absorb transfers effectively". ⁽²¹⁰⁾ The ability of regions to turn EU funds into higher investment and growth seems to depend on the quality of their governance among other determinants such as the level of education of its population.

⁽²⁰⁶⁾ Flyvbjerg et al. (2003) identifies sizeable and persistent cost overruns on infrastructure projects throughout the world, Pyddoke (2011) does so for Sweden but also summarizes 21 contributions on the topic.

⁽²⁰⁷⁾ Flyvberg (2009); Flyvbjerg (2014), see also the example of the Spanish high speed train in Sub-section IV.4.2.2.

⁽²⁰⁸⁾ In the case of Australia, Tan and Makwasha (2010) consider the issue of risk analysis. Quinet (2011) compares the outcome of different indicators. Pyddoke (2011); Flyvbjerg (2014) advocate the *outside view*, a benchmarking approach to correct *ex ante* estimation biases.

⁽²⁰⁹⁾ European Commission (2016a).

⁽²¹⁰⁾ The citation is from Becker et al. (2013); Rodriguez-Pose and Garcilazo (2013) find that governance quality is key to make the most of the largest transfers of cohesion expenditure in the EU; Ederveen, de Groot and Nahuis (2006) reach a similar conclusion; Crescenzi, Di Cataldo and Rodriguez-Pose (2016) show that if infrastructure are beneficial to regional development its thanks to secondary roads as opposed to highway projects. On the contrary, Pellegrini et al. (2013) find that the growth effects of EU funds are modest and Dall'Erba and Le Gallo (2008) that these funds are not sufficient to counterbalance the strong effects of agglomeration economies.

The design of the procurement procedure is particularly prone to (in)efficiencies. In the case of Italy, it has been shown that sub-national authorities, through modifications of the procurement procedures can either induce a reduction of contracted costs or a decline in competition.⁽²¹¹⁾ This likely also holds for the existence and effectiveness of mechanisms to solve the disputes between governments and private actors in case they arise in the course of the investment.

Corruption affects regions to different extents. On the case of infrastructure work in Italy, it has been shown that corruption at the sub-national level has a negative impact on efficiency as measured by delays and cost overruns.⁽²¹²⁾

An efficient management of government investments at the regional level can be hampered by the capacity of the sub-national authorities. A comparison of the performance of two Italian regions (Sicily and Basilicata) in the utilisation of European structural funds, reveals the importance of administrative capacity in explaining regional disparities.⁽²¹³⁾ Based on audits of projects financed from the Cohesion Fund, the Commission also identified administrative capacity as a key bottleneck to the full exploitation of structural funds.⁽²¹⁴⁾

A framework to systematically identify inefficiencies

Proposals have been put forward to put together these different aspects of public investment efficiency in assessment frameworks.⁽²¹⁵⁾ Such comprehensive approaches build on more specific reflexions in particular on the management of public

finances,⁽²¹⁶⁾ on Public Private Partnerships,⁽²¹⁷⁾ on cost-benefit analysis⁽²¹⁸⁾ and on the capacities of sub-national government levels and the necessity of coordination.⁽²¹⁹⁾

These proposals cover all phases of public investments from the definition of a strategy to *ex post* assessment. The Public Investment Management Assessment (PIMA) framework (IMF), the principles on effective public investment across levels of government (OECD), the unified framework for public investment management (World Bank) all put forward similar capacities or institutions as ensuring efficient public investment. These are typically based on four phases, though the details may change across the proposals (Table IV.2.1).

- **In the planning phase**, insistence is put on strategic planning, on coordination across stakeholders, sectors and government levels and on projects' appraisal and selection.⁽²²⁰⁾
- **In terms of financing**, securing pluriennial financing is highlighted as an important factor in the more general context of the fiscal framework.⁽²²¹⁾ The use of innovative sources of financing engaging with the private sector (e.g. PPP) is often praised.
- **For the implementation phase**, modern practices in terms of public management (public procurement, transparency, project management) and the capacity among the civil services to achieve such high standards are emphasised.
- **In the evaluation phase**, the issue of formal compliance is raised while an effective and

⁽²¹¹⁾ Regional modifications of the national procurement rules proved beneficial to the public authorities in the Turin province but favoured local companies in Valle d'Aosta and Friuli; Decarolis and Giorgiantonio (2015), see also the Spanish country case in Sub-section IV.4.2.2.

⁽²¹²⁾ Finocchiaro Castro et al. (2014).

⁽²¹³⁾ Milio (2007).

⁽²¹⁴⁾ European Commission (2011), see also the German country case in Sub-section IV.4.2.1.

⁽²¹⁵⁾ See <https://www.imf.org/external/np/fad/publicinvestment/>, and in particular IMF (2015); Fainboim et al. (2013) for the IMF; <http://www.oecd.org/effective-public-investment-toolkit/> and in particular OECD (2014) for the OECD; Rajaram et al. (2010); World Bank (2014) for the World Bank.

⁽²¹⁶⁾ Spackman (2001) Cangiano et al. (2013).

⁽²¹⁷⁾ The European Commission has produced a guide and a green paper on PPP European Commission (2003); European Commission (2004), the EIB also very active on this topic; EIB EPEC (2016); EPEC (2015a).

⁽²¹⁸⁾ The European Commission dedicated a full guide to this topic European Commission (2008), the EIB; EPEC (2015b) as well as the World Bank; IEG World Bank, IFC, MIGA (2010).

⁽²¹⁹⁾ Allain-Dupré and Mizell (2013); OECD (2013); Charbit and Michalun (2009).

⁽²²⁰⁾ See the Irish country case in Sub-section IV.4.2.4 for a plan to reverse the public investment drop.

⁽²²¹⁾ In the case of Ireland, a sudden stop in public investment to ensure fiscal consolidation is highlighted as hampering investment quality, see Sub-section IV.4.2.4.

sound evaluation can be useful to decision making. ⁽²²²⁾

- **Throughout the different phases**, the capacity of the public administration, ⁽²²³⁾ the quality of governance and regulations, and the coordination across stakeholders, sectors and government levels are identified as a key support of public investment.

Some recommendations on improving efficiency from the literature

Through their research, academic authors provide specific advice on how to improve public investment along the same dimensions.

Ensuring sound financing is an issue highlighted by several authors. Perée and Vålilä (2007) highlight the importance of securing **fiscal space** to allow new EU Member States the possibility finance the accumulation of public capital. For the same group of countries, Laursen and Myers (2009) emphasize the necessity to ensure **plurennial budgeting**. From their work on Polish municipalities, Sekuła and Basińska (2016) conclude that "local government entities should be granted the type of **own revenues** that they are allowed to structure to the greatest extent, since this is the type of revenues that most fully translates into investment activity, thus ensuring the strongest stimulus for development". If such sources of revenues have been granted to communes in Poland, they have not been to counties and regions.

Many papers advocate "policies that limit misconduct". ⁽²²⁴⁾ Flyvbjerg (2014) also insists on making forecasters (in charge of *ex ante* estimation or their validation) **accountable**, possibly in a court of law, to counter voluntarily deceitful behaviour which he documents. For Crescenzi, et al. (2016) "**institution-building** needs to be put at the top of the development agenda". They advocate in particular "**stricter rules** for project evaluation" both *ex post* and *ex ante*. For Finocchiaro Castro, et al. (2014), "the efficiency of the execution of public works could be improved

by increasing the **accountability** of contracting authorities; among the others, enhancing **transparency** and supporting the development of **social capital** might be found as useful tools".

More generally, to promote public investment productivity, Perée and Vålilä (2005) suggest building up a substantial project assessment capability by the public sector. While based on the Italian experience of public procurement, Decarolis and Giorgiantonio (2015) form broader policy recommendations concerning the urgency for ": (i) greater **coordination of reforms** between the central and the local levels; (ii) an enhanced role for the **sector authorities**; (iii) **improvements in national regulations** so that the regional and local authorities have less of an interest in modifying them; (iv) greater **transparency** and better **information** quality".

As for the growing practice of financing public purpose investment projects through public-private partnerships (PPPs), Turrini (2004) and Perée and Vålilä (2005) observe how more transparency concerning the conditions underlying PPP and the accounting criteria, used to record PPP projects, would be desirable in order to ensure a proper evaluation of these practices on long term public finances.

Authors also identify ways to improve governance and management capacities and tools. Laursen and Myers (2009) build some recommendations based on case studies of 7 EU Member States. ⁽²²⁵⁾ Using the UK, Ireland and to some extend Spain as benchmarks to identify best practices, they recommend for new MS to strengthen their **strategic planning**, to resort to **cost-benefit analysis** and **ex post evaluations**, and strengthen the **project management skills** in the civil service. ⁽²²⁶⁾ To ensure greater value for money in public investment, Flyvberg (2009) also advocates better management **tools** and better **governance**. Grigoli and Mills (2014) advocate strengthening institutional **capacities**. Perée and Vålilä (2007) mention similar directions for improvement: "safeguarding the quality of such investment is arguably even more important. This involves the complexities of **project appraisal, selection, and management** within the public sector."

⁽²²²⁾ Insufficient *ex ante* evaluation is highlighted in the case of Spain in Sub-section IV.4.2.2, *ex post* evaluation in the case of France in Sub-section IV.4.2.3. In the case of Ireland new regulation aims at strengthening this phase, see Sub-section IV.4.2.4.

⁽²²³⁾ See also the French country case in Sub-section IV.4.2.3.

⁽²²⁴⁾ Quote from Grigoli and Mills (2014).

⁽²²⁵⁾ Four new member states Poland, Latvia, Slovakia, Slovenia, and three old ones Ireland, Spain and the UK.

⁽²²⁶⁾ See also the Romanian case in Sub-section IV.4.2.5.

Table IV.2.1: Sub-national capacities for effective management of public investment

| Stage of the investment cycle | Capacity |
|-----------------------------------|---|
| 1. Planning and project selection | <ol style="list-style-type: none"> 1. To engage in strategic planning that is tailored, results-oriented, realistic, forward-looking and coherent with national objectives* 2. To co-ordinate across sectors to achieve an integrated place-based approach 3. To co-ordinate with other jurisdictions to ensure complementarities and achieve economies of scale across boundaries 4. To involve stakeholders in planning to enhance the quality and support for investment choices – while preventing risks of capture by specific interest groups 5. To conduct rigorous <i>ex ante</i> appraisal* |
| 2. Financing and budgeting | <ol style="list-style-type: none"> 6. To link strategic plans to multi-annual budgets 7. To tap traditional and innovative sources of financing for public investment* 8. To mobilise private sector financing, without compromising the long-term financial sustainability of public investment projects |
| 3. Implementation | <ol style="list-style-type: none"> 9. To engage in transparent, competitive public procurement processes with corresponding internal control systems* |
| 4. Evaluation | <ol style="list-style-type: none"> 10. To design and use monitoring indicator systems with realistic, performance promoting targets* 11. To conduct regular and rigorous <i>ex post</i> evaluation 12. To use monitoring and evaluation information to enhance decision making |
| 1-4. Throughout | <ol style="list-style-type: none"> 13. To monitor and manage risks to integrity and accountability throughout the investment cycle 14. To engage in "better regulation" at sub-national levels, with coherence across levels of government 15. To ensure the quality and availability of technical and managerial expertise necessary for planning and executing public investment* |

* Critical capacity across all types of regions.

Source: Table adapted from EOCED (2013).

Initially based on, in particular Allain-Dupré and Mizell (2013), Rajaram et al. (2010), Dabla-Norris et al. (2012) and Milio (2007).

At the national level, the centralisation of investment is debated and calls for different responses. From their research on public works in Italy Guccio et al.(2014) find that the sub-national levels are less efficient than the central one (even after taking into account capacity), therefore, they suggest "moving to **centralised** forms of management of public works that are able to exploit the economies of scale and employ adequate bureaucratic and managerial competences". Crescenzi et al. (2016) on the contrary suggest providing "**technical guidance** to local governments lacking the administrative capacity".

Taking the lesson from these suggestions the European Commission since many years has put forward ways to improve the efficiency of the EU funds. While most researchers find a positive impact of EU funds on growth, this requires certain conditions to be met in particular in terms of quality of governance (c.f. supra). Solutions promoted by the Commission include

improving and **supporting the capacities** in the Member States and their regions,⁽²²⁷⁾ and **simplifying the rules** and requirements,⁽²²⁸⁾ a step in the right direction according to Crescenzi et al. (2016) or Rodriguez-Pose and Garcilazo (2013). The former would nevertheless go even further to "[push] through effective **evaluation frameworks** [...]. One way to do so would be to truly **condition the disbursement of EU funds** for infrastructure investment to the application of technical regulations for project evaluations". In this direction, in the programming period 2014-20, *ex ante* conditionalities have been introduced by which a number of framework conditions must be fulfilled before any payment is made.⁽²²⁹⁾ Strengthened linkages between the EU funds and the European fiscal and macroeconomic surveillance procedures have been set up as well.

⁽²²⁷⁾ The Commission provides technical assistance to the Member States in direct management. The ESI funds also target this issue, in particular under the thematic objective 11 "Improving the efficiency of public administration".

⁽²²⁸⁾ European Commission (2011).

⁽²²⁹⁾ See also the Romanian country case in Sub-section IV.4.2.5.

Box IV.2.3: The difficulty of measuring quality of public management

The efficiency of public management is a multifaceted concept, therefore its measure is quite complex.

Dabla-Norris and co-authors propose a public investment management index (PIMI) for 71 developing countries (cross-section).⁽¹⁾ This index, relying on experts or stakeholders judgement, focuses on four stages of the investment process: appraisal, selection, implementation, and evaluation. A correlation analysis of the PIMI with various indexes of governance quality shows that efficiency in the management of public investment is positively related to less specific measure governance quality such as the World Bank governance index used in Chapter IV.3. Indexes similar to the PIMI are widely used in the literature;⁽²⁾ they offer a solution to quantify an uncountable concept but are tainted with limitations due to the subjectivity of the respondents.

An alternative measure is the public investment efficiency index (PIE-X).⁽³⁾ PIE-X measures as efficiency the accessibility of public infrastructure and services compared to the optimal accessibility which could be obtained with a similar investment. It identifies inefficiency gaps as high as 13% for advanced economies and 27% for emerging markets. However, this index, built on cross country comparisons, does not control for factors, other than efficiency, which could influence the relationship between capital stock and accessibility. It has been shown in the context of Portuguese municipalities for instance that exogenous factors like geography, population age, tourism or education can influence such measures of efficiency without being under the control of the administration.⁽⁴⁾

Against this measurement difficulty and acknowledging that governance indicators rank similarly countries for different activities, innovative measures have been proposed, for instance the time for a letter to be returned if it has been mailed to a wrong address avoids the above caveats and can be used to measure government efficiency.⁽⁵⁾

The literature shows that the efficiency of investment management varies from region to region. This is confirmed by measures of governance quality at the regional level (Graph IV.2.c).⁽⁶⁾

⁽¹⁾ Dabla-Norris et al. (2012).

⁽²⁾ See for instance Keefer and Knack (2007); Grigoli and Mills (2014); IMF (2015); Crescenzi et al. (2016).

⁽³⁾ IMF (2015).

⁽⁴⁾ daCruz and Marques (2014) consider efficiency not specifically in the context of public investment but also review the literature on local government's efficiency on top of analysing the Portuguese case.

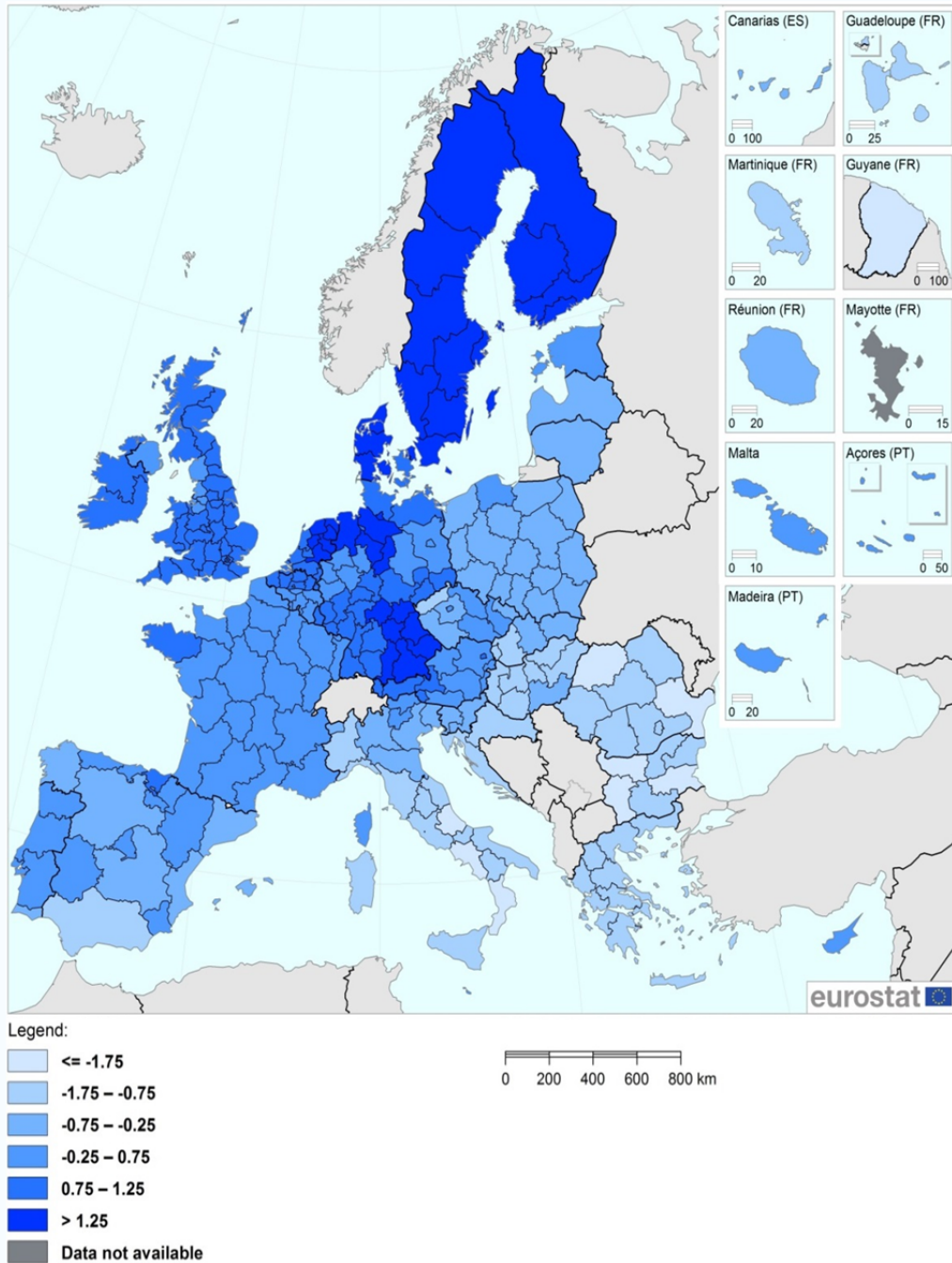
⁽⁵⁾ Chong et al. (2014).

⁽⁶⁾ See Charron et al. (2012); Charron et al. (2014) for an evaluation at the regional level and Rodriguez-Pose and Garcilazo (2013) for combining the regional and time dimensions.

(Continued on the next page)

Box (continued)

Graph IV.2.c: **Quality of Government Index 2017**



Source: European Commission (2017c).

3. AN EMPIRICAL INVESTIGATION OF THE DRIVERS OF PUBLIC INVESTMENT WITH A FOCUS ON THE ROLE OF INSTITUTIONAL FACTORS

This section presents the findings of a new empirical analysis on the determinants of public investment with a specific focus on the impact of institutional factors, namely governance quality and fiscal rules.

3.1. ESTIMATION STRATEGY

The determinants of public investment are investigated with a panel data approach. The analysis concentrates on up to 28 EU countries (i) and 21 years (t), using annual data from 1995 to 2016. The analysis is conducted in two steps.

As a first step, the key drivers of public investment are determined in a baseline specification, which can be expressed as follows: ⁽²³⁰⁾

$$\ln \text{public inv}_{i,t} = \beta_1 \ln \text{public inv}_{i,t-1} + \beta_2 \ln X_{i,t-1} + \vartheta_t + \theta_i + \varepsilon_{it}$$

where public investment is measured as the gross fixed capital formation of the public sector in per cent of GDP. The specification includes the lagged public investment on the right hand side of the estimated equation to take into account the persistence of public investment. X is a vector of key control variables derived from the literature (see below). Since the impact of these control variables tends to occur only gradually, they are included with a lag of one year. Furthermore, the specification includes year- (ϑ) and country-fixed effects (θ), while ε represents an error term. All variables are logged to simplify the interpretation of the coefficients. ⁽²³¹⁾ The source of the variables and the summary statistics as well as the correlation matrix can be found in Annex IV.4.

The selection of explanatory variables follows the literature reviewed in Chapter IV.2. These

variables control for the following transmission channels (the expected sign of the relationship with public investment is shown in brackets):

- *Persistence* (+) ⁽²³²⁾: lagged public investment
- *Macroeconomic conditions* ⁽²³³⁾: output gap (-), real GDP per capita (+)
- *Budget constraint* ⁽²³⁴⁾: headline/primary balance (-), total expenditure/revenues of the general government
- *Public debt* (-): gross debt of the general government
- *Financial conditions* (-) ⁽²³⁵⁾: real long-term interest rate
- *Demographic factors* (\sim) ⁽²³⁶⁾: share of persons above 65 years in the total population
- *EA membership* (+) ⁽²³⁷⁾: dummy = 1 since the year the country joined the euro area
- *Great Recession* (-): dummy = 1 for the years 2009 to 2012
- *Political economy channel*: partisanship (left governments +), election year (+)

As a second step, the baseline specification is augmented to analyse the impact of institutional factors on the provision of public investment. Chapter IV.2. concludes that institutional factors, in particular governance quality, matter for public investment. To measure their *direct* impact on public investment is challenging in a panel specification for technical reasons. ⁽²³⁸⁾ Therefore,

⁽²³²⁾ Heinemann (2006).

⁽²³³⁾ Mehrotra and Väilä (2006). We additionally test TFP growth as a determinant for similar results. It however raises some multi-collinearity issues.

⁽²³⁴⁾ Turrini (2004).

⁽²³⁵⁾ Mehrotra and Väilä (2006).

⁽²³⁶⁾ Jäger and Schmidt (2016).

⁽²³⁷⁾ Heinemann (2006).

⁽²³⁸⁾ Their time variations are limited so that their impact is hard to identify in the presence of country fixed effects.

⁽²³⁰⁾ For instance, Mehrotra and Väilä (2006), Turrini (2004), Heinemann (2006).

⁽²³¹⁾ We take the log of the value of the variable and add 10 for those variables, which can become zero or negative to avoid a selection bias.

we consider the *indirect* impact of governance quality and fiscal rules on public investment via the public debt channel. ⁽²³⁹⁾ Public debt may have a stronger negative impact on public investment if the institutional quality is poor. As a consequence, the following interaction specification is estimated:

$$\begin{aligned} \ln \text{ public inv}_{i,t} = & \beta_1 \ln \text{ public inv}_{i,t-1} \\ & + \beta_2 \ln X_{i,t-1} + \beta_3 Z_{i,t-1} \\ & + \beta_4 \ln \text{ public debt} \\ & + \beta_5 \ln \text{ public debt} \cdot Z_{i,t-1} \\ & + \vartheta_t + \theta_i + \varepsilon_{i,t} \end{aligned}$$

where Z represents either governance quality or fiscal rules' strength, which is interacted with the public debt variable.

Two different indicators are used to identify institutional factors. First, the strength of the fiscal rules at the (sub-)national level. It is measured by a composite fiscal rules index of the European Commission, which takes into account the institutional framework conditions of the fiscal rule, such as its statutory base and the room for setting or revising its objectives. ⁽²⁴⁰⁾ Second, the quality of the governance framework. This is measured by the Worldwide Governance Indicator (WGI) of the Worldbank and it covers six broad dimensions of governance, such as government effectiveness and regulatory quality. ⁽²⁴¹⁾

⁽²³⁹⁾ We also tested the impact of the institutional factors on public investment via the primary balance. The results appear slightly weaker and are not shown here.

⁽²⁴⁰⁾ The fiscal rule index represents a composite indicator, which is calculated taking into account five criteria (see Deroose et al. (2006): (i) the statutory base of the rule, (ii) room for setting or revising its objectives, (iii) the body in charge of monitoring respect and enforcement of the rule, (iv) the enforcement mechanisms relating to the rule, and (v) the media visibility of the rule. For the above criteria, for each rule scores are attributed. For more information see:

https://ec.europa.eu/info/publications/fiscal-rules-database_en.

⁽²⁴¹⁾ The Worldwide Governance Indicators report on six broad dimensions of governance over the period 1996-2016: (i) voice and accountability, (ii) political stability and absence of violence, (iii) government effectiveness, (iv) regulatory quality, (v) rule of law and (vi) control of corruption. The following results are based on a simple average of all six dimensions. The key findings are, however, unchanged when using a narrower definition, such as governance effectiveness. <http://info.worldbank.org/governance/wgi/#home>.

3.2. MAIN RESULTS

The empirical analysis points to a significant impact of several fiscal and economic variables on public investment in line with the existing literature (Table IV.3.1). The results from the baseline specifications confirm the strong persistence of public investment. As expected, an increase in public debt and in the real-long term interest rate tend to reduce public investment significantly. A higher living standard as measured by real GDP per capita seems to trigger higher public investment. ⁽²⁴²⁾ The Great Recession, as measured by a dummy variable for the time period 2009 to 2012, appears to have decreased public investment significantly. This can be partly explained by the fact that public investment was excessive in the pre-Great Recession years. At the same time, short-term budgetary pressures may have led to myopic policymaking, in which governments slashed public investment in order to achieve savings. Public investment also tends to be increased in election years ⁽²⁴³⁾, while no clear-cut effects can be found concerning the impact of partisanship. Overall, the results turn out to be robust to changes of the set of independent variables used, since the estimated coefficients do not change substantially in terms of size and significance level across the ten specifications.

High debt hampers public investment. This confirms previous findings from the literature. ⁽²⁴⁴⁾ In particular when quality of institutions is low, this effect is magnified as captured by the interaction term.

A meaningful interpretation of the interaction model requires analysing the coefficients of the interaction term closely. The impact of a change in public debt on public investment needs to be assessed taking the institutional factors (Z) into account. To ensure a meaningful interpretation of the results, partial derivatives are calculated distinguishing between short-term (ST) and long-term (LT) effects: ⁽²⁴⁵⁾

⁽²⁴²⁾ The coefficients of the economic cycle, the EA membership or the (headline/primary) net lending are not significant.

⁽²⁴³⁾ Our analysis cannot say whether the quality of public investment is impacted by election years.

⁽²⁴⁴⁾ Bacchiocchi et al. (2011).

⁽²⁴⁵⁾ Brambor et al. (2006); Braumoeller (2004).

Table IV.3.1: Regression results - baseline specification

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---------------------------------------|-----------------------|-----------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|---------------------------------|----------------------------|
| | FE | FE | FE | FE | FE | FE | FE | SGMM- 2step | FE Z = fiscal rules index | FE Z = WB governance |
| In public investment, β_1 (t-1) | 0.678*** (14.51) | 0.690*** (13.92) | 0.638*** (10.80) | 0.717*** (15.40) | 0.716*** (15.16) | 0.715*** (15.28) | 0.715*** (15.28) | 0.722*** (3.928) | 0.700*** (14.16) | 0.718*** (14.39) |
| In public debt, β_2 (t-1) | -0.0966** (-2.155) | -0.0836** (-2.086) | -0.125*** (-2.865) | -0.0839** (-2.326) | -0.0855** (-2.378) | -0.0831** (-2.403) | -0.0831** (-2.403) | -0.155*** (-3.069) | -0.0836** (-2.559) | -0.127** (-1.885) |
| In real GDP per capita USD (t-1) | 0.181* (1.823) | 0.170* (1.738) | 0.250** (2.248) | 0.233* (1.959) | 0.241* (1.933) | 0.239* (1.933) | 0.239* (1.933) | 0.239* (-0.686) | -0.0213 (2.051) | 0.277* (1.748) |
| In output gap (t-1) | -0.413 (-0.983) | -0.457 (-1.124) | -0.178 (-0.358) | -0.631 (-1.358) | -0.650 (-1.395) | -0.656 (-1.392) | -0.656 (-1.392) | 0.175 (0.280) | -0.648 (-1.447) | -0.751 (-1.241) |
| In long-term interest rate (t-1) | -0.0184* (-1.906) | -0.0150 (-1.686) | -0.0223** (-2.525) | -0.0256*** (-3.380) | -0.0266*** (-3.158) | -0.0264*** (-3.113) | -0.0264*** (-3.113) | -0.0187*** (-2.642) | -0.0242*** (-2.977) | -0.0237*** (-2.365) |
| dummy EA member | -0.0290 (-0.877) | -0.0355 (-1.073) | -0.0403 (-1.261) | -0.0472 (-1.418) | -0.0498 (-1.432) | -0.0431 (-1.276) | -0.0431 (-1.276) | 0.0106 (0.470) | -0.0470 (-1.345) | -0.0416 (-1.248) |
| In headline balance (t-1) | | 0.495 (0.949) | | | | | | | | |
| In primary balance (t-1) | | | | 0.361 (0.849) | 0.359 (0.853) | 0.408 (0.977) | 0.408 (0.977) | 0.219 (0.305) | 0.467 (1.116) | 0.584 (1.232) |
| In total revenue (t-1) | | | 0.0339 (0.124) | | | | | | | |
| In total expenditure (t-1) | | | 0.00820* (1.918) | | | | | | | |
| In election year (t) | | | | 0.0722*** (2.924) | 0.0727*** (2.919) | 0.0726*** (2.906) | 0.0726*** (2.906) | 0.0490** (2.155) | 0.0722*** (2.856) | 0.0882*** (3.430) |
| In government left (t) | | | | 0.0313 (0.657) | 0.0317 (0.648) | 0.0317 (0.648) | 0.0317 (0.648) | 0.0448 (1.072) | 0.0389 (0.771) | 0.0159 (0.312) |
| In population share > 65 (t-1) | | | | | | | -0.132 (-0.665) | -0.132 (0.971) | -0.204 (-1.078) | -0.168 (-0.891) |
| Dummy 2009-12 | | | | | | | -0.0600** (-2.225) | 0.0194 (0.817) | -0.0681** (-2.117) | -0.0631** (-2.325) |
| In institutional quality (Z) (t-1) | | | | | | | | | -0.0731 (-0.893) | -0.156 (-0.737) |
| In public debt x Z, β_5 (t-1) | | | | | | | | | 0.014 (0.665) | 0.0351 (0.598) |
| Observations | 453 | 442 | 441 | 403 | 403 | 403 | 403 | 403 | 403 | 379 |
| # countries | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 27 |
| R-squared | 0.635 | 0.635 | 0.641 | 0.645 | 0.646 | 0.647 | 0.646 | 0.646 | 0.648 | 0.650 |
| Wald time dummies (p-value) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.090 | 0.000 | 0.000 |
| AR(1) (p-value) | | | | | | | | 0.030 | | |
| AR(2) (p-value) | | | | | | | | 0.428 | | |
| Hansen (p-value) | | | | | | | | 0.450 | | |
| # instruments | | | | | | | | 26 | | |

Note: The sample includes up to 28 EU countries covering the period 1980-2014 using annual data. All estimations include time dummies, which are not shown due to space constraints. Estimation approaches: (1) Fixed effects using heteroskedasticity-robust Huber-White standard errors; (2) two-step system GMM (SYS-GMM) estimator following Blundell and Bond (1998), controlling for endogeneity of the lagged dependent variable, public debt and the real GDP per capita. Due to the small sample size the set of internal instrumental variables is restricted to up to 5 lags and the matrix of instruments is "collapsed" to limit instrument proliferation. The standard errors are corrected following Windmeijer (2005). AR(1,2) and Hansen tests confirm the validity of the system GMM specifications. Since the results appear robust to the choice of estimator used (FE vs. SYS-GMM), priority is given to the simple fixed effects specification. This is further justified, since the bias identified by Nickell (1981) is rather small in a specification with a rather larger number of years (T=21). ***, ** and * denote respectively statistical significance at 1, 5 and 10%.

Source: Author's calculations.

$$\left. \frac{\partial \ln \text{public inv}}{\partial \ln \text{public debt}} \right|^{ST} = \beta_4 + \beta_5 \cdot Z_{i,t-1}$$

$$\left. \frac{\partial \ln \text{public inv}}{\partial \ln \text{public debt}} \right|^{LT} = \frac{\beta_4 + \beta_5 \cdot Z_{i,t-1}}{(1 - \beta_1)}$$

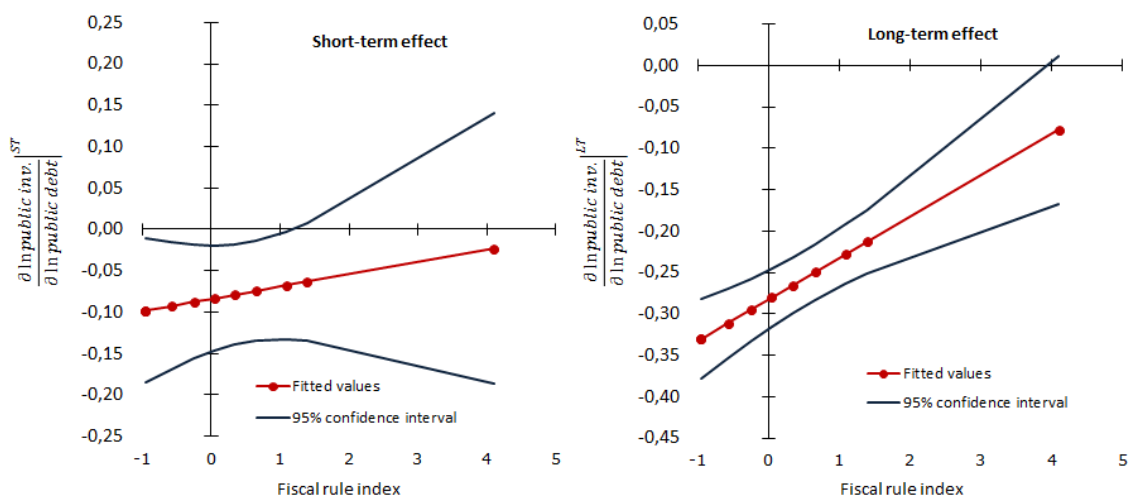
These partial derivatives show that the impact of a change of public debt on investment depends on the institutional features (Z). This requires analysing the size and significance levels of the impact of public debt for the whole range of observed values of both institutional variables (Graph IV.3.1 and IV.3.2).

Stronger fiscal rules mitigate the negative impact from public debt on public investment. To be more precise, the negative impact from public debt on public investment becomes smaller, the stronger the fiscal rules index (Graph IV.3.1).

The impact of public debt on public investment is therefore particularly strong for countries with very weak fiscal rules. For the highest observed value of the fiscal rules index (i.e. representing the strongest rules) the impact of public debt on public investment is no longer statistically significant in the short run, while it is only significant at the 10% level in the long run. Overall, the short-term effect of public debt is smaller than the long-term effect, because of the persistence of public investment (captured by the auto-regressive term).

A higher quality of the governance framework reduces the negative impact of the public debt transmission channel (Graph IV.3.2). The long-term impact of public debt is more detrimental than the shorter-term impact.

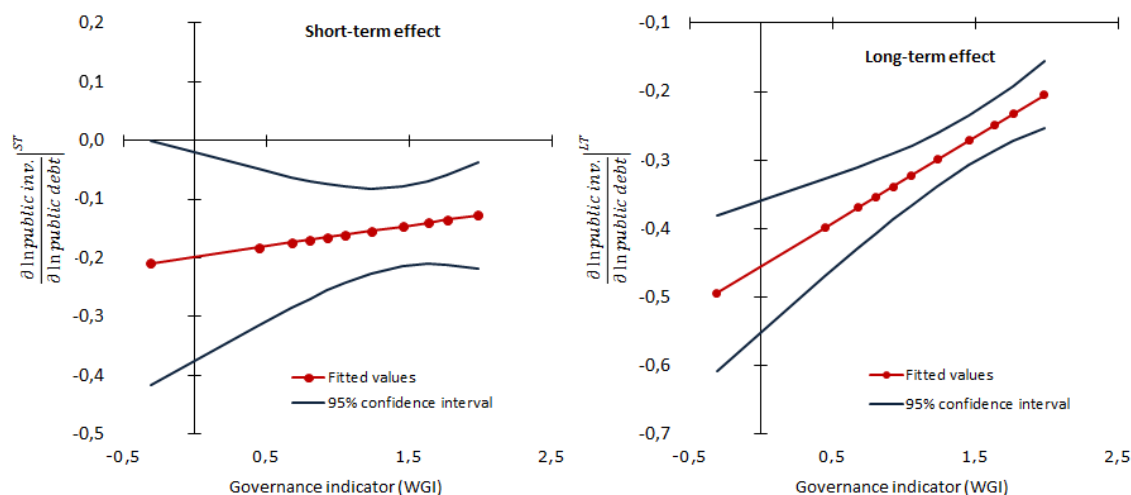
Graph IV.3.1: Reduction of debt impact through institutional quality - strength of fiscal rules



Note: The figures show the impact of a change of public debt on public investment for changes of the institutional factors, which is measured by two indicators, namely: fiscal rule strength index (Graph IV.3.1) and governance quality (Graph IV.3.2). The fitted line and the confidence intervals are plotted for the whole range of observed variables, while the red circles on the fitted line indicate the distribution of the institutional factor starting from the minimum to maximum of observed values in intervals of 10%. The figures on the left (right) side refer to the short-term (long-term effects). The indicators of institutional quality are plotted for the observed range of values for the panel consisting of 28 EU countries for the period 1995 to 2016.

Source: Author's calculations.

Graph IV.3.2: Reduction of debt impact through institutional quality - governance framework



Note: The figures show the impact of a change of public debt on public investment for changes of the institutional factors, which is measured by two indicators, namely: fiscal rule strength index (Graph IV.3.1) and governance quality (Graph IV.3.2). The fitted line and the confidence intervals are plotted for the whole range of observed variables, while the red circles on the fitted line indicate the distribution of the institutional factor starting from the minimum to maximum of observed values in intervals of 10%. The figures on the left (right) side refer to the short-term (long-term effects). The indicators of institutional quality are plotted for the observed range of values for the panel consisting of 28 EU countries for the period 1995 to 2016.

Source: Author's calculations.

In brief, the regression analysis points to the importance of sound institutions for the provision of public investment.

Some caveats remain. First, like for every cross-country panel approach, the results reveal relationships which are valid only on average across countries, but may differ from one country to another. Second, the measures of institutional factors – namely the strength of the fiscal rules and the quality of the governance framework – are useful quantitative indicators. However, they cannot capture the full complexity of the institutional features at the country-specific level. This calls for supplementary case studies on the impact of the institutional factors on public investment.

Box IV.3.1: Public investment gap

Prolonged low levels of public investment can have a cost in terms of public capital or output growth but can also imply negative spillovers on neighboring countries. ⁽¹⁾

Empirical evidence provides mixed indications regarding public capital undersupply. On the one hand, since the crisis, the current protracted reduction in government investment doesn't seem to have caused an increase of public capital productivity. ⁽²⁾ On the other hand, a large investment gap exists for the Euro area and for the OECD. ⁽³⁾

Three main methods are used to identify public investment gaps. A theoretical method identifies the gap between actual investment and its optimal level estimated using growth models. ⁽⁴⁾ An econometric method is based on the identification of the drivers of public investment (Chapter IV.3). The gap is measured in comparison to expected investment according to a selection of drivers. ⁽⁵⁾ A descriptive method compares investment with its level in a period of reference, for example pre-crisis. ⁽⁶⁾

The present estimation is based on the econometric approach. The main macroeconomic determinants of public investment are used to estimate the following panel regression:

$$gfcf_{it} = \beta_0 + \beta_1 y_{it} + \beta_2 r_{it} + \beta_3 debt_{it} + \beta_4 net\ lending_{it} + \beta_5 pop\ growth_{it} + \beta_6 stock_{it} + u_{it}$$

We use a time and country fixed effect estimator with clustered robust standard errors. In this way, both country-specific factors and events affecting, contemporarily, all countries are taken into account.

The sample covers EU Member States with annual data from 1995 to 2016. The sample is split between cohesion (CZ, EE, HU, LV, RO, HR, LT, PL, SK, SI, BG, CY, MT) and non-cohesion Members (AT, BE, DE, DK, EL, ES, FI, FR, IE, IT, NL, PT, SE, UK, LU). ⁽⁷⁾

The dependent variable (*gfcf*) is the ratio of gross fixed capital formation to GDP. The ratio to potential GDP as well as a broader concept of investment ⁽⁸⁾ still expressed in actual and potential GDP terms are used for robustness checks.

The explanatory variables are general economic and fiscal variables like the per capita real output (*y*), real long term interest rate (*r*), public debt ratio, fiscal balance ratio, all expressed in actual (or potential) GDP terms (consistently with the dependent variable). The level of per capita public capital stock (*stock*) and the demographic dynamic (*pop growth*) are added in order to better capture the investment needs. ⁽⁹⁾

In line with the literature, the coefficient of per capita output and population growth is positive in both samples, while all the others are negative (Table IV.3.a). The debt coefficient is the main difference between the two groups: the level of debt does not affect negatively investment in cohesion countries, it does so in non-cohesion countries (almost all characterized by a level of debt higher than 60%).

⁽¹⁾ De Jong et al. (2017a,b).

⁽²⁾ De Jong et al. (2017a,b).

⁽³⁾ Baldi et al. (2014) find investment gaps of 0.5% and 2% over the 1999-2012 and 2010-2012 periods respectively in the Euro Area. Lewis et al. (2014) find, in 2013, an investment gap of 2.5pp of GDP for the OECD as a whole.

⁽⁴⁾ Auschauer (1989), (1998); Kamp (2005); Miller and Tsoukis (2001); De Jong et al. (2017a,b).

⁽⁵⁾ Baldi et al. (2014) and this Box.

⁽⁶⁾ Lewis et al. (2014).

⁽⁷⁾ The same distinction can be found in Mehrotra and Vålilä (2006), in line with the considerable differences in public investment across these two groups in the sample years European Commission (2016a).

⁽⁸⁾ We adopt here a wider concept of investment including investment in human capital as the result of spending on health and education (investment in human capital), in innovation and technological development through spending in R&D and in infrastructure by spending in transport and communication.

⁽⁹⁾ The choice of variables follows in particular Turrini (2004) and Mehrotra and Vålilä (2006), see also Annex IV.3 for a more detailed review of the variables used in such analysis.

(Continued on the next page)

Box (continued)

Investment gaps are obtained as a difference between the predicted investment rates for 2016 and the actual figures for the same year. ⁽¹⁰⁾ We focus on the existence of a gap rather than on its size because the latter depends on the model and the definition of investment considered (Table IV.3.b). ⁽¹¹⁾ Depending on the persistence of a gap across models, countries are classified as suffering from an investment gap with certainty, almost certainty and no certainty.

Table IV.3.a: Panel country-year fixed effect estimations

| | Cohesion GFCF (% of GDP) | Non cohesion GFCF (% of potential GDP) | Cohesion GFCF (% of potential GDP) | Non cohesion GFCF (% of potential GDP) | Cohesion Wider Investment concept (% of GDP) | Non cohesion Wider Investment concept (% of potential GDP) | Cohesion Wider Investment concept (% of potential GDP) | Non cohesion Wider Investment concept (% of potential GDP) |
|--|--------------------------------|---|--|---|---|--|---|--|
| real_pca | 1.637** (7.36) | 0.521 (1.34) | 2.071** (6.26) | 0.792** (2.23) | 0.179 (1.51) | 0.110 (0.62) | 0.456** (3.05) | 0.403* (2.08) |
| real_intrate | -0.0103 (-1.77) | -0.00944 (-1.41) | -0.0119 (-1.73) | -0.0129 (-1.71) | 0.00295** (2.35) | 0.00109 (0.56) | -0.000848 (-0.35) | -0.00157 (-0.65) |
| capital_pca | -0.520** (-4.92) | -0.740** (-2.41) | -0.531** (-3.01) | -0.578 (-1.71) | -0.103* (-2.10) | -0.301** (-2.24) | -0.0855 (-0.62) | -0.184 (-1.19) |
| popgrowth | 0.0685** (2.29) | 0.126** (2.58) | 0.0781** (2.66) | 0.182** (3.45) | 0.0234** (3.22) | 0.0171 (1.32) | 0.0381** (3.14) | 0.0595** (3.60) |
| netlending | -3.404** (-5.81) | -1.767** (-4.99) | | | -1.377** (-3.89) | -1.333** (-5.53) | | |
| debt | 0.165** (2.47) | -0.157* (-1.81) | | | -0.000592 (-0.04) | -0.0272 (-0.84) | | |
| netlending (% of potential GDP) | | | -3.735** (-4.28) | -1.751** (-3.77) | | | -1.388** (-2.58) | -1.252** (-4.18) |
| debt(% of potential GDP) | | | 0.227* (2.04) | -0.106 (-1.07) | | | 0.0254 (0.83) | -0.00546 (-0.15) |
| _cons | 5.680 (1.47) | 11.67** (3.80) | 2.335 (0.45) | 6.672* (1.96) | 8.069** (4.27) | 10.56** (7.82) | 4.804* (1.85) | 5.602** (3.41) |
| N | 191 | 282 | 190 | 282 | 157 | 259 | 157 | 259 |
| R ² | 0.6105 | 0.5875 | 0.7772 | 0.6425 | 0.5510 | 0.7072 | 0.8381 | 0.8940 |

Note: All explanatory variables are in logarithm, except popgrowth and real_intrate. t-values in parentheses (significance: * p < 0.10, ** p < 0.05). Cluster robust standard errors and country-specific time trends and constants are used, although not displayed.

Source: Authors' calculations.

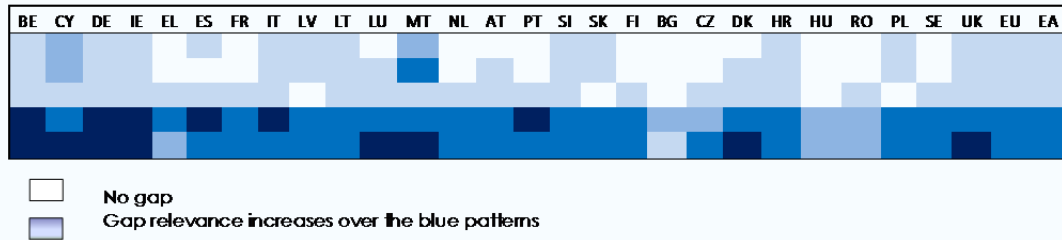
⁽¹⁰⁾ Because of missing data (in particular real interest rate) for EE the gaps for this country cannot be computed.

⁽¹¹⁾ Estimation (7) of the baseline specification from Table IV.3.1 is also included to the analysis.

(Continued on the next page)

Box (continued)

Table IV.3.b: Heat map of investment gap intensity

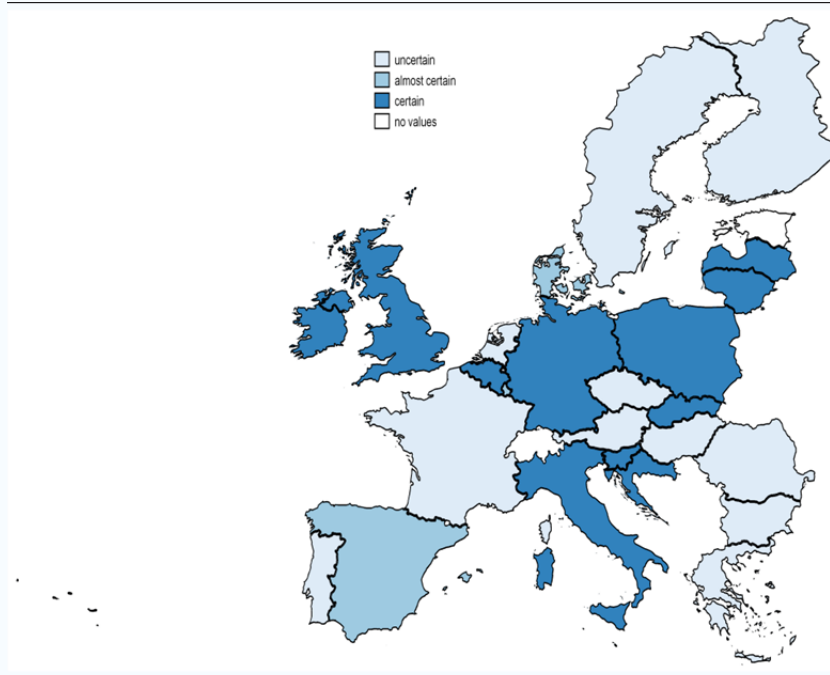


Note: The five models included are the four cases from Table IV.3.a and Estimation (7) of the baseline specification from Table IV.3.1.

Source: Authors' calculations.

An investment gap is found with certainty/almost certainty in more than half of the EU countries (Graph IV.3.a). This is in line with the observation that in almost all the EU members the 2016 level of government investment was still below its 1995-2007 average.

Graph IV.3.a: Gap distribution



Source: Authors' calculations.

4. FIVE CASE STUDIES ON INSTITUTIONAL FEATURES HAMPERING PUBLIC INVESTMENT

In order to have a deeper dive into the relevance of institutional factors, five case studies are proposed here examining the main institutional barriers (or drivers) of public investment in the selected EU Members. The views exposed in this Chapter do not constitute the official position of the Commission on the five Member States considered, but rather set out some tentative results. The descriptions below are not exhaustive but exemplify some of the key issues encountered at the different stages of the public investment process.

4.1. SELECTION OF COUNTRIES AND MAIN RESULTS

Selection of countries and contextual statistics

The selection of Member States aims at capturing a balanced mix of federal versus centralised Member States with different patterns of public investment. Germany and France were chosen as examples of a federal and unitary country, respectively, which experienced a sizeable long-term decline in investment, although at different levels. Spain was chosen as the example of a federal country and Ireland as a unitary one having experienced a pronounced property-led boom followed by a decline in public investment after the Great Recession. Finally, Romania was selected as a unitary country with a rather high and stable investment pattern, highlighting the role of EU funds in impacting public investment.

Table IV.4.1: General government investment trends in the EU (% of GDP)

| Country/year | 1990-2000 | | 2007-2016 | | | | | | | | | | | | | | |
|--------------|-----------|------|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|
| | 1999 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | |
| DE | 2,4 | 2,1 | 1,9 | 2,1 | 2,4 | 2,3 | 2,3 | 2,2 | 2,2 | 2,1 | 2,1 | 2,1 | 2,1 | 2,1 | 2,1 | 2,1 | 2,1 |
| ES | 3,8 | 4,0 | 4,7 | 4,6 | 5,1 | 4,7 | 3,7 | 2,5 | 2,2 | 2,1 | 2,5 | 1,9 | 1,9 | 1,9 | 1,9 | 1,9 | 1,9 |
| FR | 4,3 | 3,9 | 3,9 | 3,9 | 4,3 | 4,1 | 4,0 | 4,1 | 4,0 | 3,7 | 3,5 | 3,4 | 3,4 | 3,4 | 3,4 | 3,4 | 3,4 |
| IE | 2,6 | 3,7 | 4,6 | 5,2 | 3,7 | 3,3 | 2,4 | 2,0 | 2,0 | 2,1 | 1,7 | 1,8 | 1,8 | 1,8 | 1,8 | 1,8 | 1,8 |
| RO | 2,8 | 3,4 | 6,3 | 6,7 | 6,0 | 5,7 | 5,4 | 4,8 | 4,5 | 4,3 | 5,2 | 3,6 | 3,6 | 3,6 | 3,6 | 3,6 | 3,6 |
| EU28 | n/a | 3,1 | 3,2 | 3,4 | 3,7 | 3,5 | 3,3 | 3,1 | 3,0 | 2,9 | 2,9 | 2,7 | 2,7 | 2,7 | 2,7 | 2,7 | 2,7 |
| EA19 | 3,2 | 3,1 | 3,2 | 3,3 | 3,6 | 3,4 | 3,1 | 2,9 | 2,8 | 2,7 | 2,7 | 2,6 | 2,6 | 2,6 | 2,6 | 2,6 | 2,6 |
| New MS* | n/a | 3,6 | 4,7 | 4,8 | 4,9 | 5,0 | 4,9 | 4,3 | 4,1 | 4,4 | 5,0 | 3,3 | 3,3 | 3,3 | 3,3 | 3,3 | 3,3 |
| Cohesion 4** | n/a | 4,2 | 4,5 | 4,7 | 4,9 | 4,5 | 3,4 | 2,4 | 2,3 | 2,3 | 2,5 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 |

Note: * joined the EU in 2004 and 2007, CY, CZ, EE, HU, LV, LT, MT, PL, SK, SI, BG and RO.

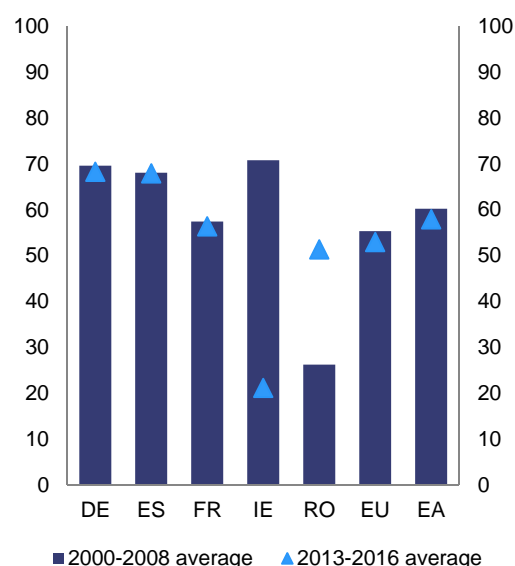
** EL, ES, IE and PT.

Source: Eurostat.

The share of sub-national public investment with respect to total public investment has followed different paths across the selected countries (Graph IV.4.1). In the EU on average as

well as in Germany, Spain and France, the share of sub-national authorities in total public investment remained broadly constant before and after the Great Recession. By contrast, Romania decreased the share of public investment carried out by its sub-national governments, while Ireland's share of public investment at the sub-national level was reduced to the benefit of the central government.

Graph IV.4.1: Sub-national investment as a share of total public investment



Note: EU excludes the year 2000 for data availability reasons.

Source: Eurostat.

Main findings from the country cases

The five cases highlight that the efficiency can be improved across all phases of the investment process in most countries. Table IV.4.2 illustrates the topics discussed across the phases of the process of producing public investment: planning, financing, implementation and *ex post* evaluation phase (see also Section IV.2.5).

The case studies identify a clear need to improve planning. Issues relative to coordination across levels of government are exemplified in particular in the planning phase. While Spain seems to undergo formal and informal consultations of sub-national authorities, Ireland aims at doing the same by 2040 through a comprehensive review of its investment

programmes. *Ex ante* analysis is also found to be lacking in Spain. The definition of a long-term strategy is key in the planning phase. Romania is currently missing such a strategy, while Ireland is in the process of defining one. Some improvements in accounting for a longer horizon are also needed in the French case.

Table IV.4.2: Topics discussed in the country analysis

| Country\ Phase | Planning | Financing | Implementation | Ex post evaluation | Throughout |
|----------------|--|---|------------------------|------------------------|--|
| Germany | | Fiscal autonomy (-), Investment funds (+) | | | Administrative capacity (-) |
| Spain | Coordination (consultation) (+), <i>Ex ante</i> analysis (-) | Fiscal rules (=) | Public procurement (-) | | |
| France | Impact assessment including long term (-) | Transfers to SNG (-), Fiscal rules (=); Pluriennial budgeting (+) | | Ex-post evaluation (-) | Admin. capacity (-), Coordination (information sharing across levels of gov) (-), Territorial reform (+) |
| Ireland | New plans (+) | Sudden stop in financing (-), EU fiscal rules (=) | New spending code (+) | | |
| Romania | Strategy (-) | EU Funds (+&-) and national program (PNDL) (+) | Public procurement (-) | | Admin. capacity (-), Transparency-Political interference (-) |

(+) are factors with a positive impact, (-) a negative impact, (=) neutral. For a same topic, both positive and negative sides can be discussed (+&-).

Source: Authors' elaboration.

Financing arrangements are an indispensable part of the functioning of the government investment cycle. They emerge as relevant in all cases. Transfers to sub-national governments have been cut in France, or on the contrary supported by national funds in Germany or both national and EU funds in Romania.

Public procurement influence the implementation phase. Romania and Spain suffer from weaknesses in public procurement. While Ireland aims at improving its project management with a new spending code.

Ex post evaluation can be improved. In particular its lack is perceived as a problem in France where it is only optional at the local level.

Throughout the investment process, several issues constrain public investment. Capacity constraints at the sub-national level are a pressing issue in Germany, France and Romania and can have negative impact on all phases of investment projects. The lack of information sharing across government levels in France is also likely to affect the entire investment cycle. In Romania, lack of transparency and political considerations appear as

particularly damaging throughout the phases of public investment.

4.2. DETAILED CASE STUDIES

4.2.1. Germany

Long-standing subdued municipal investment has resulted in a significant infrastructure investment backlog in Germany. Over the last decade, investment by the general government has only slightly increased to reach 2.1% of GDP and 4.8% of total public expenditure in 2016, and has inched back to the pre-crisis averages (Table IV.4.1) but remains below the averages of the EU/EA (2.7/2.6% of GDP). While public investment at the federal and federal states level as a proportion of GDP has remained largely constant since 1991, at municipal level it was on a downward trend during most of the 1990s and the first half of the 2000s and has only recently stabilised. Consequently, the municipal share in public investment has declined from 51% in 1991 to 35% in 2016. This decrease can partly be ascribed to strong infrastructure investment in East Germany in the early 1990s levelling off over time as well as to the privatisation of construction and operation of infrastructure.⁽²⁴⁶⁾ In net terms, municipal investment has been negative since 2002, meaning that gross investment has fallen below depreciation. Efforts made in recent years to strengthen municipal investment have not yet resulted in a trend reversal. The longstanding investment weakness has contributed to an estimated investment backlog in municipal infrastructure of EUR 126 billion (3.9% of GDP), notably in terms of roads and schools.⁽²⁴⁷⁾

A mismatch between available resources and investment responsibilities may have contributed to funding constraints for a number of municipalities. Federal legislation can impose tasks on lower levels of government without providing an adequate financial endowment. This is in line with the constitutional principle which stipulates that spending responsibility follows administrative responsibility, but may have contributed in particular to rising social expenditure and the financial distress of a number of

⁽²⁴⁶⁾ European Commission (2014a).

⁽²⁴⁷⁾ KfW Research (2017).

municipalities.⁽²⁴⁸⁾ Moreover, limited revenue autonomy of federal states and municipalities reduces the scope for raising additional funds. In addition, it is observed that municipal fixed-capital formation tends to be lower the higher the overall indebtedness of municipalities.⁽²⁴⁹⁾ The extent of short-term loans (*Kassenkredite*) also partly corresponds to investment activity.⁽²⁵⁰⁾ A number of municipalities increasingly make use of short-term loans to finance structural deficits rather than for their purpose of bridging liquidity shortages. The use of short-term loans is higher in those federal states which are highly indebted and provide lower transfers to local authorities within their internal municipal equalisation scheme.⁽²⁵¹⁾

Measures have been taken to improve municipalities' fiscal situation and support their investment, though the uptake of extra funds has been so far limited. In recent years, the Federal Government has taken several steps to relieve municipalities of social expenditure⁽²⁵²⁾ and to support investment spending of the federal states and municipalities in childcare facilities, transport infrastructure, urban development, social housing, energy-saving measures and broadband expansion. This included the creation of a special fund of EUR 3.5 billion (0.1% of GDP) in 2015 to support infrastructure investment of financially weak municipalities.⁽²⁵³⁾ However, the special fund for financially weak municipalities has been used only to a limited extent. While by 30 June 2017 municipalities had budgeted almost EUR 3.1 billion (0.1% of GDP) for about 10,600 investment measures, amounting to 87% of the available funds, just 8% of the funds had actually been disbursed. This small fraction results partly from

the necessary project planning and the fact that funds are disbursed only after billing. The reform of federal fiscal relations adopted in 2017 –with effect in 2020– should further improve the conditions for public investment at sub-national level.⁽²⁵⁴⁾

Reduced planning capacity in many municipalities turns out to be an obstacle for a rapid increase in public investment. In municipal administrations, the number of employees dealing with construction, housing and transport –measured in full-time equivalents– has fallen by around one third between 1991 and 2011. These staff reductions can be partly explained by efficiency gains and the privatisation of planning services, but may also reflect the period of subdued municipal investment.⁽²⁵⁵⁾ Inefficient administrative procedures and a lack of skilled staff, in particular civil engineers, also reduce the local planning capacity.⁽²⁵⁶⁾ To this end, the reshaped consulting firm for public investment projects and the modernisation of public administration (Partner Deutschland PD)⁽²⁵⁷⁾ offers extended consulting services with respect to infrastructure investment to the whole public sector from early planning steps up to project implementation.

The current high capacity utilisation in the construction sector may also temporarily limit increases in public investment. Production capacity in the construction sector has not kept up

⁽²⁴⁸⁾ Goerl et al. (2014); Sachverständigenrat (2004).

⁽²⁴⁹⁾ Expertenkommission im Auftrag des Bundesministers für Wirtschaft und Energie (2015).

⁽²⁵⁰⁾ The recourse to liquidity loans has been particularly pronounced in Saarland, Rhineland-Palatinate and North Rhine-Westphalia, while it has been virtually absent in Saxony, Baden-Württemberg, Bavaria and Thuringia. North Rhine-Westphalia and Saarland have also recorded the lowest municipal investment per inhabitant of all the federal states, European Commission (2016b).

⁽²⁵¹⁾ Gröpl et al. (2010).

⁽²⁵²⁾ The federal government has partly or fully taken over expenditure relating to welfare benefits, accommodation allowances, basic security in old age and for people with reduced earning capacity, financial assistance for students and trainees, and the accommodation of asylum seekers and refugees.

⁽²⁵³⁾ The special fund was topped up in 2017 by additional EUR 3.5 billion for investment in school infrastructure.

⁽²⁵⁴⁾ In particular, extra revenue estimated at around EUR 9.7 billion in 2020 (0.3% of 2017 GDP), rising to EUR 13 billion by 2030, will be allocated to the federal states at the expense of the federal budget. However, the reform fell short of more fundamental changes in terms of increasing tax autonomy of federal states and municipalities, which could have further increased the scope for public investment, European Commission (2017).

⁽²⁵⁵⁾ Gornig and Michelsen (2017).

⁽²⁵⁶⁾ Public sector salaries make it difficult for local authorities to compete for high skilled workers. Lighter administrative procedures (digitisation) could release additional capacity. Moreover, providing more planning services centrally could relieve in particular smaller municipalities. Brand and Steinbrecher (2016).

⁽²⁵⁷⁾ The previously public-private consultancy firm to promote public private partnerships (ÖPP Deutschland AG) was transformed by the end of 2016 into a purely public body, with the Federal Government as the main shareholder. A number of other public entities have already indicated their interest in taking a share in the consultancy firm, including bigger and smaller municipalities, social insurances, public enterprises and federal states. It already employs almost 100 consultants specialised in various fields, Bundesministerium der Finanzen (2017).

with increased demand driven notably by the housing boom. Orders have reached record levels, and equipment utilisation has been higher than during the construction boom in the mid-1990s. ⁽²⁵⁸⁾

4.2.2. Spain

The share of Spain's general government investment over total investment is currently below both its pre-crisis and the EA average. In 2016, general government investment (1.9% of GDP) is considerably lower than its property-boom fuelled pre-crisis average (4.0% between 2000 and 2007), and also lower than the corresponding EU/EA averages (2.7/2.6%) (Table IV.4.1). Public investment is the spending category which experienced the largest reduction under the pressure of fiscal consolidation following the crisis (-61% between the 2009 peak and 2016).

The drop in total public investment after 2009 largely occurred at the sub-national level. In 2013-2016, regional and local governments accounted for 45% and 23%, respectively, of general government's investment (Graph IV.4.1). Over 2009-2016, the central government reduced its investment by 10.9% annually, but regions and local governments reduced investment by even more (11.2% and 16.5%, respectively).

There are concerns related to the historically low level of sub-national authorities' investment (1.3% of GDP in 2016). Protracted low levels of investment may compromise the quality of services provided by sub-national governments in the future. ⁽²⁵⁹⁾ It may also condition the regions' convergence capacity. The large drop in SNG investment could be seen as a correction of the high levels of investment in the pre-crisis period, as larger reductions were on average recorded in those regions which experienced a public investment boom in the pre-crisis period.

Existing national budget rules supporting fiscal consolidation in Spain do not differentiate public investment from other expenditures. Gross fixed capital formation falls under the scope of the spending rule set out in Spain's Stability Law, which in essence caps growth of government primary spending, net of non-discretionary expenditure on unemployment benefits and

discretionary revenue measures, at the growth rate of Spain's medium term GDP. Dynamics in government investment are therefore called to contribute to ensuring compliance with the rule, as are other spending categories falling under its remit and/or additional revenue. In other words, the various tiers of governments are free to decide on the mix of revenues and / or current and capital expenditure which will enable them to comply with the Stability Law's expenditure rule. However, for local governments, which on aggregate have been running budget surpluses since 2012, special provisions apply, as those with sound public finances ⁽²⁶⁰⁾ can, under certain conditions, use their budget surplus to fund financially-sustainable investment. ⁽²⁶¹⁾

A large share of investment at the sub-national level is directed to road and metropolitan transport. Investment on defence is a prerogative of the central government; health, education and general public services take a relatively large share in regional government investment; while for local governments housing and culture account for over a third of their investment. However, the majority of investment at all government levels goes into transport infrastructures. At the central level, spending goes to railways, maritime ports, airports and roads. Road and metropolitan transport accounts for the largest share of sub-national investment, the development and maintenance of the road network being a key competence for sub-national authorities. Indeed, 84% of the large road network of Spain – actually, one of the largest in the EU according to different metrics, ⁽²⁶²⁾ belongs to sub-national authorities.

The influence of sub-national entities in the planning of transport infrastructure goes beyond the projects they directly manage. While the planning and development of large transport infrastructure, covering airports, high speed trains and motorways, falls under the responsibility of the central government, sub-national governments can influence them. This can be done firstly

⁽²⁶⁰⁾ This includes, among others, compliance with the debt limits provided in the sectoral legislation and with the average payment rule to commercial suppliers.

⁽²⁶¹⁾ The possible uses of budget surplus are set out in the sixteenth additional provision of Royal Legislative Decree 2/2004 on the local entities' financing system. Conditions to do so are set out in the sixth additional provision of organic law 2/2012 on budget stability and financial sustainability. The controller of the local government verifies compliance with the legal requirements.

⁽²⁶²⁾ European Commission (2015a).

⁽²⁵⁸⁾ Gornig and Michelsen (2017).

⁽²⁵⁹⁾ De la Fuente (2016).

through bilateral exchanges between representatives of the central and sub-national governments, and secondly, through the consultation processes set out in the sectoral legislation on each transport modality and on the environment.

Insufficient *ex ante* analysis of large infrastructure projects led to overinvestment in the pre-crisis years. Specifically, in the pre-crisis period, insufficient attention to cost-benefit analysis and undue emphasis on the territorial coverage led to inefficiently high levels of investments in roads, high speed trains and airports, implying welfare losses.⁽²⁶³⁾ Examples include the Spanish high-speed rail (HSL) network which services only a limited number of passengers compared to the initial plan. Overestimation of demand and underestimation of costs (e.g. of expropriations) at the planning stage eventually resulted in the bankruptcy of nine motorway concessions.⁽²⁶⁴⁾

In its EDP decision addressed to Spain in August 2016, the Council noted a series of irregularities in the application of procurement legislation in Spain. In particular, the Council pointed at disparities in the implementation of public procurement across Spain's contracting authorities and entities and insufficient *ex ante* and *ex post* control mechanisms. Moreover, Spain stands out for a low publication rate of contract notices and a relatively high use of the negotiated procedure without prior publication.

Sub-national authorities procure a large share of public work contracts, which are directly linked to government investment projects. Over 2013-2016, sub-national authorities accounted for 53% of the value of contract notices (*licitación*) of public work contracts in Spain. The bulk of sub-national authorities notices focused on roads, urbanisation, water supply and sanitation infrastructure. Spain's Court of Auditors points to irregularities with the application of procurement legislation at the local level, in particular on public work contracts. Such irregularities are concentrated in the pre-award stage of contracts, thus suggesting the need to increase *ex ante* controls. For example, based on a sample of audited contracts, the need to launch the procurement has in some cases, been insufficiently

justified and the award criteria not properly spelled out, with the price not being considered an award criteria in some others. A non-negligible share of irregularities has also been found at the execution phase of public work contracts (e.g. delays in the execution of contracts and insufficient justification given to contract changes).⁽²⁶⁵⁾

Several new measures aim to counter such irregularities. The recently adopted legislation transposing the latest package of public procurement directives⁽²⁶⁶⁾ creates an Independent Office for Regulation and Supervision of Public Procurement, within the Ministry of Finance. This office will coordinate the supervision of all public contracting authorities and ensure the correct application of public procurement legislation. Moreover, an Office for National Evaluation (ONE) was created in October 2015 to assess the financial sustainability of public work concessions and service concession contracts. Regional governments are free to create their own office for evaluation or to adhere to ONE. However, at the time of writing, the office had not started its operations.

4.2.3. France

In France, the level of public investment is higher than in the EU and the euro area as a whole (Table IV.4.1). Public investment in France remains close to the pre-crisis level (3.9% of GDP) and has weathered well through the crisis.⁽²⁶⁷⁾ Between 2008 and 2016, public investment has decreased by less in France (-0.5 pp.) than in the rest of the euro area and the EU (-0.7 pp.).

Public investment is broadly shared between the central and the sub-national level. The sub-national governments account for 57% of public investment (Graph IV.4.1), a share which has remained quite stable over time.⁽²⁶⁸⁾ Local public investment can be further broken down among different categories of local authorities: in 2015, 57% of the local public investment was made by the communes, 22% by the *départements* and 20% by the regions.⁽²⁶⁹⁾

⁽²⁶⁵⁾ Tribunal de Cuentas (2016).

⁽²⁶⁶⁾ Law 9/2017 of 8 November on public sector contracts.

⁽²⁶⁷⁾ Cour des Comptes (2015).

⁽²⁶⁸⁾ Finances Publiques et Economie (FIPECO) (2017a) and Cour des Comptes (2015).

⁽²⁶⁹⁾ Finances Publiques et Economie (FIPECO) (2017b).

⁽²⁶³⁾ De Rus (2015).

⁽²⁶⁴⁾ European Commission (2015a).

The recent cut in state transfers for local public investment had some temporary consequences on the local authorities' capacity to invest. In the aftermath of the economic crisis, the French government committed to substantially reduce its spending. This commitment concerned all levels of public administration and implied a cut in state transfers dedicated to local administrations starting from 2014.⁽²⁷⁰⁾ A majority of sub-national authorities (71% of municipalities and 53% of *départements*) stressed that a continuous decrease in state grants could lead to a reduction of the number of newly implemented investment projects,⁽²⁷¹⁾ corroborated by the observed EUR 10 bn drop in local investments between 2013 and 2016.

The cut in state transfers and the budgetary discipline to which local administrations are subject, however, have not impeded local investment to accelerate in 2107. Local administrations are subject to a stricter budgetary discipline with respect to the central administration. First, functioning spending and investment spending need to be reported in two different sections of their budget. Second, local administrations need to follow a strict balanced budget rule, contrarily to the central government. In this perspective, local administrations have the possibility to take out a new loan only to finance a new investment. Existing debt (former loans) must be reimbursed through revenues coming from the functioning section or through certain resources from the investment section. However, these rules have not impeded local investment to rebound quickly after the drop observed in 2013-2016. This reduction in local investment proved to be short-lived, along with the fear that local authorities would have cut public investments rather than operating expenditures. Local investment is now expected to accelerate by 3.7% in 2017.⁽²⁷²⁾

Local authorities are able to programme their investments through the adoption of multi-

annual investment projects. Multi-annual investment projects require the adoption of an authorisation programme. Such authorisation programme indicates an upper threshold for investment spending. This allows them to spread the investment costs over several years. All regions, 55% of the municipalities, and 81% of the *départements* resort to multi-annual investment plans.⁽²⁷³⁾ Also, a similar share of local administrations tends to finance investment activities as a whole rather than per project.

The effectiveness of local public investment, however, could still be improved by giving more priority to long-term projects. A precise evaluation of the long-term impact of investment projects can select the local public investments having a positive and lasting impact.⁽²⁷⁴⁾ Local investment decisions should be taken with the aim to stimulate enterprises' production capabilities, increase living standards and public administrations' productivity.

Systematic information on local investment projects is lacking. In August 2012, the *Commissariat général à l'investissement* (CGI) was asked to compile an inventory of the currently implemented public investment projects. However, local investment projects were excluded from this inventory, so that the available information on local investment is still incomplete.⁽²⁷⁵⁾ This omission points to a lack of coordination between the central and the local level of the public administration.

The evaluation of implemented investment projects remains voluntary at the local level. The 2012 public finance programming bill (*Loi de programmation des finances publiques*) made a socio-economic assessment of implemented projects mandatory. This assessment consists in identifying and evaluating the gains and costs of an investment project for all economic actors. However, it remains voluntary for local authorities, as they do not have the same financial means as the national administration to assess the impacts of their investments. Contrarily to *départements* and regions, only 25% to 30% of local authorities have experimented follow-up schemes or launched studies about their usefulness. This implies that the majority of local authorities still does not have a

⁽²⁷⁰⁾ Cour des Comptes (2015).

⁽²⁷¹⁾ Caisse des Dépôts (2014). Moreover, 76% of the municipalities and 65% of the *départements* pinpointed even that such a decrease could delay the implementation of already validated projects or put their existence at risk. The study also predicted a 7.4% decrease (i.e. between EUR 10.8 mn and EUR 11.8 mn) in the amount annually spent by *départements* on investment between 2015 and 2020.

⁽²⁷²⁾ La Banque Postale (2017).

⁽²⁷³⁾ Caisse des Dépôts (2014).

⁽²⁷⁴⁾ Cour des Comptes (2015).

⁽²⁷⁵⁾ Cour des Comptes (2015).

follow-up scheme for investment projects or does not assess the savings enabled by new equipment or their efficiency by comparing their achievements with the initial goals. ⁽²⁷⁶⁾

The 2015 territorial reform is expected to progressively increase the efficiency of local public investments and to allow local authorities to systematically evaluate projects. Municipalities will have the opportunity to pool their human and financial means to provide more and better investment. ⁽²⁷⁷⁾ Pooling of resources may allow decreasing the costs of local investments and hence to increase the level of investment. It may also increase the quality of investment, by allowing local administrations to select projects with a longer-term horizon as well as to provide an evaluation of selected projects.

4.2.4. Ireland

Following the pre-crisis boom, government investment in Ireland collapsed during the Great Recession. Over the last five decades, the general government's gross fixed capital formation has displayed large fluctuations: it peaked above 5% of GDP in 1974, 1980 and 2008, while falling below 2% of GDP both at the end of the 1980s and in 2015-2016. ⁽²⁷⁸⁾ During the 1990s, government investment steadily increased, fuelled also by the housing boom. The trend reverted abruptly with the Great Recession, as cuts in public fixed capital formation were one of the main drivers behind the fiscal consolidation. As a result, government investment averaged 1.9% of GDP over 2013-2016 (Table IV.4.1), much below both the EU average and Ireland's pre-crisis average levels (1990-1999 and 2000-2006). The crisis led to a structural shift in the composition of public expenditure in favour of current spending. ⁽²⁷⁹⁾

The halt of government investment affected the quality and adequacy of infrastructure. Cuts in government investment in Ireland mainly focused on environmental protection, housing, transport,

public order and safety, and, to a lesser extent, defence, education and R&D. As a consequence, pressure points have emerged in a number of areas, against the backdrop of a resumption in economic growth. In particular, housing, water services and public transport have been facing interrelated challenges. By the same token, the unprecedented increase of government capital expenditure until 2008 called into question the efficiency and the *value for money* of this investment. ⁽²⁸⁰⁾ Maintaining competitiveness on the global level for a small and very open economy such as Ireland partly hinges on addressing these infrastructure congestions and bottlenecks through a sustainable, efficient and well planned public investment strategy.

Against this background, a new Infrastructure and Capital Investment Plan was published in order to set the ground for an envisaged trend reversal. The plan, announced in September 2015, has defined priority needs in transport, education, housing and health care and also envisages additional investments by semi-state companies. The government allocated close to 10% of GDP over 2016-2021. At the end of 2016, sustained economic growth and the stabilisation of public finances have enabled the government to commit to an additional 1.8% of GDP. While 0.8% of GDP has already been pre-committed to support the Government's Action Plan on Housing and Homelessness, the remaining additional funding was planned to be allocated in budget 2018. Furthermore, the government intends to redirect part of the planned "rainy-day fund" to finance additional investment in physical and social infrastructure. ⁽²⁸¹⁾ Capital expenditure is now expected to reach 2.3% of GDP in 2021, up by 85% compared to 2016 levels. ⁽²⁸²⁾ A ten-year National Investment Plan for the period 2018-2027 is scheduled to be published in the course of 2018. However, there are some doubts over the degree to which the construction industry, as a key stakeholder in the delivery of publically funded infrastructure, has the capacity to respond to such plans, with access to credit representing a much cited constraint for the industry in the aftermath of the financial crisis.

⁽²⁷⁶⁾ Caisse des Dépôts (2014).

⁽²⁷⁷⁾ Martin et al. (2015).

⁽²⁷⁸⁾ The effect of globalisation and the operations of multinationals increasingly distort GDP as a measure of the size of the economy, in particular after the exceptional GDP surge in 2015.

⁽²⁷⁹⁾ In 2013-2016, investment spending averaged only 6.5% of the total expenditure (net of interest expenditure and other capital transactions), 2.5pps lower than Ireland's 1990-2015 average.

⁽²⁸⁰⁾ Scott and Bedogni (2017).

⁽²⁸¹⁾ Department of Public Expenditure and Reform (2017).

⁽²⁸²⁾ Using the modified gross national income (GNI*), which accounts for the impact of globalisation, public investment is projected to meet the 3% historical level from 2019 onward.

Over a longer horizon, the authorities are preparing a national planning framework to cope with coordination issues (Ireland 2040).

Ireland has a poor track record in terms of spatial planning at a national level, while the planning system can lead to excessive delays in bringing forward individual projects at a local level. In 2017, the government launched a consultation for the preparation of a strategic planning and development framework for Ireland and its regions for the years ahead. Heavy emphasis is put on better coordination (between national, regional and local authority) to avoid the mistakes made in the past. The Plan, a draft of which was published for consultation in September 2017, is intended to consider different dimensions (regional, social, economic and environmental) over a longer horizon.

A centrally-led review of capital programmes is meant to ensure coherence between local and national priorities.

Government's funding allocation in Ireland follows a review process led by the Department of Public Expenditure and Reform (DPER) on the basis of analysis undertaken by the newly established Irish Government's Economic and Evaluation Service (IGEES), central Government Departments and agencies with sectoral responsibilities. The analysis includes a detailed assessment of demand requirements and priorities for capital spending. Claims from sub-national government level are collected and managed by the Department of the Environment, Community and Local Government. These departments also ensure that projects comply with the appropriate regulatory requirements including those related to planning law and environmental impact assessments.

Efforts to improve quality and effectiveness of public spending need to be supported with institutional reforms.

The Public Spending Code launched by the DPER in late 2013 is intended to improve project management. Its objective is to ensure a comprehensive and uniform approach to project appraisal and evaluation under the new Capital Plan. All Government Departments and agencies are responsible for ensuring that value for money appraisal and evaluation is carried out in relation to the planning, management and delivery of Government expenditure programmes and projects. ⁽²⁸³⁾ At any stage a project can be

⁽²⁸³⁾ For proposals over EUR 5 million, a preliminary appraisal should be undertaken by a Sponsoring Agency. The

abandoned if its continuation would not represent value for money. ⁽²⁸⁴⁾ Reforms also occurred in other government bodies and notably in the transport area, where the National Roads Authority and the Railway Procurement Agency were merged into the new Transport Infrastructure Ireland (TII). This new agency is now the core of expertise in Ireland for the planning, delivery and management of capital transport projects. It is intended to transfer the PPP procurement functions of the National Development Finance Agency into TII.

Despite the above described policy efforts, calls to prioritise on public investment have grown.

The most recent official budgetary plans imply that capital investment to GDP will remain subdued for the coming years. Business and employer associations have already stressed that they see a greater need for public sector infrastructure development on top of what is provided by the private sector. ⁽²⁸⁵⁾

Sponsoring Agency has the overall responsibility for the proper appraisal, planning and management of projects/schemes. Sponsoring Agencies are also responsible for post-project review. The Sponsoring Agency may be a Government Department, local authority, health agency, University or other State body. In some instances the Sponsoring Agency and the Sanctioning authority, in relation to individual projects, may be the same body, e.g. the National Roads Authority or non-Exchequer funded commercial State Companies.

⁽²⁸⁴⁾ The sequence of decisions is meant to lead to progressively greater commitment of resources, but an irrevocable commitment to a proposal should only be made after all appraisal stages have been passed, and final approval obtained by the Sanctioning Authorities. The Sanctioning Authority is responsible for granting the approvals required as projects/schemes, funded with public assistance, proceed through the project/expenditure life cycle. The Sanctioning Authority is normally the Government Minister or Department or public body with sectoral responsibility for implementing Government policy and for providing public financial assistance in that sector. In the case of major projects the sanctioning authority may be the Government. As a rule the Government will be the Sanctioning Authority for very large projects, costing more than EUR 100 million, but the Government could also be the Sanctioning Authority for projects below this value.

⁽²⁸⁵⁾ In a recent publication, the national authorities estimated that the existence of an expenditure rule at the EU level had decreased the ratio of gross fixed capital formation to GDP by almost 0.6%, which was reported to be robust and statistically significant across all their estimated models. See for details: Department of Public Expenditure and Reform (2016). However, it is worth recalling that, while EU rules already take into account some degree of flexibility, at the same time they allow to increase investment spending as long as it is financed by raising

4.2.5. Romania

Romania, as one of the catching-up economies in the EU, has one of the highest public investment ratios both before and after the crisis. Public investment exceeded 6% of GDP before the outbreak of the crisis in 2008, well above the EU average for the same period (Table IV.4.1). Despite the sharp correction observed in 2016, which is mainly due to the end of the 2007-2013 programming period and the slow start of the new generation of European Structural and Investment Funds (ESIF) supported programmes, Romania's long term average remains above that of the EU. The central government still accounts for nearly 50% of the total public investment over 2013-2016 despite a decentralisation movement since the pre-crisis period (Graph IV.4.1).

EU funds account for a significant share of public investment in Romania despite the delayed start of the new generation of EU-funded programmes.⁽²⁸⁶⁾ The share of EU-funded investment over total general government investment stood at more than 35% on average between 2013 and 2016, despite the drop observed in 2016. This decline is nevertheless expected to be reversed in the future once the implementation of the current generation of EU-funded programmes picks up.⁽²⁸⁷⁾

Long-term planning of public investment spending was enhanced but results are still to come. In key infrastructure such as transport and networks, a strategic framework for investment is either non-existent or fragmented and often dependant on changing political priorities. A Public Investment Evaluation Unit was set up in 2013 within the Ministry of Finance with the aim to evaluate and prioritise large infrastructure projects. The Unit became functional in 2016 and this is a first step to address the lack of planning, prioritisation, implementation and monitoring of

investment projects. Its role has been positive in amending the relevant legislation to oblige line ministries to finance the most important projects according to the prioritisation.⁽²⁸⁸⁾ The Unit's role is to maintain and update annually the criteria to define the list of large projects (currently 123 of them) receiving financing either from the state budget, EU funds or both. In this context, the Unit also started a pilot project aiming to define a new methodology for rationalizing investments. However, the allocation of funds by line ministries to the many projects in the priority list remains under their appreciation within the legal framework. Control over whether the choice of projects follows the prioritisation is ensured by the Court of Auditors and the Economic and Financial Inspection division from the Ministry of Finance upon input of the above-mentioned Unit. Whether actually the control is put in place and pressure on line ministries towards the prioritization is exerted, requires thereby constant will by the finance minister. Notwithstanding these positive developments, the list of priority projects is still very long and contains 50 projects that are older than 10 years.

A partnership agreement setting out the planned use of the ESI Funds sought to partly address the lack of strategic focus. The partnership agreement, signed with the Commission ahead of the implementation of the new seven-year programme period for 2014-2020, seeks to concentrate resources on a limited number of clearly defined thematic objectives. To ensure an efficient and effective use of ESI funds, a set of *ex ante* conditionality conditions (EACs) had to be fulfilled at an early stage of the programming period. The EACs requested not only the improvement of the framework conditions for investment, such as public procurement, but also the preparation of long-term strategic plans for sectors such as transport, public administration and health.

The implementation of EACs has stimulated reforms, but progress remains slow. While EACs helped steering structural reforms in Romania over recent years, the country still faces

revenues or reducing other expenditure. Similar considerations have been presented by the annual report of the Irish fiscal council (Irish Fiscal Advisory Council, 2016) who emphasizes the need to carefully balance the desires for relaxed rules on capital spending with the sustainability of public finances, given the need to bring the debt down and to provision for future demographic pressures.

⁽²⁸⁶⁾ "EU funds" include ESI Funds as well as other directly managed EU funds.

⁽²⁸⁷⁾ For a discussion on the role of EU funds supporting public investments in a regional perspective, see European Commission (2016a).

⁽²⁸⁸⁾ The ranking of the largest projects for Romania decided by the government is based on a set of efficiency indicators developed by the Unit on the basis of a score assigned by the line ministries. New projects can be considered by line ministries when promoted through a specific legal procedure.

difficulties in implementing a number of EACs in areas such as public procurement, transport, environment, research infrastructure and public administration. The execution of the action plans for the fulfilment of these EACs is significantly delayed (formal deadline was December 2016) and this could result in the suspension of payments to a number of operational programmes.

The difficulties in fulfilling the EACs reflect a broader difficulty in planning on a longer-term horizon. This is a key element for the preparation and implementation of large infrastructure projects whose life cycles are longer than the political ones. As a consequence, Romania is currently facing a worrying paradox: despite the very high need for infrastructure development, there are very few mature investment projects in the pipeline to be supported by EU funds or other sources such as the EIB.

The financing from ESI Funds requires (close) monitoring. As for other EU Member States, the implementation of ESI funds is managed jointly by the Commission and Romania. In order to monitor progress towards the objectives defined at the beginning of the programming period, each operational programme uses a set of indicators for which clear and measurable milestones and targets are defined. Progress is reported annually by the Member States. In 2019, the Commission will review the performance of all operational programmes up to the end of 2018. Following this performance review a performance reserve of 5–7% shall be allocated to the programmes that had achieved their milestones at the end of 2018.

The setting up of the National Programme for Local development (PNDL) seeks to tackle the fragmentation of investment spending by local authorities. The PNDL represents one of the main public investment tools financed by the state budget, under the management of the Ministry of Regional Development and Public Administration (MDRAP). The programme was created in 2013 by grouping several investment programmes financing local infrastructures which were previously independent from one another. The PNDL generally finances small and medium size infrastructure projects that do not fulfil the eligibility criteria for EU funds. Similarly to the operational programmes financed by ESI Funds, the PNDL is a multiannual programme, though not framed by multi-annual financial programming, unlike EU-funded programmes.

At national level the disbursement of funds to local authorities seems to be impacted to a large extent by political considerations. The selection process of local investment projects financed through transfers from the state budget could benefit from higher transparency. Decisions approving the disbursement of financing appear at times to be timed with the political calendar or other short-term priorities unrelated to technical aspects.

The implementation of the 2014-2020 ESI funds programmes started with a considerable delay. This delay is mainly due to the late adoption of the new legal basis, delays in the implementation of previous programmes and lack of viable new projects. The managing and certifying authorities have been only notified in the summer 2017, which means that Romania can now submit payment application for eligible expenditure actually incurred on the ground (interim payments). The accumulated delays could elevate the risk of lost development opportunities against the backdrop of the de-commitment rule applicable to ESI Funds.⁽²⁸⁹⁾ The purpose of the rule is to ensure that implementation of projects progresses at a reasonable speed. Such a mechanism does not appear to exist for the investment programmes financed exclusively from the state budget.

Low implementation rates for ESI funds together with high investment rates at national level suggest the existence of a substitution effect. The funding made available via the ESI funds is meant to reduce economic, social and territorial disparities, complementing national sources. The very low absorption so far (reimbursements of expenditure were approximately 8% of the ESIF envelope for Romania against some 11% for EU overall) in the context of an insufficient and largely inadequate infrastructure raises several questions regarding the administrative capacity of national authorities in applying the rules governing access to ESI funds.

⁽²⁸⁹⁾ Funds made available under the ESI Funds are subject to an automatic de-commitment rule which foresees that a commitment made in year N has to be covered by pre-financing and interim payments by the end of year N+3. The amount unclaimed is lost for the Member State concerned.

5. CONCLUSIONS

Government investment remains at the top of the policy agenda in the EU. Last year's edition of the Report on Public Finance in EMU dedicated a full part to government investment. It concluded to the existence of investment gaps in the EU and that higher investment was needed to achieve both short and long term benefits. The current edition of the report analyses possible drivers for such poor increase in government investments, with a focus on the role of key institutional factors, the institutional arrangements across levels of government, the quality of governance and national fiscal rules.

Governance quality is a key element to improve the value for money. This is the case both at the national and the sub-national level in all Member States. Improvements are possible in all phases of the investment process, in particular with respect to the administrative capacity, coordination, evaluation, secured plurennial financing, as exemplified in the selected case studies.

Sub-national governments are at the forefront of public investment. Sub-national authorities are major providers of public investment but rely for a sizeable share on central government financing. Local governance, institutional arrangements and coordination across levels of governance are therefore key elements for the proper provision of public investment.

A solid fiscal framework can support public investment. Government investment is hampered by high debt levels and used as an adjustment variable in times of fiscal consolidation. On the contrary, strengthened fiscal rules mitigate the depressionary effect of public debt and allow for a smooth financing of public investment.

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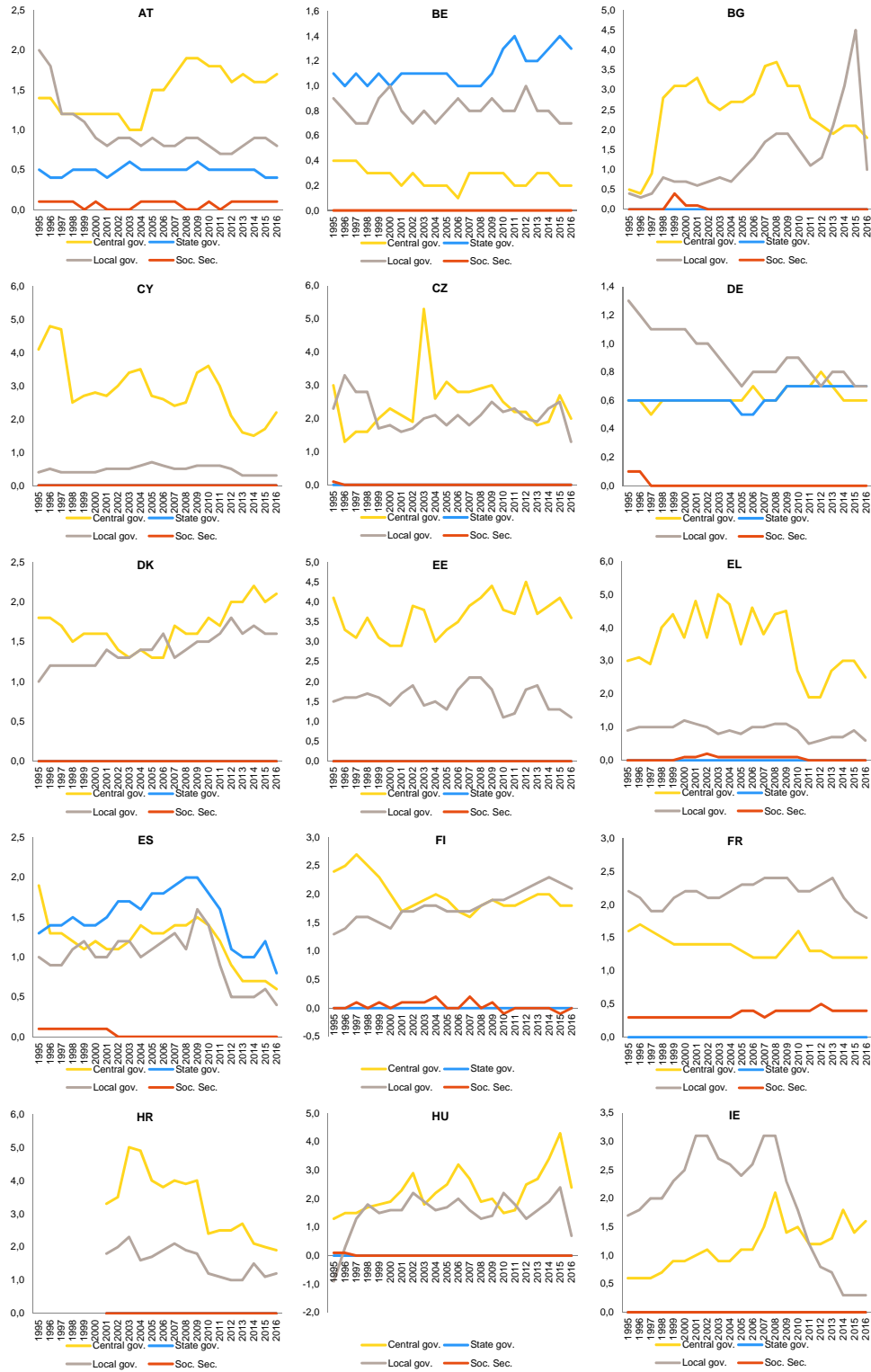
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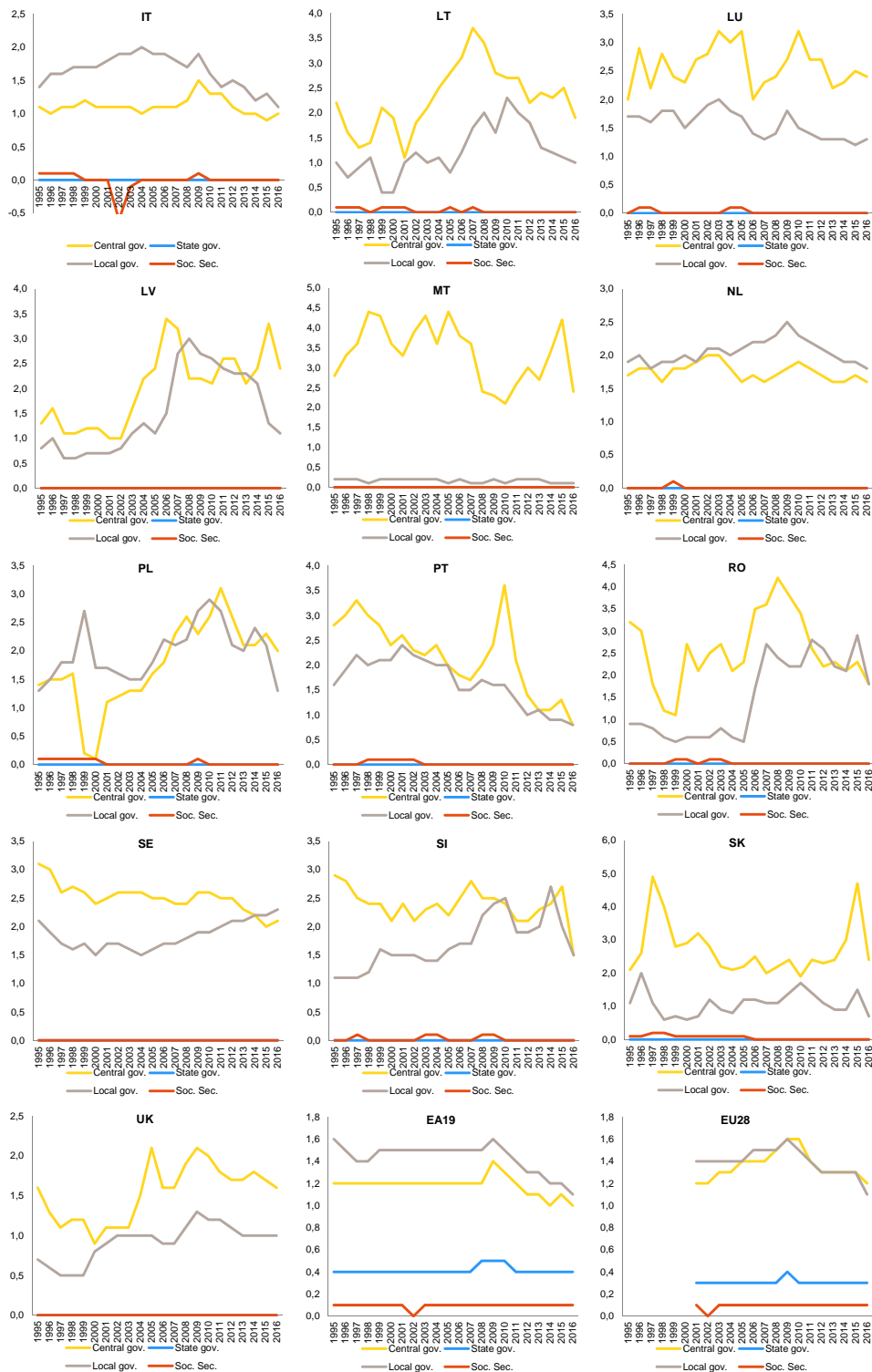
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ANNEX 1

Public investment (% of GDP) by the different levels of government in the EU countries

Graph IV.A1.1: Public investment (% of GDP) by the different levels of government in the EU countries



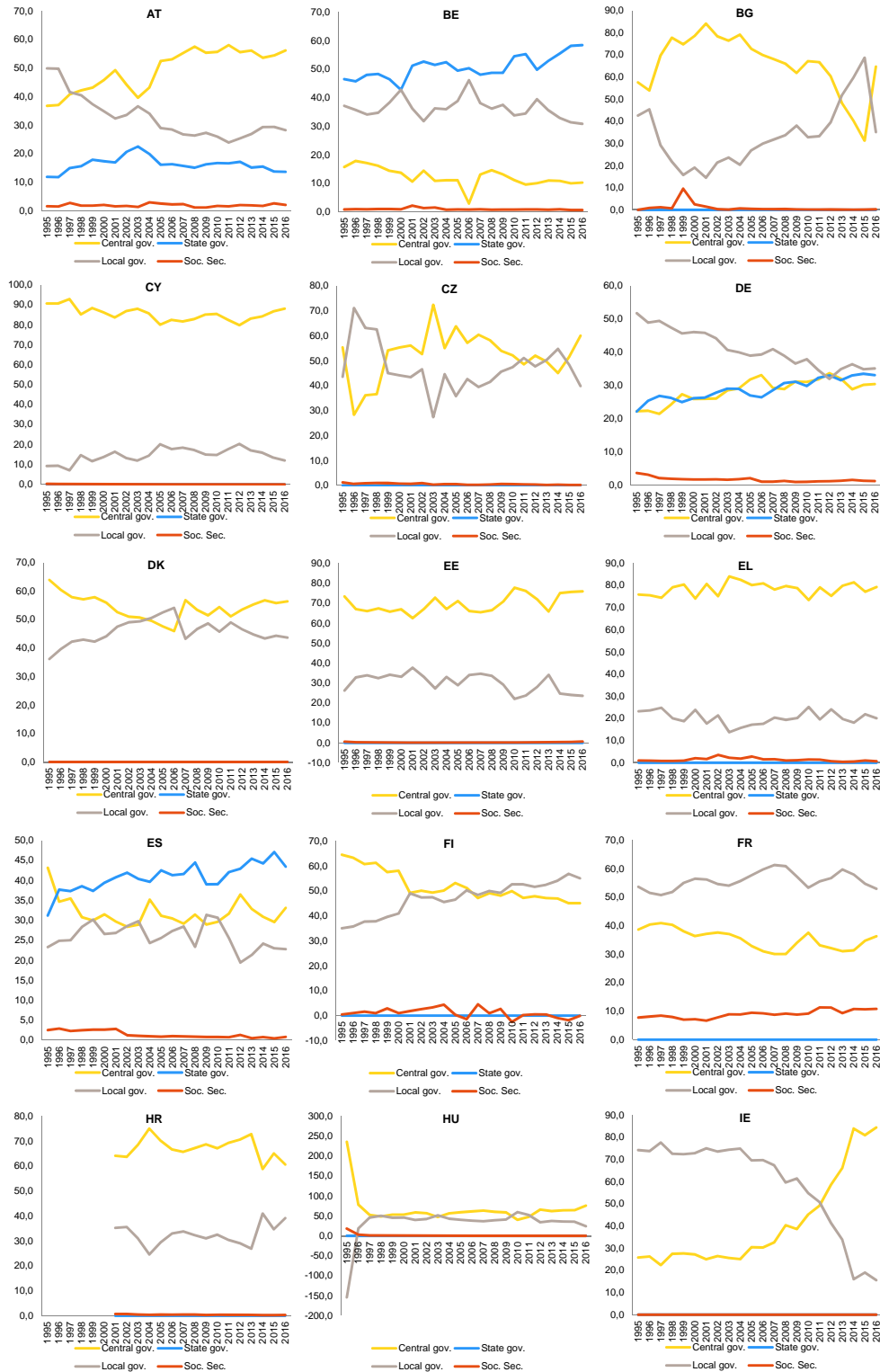


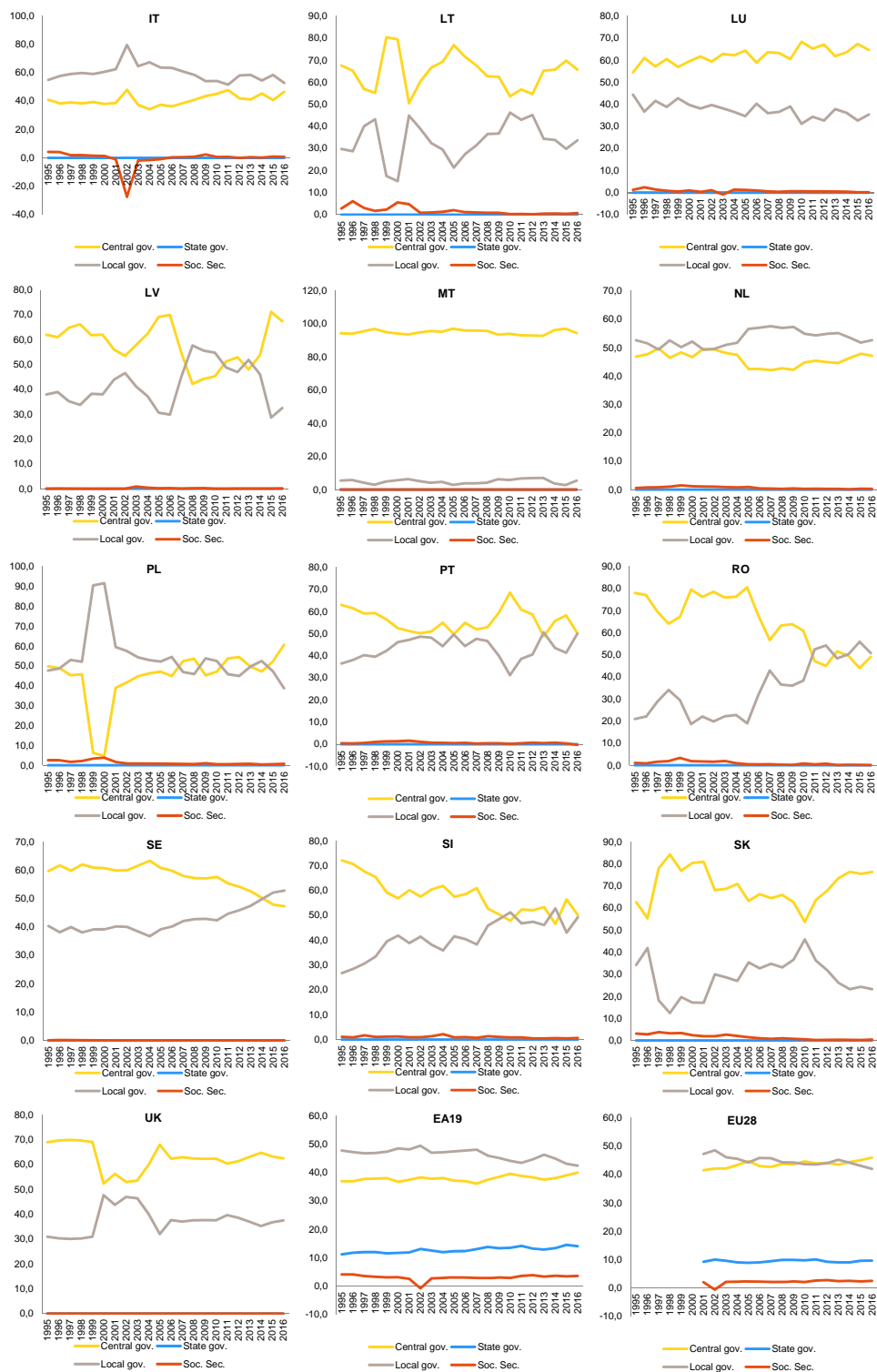
Note: State government is the federated state level where applicable, local government combines regional and municipal authorities.
Source: Eurostat.

ANNEX 2

Shares of public investment by the different levels of government in the EU countries

Graph IV.A2.1: Shares of public investment by the different levels of government in the EU countries





Note: State government is the federated state level where applicable, local government combines regional and municipal authorities.
Source: Eurostat.

ANNEX 3

Synoptic literature review of public investment drivers

Table IV.A3.1: Synoptic literature review of public investment drivers

| Authors | Variables used | Method | Sample and Horizon |
|----------------------------------|---|--|---|
| <i>Government</i> | | | |
| De Haan, Sturm and Sikken (1996) | Lagged investment ratio Lagged investment share of total expenditure Real growth rate Growth rate of civil servants Fiscal stringency dummy Structural deficit Political cohesion index Colour of government Political stability Private investment Centralization of taxes Election year | Panel analysis | 22 OECD countries for 1980–1992 |
| Rodrik (1998) | Per capita GDP Dependency ratio in the population Urbanization rate Dummy for socialist countries Dummy for OECD members Dummies for geographical regions Ratio of trade to GDP | Panel fixed effect | Penn world countries (version 5.6a) 1985–89 1990–92 |
| Sturm (2001) | *Structural variables degree of urbanization population growth *Economic variables real economic growth government budget deficit government debt interest payment of government private investment foreign aid openness foreign direct investment *Politico-institutional variables: Ideology electoral cycles coalition variables Economic and political freedom Political instability | Panel fixed effect | 123 non-OECD countries |
| Gali and Perotti (2003) | Output gap General government debt to potential GDP ratio | Panel fixed effect | 19 OECD countries 1980-2002 |
| Turrini (2004) | Per-capita trend real GDP Output gap Adjusted tax revenues over trend real GDP Current expenditure over trend real GDP Debt gross of interest expenditure over trend real GDP Primary CAB over trend real GDP | Panel fixed effects | 14 EU countries 1970-2002 |
| Mehrotra and Väilä (2006) | Net lending Real GDP Long-term interest rate Public debt Net lending Current disbursement and revenues Output gap EMU dummy | Panel fixed effect Cointegration analysis | EU14 1970-2003 |

(Continued on the next page)

Table (continued)

| | | | |
|--|---|---------------------|--|
| Heinemann (2006) | GDP OECD Debt-GDP-level Unemployment rate OECD Output gap OECD Real interest rates Government receipts/GDP OECD Index financial market regulation Years since liberalisation of capital account transactions FDI/GDP Capital flows/GDP Openness, (imports + exports)/GDP Property income received by the government *Proxies return on investment Fertility rate Population share<14 years Government net capital stock/GDP GDP p.c. (in PPP) USD *Proxies political stability Polarization Share government seats Dropping veto players *Election cycle Years left in current term Election year *Political preferences: Dummy left leading government party Dummy right leading government party *Country groupings EU and EMU member dummies post-Maastricht dummy EMU qualification dummy | Panel fixed effect | 20 OECD countries 1961-2001 |
| Vuchelen and Caekelbergh (2010) | * Consolidation process Interest payments Deficit Primary deficit Debt *Stabilization goal Cyclically adjusted total deficit Cyclically adjusted primary deficit * Discontent of voters Expenditure gap variables | OLS | 14EU countries 1972-2004 |
| Keman (2010) | Public expenditure on investment (1980) Investment expenditure change (1980-2004) Inflation Z-scores Deficit Spending Z-scores Gross Public Debt Z-scores Change in welfare spending(1980-2004) Left policy legacy (1951-1980) Right parties in the government (1980-2004) | OLS | 18 OECD 1980-2004 |
| Bacchiocchi, Borghi and Missale (2011) | General government gross financial liabilities Real GDP growth Output gap Deficit ratio | Panel fixed effects | 29 OECD countries 1990–2008 |
| Grigoli and Mills (2014) | Institutional quality Population Leftist party Investment price relative to US GDP growth per capita (in PPP) Ongoing conflicts ODA (net disbursements as a share of GDP) Volatility of public revenues Rents from natural resources | SYS-GMM | 144 countries over the period 1984–2008 |

(Continued on the next page)

Table (continued)

| | | | |
|---|---|--|--|
| Afonso and Jalles (2015) | LHS = public and private investment (in % of GDP) Public revenue and expenditure variables by categories (controls: Real GDP per capita, age dependency ratio, labour force participation rate, and population growth) | Panel fixed effect and SYS-GMM | 95 countries 1970-2008 |
| Jäger and Schmidt (2016) | Elderly voter share Debt-to-GDP ratio Real GDP per capita Total population | Pooled D-OLS and FM-OLS | EU13 1971 - 2007 |
| Economy | | | |
| Baldi et al (2014) | GDP per capita ppp Real growth Saving rate Employment rate Industry rate Market capitalization Loans by domestic banks to the private sectors Real effective exchange rate Inflation rate | Panel analysis | 33 OECD countries 1999-2012 |
| Regional level | | | |
| Kappeler and Väilä (2008) | LHS = GG investment for 4 COFOG functions share of tax revenue attributed to sub-national levels of government (regional and local governments) investment grants from the central government to sub-national levels of government (cap) GDP per capita Public debt and deficit Population density (ns: unemployment, birth rates, migration rates, and mortality rates) | GMM | EU10 countries (EU15 less the Cohesion countries less Luxembourg) during the period 1990–2005 (unbalanced) |
| Kappeler, Solé-Ollé, Stephan and Väilä (2013) | LHS = SNG investment in (1) Economic affairs (transport) (2) Redistribution (investment in housing, recreation and social protection) Tax decentralisation Capital grants GDP per capita Public debt and deficit | Corrected Least Squares Dummy Variable (LSDVC) | 20 European countries over the period 1990–2009 (unbalanced) |
| Becker, Egger and von Ehrlich (2013) | LHS= regional investment per capita or GDP growth per capita EU funds (Objective 1) Human Capital Quality of government | Pooled OLS and panel fixed effects Regression discontinuity design (RDD) heterogeneous local average treatment effects (HLATE) | 186 to 251 NUTS2 regions; EU programming periods: 1989–1993, 1994–1999, and 2000–2006 |
| Rodríguez-Pose and Garcilazo (2013) | LHS = regional growth EU structural and cohesion policy funds with interaction term with quality of governance (controls: motorway km per capita, education, employment rate and density, GDP per capita) | two-way fixed effect panel regression model | 169 European regions during the period 1996 to 2007 |
| Crescenzi, Di Cataldo and Rodríguez-Pose (2016) | LHS = regional growth Transport infrastructure investment with interaction term with quality of governance (controls: region and year dummies, population, human capital, employment in agriculture, patents) | Panel fixed effects | 166 European regions, period 1995–2009 |

Source: Authors' elaboration.

ANNEX 4

Additional tables to Chapter IV.3.

Table IV.A4.1: Summary statistics

| Variable | Source | Unit | Obs | Mean | Std. Dev. | Min | Max |
|--|--------------------------------|--|-----|------|-----------|-------|-------|
| Fiscal variables | | | | | | | |
| Public investment | Ameco | % GDP | 610 | 3,7 | 1,1 | 0,6 | 7,3 |
| Public debt | Ameco | % GDP | 609 | 55,4 | 32,3 | 3,7 | 179,7 |
| Headline balance | Ameco | % GDP | 609 | -2,8 | 3,3 | -15,1 | 6,9 |
| Primary balance | Ameco | % GDP | 609 | -0,1 | 3,2 | -12,5 | 9,6 |
| Total revenue | Ameco | % GDP | 610 | 42,0 | 6,5 | 27,5 | 58,4 |
| Total expenditure | Ameco | % GDP | 610 | 44,9 | 6,7 | 28,0 | 65,3 |
| Macro control variable | | | | | | | |
| Real GDP per capita | Ameco | 1,000 US Dollar | 588 | 29,6 | 19,9 | 3,8 | 111,1 |
| Output gap | Ameco | in % | 594 | -0,2 | 3,2 | -14,5 | 14,4 |
| Long-term interer rate | Ameco | in % | 533 | 2,4 | 3,0 | -12,4 | 24,5 |
| Pop share > 65 | Ameco | % tot. population | 588 | 15,8 | 2,5 | 10,1 | 22,4 |
| Political economy control variables | | | | | | | |
| Election year | Comparative Political Data Set | | 560 | 25,0 | 30,8 | 0,0 | 99,5 |
| Govt. left | Comparative Political Data Set | cabinet posts of social democr. & other left parties in % of total cabinet posts | 555 | 21,5 | 19,6 | 0,0 | 65,9 |
| Dummy variables | | | | | | | |
| EA membership 2009-12 | | dummy (0, 1) | 616 | 0,4 | 0,5 | 0,0 | 1,0 |
| | | dummy (0, 1) | 616 | 0,2 | 0,4 | 0,0 | 1,0 |
| Interaction terms | | | | | | | |
| WB governance index (interpolated) | Worldbank | Index | 540 | 1,1 | 0,5 | -0,3 | 2,0 |
| Fiscal rules index | DG Ecfm | Index | 588 | 0,2 | 1,0 | -1,0 | 4,1 |

Note: The table shows the summary statistics for the sample of 28 EU countries for the time period 1995 to 2016 using annual data. The headline/primary balance for Ireland in 2010 of -32.1/-29.3% of GDP is considered to be an outlier and dropped from the whole regression analysis.

Source: Authors' elaboration.

Table IV.A4.2: Correlation matrix

| | Fiscal variables | Public investment | Public debt | Primary balance | Total revenue | Total expenditure | Macro variable | Real GDP per capita | Output gap | L-t interer rate | Pop share > 65 | Pol. economy variable | Election year | Govt. left | Dummy variables | EA membership | 2009-12 | Interaction terms | WB governance index | Fiscal rules index |
|---------------------------------|------------------|-------------------|-------------|-----------------|---------------|-------------------|----------------|---------------------|------------|------------------|----------------|-----------------------|---------------|------------|-----------------|---------------|---------|-------------------|---------------------|--------------------|
| Fiscal variables | | | | | | | | | | | | | | | | | | | | |
| Public investment | | 1 | | | | | | | | | | | | | | | | | | |
| Public debt | | -0,36 | 1 | | | | | | | | | | | | | | | | | |
| Primary balance | | -0,24 | -0,03 | 1 | | | | | | | | | | | | | | | | |
| Total revenue | | -0,09 | 0,32 | 0,34 | 1 | | | | | | | | | | | | | | | |
| Total expenditure | | -0,06 | 0,50 | -0,12 | 0,86 | 1 | | | | | | | | | | | | | | |
| Macro variable | | | | | | | | | | | | | | | | | | | | |
| Real GDP per capita | | -0,33 | 0,32 | 0,03 | 0,21 | 0,22 | 1 | | | | | | | | | | | | | |
| Output gap | | 0,14 | -0,31 | 0,34 | -0,10 | -0,29 | -0,02 | 1 | | | | | | | | | | | | |
| Long-term interer rate | | -0,17 | 0,33 | -0,23 | 0,06 | 0,26 | 0,00 | -0,55 | 1 | | | | | | | | | | | |
| Pop share > 65 | | 0,02 | 0,39 | 0,05 | 0,37 | 0,35 | 0,37 | -0,16 | -0,05 | 1 | | | | | | | | | | |
| Pol. economy variables | | | | | | | | | | | | | | | | | | | | |
| Election year | | 0,08 | -0,03 | -0,06 | -0,03 | 0,01 | -0,03 | 0,04 | 0,00 | 0,01 | | 1 | | | | | | | | |
| Govt. left | | -0,11 | 0,09 | 0,08 | 0,12 | 0,13 | 0,09 | 0,03 | 0,09 | 0,04 | | -0,01 | 1 | | | | | | | |
| Dummy variables | | | | | | | | | | | | | | | | | | | | |
| EA membership | | -0,16 | 0,39 | 0,03 | 0,21 | 0,18 | 0,27 | -0,07 | -0,04 | 0,28 | | -0,01 | 0,01 | | 1 | | | | | |
| 2009-12 | | 0,10 | 0,10 | -0,43 | -0,01 | 0,16 | 0,02 | -0,37 | 0,21 | 0,20 | | 0,05 | -0,18 | | 0,16 | 1 | | | | |
| Interaction terms | | | | | | | | | | | | | | | | | | | | |
| WB governance index (interpol.) | | -0,19 | -0,05 | 0,33 | 0,51 | 0,31 | 0,21 | 0,09 | -0,11 | -0,07 | | -0,03 | 0,06 | | 0,29 | -0,01 | | | 1 | |
| Fiscal rules index | | -0,09 | 0,04 | 0,11 | 0,19 | 0,06 | 0,28 | -0,16 | -0,12 | 0,42 | | -0,06 | 0,02 | | 0,19 | 0,04 | | | 0,16 | 1 |

Note: The table shows the correlation matrix for the sample of 28 EU countries for the time period 1995 to 2016 using annual data. The headline/primary balance for Ireland in 2010 of -32.1/-29.3% of GDP is considered to be an outlier and dropped from the whole regression analysis.

Source: Authors' elaboration.