Investing in Public Infrastructure in Europe

A local economy perspective



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The study is printed in this form to communicate the result of an analytical work with the objective of generating further discussions on the issue.

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Abbreviations and acronyms

AC	Administrative Council
CEB	Council of Europe Development Bank
DFIs	Development Finance Institutions
EBRD	European Bank for Reconstruction and Development
EEA	European Environment Agency
EIB	European Investment Bank
ESIF	European Structural and Investment Funds
EU	European Union
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
ICT	Information and Communication Technologies
IFI(s)	International Financial Institution(s)
ILB	Investitionsbank des Landes Brandenburg
IPCC	Intergovernmental Panel on Climate Change
NIB	Nordic Investment Bank
OECD	Organisation for Economic Co-operation and Development
PLN	Polish Zloty
PPPs	Public-Private Partnerships
QPIBs	Qualified Public Infrastructure Bonds
SIBs	Social Impact Bonds
SMEs	Small and medium-sized enterprises
TIF	Tax Increment Financing
UNECE	Unites Nations Economic Commission for Europe
WBIF	Western Balkans Investment Framework

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Executive summary

Public infrastructure and the role of the local economy

1. Public infrastructure can come in two forms, either ***economic*** (transport, utilities, telecommunications) or ***social*** (education, health, community services). Effective public infrastructure has far reaching implications in helping a country achieve its economic and social development goals. It has historically been a primary input in reducing production costs for firms, advancing human capital development, and progressing social welfare.

2. In Europe, local governments play an especially important role in public infrastructure investment, accounting, on average, for more than half of public investment in 2015. Relative to the central governments, local governments tend to disproportionately invest in "social" public infrastructure (for example social housing, environmental protection, community services, etc.). However, the degree of decentralisation (the power of local governments to make infrastructure investment decisions) is highly diverse in Europe – reflected by the fact that in some countries, local governments heavily depend on central government transfers, which often has a bearing on local investment priorities.

There has been a slow and uneven recovery in public investment since 2009

3. In Europe, public investment levels were, on average, 10.8% lower in 2015 than the 2009 peaks. While all levels of government saw public investment decline below pre-crisis peaks in 2015, local government levels were noticeably lower (down 12%) than those of central government (down 8.1%). No full public investment recovery is expected in the foreseeable future. However, given the diversity of Europe, some countries have fared better, seeing government investment recover to pre-recession levels due to better underlying macro-economic conditions (only a few countries have surpassed pre-crisis levels).

4. These uneven public investment recoveries are the result of some countries facing much harsher economic headwinds (expressed in large GDP growth rate declines) and over inflated budget deficits which have had to be tempered – all of which has negatively affected public investment growth.

   This paper has established five distinct categories based on such factors since 2009:

   - ***Group 1*** *(severe GDP and public investment decline)*: Spain, Cyprus, Ireland, Portugal, Greece, Croatia, Italy.
   - ***Group 2*** *(less severe GDP and public investment decline)*: France, Netherlands, Czech Republic, Lithuania, Slovenia, Estonia, Austria, Germany, Romania, Poland.
   - ***Group 3*** *(weak GDP and public investment recovery)*: Latvia, Belgium, Finland, Bulgaria, Norway.
   - ***Group 4*** *(weak GDP recovery but strong public investment growth)*: Denmark, Slovak Republic, Hungary.
   - ***Group 5*** *(strong GDP recovery but weak public investment recovery)*: United Kingdom, Iceland, Sweden, Switzerland.

5. Moreover, the public capital stock (the accumulate stock of all public infrastructure) is beginning to drop in many countries, after years of weakening public investment in infrastructure (aside from Group 3 which is seeing public capital stock on the rise). This deterioration may result in sub-optimal delivery of public services in the near future.

CEB financing: experience to date and the way ahead

6. Since its creation in 1956, the Council of Europe Development Bank (CEB) has financed social investment projects in European urban and rural areas. The CEB finances projects involving the construction or rehabilitation of infrastructure in the fields of urban renewal and rural modernisation in favour of public and private entities at national or local level. Given its social mandate, the CEB targets dilapidated neighbourhoods, peripheral districts or cities lacking in urban infrastructure, and social and cultural amenities. In addition, improving living conditions in rural areas contributes to a higher standard of living and decreases the population drain from these areas into cities. Over the period 1957-2016, the total volume of projects approved in this sector amounts to € 9 billion, representing 15% of all loans approved.

7. The scale of needs in the local infrastructure sector across Europe is particularly large, given increasing urbanisation, changing demographics, shifting migration patterns, and rising pressures from climate change. Investment in this sector should thus be a driving force in the current challenging environment, with the clear objective of improving people's welfare and quality of life. In this respect, regional and local authorities have a huge potential to revive infrastructure investment as they play a key role in financing and managing public investment programmes. Admittedly, this potential will have to be carefully considered based on a proper assessment of infrastructure needs and of the capacity of sub-national governments to provide financing without compromising their fiscal sustainability.

8. In the coming years, the CEB will be responding to local investment needs in all its member countries. From a geographic standpoint, the focus of CEB action could be placed on the countries that have experienced the most severe decline and weakest recovery in public capital investment since 2009 (Groups 1 and 2). From a sectoral standpoint, the CEB will examine the possibility of providing financing in the following areas: urban and rural investment in infrastructure and services, "silver economy", migrant integration, urban and rural adaptation to climate change. Given its social mandate, the CEB will be giving special attention to vulnerable and marginalised groups in society such as low-income households, the unemployed, the frail elderly, people with disabilities or chronic diseases, ethnic minorities and migrants.

9. As the only development bank with an exclusively social vocation in Europe, the CEB will thus continue to finance adequate, affordable and sustainable local infrastructure and services across its member countries, with a particular focus on the neediest areas. In so doing, the CEB will be making its contribution to the United Nations 2030 Agenda for Sustainable Development and particularly to Goal 11: "Make cities and human settlements inclusive, safe, resilient and sustainable".

Introduction

Investments in modern and well-functioning infrastructure are regarded as the foundations for sustainable and inclusive development and growth. The academic literature shows that well-designed infrastructure investments create long-term economic and social benefits and positive spill-over effects in the economy. The weak recovery in infrastructure investment in Europe since the financial crisis in 2008 has thus been a major concern. The scale of needs in the local infrastructure sector across Europe is particularly large, given increasing urbanisation, changing demographics, shifting migration patterns, and rising pressures from climate change. Investment in this sector should thus be a driving force in the current challenging environment, with a focus on people's welfare and quality of life.

Since its creation in 1956, the Council of Europe Development Bank (CEB) has financed social investment projects in European urban and rural areas. The CEB's investments in local infrastructure – involving the construction or rehabilitation of schools, playgrounds, green areas, libraries, medical and social care facilities, social aid centres, housing and local transport – contribute to delivering affordable and sustainable essential services to local populations. Given its social mandate, the CEB targets dilapidated neighbourhoods, peripheral districts or cities lacking in urban infrastructure, and social and cultural amenities. In addition, improving living conditions in rural areas contributes to a higher standard of living and decreases the population outflows from these areas into cities. Creating a more attractive, inclusive and sustainable living environment is therefore key not only to improving the conditions and quality of urban and rural life, but also to establishing a more dynamic local economic base, spurring stronger social and cultural identities and creating thriving communities. At a time when cuts in public spending risk exacerbating rising inequalities, CEB funding makes sure that vital public services continue to be provided.

This study presents an overview of the CEB's long-standing experience in improving the living conditions in urban and rural areas in Europe. It also assesses recent trends and challenges in the provision and financing of local infrastructure across CEB member states and their implications for future lending to this sector.

The study is divided into three main parts.

Part I: **A primer to public infrastructure in Europe**

Chapter 1 briefly describes the main characteristics and benefits of public infrastructure. Chapter 2 then looks at capital stocks across CEB member countries, which are grouped into five clusters based on their respective performance in terms of GDP growth, fiscal stance and government infrastructure investment.

Part II: **Trends and challenges in the provision and financing of local infrastructure**

Chapters 3 & 4 analyse how the infrastructure investment landscape is changing. Chapter 3 describes the various financing channels for local infrastructure investments and their evolution in the current context. Chapter 4 presents some of the demographic, socio-economic and environmental trends that are likely to reshape the provision and financing of local infrastructure across CEB countries in the near future. On the one hand, urban and rural areas will have to address numerous challenges resulting from urbanisation, changing demographics, rising pressures from climate change, etc. On the other hand, these trends will create substantial new costs, thus challenging the fiscal sustainability of local governments, and leading to greater involvement of the private sector in the provision and financing of local infrastructure.

Part III: **CEB financing: experience to date and the way ahead**

Chapter 5 describes the CEB's approach to and its long-standing experience in financing projects in the "Improving living conditions in urban and rural areas" sector. The portfolio of projects financed by the CEB is illustrated by case studies, highlighting the Bank's social value in this sector of action. To conclude, Chapter 6 discusses the CEB's relevance in the context of the challenges described in Part II and reflects on potential avenues for the Bank's continued investment in local infrastructure in CEB member countries.

PART I: A primer to public infrastructure in Europe

Part I provides the general framework for the assessment of public infrastructure in Europe. Chapter 1 briefly describes the main characteristics and benefits of public infrastructure. Chapter 2 then examines the recent evolution of public capital stocks across CEB member countries, which are grouped into five clusters based on their respective performance in terms of GDP growth, fiscal stance and government infrastructure investment. Special attention is given to government investment, at both central and local levels, and its variations across country groups.

Box 1: CEB sectoral lines of action

Set up by the Committee of Ministers of the Council of Europe in 1956 as the Council of Europe Resettlement Fund for National Refugees and Over-Population in Europe, the CEB is the oldest IFI and the only development bank with an exclusively social mandate in Europe.

With a mandate to operate in its 41 member states[1] and a particular focus on the countries in Central, Eastern and South Eastern Europe, known as "target countries", the CEB has become an important financial tool within the framework of European solidarity.

The Bank's original mandate was to respond to emergency situations, with aid to refugees, migrants, displaced persons and victims of natural or ecological disasters being a statutory priority (Article II of the Articles of Agreement). The Bank's scope of action has progressively widened to include other sectors that directly contribute to strengthening social cohesion in Europe.

CEB lending is structured around three sectoral lines of action:

- Sustainable and inclusive growth with emphasis on socially oriented components and particularly on public infrastructure with a social vocation, job creation and preservation, access to the labour market, housing and the integration of vulnerable groups
- Integration of refugees, displaced persons and migrants
- Climate action: developing mitigation and adaptation measures.

These sectoral lines of action reflect both the CEB's specific social mandate and the logic underpinning its activity in the following sectors of action:

- Aid to refugees, migrants, displaced persons and other vulnerable groups
- Social housing for low-income persons
- **Improving living conditions in urban and rural areas**
- Natural or ecological disasters
- Protection of the environment
- Protection and rehabilitation of historic and cultural heritage
- Health
- Education and vocational training
- Administrative and judicial infrastructure
- Supporting MSMEs for the creation and preservation of viable jobs.

The CEB's approach to "Improving the living conditions in urban and rural areas" sector and its scope of action in this field are defined in the "Loan and Project Financing Policy" (updated in November 2016), available on the CEB's website.

1. **Albania**, **Bosnia and Herzegovina**, Belgium, **Bulgaria**, **Croatia**, **Cyprus**, **Czech Republic**, Denmark, **Estonia**, Finland, France, **Georgia**, Germany, Greece, Holy See, **Hungary**, Iceland, Ireland, Italy, **Kosovo**, **Latvia**, **Lithuania**, Liechtenstein, Luxembourg, **Malta**, **Republic of Moldova**, **Montenegro**, Netherlands, Norway, **Poland**, Portugal, **Romania**, San Marino, **Serbia**, **Slovak Republic**, **Slovenia**, Spain, Sweden, Switzerland, **"the former Yugoslav Republic of Macedonia"**, **Turkey**.
Note: Countries in bold are the CEB's target countries in Central, Eastern and South-Eastern Europe.

Chapter 1: Characterising public infrastructure

This chapter briefly defines what public infrastructure is, how it is a distinct type of capital investment, and the role local governments play in providing it. Public infrastructure is particular in that it is provided to everyone within a country and generates considerable economic and societal benefits.

▪ The varied forms of infrastructure

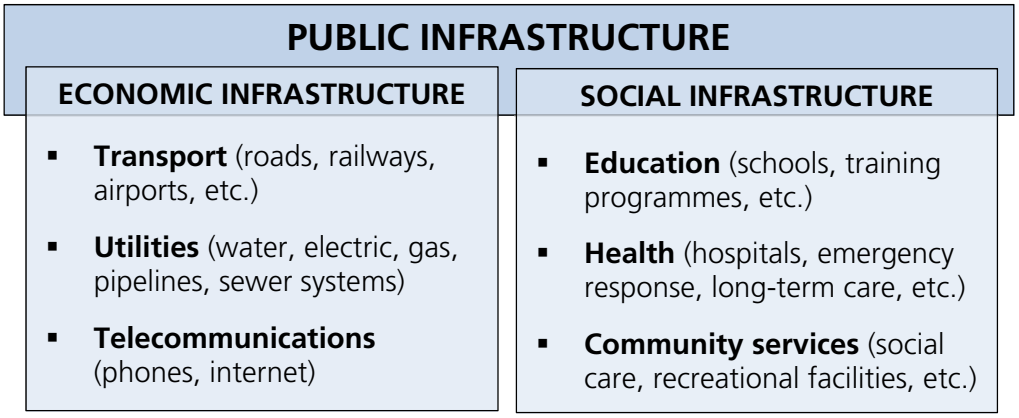
The broad nature of public infrastructure has no universally accepted definition. Over two decades ago, it was confined to mean "large capital intensive natural monopolies such as highways, other transportation facilities, water and sewer lines, and communication systems".[2] Any other form of infrastructure that focused on human capital or research and development investment fell into a wider and less accepted definition. Today, its meaning has broadened significantly. This chapter will define the theoretical underpinnings of public infrastructure, without making a distinction between local and central public infrastructure because there are no qualitative differences, other than size and the level of government providing it.

Public infrastructure can be characterised as the physical assets created by public investment that provide basic services for industry and households. These services can be classified as one of two types of infrastructure; *economic* or *social*[3] (see Figure 1.1 for detailed examples):

- **Economic infrastructure** comprises of fixed assets that primarily serve as common inputs used to produce goods and services by industry. The scope and effective delivery of economic infrastructure can have a large effect on the efficiency of industry, production costs, and final production output. This category includes transportation related services, utilities and telecommunications (see Figure 1.1).

- Similarly, **social infrastructure** can be categorised as public investments that serve public necessities such as education, health and community services. Although social infrastructure is less tangible than economic infrastructure, it does help develop a nation's human and social capital endowment. The former develops a healthy and educated skilled workforce, reduces firm costs (in the form of health expenditure and training) and increases productivity. The latter endowment creates a more socially cohesive society, where every citizen has equal access to the necessary amenities to lead a prosperous and fulfilling life.

Figure 1.1: The different types of public Infrastructure



▪ The uniqueness of public infrastructure

Historically, there has been much variation of how infrastructure should be defined, regarding its individual components and the form of capital it takes. Although no set definition exists, public infrastructure investments typically have several key components that make them a distinct form of capital:[4]

2. (Gramlich, 1994).
3. (IMF, Making Public Investment More Efficient – Staff Report, 2015); (Chan, Forwood, Roper, & Sayers, 2009).
4. (IMF, 2014b).

1. **A non-rival good** – A defining feature of public infrastructure is that when it is consumed or utilised by an individual or a firm, it does not prevent consumption by another person/firm (that is there is no rivalry for its use). In other words, most public infrastructure is "shareable" and its resources/services can be accessed by multiple users.

2. **Non-excludable** – Public infrastructure is also unique since, in some cases, those who do not pay for it are not excluded from utilising it. Within economics, the non-excludability of public goods implies that private actors would face difficulties in deriving an economic return.

3. **High initial investment costs** – The vastness and scope of public infrastructure implies high up-front costs (for example building motorways or electricity grids). Since the high initial costs are significant and the benefits and returns accrue over a long period of time (sometimes decades), the investment plans have to be carefully considered and implemented.

4. **Positive externalities/under-provision** – Public infrastructure often generates positive-externalities[5] and may create a situation where the benefits to society (for example schools, health services, roads, etc.) exceed the private returns that can be generated for a provider. Such a conflict may result in the under provision of an essential infrastructure investment if just left in the hands of the private sector. This has resulted in infrastructure historically being provided by the public sector.[6]

5. **Natural monopolies** – Public infrastructure investment can also generate increasing returns to scale because it often provides a universal service. Moreover, these investments are large in scale and capital intensive.[7] All of this may result in the establishment of a natural monopoly (where one provider controls the entire market, and thus supply and prices). Given the vastness of such projects, it is typically more cost-effective for certain public infrastructure to be provided by a single-entity (typically the public sector).[8]

It would be incorrect to define any public infrastructure simply as a public good, as no one service could meet that exact economic definition (transport networks for example are a quasi-public good: it benefits the society as a whole, but its increased usage results in congestion, which consequently results in decreasing economic returns). Equally, the defining characteristics of public infrastructure are not static. Technological changes or new policy approaches may change how public infrastructure is viewed (for example, technological development in telecommunications has helped minimise the costs associated with developing ICT infrastructure).

▪ The returns from public infrastructure

Effective public infrastructure has far reaching implications in helping a country achieve its economic and social development goals. It has historically been a primary input in reducing production costs for firms, advancing human capital development, and progressing social welfare.

Economic benefits

The positive economic benefits of public infrastructure have been well documented in economic literature. It is still hotly debated whether increasing infrastructure service is a precondition for economic growth, or conversely that economic growth encourages demand for infrastructure. It is beyond the scope of this study to resolve this question, and it will rest on existing literature on the economic returns to infrastructure.

From a conceptual and practical perspective, infrastructure investment tends to have both short-term and long-term benefits. The short-term effect is increasing aggregate demand through increased fiscal spending, which results in a fiscal-multiplier effect (for example, utilising private sector contractors to work on a project). A relative example to the EU is in the USA, where under various annual infrastructure investment scenarios, ranging from $18 billion to $250 billion, it could result in new job creation of between 216 000 to 3 million new jobs, respectively.[9] However, the government may be required to take on debt to finance the initial capital costs of a specific project. Paradoxically, if the initial fiscal multiplier or elasticity of revenues is great enough, GDP may grow faster than the initial uptake of debt, generating higher tax revenues which would in part compensate for the increase in public-spending.[10]

5. A positive externality is a benefit that an individual(s) obtains from an economic activity/decision that is unrelated to them. For example, social returns from investment in education and health; flood protection measures; environmental protection.
6. There are additional public sector methods to public infrastructure provision, such as public-private partnerships and regulated private entities.
7. (Otto & Voss, 1995).
8. (IMF, 2014b).
9. (Bivens, 2014).
10. (IMF, 2014b).

Public infrastructure's long-term benefits to the economy are extremely important. Public infrastructure can have a positive productivity effect on factors in production, especially when the factor of production and the infrastructure are complementary to one another. For example, building roads (the infrastructure) to remote areas may make capital investment (factor) there possible or providing services such as electricity/telecommunications (infrastructure) that enables innovative entrepreneurs to develop (factor) new technologies.[11] Moreover, as certain infrastructure services become more reliable, namely utility services such as electricity, firms are able to reduce investment in "infrastructure substitutes" (such as electricity generators used during service interruptions). The new-found surplus of resources can be utilised to invest in new productive activities.

Labour productivity benefits from improved general and public infrastructure. Reduced commuting times resulting from improved roads decrease the time employees take getting to work, as well as having the psychological benefit of reducing stress.[12] Moreover, empirical studies have demonstrated that improvements in the provision of social infrastructure in health and education are associated with increased labour productivity.[13]

Investments in large-scale infrastructure projects generate benefits resulting from economies of scale (for example, large public transport networks lead to the lowering of transportation costs for the general public).[14] In the same way, improved access to information and technology resulting from advances in telecommunication and transport infrastructure can widen markets, enhance competition and allow for effective market clearing.

Social benefits

Beyond the traditional economic returns of infrastructure, public infrastructure can result in wide-ranging social benefits. Public infrastructure can act as a means of supporting economically disadvantaged households, provide broad welfare gains, support human development, access to new job markets, and improve overall quality of life. These social benefits are often interconnected with each other and support the economic gains outlined above.

All types of households tend to use a third to half of infrastructure services as a final consumption.[15] This implies major income savings for households when they have reliable access[16] to public infrastructure services. Poor households tend to experience disproportionately large benefits from increased access to public infrastructure. Studies, in primarily developing countries, have shown that access to basic services such as water and electricity can have a positive effect on poor households' budgets.[17] Developing physical infrastructure such as roads and access to electricity works to improve incomes and reduce levels of poverty (especially in rural areas).[18] Moreover, poor households benefit from better infrastructure by being able to access productive opportunities, new information, and increasing the value of their assets.[19]

Additionally, social public infrastructure benefits the human capital development of all types of households via educational and health services (but again most strikingly for poor ones, especially when coverage is already high). Education is a key asset that helps increase a person's productivity; it can be provided without excluding anyone else from it, and is linked to reducing socioeconomic inequalities.[20] Similarly, access to health-related infrastructure (be it hospital or improved sanitation) helps improve living conditions and improves the health of the population, further helping develop a country's human capital (healthier workers are economically more productive and have increased levels of personal wellbeing).

There are considerable welfare gains and benefits to quality of life that arise from public infrastructure investments. This can come in the form of increased safety (better roads may reduce accidents), more leisure activity (more time for it or better access to it), increased social capital (through community centres and social programmes) and improved environmental conditions (improved air quality due to decreased congestion, environmentally friendly waste management or more efficient utility delivery).[21]

11. (Straub, 2008).
12. Ibid.
13. (Thomas & Strauss, 1992); (Galiani, Gertler, & Schargrodsky, 2005).
14. (Hulten, Bennathan, & Srinivasan, 2003).
15. (Snieska & Simkunaite, 2009).
16. This is an important point, as some studies have stressed that accessibility of public infrastructure is sometimes overshadowed by an importance put on total public infrastructure spending. Especially in developing economies, where public investments tend to disproportionally be allocated to urban areas where incomes are higher and poverty levels less pronounced.
17. (Foster & Araujo, 2004).
18. (ADB, 2003).
19. (Calderón & Servén , 2014); (McKibbin & Henckel, 2010).
20. (World Bank Latin America and Caribbean Studies, 2003).
21. (Aschauer, 1990).

▪ Decentralisation of public infrastructure

Various levels of government, central, state or local, can be responsible for different types of public services/projects. For instance, roads or primary schools in a town may be better provided by local authorities who are better aware of local needs. This is most effectively undertaken through the process known as *decentralisation* (or devolution) – in which fiscal and institutional powers are transferred from central to local levels of government. In recent decades, many European countries have begun this process (notably in formerly centralised transition economies in Central and Eastern Europe). However, today, there is still considerable heterogeneity regarding decentralisation because of various political systems, as well as a difference of opinion on the scope of competences and powers of local authorities in certain countries.

Box 2: The different levels of government

Every country has different levels of government, which are responsible for the delivery of public services. To ensure consistency throughout the paper, we utilise the Eurostat categories[22], which are as follows:

Central Government: *consists of all administrative departments of the state and other central agencies whose responsibilities cover the whole economic territory of a country. The central government typically is responsible for providing collective services for the benefit of the community as a whole, such as national defence, relations with other countries, public order and safety, and for regulating the social and economic system of the country. In addition, it may incur expenditure on the provision of services, such as education or health, primarily for the benefit of individual households, and it may make transfers to other institutional units, including other levels of government.*

This paper aggregates **state and local governments** in the quantitative analysis. Countries with state governments (namely Belgium, Germany, Spain, Austria and Switzerland) also have local governments. But, the state governments in those countries overwhelmingly dominate the sub-national spending and investment figures. Thus, to ensure the above countries have their sub-national figures fairly represented state government figures are added to the local government figures.

The definitions of the sub-national categories are as follows:

State Government: *could be described as the separate institutional units that exercise some government functions below those units at central government level and above those units at local government. A state is the largest geographical area into which the country as a whole is divided for political or administrative purposes. Such areas are known by terms such as provinces, Länder, cantons, republics or administrative regions. A state government usually has the fiscal authority to levy taxes on institutional units that are resident in, or engage in economic activities in, its area of competence. In federal countries, considerable powers and responsibilities may be assigned to state governments, and compiling a state government subsector is appropriate in such cases.*

Local Government: *consists of all types of public administration whose responsibility covers only a local part of the economic territory. Local governments typically provide a wide range of services to local residents, some of which may be financed out of grants from higher levels of government. Statistics for local government cover a wide variety of governmental units, such as counties, municipalities, cities, towns, townships, boroughs, school districts, and water or sanitation districts*.

Effective Decentralisation

A large number of public infrastructure's final services are delivered and consumed at a local level. Decentralisation is seen as a viable option to effectively provide such services – such as urban transit, water supply, waste management, and road construction and maintenance.[23]

The primary theory of decentralisation stems from the notion that every level of government attempts to maximise the social welfare of its people (for example, local governments work to promote the interests of the people within its jurisdiction).[24] Thus, when a country has a large number of localities, which have diverse public service preferences, decentralisation may generate larger welfare gains, as local governments are more aware of their citizen's demands than a central authority.[25] Oates (2005) further

22. Source: Eurostat Government Finance Statistics paraphrased definitions.
23. (Estache & Sinha, 1994).
24. (Oates W. E., 2005).
25. (Oates W. , 1972) .

argues that decentralisation may be beneficial even when such information asymmetries between local and central authorities do not exist, as central authorities may not be able to fairly and equally treat all sub-national authorities with appropriate investments. Political realities may lead to "pork-barrel politics", where central government financing is concentrated towards politically favoured areas.

Decentralisation may also create the added benefit of efficient public services spurred on by competition between local governments. Known as the Tiebout model, citizens move to localities which more closely match their preferences.[26] Thus local authorities may be incentivised to provide public services in a more efficient and innovative manner, in order to draw more labour and capital – and also have the added benefit of increasing accountability and decreasing corruption.[27]

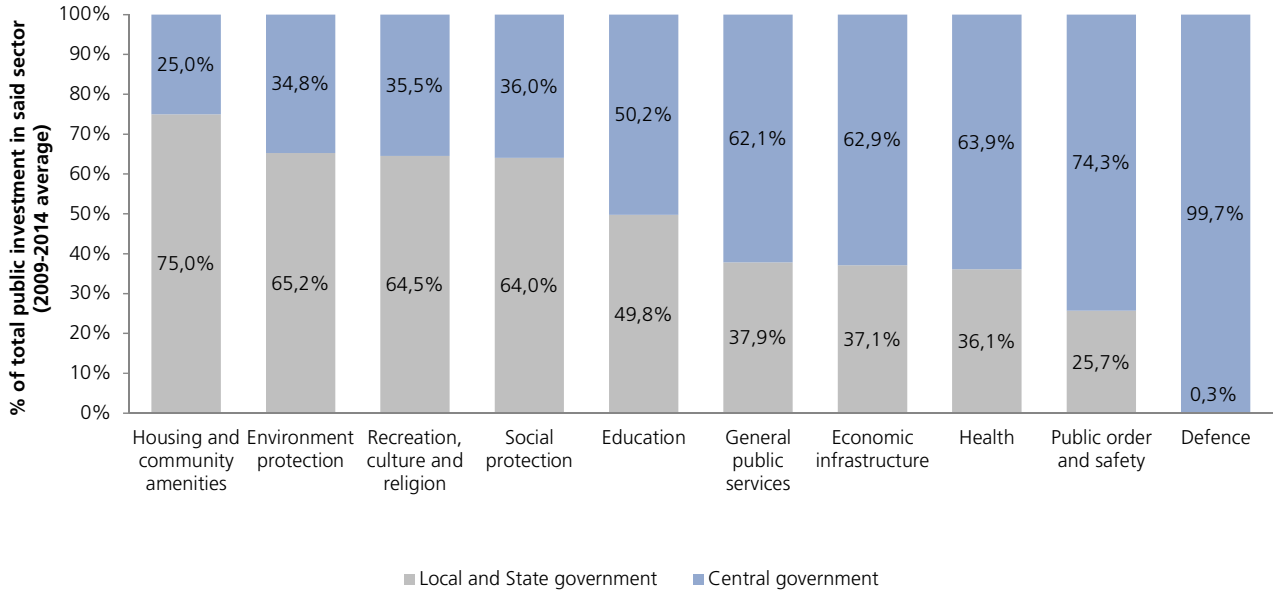
However, decentralisation can also be a sub-optimal choice for a country. For instance, local level investments may not be ideal if an infrastructure project generates benefits that spill over into multiple jurisdictions and thus may require central government engagement to ensure equity.[28] In countries that are still developing democratic institutions, devolution may result in local elite capture of spending (namely corruption).[29] Additionally, if competition among local authorities is allowed to become extreme (namely limited budget constraints regulation[30] that generates excessive spending and debt financing), it could lead to sub-optimal allocation of investments away from productive infrastructure, or could miss an opportunity to pool resources between localities to achieve economies of scale.[31]

Decentralisation in Europe

The extent of fiscal decentralisation in Europe is currently highly heterogeneous. Decentralisation is partially a reflection of a country's government type. In Europe, countries are typically unitary (strong central government), federation (stronger sub-national government power), and in a few cases a mix of the two (see Appendix Figure 1.1).

Naturally in unitary states, the central government is responsible for the bulk of total public investment. Nonetheless, even in the most unitary countries, local governments are responsible for the investment and delivery of many public services (national defence being the notable exception almost virtually for all countries). Between 2009 and 2015, local and state governments in Europe, represented on average 53.6% of total public capital investment.

Figure 1.2: Local and state share of public infrastructure investment in Europe

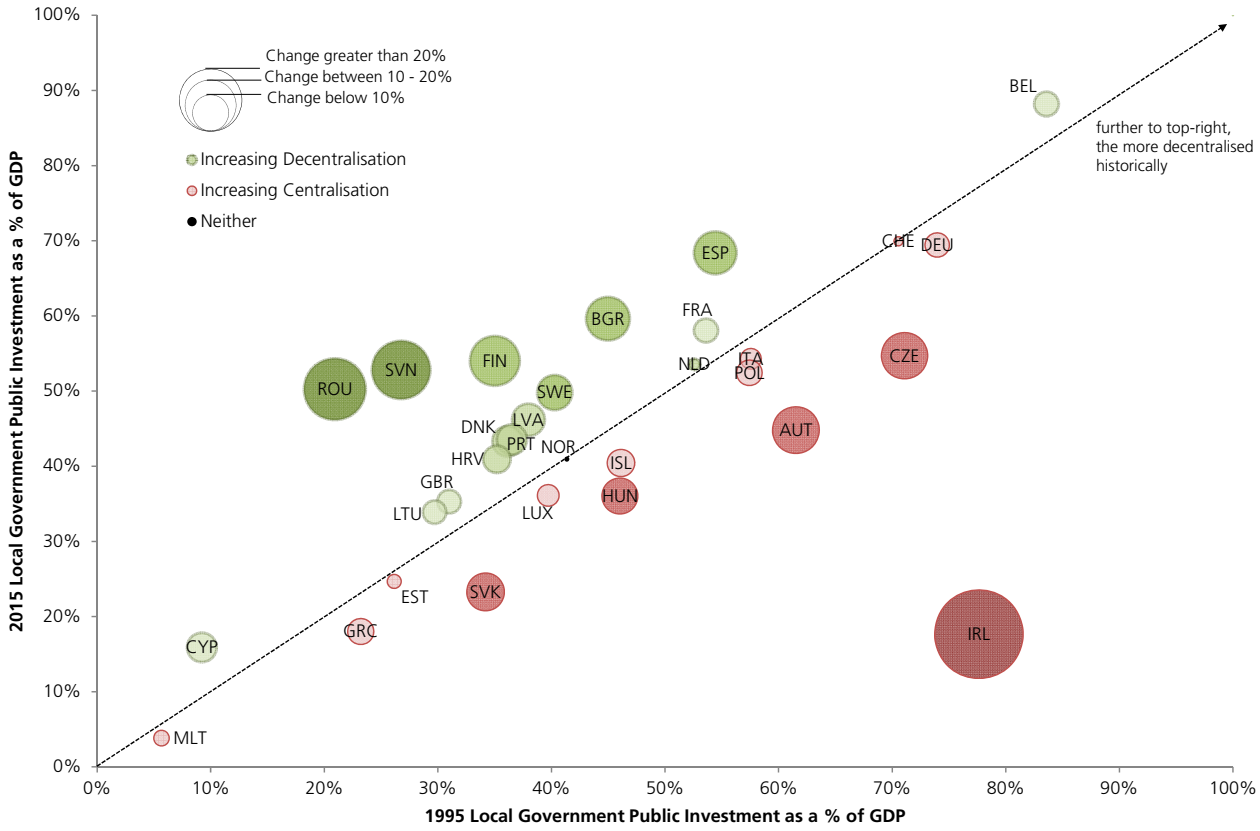


Source - Eurostat and CEB staff calculations

26. For complete theory see (Tiebout, 1956).
27. (IMF, 2009).
28. (Shah, 2008).
29. (Ter-Minassian & Fedelino, 2008).
30. This is primarily a concern in developing countries where fiscal rules are still not fully developed.
31. (Oates W. , 1972); (Ter-Minassian, 1997).

Regardless of government type, local governments tend to invest more in social public infrastructure (see Figure 1.2). In Europe, on average, local governments tend to investment more than central governments in housing and social amenities, environmental protection, recreation, culture and religion, and social protection. Local and central governments tend to be relatively equal in educational infrastructure investment. These sectors are generally areas where local authorities better understand the needs of local citizens.

Figure 1.3: Different levels of decentralisation 1995 vs. 2015[32]



Source - Eurostat and CEB staff calculations, see Appendix of country codes

The degree of decentralisation is not uniform in Europe (see Figure 1.3). Although decentralisation of public investment is more advanced in federalist nations (such as Germany, Belgium, Switzerland), a number of unitary states (primarily in the Central and Eastern Europe transition countries of Romania, Slovenia, and Bulgaria) have undertaken noticeable efforts towards decentralisation since the mid-1990s. However, many European countries have not made dramatic changes towards decentralising public investment (countries that are both close to the bottom left hand corner and to the 45-degree line in Figure 1.3 indicate limited change towards decentralisation), showcasing the important role that central governments still play in public infrastructure investment in some countries.

32. This figure does not include the following CEB countries: Albania, Bosnia & Herzegovina, Georgia, Kosovo, Liechtenstein, Republic of Moldova, "the former Yugoslav Republic of Macedonia", Montenegro, Romania, Serbia, San Marino, Slovenia, Turkey.

Chapter 2: Assessing the level of public infrastructure

The weak economic recovery since the 2008 financial crisis has had reverberating effects on multiple segments of European economies. One chief area is the feeble growth in gross fixed capital formation (GFCF) at both the central and local levels of government in many countries. GFCF is the primary indicator that this study will utilise in assessing the public sector's investment in public infrastructure. Since that data is often highly aggregated, this quantitative chapter is initially very much centred on a macro-perspective, only to later focus more granularly on a local level.

Box 3: What is Gross Fixed Capital Formation (GFCF)?

The official definition for Gross Fixed Capital Formation is *"the formation that consists of resident producers' acquisitions (investments), less disposals, of fixed assets during a given period plus certain additions to the value of non-produced assets realised by the productive activity of producer or institutional units. Fixed assets are produced assets used in production for more than one year. This covers in particular machinery and equipment, vehicles, dwellings and other buildings".*[33]

Put it simply, GFCF is whenever someone spends money (in whatever type of market) to physically improve existing assets (for example re-doing the pipes in a building), purchase new assets (equipment, machines), or to construct tangible items such as roads, railways, houses or buildings.

Importantly GFCF is measured in gross terms, as it does not take into account the depreciation of capital and the replacement of existing capital because of normal *wear and tear*. Furthermore, its calculation does not include financial assets, inventories/stocks, and the sale and acquisition of land.

In the EU, GFCF levels are 5.6%[34] below pre-crisis levels and are resolutely not returning back any time soon. Households, businesses (private sector), and government (public) all contribute to GFCF. Since the recession, only private sector investment has recovered – currently 1.1% above the 2008 level. Household levels have yet to recover, which are 12.7% below 2008 peaks. Excluding the sudden drop right after the crisis, since 2009 business sector GFCF has been steadily, although slowly growing at an annualised growth rate of 2.5%. Conversely, household levels are still declining at a -0.2% rate annually, due to decreased consumption because of economic uncertainty.

However, the scope of this study is to examine the behaviour of public sector investment levels since the onset of the crisis and the effect on public infrastructure. Public investment levels peaked in 2009 (due to lag effect of public investment commitments made in 2008), and are 10.8% lower in 2015. On average, since 2009 public GFCF is declining by 1.9% annually and the slowdown has gone unabated.

Importantly, the decline in public GFCF is not universal across Europe, given the heterogeneity of the continent – with economies having fundamentally different macroeconomic factors guiding public investment. The CEB categorises countries as either target or non-target countries, with countries in both groups seeing wide variance in public GFCF levels before and after the crisis.

In both groups the average government share of GFCF spending has decreased. In target countries the average pre-recession level stood at 4.4%, and in the post-crisis period dropped down to 4.2%. Although not an alarmingly large drop at first glance, the decrease is more pronounced when examining the annualised growth rates of public GFCF.

In most target economies, public GFCF growth has significantly dropped from historical highs during the pre-crisis era (see Figure 2.1), and with most seeing negative growth after the crisis (8 out of the 12 target countries are in negative territory) – with two notable exceptions, Hungary and the Slovak Republic, which have seen annualised public GFCF growth rates in the post-crisis period hit 12.5% and 9%, respectively. Both countries absorbed large amounts of EU funding for public investment – with Hungary using significant amounts towards infrastructure spending.[35] The decline in the other countries is in part a reflection of government budgetary consolidation programmes to rein in large deficits (for a more granular perspective, examining central, local and state level government GFCF growth rates prior and after the financial crisis, please refer to Appendix Figure 2.1 and 2.2)

33. (Eurostat, 2010).
34. Adjusted for 2005 euro-prices.
35. (IMF, 2016).

A more polarised story emerges in non-target countries where the average public GFCF as a percentage of GDP has fallen from 3.6% to 3.3% between the pre- and post-crisis eras. However, unlike the non-target countries, the fall is concentrated in a number of economies, namely Greece, Ireland, Italy, Portugal and Spain, which all saw annualised public GFCF growth rates fall well into negative territory in the post-crisis period, see Figure 2.2 (Spain -11%, Ireland -8.9%, Portugal -8.6%, Greece -7.0%, Italy -6.0%). To a lesser extent, France and the Netherlands also saw annualised public GFCF growth rates decline (to -2.6% for both). However, the remaining countries for the most part maintained relatively unchanged annualised public GFCF growth rates, allowing many economies to slowly although not fully return to pre-crisis levels. Notably Switzerland and Norway saw annualised public GFCF growth rates surpass pre-crisis levels (notably both of these countries have government budgetary surpluses). Iceland has begun to see a rebound in public GFCF growth, after public investment declined sharply after the crisis due to government fiscal adjustment programmes and the government recently focusing on investing in a backlog of needed infrastructure projects[36] (for a more granular perspective, examining central and local and state level government GFCF growth rates prior and after the financial crisis, please refer to Appendix Figure 2.3 and 2.4).

Figure 2.1: Public GFCF annualised growth in CEB target countries[37]

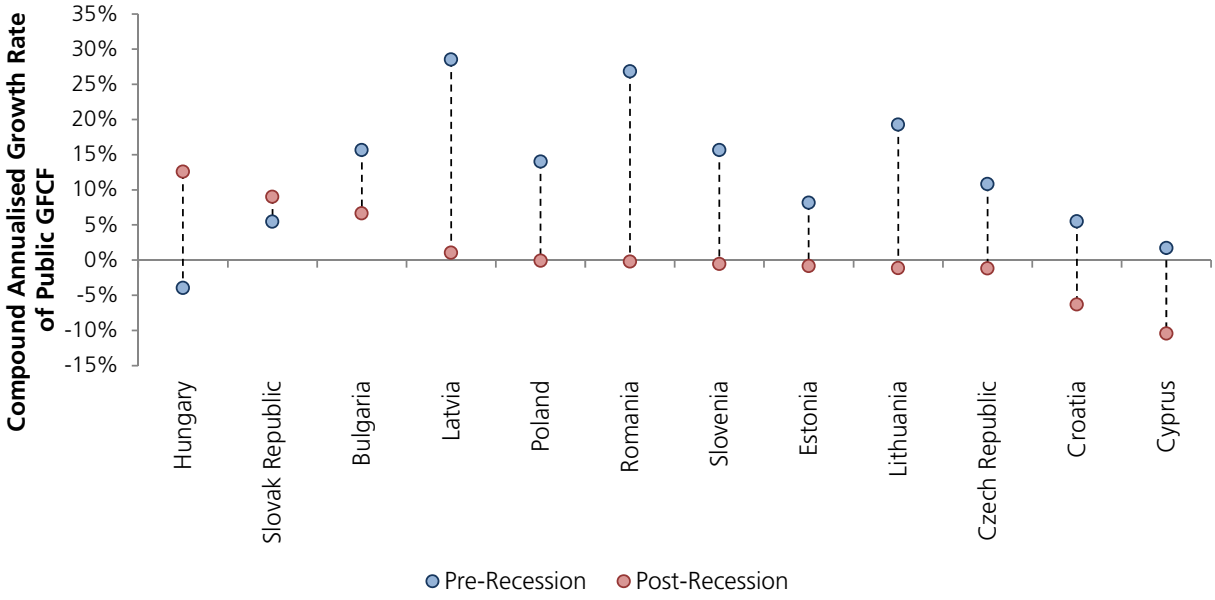
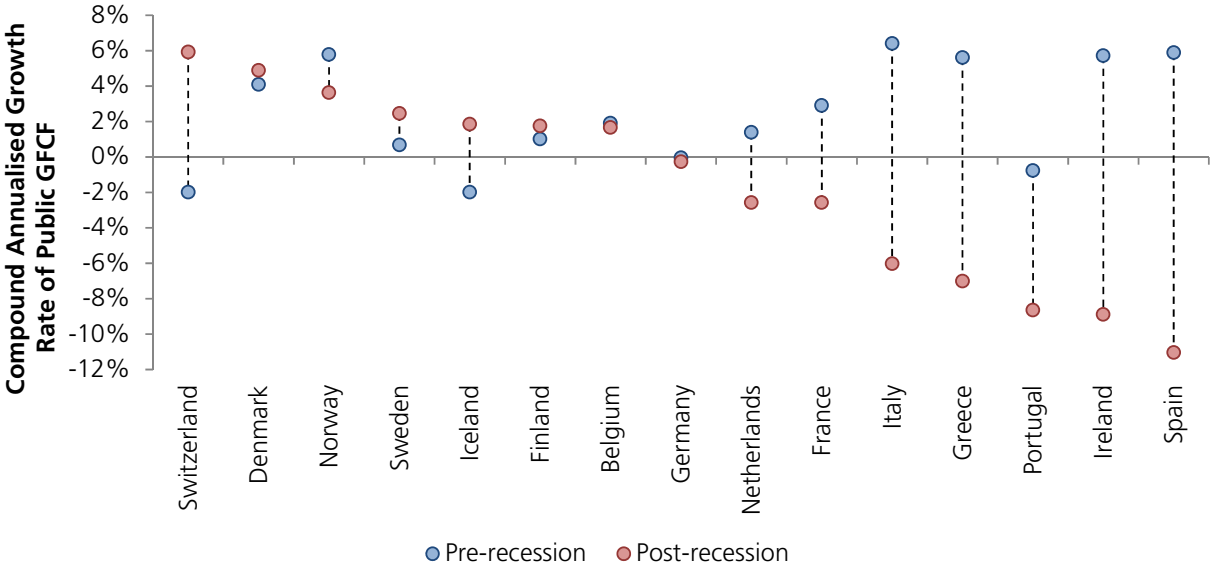


Figure 2.2: Public GFCF annualised growth in CEB non-target countries[38]



Source - Eurostat and CEB staff calculations

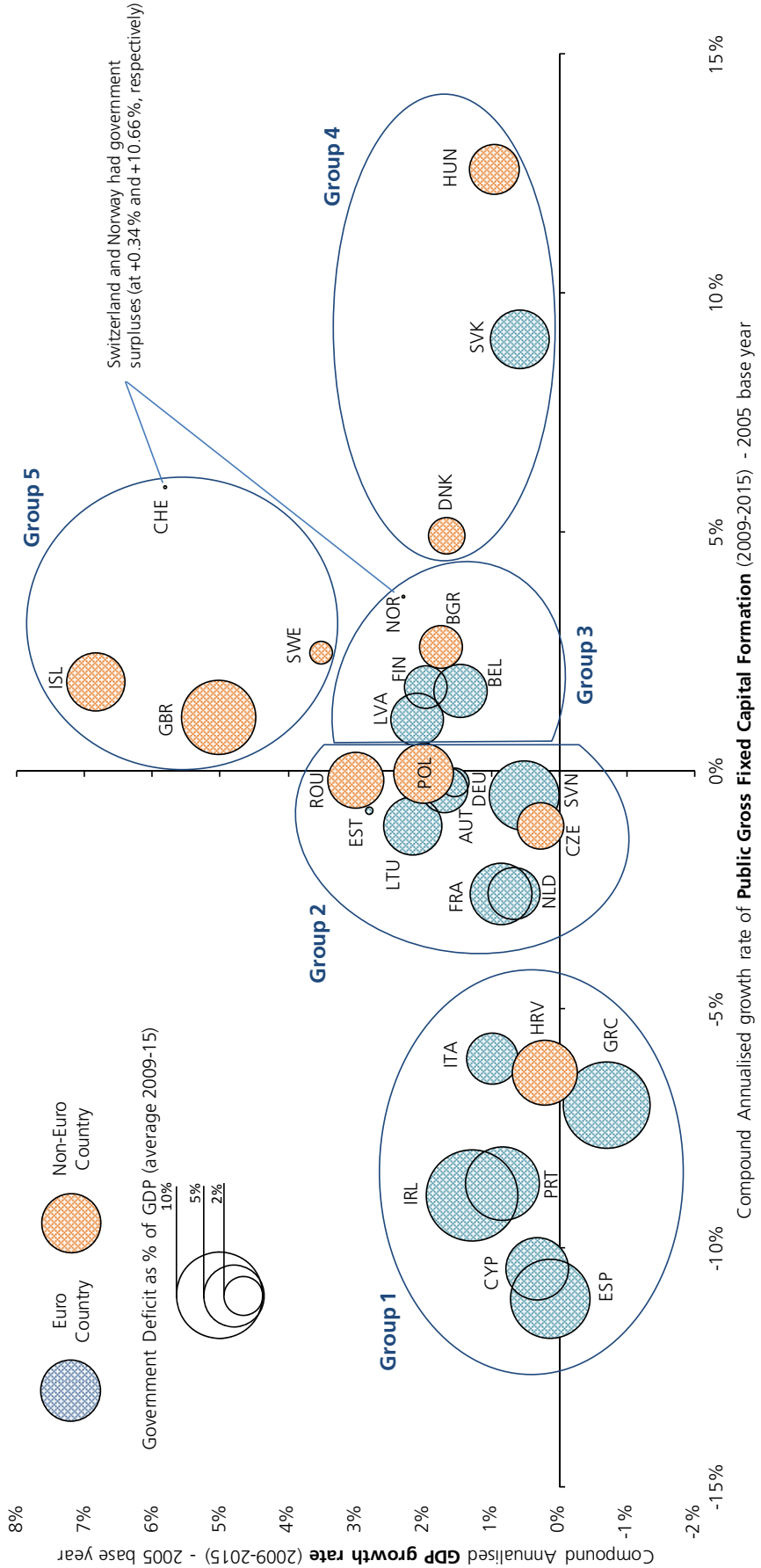
36. (IMF, 2016a).
37. Due to data limitations, this figure does not include the following CEB target countries: Albania, Bosnia & Herzegovina, Georgia, Kosovo, "the former Yugoslav Republic of Macedonia", Malta, Republic of Moldova, Montenegro, Serbia, Turkey.
38. Due to data limitations, this figure does not include the following CEB non-target countries: Holy See, Liechtenstein.

▪ The GFCF recovery – diverse trajectories

The CEB's traditional categorisation of countries between target and non-target countries may not suffice when addressing the issue of public GFCF recovery rates and their impact on public infrastructure. As noted above in each category, there was considerable variation with countries seeing negative, stagnant, or in a handful of cases, positive public GFCF growth rates. Figure 2.3 takes on another perspective by comparing the countries based on the GFCF growth rates after the crisis, relative to GDP growth and deficit levels. The initial, broad results indicate a few noteworthy points. The Eurozone economies (in blue) on average had weaker economic recoveries as measured by GDP growth rates and were more likely to see negative GFCF growth rates since 2009. This study does not draw the conclusion nor is it within its scope to analyse the effects of Eurozone membership on macroeconomic outcomes. Secondly, high-deficit countries saw, on average, worse GFCF growth in the post-recession period.

The perspectives of Figure 2.3 show that the analysis would be better served by categorising the countries based on the correlation between post-crisis GFCF and GDP growth rates, and average government deficits. The underlying rationale is to firstly examine the correlation between macroeconomic shocks and GFCF growth rates, and the scope left for GFCF recovery. Secondly, by examining the average deficit levels of each country, we are also able to examine the countries that undertook large fiscal consolidation programmes to reduce public debt-burdens, which often constrained public investment spending.

Figure 2.3: GFCF growth rates vs. GDP growth and deficit levels[39]



Source - Eurostat and CEB staff calculations, see Appendix of country codes

39. Due to data limitations, this figure does not include the following CEB countries: Albania, Bosnia & Herzegovina, Georgia, Holy See, Kosovo, Liechtenstein, Luxembourg, "the former Yugoslav Republic of Macedonia", Malta, Republic of Moldova, Montenegro, San Marino, Serbia, Turkey. This figure does include two non CEB countries: Austria and United Kingdom.

Five distinct groups emerge from Figure 2.3, all of which exhibit distinct characteristics regarding their respective GFCF growth rates, GDP recoveries and government deficit levels.

Table 2.1: Clustering based on GFCF growth rates vs. GDP growth and government deficit levels

		Key characteristics		
	Countries[40]	Avg. GDP growth (09-15)	Avg. GFCF growth (09-15)	Avg. Government Deficit (09-15)
Group 1 ▪ Severe GDP downturn ▪ Significantly negative GFCF growth rate	Spain, Cyprus, Ireland, Portugal, Greece, Croatia, Italy	0.44%	-8.35%	-7.28%
Group 2 ▪ Weak GDP recovery ▪ Drop in GFCF growth rate	France, Netherlands, Czech Republic, Lithuania, Slovenia, Estonia, Austria, Germany, Romania, Poland	1.55%	-0.99%	-3.54%
Group 3 ▪ Weak GDP recovery ▪ Positive GFCF growth rate	Latvia, Belgium, Finland, Bulgaria, Norway	1.91%	2.13%	-3.07%[41]
Group 4 ▪ Weak GDP recovery ▪ Large increase in GFCF growth	Denmark, Slovak Republic, Hungary	1.06%	8.82%	-3.22%
Group 5 ▪ Healthy GDP recovery ▪ Weak GFCF growth	United Kingdom, Iceland, Sweden, Switzerland	5.29%	2.83%	-3.05%

The heterogeneity of the groups and the varying country coverage provide a mixed picture of activity.

What is most striking is the severity of declines in GFCF average growth in **Group 1**, with an average annualised GFCF contraction of -8.35%. Spain and Cyprus had the largest public annualised GFCF contractions (at -11.05% and -10.45% respectively). Although fiscal consolidation was universal within the whole group, Spain and Cyprus undertook strict fiscal consolidation programmes (the Spanish programme was considered the most ambitious in the Eurozone) that depressed general government spending.[42] The remaining countries all saw dismal declines in annualised GFCF growth (Ireland -8.89%; Portugal -8.66%, Greece -7.01%; Croatia -6.33%; Italy -6.03%). The consolidation programmes enacted in these countries to rein in the large government deficits, often targeted public investment spending, which was considered to be above EU-averages in the pre-crisis era. Furthermore, the weak economic recoveries in almost all the countries exasperated the situation as budget constraints arose due to deflated tax revenues (only Ireland had a GDP growth rate above one per cent, at 1.28% between 2009 and 2015, and Greece continues to contract with annualised GDP growth at -0.7% in the same time period).

Group 2, which consists of the largest number of countries, 10 out of 26, saw mixed results. GDP recoveries were varied, with some countries seeing slightly better recoveries (Poland, Lithuania, Estonia, Germany, Austria) while others experienced anaemic growth (France, Netherlands, Czech Republic, Slovenia). However, the shared characteristic is that all have seen declining public GFCF growth rates since 2009. France and the Netherlands are at the extreme end with -2.59% and -2.58% public GFCG contractions – France undertook a stimulus programme to boost public investment after the onset of the crisis, but in recent years public investment has begun to decline again.[43] Germany, Romania and Poland on the other end saw more modest public GFCF contraction at -0.27%, -0.21%, and -0.09%, respectively between 2009 and 2015. Germany's low GFCF growth is in part due to the Ministry of

40. The countries are not put in alphabetical order: the list is based on their performance in terms of compound annualised growth rate of public GFCF (2009-2015), 2005 base year (see Figure 2.3).
41. This figure does not include Norway, which had a government surplus at 10.66% of GDP (average 2009-2015). Including this figure decreases the group's average government deficit level to -0.32%.
42. (IMF, 2014a); (IMF, 2015a).
43. (IMF, 2010); (IMF, 2016c).

Finance's "black zero" policy on public spending at the federal level, which dampened public investment. Moreover, at Germany's local level, administrative and regulatory constraints are limiting local public investment.[44] Romania and Poland saw annualised GFCF growth slowdowns due to public administration constraints and inability to fully and effectively absorb EU funds.

Conversely, **Group 3** is characterised by a set of countries which also saw weak GDP recovery but with some of Europe's lowest government deficit levels and positive public GFCF growth rates. Latvia, Belgium, and Finland saw annualised public GFCF growth at 1.06%, 1.66%, and 1.74%, respectively. On the other hand, Bulgaria and Norway saw much stronger annualised public GFCF, at 2.58% and 3.62%, respectively. Bulgaria saw rapid public GFCF growth as it used EU funds in an effort to converge to its regional peers.[45] Norway's government enacted a fiscal programme to improve economic competitiveness, which among other things emphasised increased spending on infrastructure, and improving the efficiency in local services.[46]

The strong public GFCF growth rates seen in **Group 4**, coupled with relatively weak GDP recoveries, are distinct outliers. Of the three countries, Denmark saw the lowest annualised public GFCF formation (at 4.89%), while the Slovak Republic and Hungary both had the largest GFCF growth rates of the entire sample (at 9.01% and 12.56%, respectively). Slovak Republic's and Hungary's accelerated GFCF growths are explained by both countries playing catch-up to other EU countries in terms of public investment by utilising large sums of EU funds.[47]

Group 5 is another set of outliers, comprising of countries that saw relatively strong economic recoveries and relatively low GFCF growth rates. Although the United Kingdom undertook an extensive consolidation programme in response to its large deficit, it did however increase spending on infrastructure projects. Switzerland is the exception here, having both relatively strong GDP and GFCF growth.

▪ The health of public capital stocks in Europe

In order to paint a complete picture of the state of public investment, it is necessary to move beyond public GFCF and analyse a country's public capital stock – which is the accumulation of the total value of all public investment over time. This study utilised the perpetual inventory method (see Appendix 1 for full details of estimation methods and data sources). Capital stock, adjusted for depreciation, is an important indicator in order to gauge the health of public capital, which is the primary input into public infrastructure production[48] (one can also utilise this data to examine public investment efficiency, but this is beyond the scope of this study).

Capital stock levels can be difficult to read. As can be seen in Figure 2.4, the public capital stock levels (as a % of GDP) have been increasing since the onset of the recession. Since capital stock is the accumulation of public investment, there is a *lag effect*. It can take several years for public investment levels to be physically realised and to be registered in the accumulated public stock. In addition, Figure 2.4 shows the growth rate of the three-year moving average of total public GFCF (right-hand axis) to showcase the effect of the lag. As can be seen, prior to the crisis, all countries in all five groups (outlined above) saw a boom in public GFCF growth, which is reflected with the public capital stock growing in most economies since the crisis.

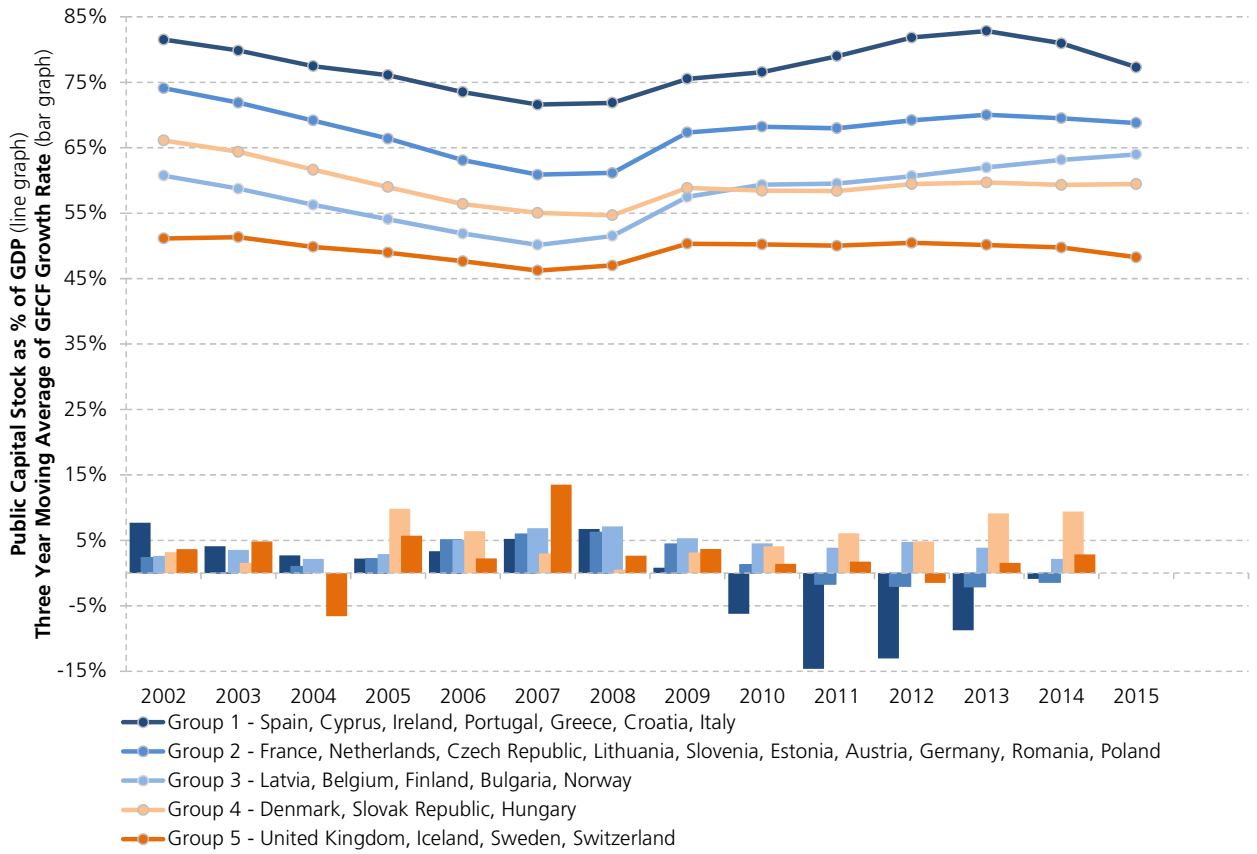
Since the onset of the crisis, public investment (GFCF) levels have begun to shrink, especially in **Group 1** and **Group 2** and, to a lesser extent, in **Group 5**, which in recent years has translated to capital stock levels steadily declining. On the other hand, **Group 3** continues to see public investment dampen from the pre-crisis highs, although still positive, and this is reflected in the growing accumulation of the public capital stock. However, if the steady decline continues, eventually capital depreciation will take hold and reverse the trend in capital stock growth.

Conversely, in recent years, **Group 4** countries have seen robust public investment growth after years of positive but stagnant public investment growth. Although public stock levels do not reflect this (they are slightly positive but more or less linear, reflecting the historical stagnant investment levels), in the near future one should expect the public capital stock of countries in **Group 4** to grow and accumulate.

44. (IMF, 2016d).
45. (IMF, 2012); (IMF, 2015b).
46. (IMF, 2014c); (IMF, 2015d).
47. (IMF, 2016f); (IMF, 2011); (IMF, 2016b).
48. (IMF, 2015).

Finally, **Group 5** countries saw GFCF levels drop to relatively low, but positive levels. The capital stock of these countries has more or less been stagnant, with a recent downturn trend (reflecting the drop in public investment in 2012), but should expect to maintain its static capital stock levels in the near future.

Figure 2.4: Public Capital Stock levels and three-year moving average of GFCF



Source – Eurostat and CEB staff calculations

▪ Differences in local and central public investment

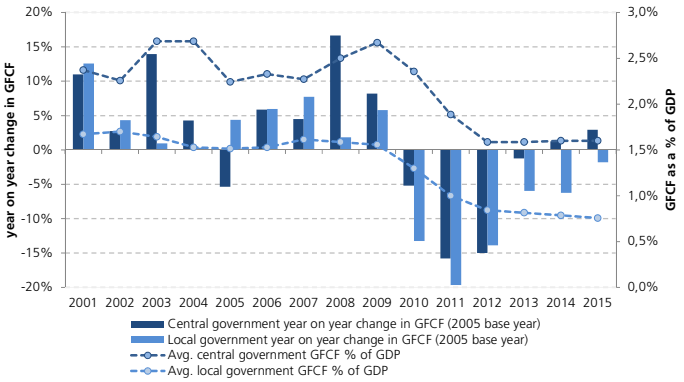
The aim of this chapter is to obtain an understanding of the state of local public infrastructure investment. The discussion thus far has been of a general nature at a macro level – a reality of data constraints often imposes a macro perspective. However, enough data exists to paint a picture of the state of local GFCF investment over the years. Based on this study's five groupings, a number of local infrastructure trends emerge.

For each group, the authors provide **two graphs**:

- The left-hand figure depicts both local and central public investment levels, with the ***dashed-lines*** showcasing GFCF as a % of GDP (on the right axis), and the **bars** showing year on year changes in GFCF (on the left axis).

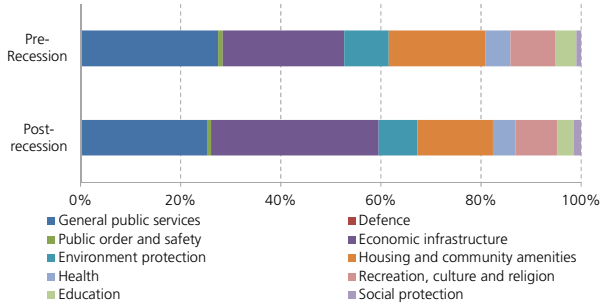
- The right-hand graph focuses solely on local infrastructure, and showcases the total proportion of local GFCF by different spending categories prior and after the crisis. It is important to note that this is only a proportion of total local GFCF for that period (for some periods the local GFCF is much higher or lower, thus the reader is given a snapshot of what the local government spending priorities were for that time period).

Figure 2.5a: Group 1
Dramatic drops in local and central GFCF



Source - Eurostat and CEB staff calculations

Figure 2.5b: Group 1
Declines in Housing investment

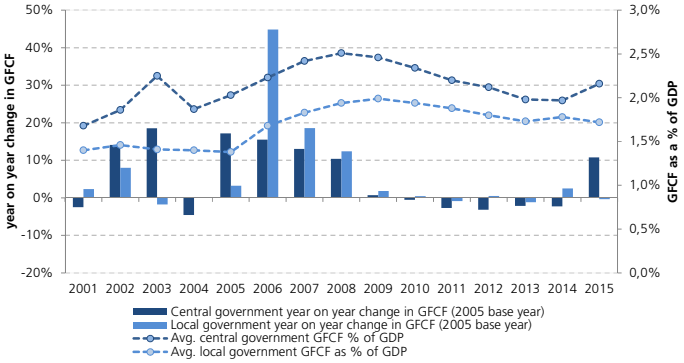


Source - Eurostat and CEB staff calculations

In **Group 1**, unsurprisingly the hardest hit economies with the most far-reaching consolidation programmes have seen major declines in GFCF since the onset of the recession – with GFCF as a % of GDP still not recovering to pre-crisis levels. Most striking is that, while on average central government public investment in recent years has begun to show signs of healing (since 2013 year-on-year growth rates have been positive), local investment still remains in negative growth territory – and a recovery to pre-crisis levels for both central and local investments are still far off.

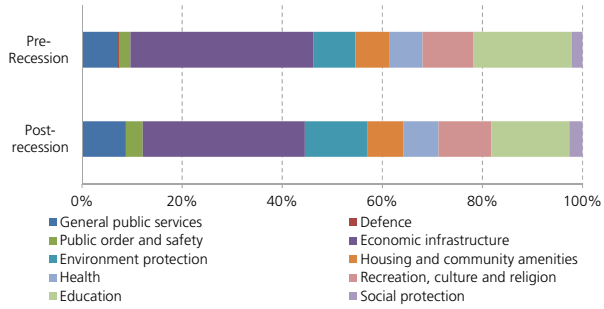
Prior to the crisis the largest proportion of local GFCF investment, on average, was devoted to economic infrastructure (at 24.3% of public investment), general public services (27.5%), and Housing (19.4%) – see Figure 2.5b. In the post-crisis period, the lowered investment pool meant that local authorities devoted less investment towards housing & community amenities, dropping by 4.3% (from 19.4% of total investment), followed by environmental protection (down 1.1% from pre-crisis level of 8.9%) and education (down by nearly 1% from 4.3%). However, economic infrastructure saw the largest increase, growing by 9.2% (to 33.5% of total local investment in the post-crisis period).

Figure 2.6a: Group 2
A lack of local public investment recovery



Source - Eurostat and CEB staff calculations

Figure 2.6b: Group 2
Education and Economic infrastructure dropping

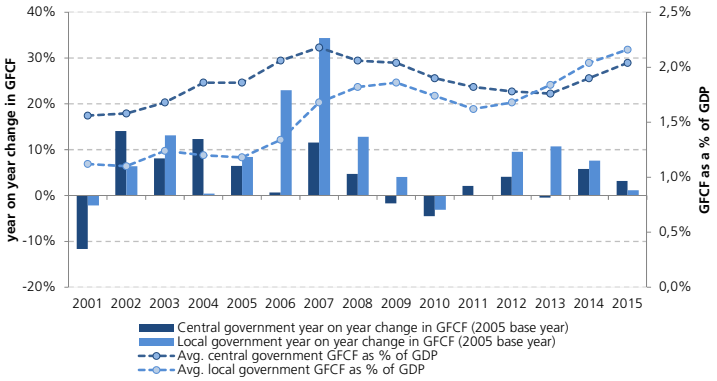


Source - Eurostat and CEB staff calculations

Similarly, **Group 2** has seen central and local public investment growth either consciously stay negative or hover around zero since the onset of the crisis, with central public investment only seeing positive growth since 2014. Depending on the robustness of this growth, central public investment may sluggishly return back to pre-crisis level in a few years. Local public investment growth is still stubbornly low and on average negative, and public investment levels do not look likely to return to pre-crisis levels in the near future.

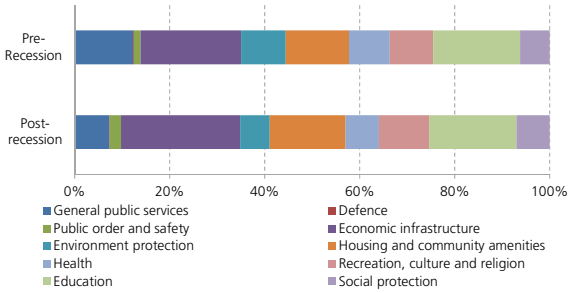
Before the crisis, Group 2 countries tended to see, on average, local governments investment geared towards economic infrastructure (36.5%), education (19.6%), recreational, cultural, and religious – i.e. community services (10.1%). Since the onset of the crisis, the reduced local GFCF pool has meant that the investment has fallen by 4% for each of the three categories. However, in the post-crisis period, housing and social protection investment has increased slightly by 0.53% and 0.45% of total investment, (although the gross levels of local public investment were still in decline, but not as dramatically).

Figure 2.7a: Group 3
Healthy local public investment recovery



Source - Eurostat and CEB staff calculations

Figure 2.7b: Group 3
Local Housing and Health investment on the rise

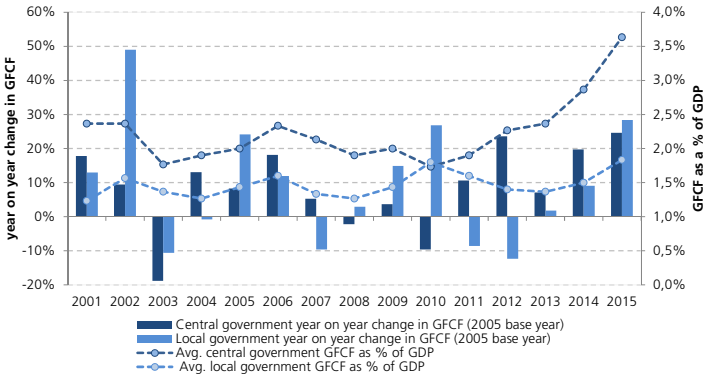


Source - Eurostat and CEB staff calculations

Conversely, **Group 3** has seen a healthy recovery in public GFCF to the pre-crisis level at both central and local investment levels (see Figure 2.7a). Notably, both local and central government investment levels (as a share of GDP, starting 2013) surpassed their pre-crisis peaks The initial declines in central and local public GFCF growth levels were short-lived after the crisis, quickly returning to positive growth. However, recently the year-on-year growth, although still positive, is declining.

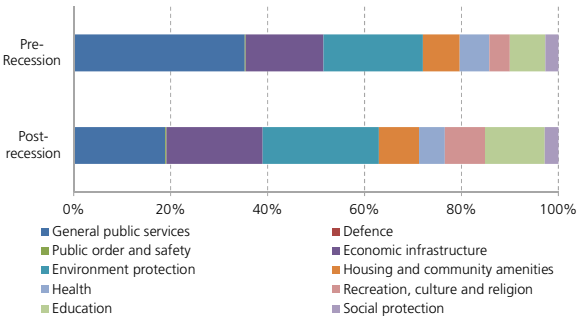
In Group 3, the total pool of local GFCF has increased. In these countries, the increase in local GFCF has been, on average, concentrated in heightened spending in housing (up 2.7% to 16% of total local investment) and economic infrastructure (up 3.8% to 25% of total local public investment).

Figure 2.8a: Group 4
Strong central government public investment recovery



Source - Eurostat and CEB staff calculations

Figure 2.8b: Group 4
Environmental protection is being prioritised

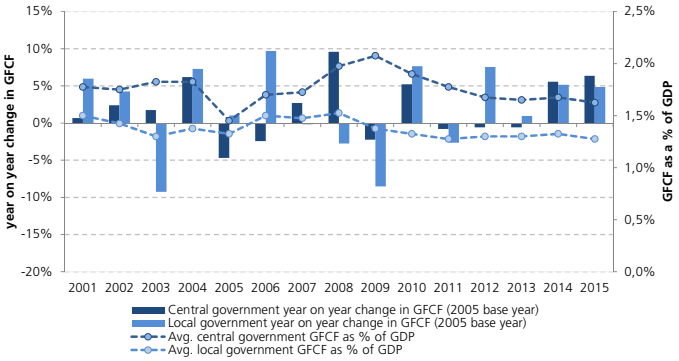


Source - Eurostat and CEB staff calculations

The strong public investment recovery characteristic of **Group 4** was primarily led by robust central government investment. Local investment in these countries experienced a see-saw counter-cyclical like pattern, with investment declining before the crisis, recovering in the immediate years after 2008, only to drop once again in 2011, and recovering again starting in 2013. In contrast, central government investment exhibited a more traditional pro-cyclical trend, with short lived depressed growth after the crisis and a healthy recovery afterwards – with public investment as a share of GDP far surpassing pre-crisis levels.

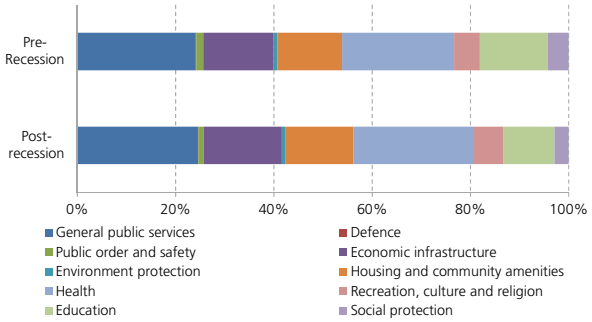
The make-up of where local governments are directing GFCF after the crisis has slightly changed. Prior to the crisis, general public services, on average, dominated local investment at 35.3%. This figure has dropped significantly by 16%, and the investment priorities have been relocated to economic infrastructure (up 4% to 20% of total local investment in the post-crisis period), environmental protection (up 3.8% to 24% of total local investment), and education (up 5% to 12% of total local investment).

Figure 2.9a: Group 5
Sustained low levels of local and central public GFCF



Source - Eurostat and CEB staff calculations

Figure 2.9b: Group 5
General Public Services increasing in priority



Source - Eurostat and CEB staff calculations

Lastly, **Group 5** countries have experienced varied and mixed results in local and central government investment levels. In both cases, public investment levels have yet to return to pre-crisis peaks. Notably, all of these economies are not part of the Eurozone, and include Iceland which experienced sharp drops in public investment after historic highs in the run-up to the recession (which in part explains the wild variation).

In these countries, public investment levels have failed to see a robust recovery in the immediate aftermath of the crisis, despite a few "false starts", and stayed at low levels for several years after the initial drop. Encouragingly, year on year growth rates have begun to enter into positive territory recently, and although this has yet to translate into high public GFCF as a % of GDP level, in the near future, an upwards trend may help the countries recover to pre-crisis levels. The proportion of local investment priorities has gradually been shifting towards economic infrastructure (up 1.7% to 16% of total investment in the post-crisis period), and health (up 1.6% to 24.4%). Otherwise, the proportion of local GFCF for the other categories has remained, for the most part, relatively unchanged.

PART II: Trends and challenges in the provision and financing of local infrastructure

Part II analyses how the infrastructure investment landscape is changing. Chapter 3 describes the various financing channels for local infrastructure investments and their evolution in the current context. Chapter 4 presents some of the demographic, socio-economic and environmental trends that are likely to reshape the provision and financing of local infrastructure across CEB countries in the near future. On the one hand, urban and rural areas will face numerous challenges resulting from urbanisation, changing demographics, rising pressures from climate change, etc. On the other hand, these trends will cause substantial new costs and challenge the fiscal sustainability of local governments and lead to a greater private sector involvement in the provision and financing of local infrastructure.

Chapter 3: Financing local infrastructure investment

Given the characteristics of public infrastructure, local governments can face a number of financing challenges that arise as a result of a few factors:[49]

- Infrastructure investment tends to be **capital intensive with substantial up-front costs**, and limited initial profit generation (some infrastructure never generates any form of returns). Local governments thus face a large fiscal burden to allocate substantial initial funds and forgo returns for several years.
- Infrastructure can often be subject to **regulatory changes** (ex. new rules on construction processes) and is **highly complex to implement** in terms of design and logistics, with multiple actors involved (architects, contractors, numerous suppliers, etc.). This will require strict legal provisions to ensure all parties receive timely payments and to facilitate proper risk-sharing.
- For certain complex infrastructure projects (ex. construction of roads), the issue of **transparency** may arise – in some countries from 5% to 30% of infrastructure investment is lost because of mismanagement or corruption[50]. Market information about infrastructure projects can be limited, making it difficult to assess the risk and performance of an investment. This information asymmetry may make non-public investors hesitant to enter into such projects. A strong regulatory and business environment can work towards the full disclosure of infrastructure project information, which will reduce mismanagement, allow all stakeholders to be fully aware of costs and quality, and thus increase overall transparency.
- Public infrastructure can often generate **natural monopolies** (as explained in Chapter 1) and generate large scale **social benefits**. The social benefits that are generated may be a benefit for the general population, even if there is limited or no economic pay-off for the provider. This makes it difficult for local governments to find investors who are willing to fund a project with limited economic returns.
- Many infrastructure projects have a **long-term investment horizon**. A large number of financial investors with a short-term investment horizon who favour liquid assets that can generate rapid returns will be reluctant to invest in the generally illiquid and long-maturity that are characteristic of public infrastructure. Admittedly, certain institutional investors (ex. pension funds) and national/international development banks, which often have a long-term perspective on investments, may be more willing to finance local infrastructure projects.

Box 4: Financing ≠ Funding

Infrastructure *financing* in essence is raising the high upfront costs to build the infrastructure when and where needed by leveraging future revenue streams that can repay the upfront costs. Financing is the raising of this upfront capital to expedite the process. *Funding* represents the revenue streams in the future to repay the financing.

In this study, we focus on the financing side.

49. This list relies heavily on the work outlined in (OECD, Infrastructure Financing Instruments and Incentives, 2015b).
50. (Kenny, 2006).

▪ The traditional channels of financing

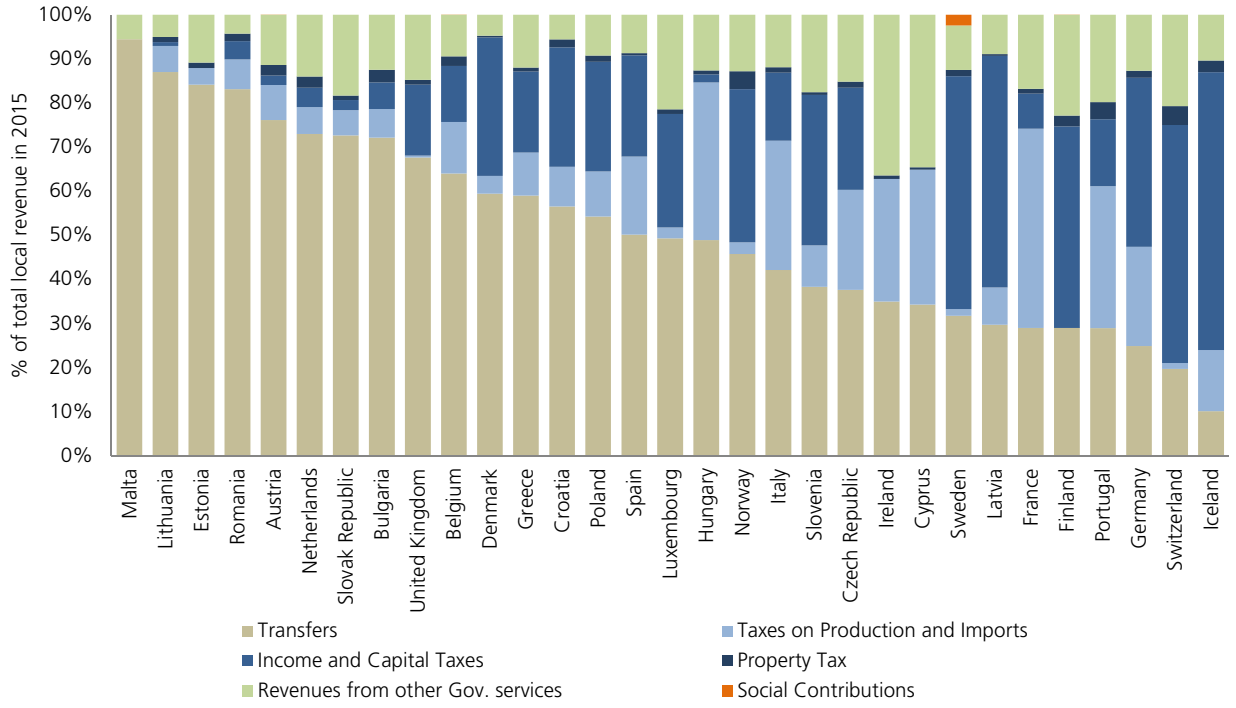
Keeping in mind the unique elements of funding public infrastructure, there are various financing tools that local governments can employ to fund local infrastructure projects. Although by no means an exhaustive list, this section summarises a number of financing categories and instruments available to local governments.

A number of long-established tried and tested financing methods exist for local governments to fund the needed public infrastructure, namely taxes, central government transfers, borrowing from financial markets, bonds and public-private partnerships. Although they are still the first port of call that local governments use, they have come under great stress in the wake of the recent financial crisis.

First off it is important to recognise that there is considerable heterogeneity between countries on how local governments are viewed and how they can secure financing. From a purely theoretical point, they can take on two forms: *sovereign actors*, deciding financing options and projects that they deem best for their local communities; or as *agents* implementing a central government's policies utilising transferred funds.[51]

The level of autonomy in part is a reflection of the original source of funding (see Figure 3.1). Smaller countries, with few local authorities, depend greatly on central government transfers (the concepts of transfers are fully explained below). And although local authorities in many unitary governments still depend heavily on transfers, in some countries which have begun the process of decentralisation (for example Slovenia), they have a lessened reliance on transfers and instead depend on funding from their own sources (namely local government revenues, explained in detail below). However, decentralisation of investment power does not always mean increased autonomy over revenue. For instance, Romania has made noticeable efforts towards decentralisation of investment decisions, and yet the local authorities there are among the most dependent on central government transfers in Europe. On the other hand, those countries which have a history of decentralisation (for example France, Germany, Switzerland) tend to see local authorities raise most of their funds through their own sources.

Figure 3.1: Local Government Revenue Sources in 2015[52]



Source - Eurostat and CEB staff calculations

51. (Saiger, 2016).
52. Due to data limitations, this figure does not include the following CEB countries: Albania, Bosnia & Herzegovina, Georgia, Holy See, Kosovo, Liechtenstein, "the former Yugoslav Republic of Macedonia", Republic of Moldova, Montenegro, San Marino, Serbia, Turkey.

Local Government Revenues

The initial form of financing comes from the straightforward approach of local governments levying taxes to fund a project. The scopes of the types of taxes that can be levied are various:

(1) *Property Tax* – Typically property tax is decentralised to local authorities, which is a sizeable and stable source of tax revenue[53] (property and house demand is typically driven by stable populations). Naturally such taxes require a strong cadastre system for enforcement, and are typically not income elastic unless appropriate price indexation tools are implemented.

(2) *User Charges* – Local governments can charge citizens to use certain services such as water and sewage, administration (for example business registration fees, permits, etc.), transportation, and community services (for example child and/or elderly care). The immediate advantage is that the government can directly charge those who use certain public infrastructure the most. The obvious disadvantage is that poorer members of society can be priced out, typically resulting in the local government providing certain services below the full cost of recovery.[54]

(3) *Vehicle and Fuel Taxes* – These taxes often have an advantage for transportation infrastructure, as they exclusively target those who utilise it most. Furthermore, it is seen as a stable form of revenue and this sub-set of tax payers often see a direct benefit (improved roads). Moreover, it is a potential means for pollution control.[55] However, it is difficult to enforce as one can simply register a car or buy fuel in a neighbouring low-tax local authority.

(4) *Local Sales Tax* – Local sales taxes are considered to be broad based, generate high revenues for low marginal tax rate, and ensure "horizontal equity" and a perception of fairness (people with different incomes pay the same tax).[56] However, sales taxes are very pro-cyclical, with negative income shocks adversely effecting consumption. Conversely, within Europe sales tax is gradually being phased out in favour of value added tax (the latter is obligatory for EU membership).[57]

(5) *Income, Payroll and Employer Tax*[58] – Such taxes target the economically productive members of a local community. Income taxes are typically flat and considered horizontally equitable, but must be levied in a uniform way (that is one area in a local area cannot have higher/lower rates). Payroll tax employers directly on the total amount of their salaries. Finally, businesses can be taxed based on their profits, number of employees, licence, etc. Such business taxes are justified in that often the public investment provides infrastructure beneficial to those businesses (see Chapter 1 for economic benefits of public infrastructure).

Central Government Transfers[59]

Central Government Transfers, also known as intergovernmental transfers, are one of the most important sources of funding for local governments. Often the transfers are intergovernmental grants that local government use for their own spending or to implement national policies. They are meant to alleviate the burdens that arise due to two types of local government financing imbalances: *horizontal imbalances* and *vertical imbalances.*

Horizontal imbalances arise when different local governments have wide disparities in their tax base (namely available funds) and expenditure needs (some regions have to provide more services, with a small tax base). In other words, there are some regions in countries which are poorer than others and need government transfers to provide basic services, while *vertical imbalances* arise when local government has fiscal spending needs which are greater than local government revenue sources.[60]

The intergovernmental transfers manifest themselves in multiple ways. Firstly, *tax sharing* schemes may be put in place, where local governments are allowed to collect specific central-government taxes and keep a share of those collected taxes.[61] Tax sharing is often used to help resolve vertical imbalances that arise when local governments do not have adequate tax revenue collection abilities.

53. (Bahl & Martinez-Vazquez, 2007).
54. (UN-Habitat, 2015).
55. (Goldman, Corbett, & Wachs, 2001).
56. Ibid.
57. (Council of Europe, 2004).
58. (Goldman, Corbett, & Wachs, 2001).
59. The debate on inter-government transfers contains nuanced and technical dimensions, which is beyond the scope of this study. OECD (2006) & UN-Habitat (2015) give more detailed perspectives on the topic.
60. (OECD, 2006).
61. (UN-Habitat, 2015).

However, the two primary forms of grants are typically *earmarked grants* or *non-earmarked grants.* The former are attached with specific conditions on how money can be spent, and can be either matching[62] or non-matching. Typically, these grants aim to ensure that minimum national standards are met (such as education and health services) to reflect national interests (for example reduce poverty), or because of considerable spill overs (clean air and water) and ensure local level compliance. On the other hand, non-earmarked grants allow local governments to utilise the money as if it were part of its own normal tax revenue.[63] They are often considered to be "equalisation grants" (as they are typically unconditional) to ease horizontal fiscal differences. However, these grants must be designed with the necessary measurement of tax capacity and expenditure needs of a local government.[64] Regardless of the type of transfer, a basic rule is that they must be transparent, with strong underlying rules on how they are administered/function, and are predictable (so as to not cause adverse shocks to local government revenues).

Borrowing from financial markets

Public infrastructure investment can be highly capital-intensive and local governments may not have the necessary liquidity for the initial financing from their own revenues. Borrowing from financial markets is not only essential to alleviate funding shortfalls, but a necessary instrument among a local government's basket of financing options. The term 'financial markets' is a broad one, and in this study the term is used to include the standard financial intermediaries, which includes the banking sector, pension/mutual funds, insurers, and brokerage firms.[65]

For finance infrastructure projects, there are a number of advantages to borrowing. Firstly, it is an effective way to supplement existing funds. Secondly, borrowing has a long-term repayment schedule, and thus helps avoid an inequitable burden among one set of tax payers (usually the ones that are around during the actual construction of the project when costs are highest), and instead spreads the costs over multiple users over the full life of a project.[66] Also, due to limited current revenue, borrowing can help local governments accelerate local development, can help reduce operational costs, and ensure projects are financed without major interruptions that can arise from temporary budget shortfalls.

However, threats to borrowing exist. Local governments may take on unsustainable levels of debt, overspend on projects, and thus shift the burden to future generations of governments. Additionally, taking on too much debt can lead to solvency issues and an inability to repay debts, which could threaten local services' provisions.

Local governments are for the most part constrained to just use financial markets to fund capital investments (thus local infrastructure) and not to cover operating costs – borrowing for the latter may create large debt burdens resulting in rolling over on loans. It may also result in borrowing costs being paid using current revenues, leading to sub-optimal growth of the public sector, and could even potentially crowd out the private sector from financial markets.[67]

Local government borrowing thus tends to be controlled by strict borrowing practices with a strict set of rules and regulations. Namely the "golden rule", coined by Richard Musgrave in 1959, which states that a clear distinction be established between current and capital budgets, and that borrowing should only be permitted for the latter. This allows for transparency of local finances, the means to assess the health of revenues' ability to cover costs and to determine local government's creditworthiness. This permits for the long-term planning of local infrastructure projects and to assess appropriate borrowing channels.

Additionally, regulations have to be implemented as financial market discipline is not sufficient to rein in local government borrowing (the private sector does have strong tools to assess their willingness to lend to local governments and can appropriately assess price lending but appropriate regulations are needed nonetheless). There may be information asymmetries between the lenders and the government and there may be concerns of moral hazard (private sector belief that local governments may be bailed-out). Within Europe, local government tends to be limited by ensuring that borrowing land debt levels cannot surpass a given level within a year that the servicing of debt remains at a sustainable level, those central governments (namely the Ministry of Finance) gives permission when local governments can borrow.

62. Matching grants implies that the central government will transfer part of the funds, and the local government is expected to make up whatever is the difference. Furthermore, matching grants may be dependent on normative or actual spending of public services.
63. (OECD, 2006).
64. See UN-Habitat (2015) for further details.
65. The breadth of discussion on the topic of local government utilising financial markets in its different forms is extremely comprehensive. This study will examine local government borrowing in general terms.
66. (Swianiewicz, 2004).
67. Ibid.

Municipal Bonds

Although government bond issuance is a form of debt financing that could easily fall into the financial market category, the variety of bond types today, including newly developed ones, warrant a brief sub-section. Bonds give government's financing manoeuvrability, as they can be tailored to a variety of projects, scenarios, and financing objectives. The basic method by which a bond works is that a local government (the debtor) issues a debt obligation (the bond) to a lender (a creditor) with an agreement that the local government would pay out interest on the bond (the coupon). Bonds offer the advantage of allowing the local government to access all the funds in one go (rather than over a long disbursement) which is cheaper than bank lending; they often have fixed interest rates (providing consistency), and long maturities.[68]

A cursory description of the types of bonds is as follows:[69]

- *General obligation Bonds:* The servicing of the interest of these bonds comes from the general budget of the local government (revenues, intergovernmental transfers, etc.)
- *Revenue Bonds:* Bond payments are determined by the revenues generated by the funded project(s).
- *Project Bonds:* Bonds that are allocated to fund a single infrastructure project. Project bonds are growing in popularity, but bare more risk (just one project, rather than a diversified portfolio of projects)
- *Structural Bonds:* These bonds' repayment revenue comes from sources not linked to a project (for example intergovernmental transfers), which make them less risky.
- *Green Bonds:* Although still not fully developed, green bonds allow funds to be raised which focus on green infrastructure and clean energy developments.
- *Qualified Public Infrastructure Bonds (QIPBs):* A recently developed bond instrument in the USA, which permits municipal bond funding to be directed to Public Private Partnerships (PPPs).

Public-Private Partnerships (PPPs)

Local governments can undertake a special form of procurement in the form of PPPs, which can act as a means to utilise the private sector to partially or fully provide public services or construct large-scale infrastructure projects. The primary means by which PPPs operate is that the public sector – the local government for the purposes of this study – enters into a legal arrangement with a private sector firm for the provision of a public service or to construct an infrastructure project. The public sector will outsource the project to a firm, which is expected to finance the project based on a proposed design/strategy, and will then build, operate, and maintain the public infrastructure project for the duration of its contract.[70] In return, the firm will receive a regular payment from the government (for example schools and hospital construction and maintenance) and/or extract user fees (for example roads and bridges).

The theoretical underpinning of PPPs is based on helping to reduce public sector spending obligations and supposed inefficiencies (the latter point being that the public sector lacks sufficient managerial experience to deliver certain services).[71] Thus governments can reassign risk to those private actors who can reduce project costs and increase efficiency of service delivery. A PPP can encourage timely delivery of a project, as firms will not be paid or will not be able to extract rents until the project is constructed. Moreover, the public sector can utilise PPPs as a way to leverage financial resources and fund otherwise large and costly projects, as well as to ensure that the maintenance of a project throughout its life are able to be undertaken.

The drawback of PPPs is that their costs are often much higher than if the government borrowed the money, especially after the 2008 financial crisis where private sector borrowing costs have risen. PPPs are not guaranteed to deliver higher quality services than the public sector.[72] Sound contracts have to be designed, which ensure that the private sector delivery is both predictable and measurable, and comprehensive monitoring tools need to be enacted. The procurement system for PPPs is also extremely costly for the private sector to enter (firms must devote considerable resources to design a project proposal, that may end up being unsuccessful), which in some countries has created low levels of private sector competition of PPP tenures.[73]

68. (World Bank, 2014).
69. For a complete and full discussion on the different types of bonds, please refer to OECD (2015); World Bank (2014); (OECD, 2011).
70. (IMF, 2015).
71. (Hammami,, Ruhashyankiko,, & Yehoue, 2006).
72. (Buffie, Andreolli, Li, & Zanna, 2016).
73. (Andersson, 2013).

Alternative forms of investment

In the wake of the 2008 financial crisis, many of the traditional forms of local government infrastructure financing have come under severe pressure – tax revenues have fallen, European banking sector lending has weakened, central governments have enacted fiscal consolidation programmes (with the spending cuts placing the greatest burden on local authorities). The following section is a non-exhaustive list of alternative and innovative forms of local government financing, which could be used in the face of financing hardships.

Pooled Financing
One issue that local governments face is that they may lack the size to attract the necessary financing from the private sector. Moreover, local authorities may not possess the knowledge or the experience to operate in standard financial markets on their own. A method that local governments can use to circumvent such problems is to work together to access capital markets by borrowing together as a common group. The pooling of multiple local governments generates economies of scale and diversifies risk over multiple projects/authorities, which improves the pooled governments' ability to access capital markets.[74] The pooling of governments reduces the cost of borrowing (lower risk-adjusted interest rates) over individual borrowing, and reduces operating costs (through the creation of standardised process and project plans).[75]

Such pooled financing facilities can take shape in three respects:[76]

- *Basic Level* – a group of local governments that are working together (as a club), by not borrowing together, but rather co-ordinating borrowing activities and sharing best practices.
- *Medium Level* – also known as a "club deal", where each local government is responsible for its respective payment on acquired capital. Often such arrangements can be complicated from a legal standpoint and may generate unwanted costs. The medium level is optimal for countries which have legal constraints to develop advanced sharing mechanisms (for example special purpose vehicles).
- *Advanced Level* – Local authorities can create a special purpose vehicle (SPV), which will work as a financial intermediary on behalf of the pool of local governments. Such arrangements allow the local governments to obtain a large enough volume and diversity of projects, and to reduce costs and risk for capital market access.

Social Impact Bonds (SIBs)
A new form of bonds, which focuses on social investment finance – meaning finances that have a social impact that may not generate immediate economic returns (for example, education investment may only be realised in the future in the form of a more productive labour force). Much like a typical bond outlined above, social impact bonds are issued by a public authority (or other financial actors) to willing investors. However, the repayment of the loan only occurs if the project the bond funded generates a certain social benefit within the bond's maturity.

For local governments, this is a valuable source of private financing to fund social projects, allows social services to scale up operations, and better coordinate social projects towards meeting objectives.[77] The performance of the projects is strenuously measured by comparing individuals who received a benefit from a socially oriented project and a control group. The payment to the bond holders can vary based on performance, up to an agreed upon maximum (for the highly successful project that exceeds minimum targets).[78]

Although, presently the majority of SIBs are being launched by central and state level authorities, sub-national governments are increasingly utilising SIBs. For instance, the city of Brussels launched a social impact bond in 2014 to reduce unemployment among the city's migrants. The project works with a local NGO and aims to increase the migrants' integration into society.[79] Similarly, Helsinki city authorities unveiled a SIB in 2015, towards migrant labour force integration. Another example, in Augsburg, Germany, the city introduced a SIB in 2013, which worked to help young people who have dropped out of school and labour market, renter through training and employment programmes.[80]

74. (USAID, 2005).
75. (FMDV, 2015).
76. The section relies heavily on the work of FMDV (2015) and Anderson (2015).
77. (Davies, 2014).
78. (Federal Reserve Bank of San Francisco, 2013).
79. See UK cabinet office, Centre for Social Impact Bonds.
80. See Benckiser Stiftung Zukunft, Juvat.

Tax Increment Financing (TIF)
The notion of tax incremental financing is primarily to target brown-field type investment, by re-developing areas/projects that have been neglected or that require capital improvements. A TIF operates by a local government designating an area within the local authority (a district) for capital improvements. After the selection, the government freezes all property tax levels, at a "base level", and the revenues from the base level continue to fund all existing programmes. However, the incremental changes in property tax (that is tax increases) will be devoted to the redevelopment project, typically lasting between 15-35 years.[81] Further capital is raised through borrowing/bonds, with the expected incremental tax increases as the guarantee. After the life of the TIF comes to an end, the base-level unfreezes, and the increased tax levels flow back to the local government tax authorities for general use.

▪ The role of IFIs

Local governments may have difficulty in raising the necessary capital from their own revenues or the private sector due to the inherent nature of infrastructure projects. As outlined in the introduction of the chapter, such projects have considerable up-front costs, limited initial returns, and may be subject to regulatory changes. These challenges may make private financing reluctant to invest in infrastructure projects, especially the construction phase which suffers from completion risk.[82]

International Financial Institutions (IFIs), as well as Development Finance Institutions (DFIs), help to reduce these risks and to provide the necessary liquidity for projects.[83] These institutions can make potential infrastructure deals more attractive to a reluctant private sector by providing the initial financing of costs. IFIs and DFIs are unique actors in the financing field as they are able to provide more than just liquidity, they are able to provide advisory services, co-financing vehicles and risk mitigation guarantees.[84] Furthermore, they are able to leverage private sector financing, can influence project design/selection (as they often attempt to select projects with the highest growth or social impact, depending on their mandate), and even influence the policy environment of the project.[85] IFIs and DFIs also have the added benefit of typically being established with a mandate to invest in development projects and often are exempt from corporation tax; they receive favourable borrowing terms, tend to have high credit ratings and an implied guarantee from a state (the last point applies more towards DFIs).[86] IFIs/DFIs tend to be most effective in countries/regions/sectors where private sector lending is scarce or highly risk-averse.[87]

81. (OECD, Financing Green Urban Infrastructure, 2011).
82. (OECD, Official Development Finance for Infrastructure. Support by Multilateral and Bilateral development partners, 2015c).
83. (Willem te Velde & Warner, 2007).
84. (OECD, 2015c).
85. (Spratt & Collins, 2012).
86. (Willem te Velde & Warner, 2007).
87. (Spratt & Collins, 2012).

Chapter 4: Addressing the challenges of today and tomorrow

The international community has committed to several interrelated development agendas (such as the UN 2030 Agenda for Sustainable Development and the New Urban Agenda, the Paris Climate Agreement, the Sendai Framework for Disaster Risk Reduction, etc.) that are and will be guiding investment in adequate and sustainable infrastructure in the coming years. Even though global challenges of today and tomorrow must be addressed at the national level, their nature points to an important role for local governments. Indeed, it is the local authorities who will be at the forefront dealing with underperforming infrastructures, ageing populations, increasing mobility, shifting migration patterns and rising pressures from climate change. Local governments are thus expected to respond effectively and timely to the need for public infrastructure and services and to become more efficient and innovative in their fiscal space, especially at a time when cuts in public spending risk exacerbating rising inequalities.

▪ Maintenance of existing capital stock

Given the important role that public infrastructure has towards a country's economic health and the wellbeing of its citizens, its upkeep is of critical importance. Unfortunately, in many cases, adequate financing to maintain public infrastructure falls short or becomes the target of budgetary cuts during hard times and fiscal consolidation.[88]

Gyamfi, et al. (1992)[89] defines maintenance as the physical upkeep, service management, and institutional capacity provisions to ensure that public infrastructure is able to effectively deliver the service it was designed for. The lack of appropriate funding for maintenance can have severe negative effects on a country's economic productivity, as roads deteriorate, power-line breakages limit supply, and other services begin to break down.[90] Roads and railroads are especially prone to rapid deterioration due to heavy usage, and require regular upkeep to ensure users are not severely affected.[91] Appropriate maintenance level spending slows down the depreciation rate and extends the life of capital stock.[92] In Europe, public infrastructure can date back a hundred years, highlighting the fact that in the EU 70% of public investment is used for maintenance of capital stock.[93]

Empirical research of public-capital maintenance spending effects on the economy is not as extensive as that of overall public investment. However, research has shown that when countries overspend on capital expenditure (new infrastructure) at the cost of current expenditure (maintenance), there is a negative effect on GDP growth on further capital infrastructure investments.[94] In fact, the research shows that on the margin an increase in maintenance spending has a larger effect on economic productivity and the macroeconomic health of the economy – when public infrastructure investment has historically been high. Further work has shown that spending on maintenance not only increased public capital's durability but also increased the efficiency and durability of private physical capital.[95] In a country-specific empirical paper focusing on the local governments of Norway, authors Borge, Lars-Eirk, et al. (2012) provide evidence that local authorities that are more politically fragmented see lower levels of maintenance spending and "myopic" behaviour, where questions concerning maintenance are put off. Their work also finds maintenance spending is further affected because of reduced revenues and local authorities that are unable to maintain balanced budgets.

Educational outcomes can be affected when funds are not allocated to ensure the maintenance of educational facilities. Facilities (especially historical ones, which have had modular additions over the decades) must be technologically modernised to support contemporary teaching methods, to be energy efficient (to reduce utility costs), to respond to changing health standards, and combat general wear and tear.[96] The same elements apply to the healthcare sector, where facilities must be upgraded in accordance to advances in medical practices and technologies. Similarly, for green infrastructure,[97] an appropriate level of maintenance funding must be allocated to meet new technological developments, and respond to new regulatory changes. Effective green infrastructure investment and maintenance can ensure

88. (Roubini, Sachs, Honkapohja, & Cohen, 1989); (de Haan, Sturm, & Sikken, 1996).
89. (Gyamfi, Gutierrez, & Yepes, 1992).
90. (Rioja, 2003).
91. (Agénor & Moreno-Dodson, 2006).
92. (Borge & Hopland, 2012).
93. (OECD, 2015d).
94. (Devarajan, Swaroop, & Zou, 1996).
95. (Pierre-Richard, 2008).
96. (US Department of Education, 2003).
97. Green infrastructure can be defined partially as infrastructure that works towards the preservation and restoration of natural resources, ecological-sensitive areas, improving air-quality, preserving wildlife habitats, and opportunities for outdoor recreation – EPA (2011).

sustainable environmental conditions, a function system to protect the populations health (clean air and water), and reduce traditional local government infrastructure costs.[98]

Planning effective maintenance should thus be a core-component of a local government's infrastructure development plan. For instance, in the case of South Africa and Canada, municipalities undertake life-cycle planning of infrastructure projects, with appropriate risk/service priority assessments and periodic inspections in order to assess the right mix of maintenance strategies: *corrective*, undertaking maintenance only when a public service is no longer able to be delivered; or *preventative*, scheduled maintenance to prevent future failures (for example electricity generators).[99]

- ## A long-established urbanisation trend: the need to invest in infrastructure and services

Europe is today a highly urbanised continent with 75% of the population living in cities (see Table 4.1) and 80% by 2025.[100] Urban expansion is projected to increase across all CEB countries, particularly rapidly in Eastern Europe, with the magnitude depending on population growth and household change, migration, economic growth and restructuring, land-use planning policies, growth of transport and ICT infrastructure, climate change, etc. There are also more intangible factors such as cultural values, lifestyles, social segregation, and urban/rural attitudes and perceptions impacting location choices.

Peri-urbanisation

The specificity of the urbanisation trend in Europe is that, instead of continued growth of the major urban centres, it has rather been characterised by a trend known as peri-urbanisation – when regions of big and small cities and rural areas are integrated into urban-rural regions, entailing a shift from mainly rural towards urban land uses and activities with not only physical but also socio-economic transformations. This conversion is generally rapid and unpredictable. According to PLUREL, peri-urban areas are growing four times faster than urban areas, a rate which, if continued, would double their area of 48 000 sq. km between 2040 and 2060 (see Table 4.1). Peri-urban growth is likely to continue especially in the conversion regions of Southern, Central and Eastern Europe, with increasing welfare, changing lifestyle and consumption patterns.

Table 4.1: Area types in the EU-27

	Total artificial surface area (km^2)	Total land area (surfaced + non-surfaced)	Proportion of surfaced/total land area	Residential population by area type (millions)	Overall residential density (persons per km^2)	Proportion of populations
Urban area type	48 765	61 649	79.1%	234.9	3 810	50.0%
Peri-urban type	47 532	572 669	8.3%	118.0	206	25.1%
Rural area type	72 182	2 887 273	2.5%	116.7	40	24.9%
Un-populated (rock, ice, water)		5 626				
TOTAL EU (2000 base: excluding Bulgaria)	**168 479**	**3 527 217**	**4.8%**	**469.6**	**133**	**100.0%**

Source: (Piorr, Ravetz, & Tosics, 2011)

The peri-urbanisation trend has an impact on land use and functional linkages between urban and rural areas with deep consequences for human quality of life, the environment and ecosystem services, namely the demand for and supply of water, food and recreation in natural settings. In many cases, the result is sprawl, with increasing problems of social segregation, urban decline, wasted land and oil dependency for transport. For example, in the Western Balkans, the growing sprawl around many cities and towns and along coastlines is generating higher levels of urban waste. In these countries, this phenomenon is aggravated by the legacies of illegal waste dumping and old industrial sites. Peri-urbanisation thus sets a new context for sustainable development as there are potential solutions for improved quality of life, green infrastructure, better linkages between city and countryside and more sustainable urban and rural development.[101]

In Eastern Europe, the challenges associated with the rapid pace of urbanisation also stem from pressures on fresh water supplies, sewerage, the living environment and public health, which affect the urban poor most. For example, in many countries in this region sewerage systems are far better at meeting the needs

98. (EPA, 2011).
99. (Victoria, 2015) (South Africa, 2006/2009).
100. (Piorr, Ravetz, & Tosics, 2011).
101. (EEA, Environmental trends and perspectives in the Western Balkans: future production and consumption patterns, 2010).

of upper- and middle-class neighbourhoods than they are at servicing poorer neighbourhoods, particularly unregulated neighbourhoods and slums[102] on the urban periphery. These neighbourhoods, which grow most rapidly due to migration or concentration of ethnic minorities, are characterised by their crowdedness and lack of urban development standards, including lack of access to safe drinking water and waste and wastewater disposal facilities,[103] potentially leading to spatial poverty traps. Providing adequate infrastructure such as roads, water, sanitation and electricity is thus a major urban challenge in many large and middle-sized cities in CEB target countries.

Housing & social inclusion[104]

The provision of adequate, affordable and energy efficient housing is a particular challenge across CEB countries in the context of urban expansion:

- A general characteristic of housing provision in CEB countries is the persistence of regional imbalances, with *housing shortages* observed in areas of strong economic activity regardless of whether the national housing balance is in surplus. For example, this is the case in the Czech Republic, Finland, Germany, Greece and Romania.[105] Such shortfalls are mainly due to rural-urban migration, migration and refugee movements resulting from conflicts. Capital and large cities are particularly affected by this excess housing demand, leading to affordability issues for an increasing number of households.
- There is a considerable contrast between the EU average and CEB target countries in terms of *housing quality*. This translates into the need for housing modernisation, particularly of the existing stock.

  One of the key elements of housing quality is the availability of sufficient space in the dwelling. Space issues can be analysed through the *overcrowding* rate.[106] Across CEB member countries, the highest rates were registered in 2014 in Central and Eastern European countries, particularly in Serbia, Romania and "the former Yugoslav Republic of Macedonia", where half of the population lived in an overcrowded dwelling. As a comparison, this figure was 17% across the EU. The overcrowding rate is higher for those at risk of poverty. The largest differences between the two rates, total population and population at risk of poverty, are in Sweden (25 pps), the Czech Republic (25 pps) and Hungary (22 pps).[107]

  Housing quality can also be analysed by observing other deficiencies in amenities, such as lack of basic sanitary facilities, measured by *severe housing deprivation* rates.[108] On average, 5% of the European population suffered from severe housing deprivation, with large variations across member states. The most affected countries are Romania (23%), Hungary (18%), Serbia and Latvia (16%) and Bulgaria (13%). People at risk of poverty suffer more from insufficient space and poor amenities: in Romania and Bulgaria almost half of this population group faced severe housing deprivation.[109]
- The general challenge throughout Europe is the energy efficient refurbishment and retrofitting, the so-called *"greening" of existing buildings*. The emphasis on the existing stock is essential as new buildings account for only a limited share of the total housing stock. Western EU countries have set target refurbishment rates of 2.5-3% of the total housing stock per year, but the current prevailing renovation rate across Europe is 1%. CEB target countries in particular have the greatest untapped potential for energy efficient buildings.[110] Moreover, the provision of sustainable housing at an affordable price can especially target vulnerable households hit by energy poverty, thus combining environmental and social objectives.
- Depending on the local context and targeted population, housing programmes are also increasingly used as an *instrument for fighting and preventing poverty*, since they address important cross-sector needs of different categories of populations, including low-income households and other vulnerable groups. For instance, integrated programmes that combine housing and community services – such as accompanying child or social welfare facilities and services – provide more focused support and may thus contribute in a more substantive manner to social cohesion or gender inequality issues.

102. UN-HABITAT defines a slum household as a group of individuals living under the same roof in an urban area who lack one or more of the following: 1. Durable housing of a permanent nature that protects against extreme climate conditions. 2. Sufficient living space which means not more than three people sharing the same room. 3. Easy access to safe water in sufficient amounts at an affordable price. 4. Access to adequate sanitation in the form of a private or public toilet shared by a reasonable number of people. 5. Security of tenure that prevents forced evictions.
103. (EEA, 2013b).
104. See (CEB, Financing Social and Affordable Housing in Europe: the CEB's Approach, 2015b).
105. (CECODHAS, 2012).
106. The overcrowding rate describes the proportion of people living in an overcrowded dwelling, as defined by the number of rooms available to the household, the household's size, as well as its members' ages and their family situation.
107. Source: EUROSTAT data updated on 29 June 2016, extracted on 30 June 2016 (ilc_lvho05a).
108. The severe housing deprivation rate is the share of the population living in a dwelling which is considered overcrowded while also exhibiting at least one of the following housing deprivation measures: leaking roof, neither a bath nor a shower nor an indoor flushing toilet, or a dwelling considered too dark.
109. Source: EUROSTAT data updated on 29 June 2016, extracted on 30 June 2016 (ilc_mdho06a).
110. (UNECE, 2012).

▪ Addressing the issue of accessibility in rural areas

Rural areas represent around 80% of the European territory and 25% of the population in Europe (see Table 4.1). A distinguishing feature of Europe's rural areas is their diversity in terms of geographical and landscape features, demographic composition, the composition of economic activities and the different challenges they face.

Compared to urban areas, rural areas are generally characterised by:
- lower levels of income: in EU-27, the income per capita of urban areas is almost double that of rural areas)
- an unfavourable demographic situation (out-migration of young people, a relatively higher share of elderly and lower birth rates than the national average)
- lower educational attainments and weaknesses in skills
- lower employment and higher unemployment rates
- poor labour market opportunities, especially for women and young people
- a slower development of the tertiary sector.

Furthermore, an important element characterising rural areas is that of their "**remoteness**", that is accessibility to all those services and activities which represent common facilities for people living in urban centres (such as schools, hospitals and cultural facilities).

Transport infrastructure plays a crucial role in increasing the 'attractiveness' of rural areas. Over the past 10-15 years, the possibilities of commuting have changed the characteristics of many rural areas across European countries, by making them more similar to peri-urban areas. Consequently, they are increasingly characterised by problems such as high inflation in the housing market, transport costs, pollution and other environmental pressures. Even though commuting may help reduce unemployment in rural areas, on the other hand, it may divert demand for key services away from local providers towards nearby urban ones, resulting in a decline in local provision of services, which may represent an additional source of deprivation for more vulnerable groups (such as elderly and children).

In addition, strong disparities between urban and rural areas exist in terms of access to *education and healthcare*. For some countries, these disparities can be explained by geographical and demographic features such as remoteness, low density and dispersion of villages, thus creating a lack of critical mass for services and infrastructure. In other cases, the differences may be the result of a decentralised decision-making process which gives regional and local authorities policy discretion and therefore permits regional differences in funding.

The availability of adequate infrastructure, particularly housing and transport, and access to basic services such as education and healthcare, can be identified as an especially significant factor to accessing residency and employment in rural areas.

▪ Adapting infrastructure to changing demographics

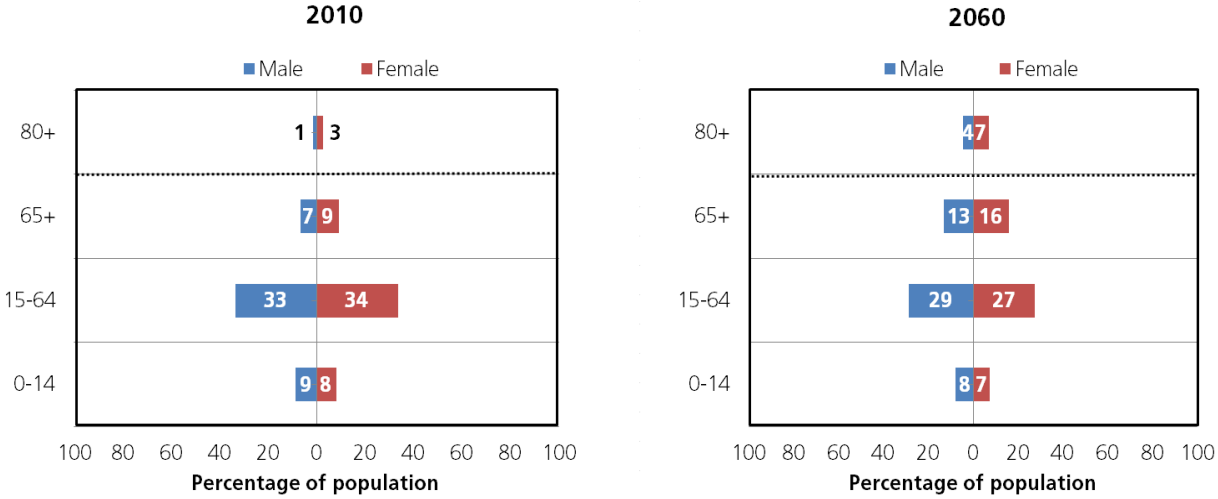
The demand for basic public infrastructure and services depends on the population in a given territory. Demographic change thus has a significant impact on the provision, management and financing of local infrastructure and services, in particular in terms of numbers of their "users" and "taxpayers". Across CEB countries, an ageing population, increasing mobility and shifting migration patterns are impacting demand and challenging the available resources of local authorities to deliver on social infrastructure needs. To address this, local authorities are looking at new ways of planning, designing, delivering, operating and maintaining social infrastructure.

Ageing populations

Europe is the oldest continent, with 19% of the population aged 65+ (2015, Eurostat). In fifty years' time, in CEB member countries those over 65 years old will represent a much larger share of the population (rising from 16% in 2010 to 29% in 2060) and those aged 80+ (rising from 4% to 11%) will be almost as numerous as the young population (see Figure 4.1).

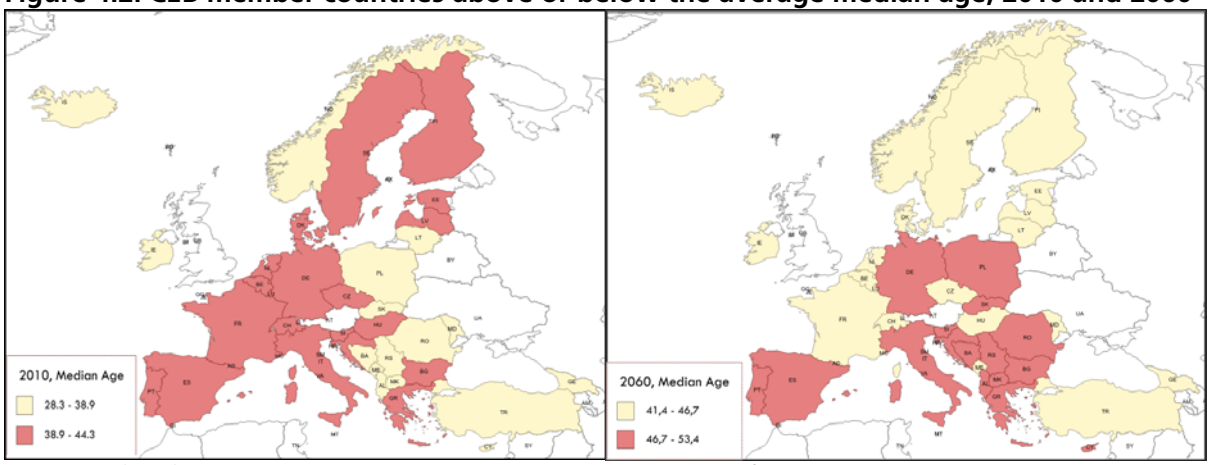
What is more, the ageing phenomenon is expected to shift eastwards: CEB member states that are relatively "young" today, mainly in Central, Eastern and South-Eastern Europe or "CEB target countries", are likely to report a significant and rapid increase in their median age in the near- and medium-term (see Figure 4.2).

Figure 4.1: Population pyramids in CEB member countries, 2010 and 2060



Source: CEB (2014), Ageing Populations in Europe: Challenges and Opportunities for the CEB.

Figure 4.2: CEB member countries above or below the average median age, 2010 and 2060



Source: CEB (2014), Ageing Populations in Europe: Challenges and Opportunities for the CEB.

The CEB's study on ageing populations in Europe (2014) demonstrates that the ageing phenomenon is expected to lead to a burgeoning, yet heterogeneous, demand for different types of eldercare infrastructure and services. This demand is likely to depend on adaptations to welfare state systems triggered by fiscal restructuring and shifting societal preferences towards "ageing in place" and home care. It could also be affected by the growing diversity among older Europeans, particularly the oldest-old (80+) and women, in terms of income, health and disability status, access to informal support and unmet care needs.

It is expected that older people will have different needs as they age more healthily and more actively than previous generations. There will be a clear need to help healthy older people remain productive and independent and to ensure that those who are frail or disabled receive care and support so that they can live in their communities for as long as possible. This has wide-ranging implications for the development of elderly-friendly products and services, environments and activities. For instance, the phenomenon of an ageing population is particularly increasing the demand for adapting (mostly existing) dwellings to the needs of the elderly as well as for providing a range of home care services, enabling active ageing. The availability, accessibility and affordability of adequate infrastructure and services for the elderly will therefore be crucial to ensuring decent living conditions for the older populations and countries will have to secure adequate care for the elderly by providing a balance of home-based, community-based and hospital-based services. The provision of such infrastructure and services should therefore be carefully considered in a longer-term and demand-driven perspective.

Many of the most essential services for the elderly are provided at local level. The way local authorities adapt to demographic changes will be one of the key determinants of quality of life for older people and of the wellbeing of the wider community. Local actors will be at the forefront of capitalising on the opportunities for developing adequate and affordable infrastructure and services for the elderly.

Migration
The biggest source of population growth in European cities today is migration from other parts of the country, from other EU countries and from outside the EU.[111] Furthermore, urbanisation and migration are interrelated processes. In effect, the vast majority of today's international migrants in European countries live in metropolitan areas which attract migrants with greater possibilities to access education, employment and economic welfare. This migration exerts significant pressure on infrastructure and housing capacities in and around cities. Across Europe, integration policies are developed and implemented primarily at the national or sub-national levels. The role of local authorities is thus critical to ensuring migrant integration and their contribution to developing local economies.

Furthermore, the recent significant refugee arrivals mainly to several countries in Europe resulted in additional challenges to all levels of government, with local authorities at the front lines of refugee and migrant reception and integration. Today, many cities are affected by two interrelated trends: austerity policies and budget cuts to scarce resources for social policies, especially affecting their capacity to meet the needs of arriving refugees, and secondly, an anti-migrant backlash in the context of the global economic crisis. Cities need the resources and skills to deliver tailored responses to meet these challenges.

The assimilation of migrants is a multi-dimensional process that involves not just economic and labour markets but takes into account social, educational, and spatial aspects. The interlinked nature of these areas implies that a failure in one area having potentially negative implications for the rest. Compared to native-born populations, immigrants often perform worse on many socio-economic outcomes (higher unemployment rates, worse educational and health outcomes, and sub-optimal living conditions).

Certain notable categories have been identified[112] as crucial for effective migrant integration, and include education and labour inclusion, access to adequate housing, civic integration and social inclusion. Due to the highly intertwined nature of all the areas above, the respective actors must work to ensure effective communication and co-ordination among themselves. The vast nature of the current refugee crisis will require different government levels to increase co-operation and financial burden sharing to effectively deliver the necessary services. Chiefly, governments should aim to support municipal actors, who often take on the lion's share of responsibility to provide housing, educational, and other social integration services. Importantly, successful and effective integration programmes need to include social partners, employers, and civil society initiatives and garner political support in order to adapt to each specific context.

The context in which migration happens is constantly evolving and there has been a change in the sort of people who are migrating and where migrants come from. Over the coming years, migration is expected to be a major demographic and social trend in Europe. Economic asymmetries are likely to remain a key driver, with large-scale refugee movements having a profound impact on some countries. In the future, migrants are also increasingly likely to be pushed by natural disasters, some of which may be the result of climate change. Local authorities will continue to be instrumental actors for migrant reception and integration in employment and other spheres of life in their communities.

▪ Responding to climate change: urban and rural adaptation[113]

When analysing present and future climate projections, almost all sectors and all regions of CEB countries have been and will continue to be affected. Responding to these risks (and benefits) means adapting to climate change, while taking into account other socio-economic factors such as urbanisation and migration.

What is adaptation?
Adaptation consists of actions responding to *current and future climate change impacts and vulnerabilities* (as well as to the climate variability that occurs in the absence of climate change) within the context of on-going and expected societal change.[114] This means not only protecting against the negative impacts of climate change, but also building resilience and taking advantage of the benefits it can bring. The earlier the adaptation responses are planned and implemented, the better equipped societies will be to cope with the challenges. In many respects, adaptation can be seen as a process of managing society's portfolio of assets. These assets include built infrastructure, natural environment, society and economy.

111. (UN-Habitat/European Union, 2016).
112. (OECD, 2015a); (CEB-OECD, 2016).
113. (CEB, 2015a).
114. (EEA, 2013a).

A first step towards adaptation to future climate change is reducing vulnerability and exposure to present climate variability. Adaptation is not a one-off measure; it can be seen as a continuous process, involving forward-looking anticipatory measures. *Adaptation is place- and context-specific*, with no single approach for reducing risks. Effective risk reduction and adaptation actions have to consider the dynamics of *vulnerability* (namely the propensity or predisposition to be adversely affected) and *exposure* (that is the presence of people, livelihoods, species or ecosystems, environmental functions, services, resources, infrastructure or economic, social or cultural assets in places and settings that could be adversely affected) and their linkages with socioeconomic processes, natural variability, sustainable development and climate change.

Adaptation options can be grouped under three broad categories:

- *grey* options that rely on technology and civil engineering projects
- *green* options that make use of nature
- *soft* options that aim at altering human behaviour and styles of governance.

Often, implementing a combination of these measures is an effective way to ensure resilience.

In addition, measures that provide benefits under the current climate and future climate change scenarios, called *low-regret measures,*[115] are the starting points for addressing projected trends in exposure, vulnerability and climate extremes. They have the potential to offer benefits now and to lay the foundation for addressing projected changes. Many of these low-regret strategies produce co-benefits, help address other development goals, such as improvements in livelihoods, human wellbeing and biodiversity conservation, and help minimise the scope for maladaptation.[116]

There are considerable differences in the character and severity of the consequences of climate change with which CEB countries, regions and geographical zones will have to cope.

- Three quarters of the population in CEB countries live in **urban areas** (see Table 4.1) and according to the Intergovernmental Panel on Climate Change (IPCC, 2014),[117] this is where many global risks of climate change are concentrated and will be most apparent in everyday life. Heat stress, extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, and water scarcity pose risks for people, assets, economies and ecosystems. Risks are amplified for those lacking essential infrastructure and services or living in poor-quality housing and exposed areas. Urban adaptation based on reducing basic service deficits and building climate-resilient infrastructure can significantly reduce vulnerability and exposure in urban areas. At the same time, urban adaptation to climate change offers opportunities for developing new jobs and promoting innovation.

- In **rural areas**[117] major future climate change impacts are expected on water availability and supply, food security and agricultural incomes, including shifts in the production areas of food and non-food crops. These impacts are likely to disproportionally affect the welfare of the poor in rural areas, such as female-headed households and those with limited access to land, modern agricultural inputs, infrastructure and education. Further adaptation to agriculture, water, forestry and biodiversity, and investment in infrastructure can enhance the long-term resilience of rural settings and allow adjustment to climate change impacts on rural communities.

115. Low-regret measures include early warning systems; risk communication between decision makers and local citizens; sustainable land management, and ecosystem management and restoration. Other low-regret measures include improvements to health surveillance, water supply, sanitation, irrigation and drainage systems; development and enforcement of building codes; better education and awareness.
116. Maladaptation occurs when specific adaptation actions: (1) do not increase resilience/adaptive capacity or do not reduce vulnerability; (2) are not sustainable from an environmental, economic or social perspective (e.g. over-exploitation of water resources); or (3) conflict with other long-term policy objectives, such as climate change mitigation targets. Maladaptation can be avoided by considering both the climatic and the socio-economic elements that constitute vulnerability to climate change.
117. (IPCC, 2014).

Making infrastructure resilient to climate change

The impacts of climate change are particularly pertinent to infrastructure and buildings in both urban and rural areas given their long lifespan, high initial costs and their essential role in the functioning of our societies and economies. Buildings and infrastructure can be vulnerable to climate change because of their design (low resistance to extreme weather events) or location (for example in flood-prone areas, landslides, avalanches). They can be damaged or rendered unfit for use by any changing climatic condition or extreme weather event: rising sea levels, extreme precipitation and floods, extreme low or high temperatures, heavy snowfalls, strong winds, etc.

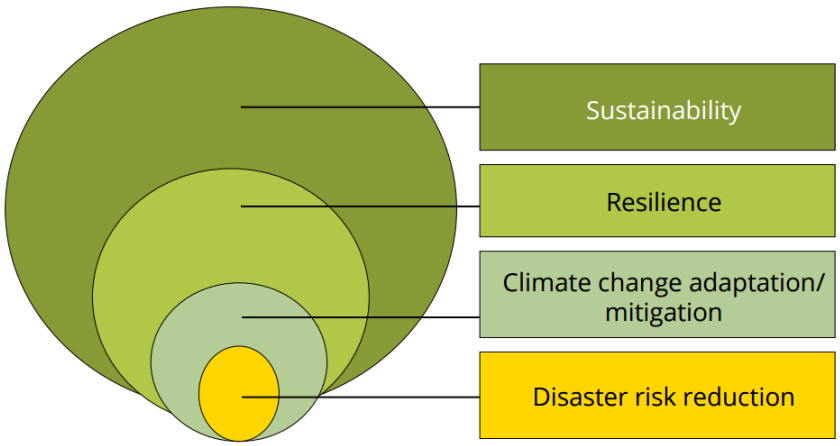
Making infrastructure resilient to climate change is an important adaptation challenge. Even though such investments often come with higher up-front costs,[118] their climate resilience makes them more profitable over the lifetime of the infrastructure. Climate change may also affect where infrastructure is built and how it is designed and operated. There will also be a need for additional infrastructure dedicated to climate protection such as improved sea defences and flood protection, interconnections in water supply, and retrofitting to improve resilience of existing infrastructure.

The severity of climate impacts on infrastructure will vary across Europe according to individual locations and their geophysical risk exposure, existing adaptive capacity and resilience, and the levels of regional economic development. Medium- and long-term climatic trends (for example increasing average temperatures, modified rainfall patterns) and an inherently rising frequency of extreme weather events impact differently from site to site. Climate impacts not only show regional and seasonal patterns (for example North/South, winter/summer) but also differ between territorial settings (for example urban/rural/coastal). Adapting infrastructure thus requires a complex, site-based analysis of the different trends and impact patterns.

Urban and rural adaptation as an integrated approach

Last but not least, *climate change is a systemic challenge* that does not happen in isolation but interacts with other environmental and socio-economic factors such as economic growth or decline; demographic change such as increase or decrease in populations, ageing, social segregation and migration; further urbanisation and urban sprawl; technological innovation; increasing or decreasing dependency on external resources such as energy, food and water; geopolitics; etc.[119] These socio-economic changes further increase the vulnerability of people, assets and ecosystems under the current climate. Regional and global trends in these factors add an extra dynamic. In response to such megatrends and multiple challenges, *mainstreaming climate change measures in comprehensive planning and infrastructure development* has become crucial in transforming urban and rural areas into climate-resilient and sustainable places (see Figure 4.3).

Figure 4.3: Embedding local adaptation in the context of sustainability



Source: Robrecht and Morchain, 2012; in EEA (2016), Urban adaptation to climate change in Europe 2016 - Transforming cities in a changing climate; 12/2016

118. Such climate proofing can be expected to increase costs for infrastructure projects. According to the World Bank study (2009, *The Costs of Adapting to Climate Change for Infrastructure*), the net cost of adapting infrastructure to climate change is around 1-2% of the total cost of providing that infrastructure. Overall, the cost of adaptation appears small in relation to other factors that may influence the future costs of infrastructure.
119. (EEA, 2016).

PART III: CEB financing: experience to date and the way ahead

Part III presents the CEB's approach to the "Improving living conditions in urban and rural areas" sector and describes the project portfolio, which is then illustrated by a series of case studies. To conclude, this part discusses the CEB's relevance in the context of the challenges described in Part II and reflects on potential avenues for the Bank's continued investment in local infrastructure across CEB countries.

Chapter 5: Portfolio profile

This chapter provides an overview of the CEB's historic role and experience in financing local infrastructure projects since its creation in 1956. The project portfolio is discussed from both a geographic and a sectoral standpoint and is illustrated in the Case Studies presented in the final section of this chapter.

▪ A historical perspective[120]

From the very first years of its existence, the CEB broadened its scope of action to include "territorial development" along with the priority mission to provide assistance to populations forced to flee from regions affected by political or economic upheavals and to those driven from their homes by natural disasters. This sectoral approach stemmed from the consequences of population movements caused by economic change. In effect, rapid urbanisation created shortages in terms of housing and local infrastructure in the host urban areas. Furthermore, rural exodus left many areas in a state of acute poverty and abandonment. It was therefore important to support the regions worst affected.

The CEB project for the development of the Epirus region in Greece, approved in 1959, was the first to be implemented in this field of action. The region's annual income per habitant was only 100 US dollars, against the national average of 240 US dollars in Greece and 1 000 US dollars in Western Europe. The region had also accumulated a number of structural disadvantages, including poor road infrastructure, small-sized farms and very basic electricity infrastructure. In addition, the region had received a significant number of refugees from Albania. To address these challenges, the CEB participated in a broad development project, coordinated by the Organisation for European Economic Cooperation and the European Productivity Agency. The CEB provided 10 million dollars for the construction of local roads, water supply, drainage and irrigation systems in the lower Acheron valley and the Yannina basin. In the 1960s, similar projects were financed in Cyprus and in the most remote regions in Iceland and Turkey. These mainly involved rural modernisation and the development of craft enterprises, small industries and tourism. In the 1970s, the CEB financed projects in the more developed regions of Western Europe to help them absorb substantial rural-to-urban migratory flows, especially in the context of high unemployment.

The Bank's financing in favour of local infrastructure in urban and rural areas expanded more particularly in the 1980s. During this period, the CEB financed large-scale government programmes involving agricultural and rural infrastructure (irrigation systems, rationalisation of production structures), economic infrastructure (roads, electricity, water) and industrial infrastructure (industrial parks). From a geographic perspective, CEB financing reflected country-specific challenges: the CEB financed large-scale irrigation programmes in Spain; the development of roads, electrification and the protection of forests in Greece; wastewater treatment and irrigation in Cyprus and large-scale government infrastructure programmes in Turkey.

While maintaining substantial volumes of lending in Western European countries, the accession of the Central and Eastern European (CEE) countries to the CEB in the late 1990s and the early 2000s shifted the Bank's geographical focus to the East. Since the 2000s, CEB lending to the CEE countries has notably developed in response to their significant infrastructure investment needs, caused by many years of underinvestment and environmental mismanagement. It has also been closely linked to the gradual decentralisation process in the provision and financing of local infrastructure and services, on the one hand, and to the need for national and local government authorities to co-finance EU funds, on the other hand. Today, a large and still growing number of CEB projects in this sector are co-financed with EU funds.

120. (Bussière & Willaert, 2006).

▪ Scope of action

The CEB can finance projects involving the construction or rehabilitation of infrastructure in the fields of urban renewal and rural modernisation in favour of public and private entities at national or local level. More specifically, the CEB can finance only those infrastructure investments that are included in the national, regional or municipal budget.

- Projects aimed at improving living conditions in **urban** areas must concern rundown neighbourhoods or urban areas lacking in urban infrastructure and/or in social and cultural amenities.

- Projects aimed at improving living conditions in **rural** areas must concern regions characterised by a low population density or activities in fields such as agriculture, forestry, aquaculture and fishing, defined by the national legislation.

The CEB can finance the following infrastructure investments:

- utilities such as water mains, electricity and gas supplies, sewers, treatment of solid and liquid waste
- local road network infrastructure and maintenance
- local public transportation infrastructure, equipment and maintenance
- public lighting
- district heating
- community services, educational and medical facilities
- temporary shelters and social housing
- socio-cultural and sports facilities such as playgrounds, green spaces, exhibition sites, theatres and libraries
- development of industrial estates
- irrigation networks in rural areas[121]
- administrative buildings and public housing.

▪ Lending to date[122]

Box 5: CEB figures – Methodological note

The figures provided in this chapter are based on the estimated amounts financed under the sector "Improving living conditions in urban and rural areas". They include different types of sectoral investments involving urban rehabilitation and rural modernisation that have been financed via various public and private borrowers.

In addition to these amounts, the CEB has financed a number of other infrastructure projects in direct cooperation with subnational authorities. However, these projects are categorised under other CEB sectors of action such as protection of the environment, social housing for low-income persons, health and education (for example, a school rehabilitation project financed with subnational authorities is categorised under the education sector). Consequently, such projects are not included in the total amount below because of their different sectoral classification.

Thus, taking a broader approach based on the borrower (namely subnational authorities) rather than on the sector ("Improving living conditions in urban and rural areas") could result in the aggregate volume of CEB financing in favour of local infrastructure being statistically underrepresented.

121. Irrigation projects involving the building of water-retaining dikes, dams and related infrastructure are eligible as long as the criteria detailed by the CEB's Environmental and Social Safeguards Policy are met.
122. In the case of multi-project programmes involving investments in several sectors such as urban rehabilitation, rural modernisation, housing, health, education or environment, only the components labelled "Improving living conditions in urban and rural areas" are reported here. Over the period 1957-1999, the amounts include projects categorised under the sector of "Territorial Development" that had existed in the CEB's previous nomenclature.

The Bank's financing in favour of local infrastructure in urban and rural areas dates back to the late 1950s. Over the period 1957-2016, the total volume of projects approved in this sector amounts to €9 billion, representing 15% of all loans approved. This amount includes €5.8 billion in projects located in the CEB's target countries (see Figure 5.1).

- Between 1957 and 2001, the CEB approved loans for local infrastructure projects in urban and rural areas totalling €5 billion and disbursed €3.5 billion. Local infrastructure projects financed in target countries amounted to €2.8 billion, thus representing 56% of all the projects approved in this sector over this period (see Figure 5.2).

- Between 2002 and 2016, the CEB approved loans totalling €4 billion and disbursed €3 billion. Local infrastructure projects in urban and rural areas financed in target countries amounted to €3 billion, representing 75% of all the projects approved in this sector over the last fifteen years (see Figure 5.2).

Figure 5.1: CEB lending to local infrastructure projects in target and non-target countries

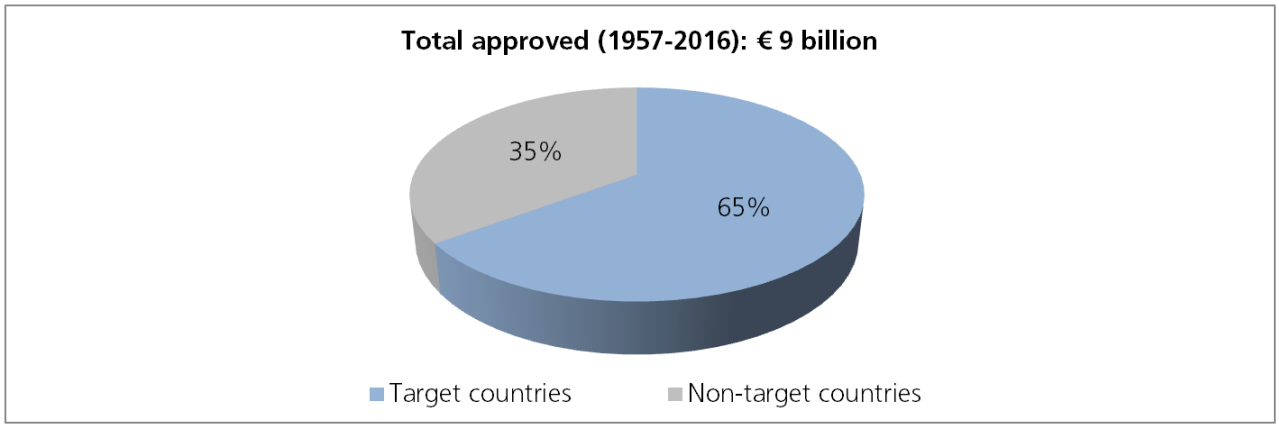
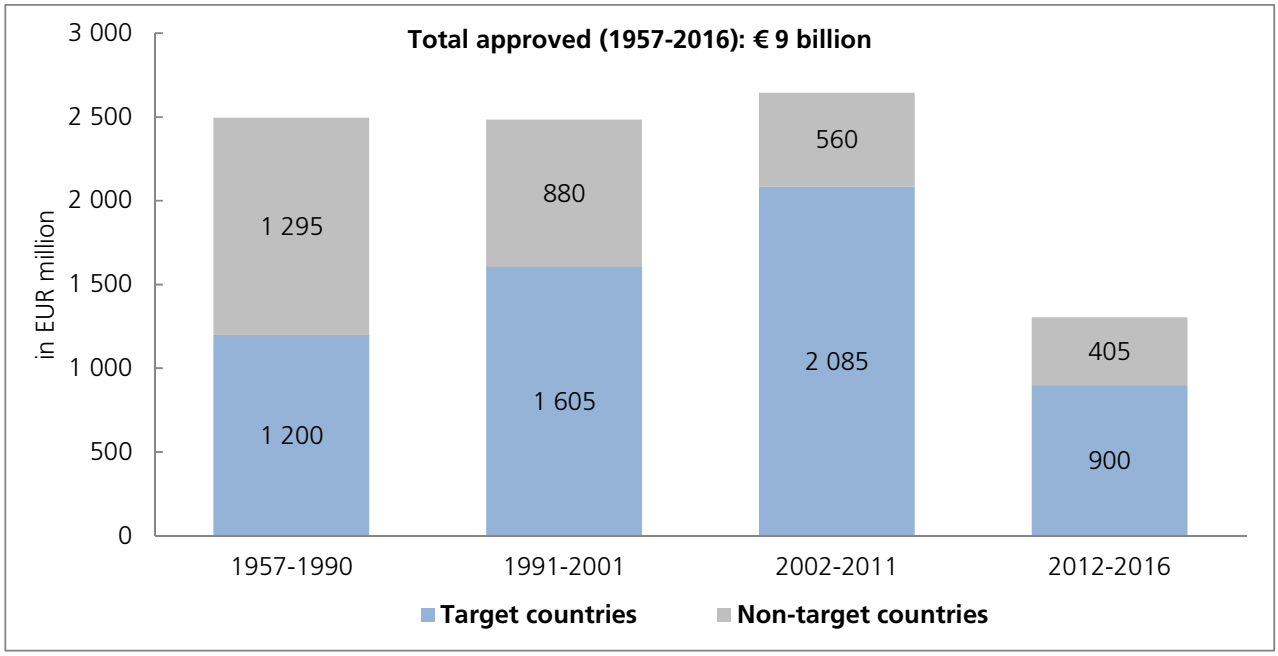


Figure 5.2: CEB lending to local infrastructure projects since 1957 per sub-period

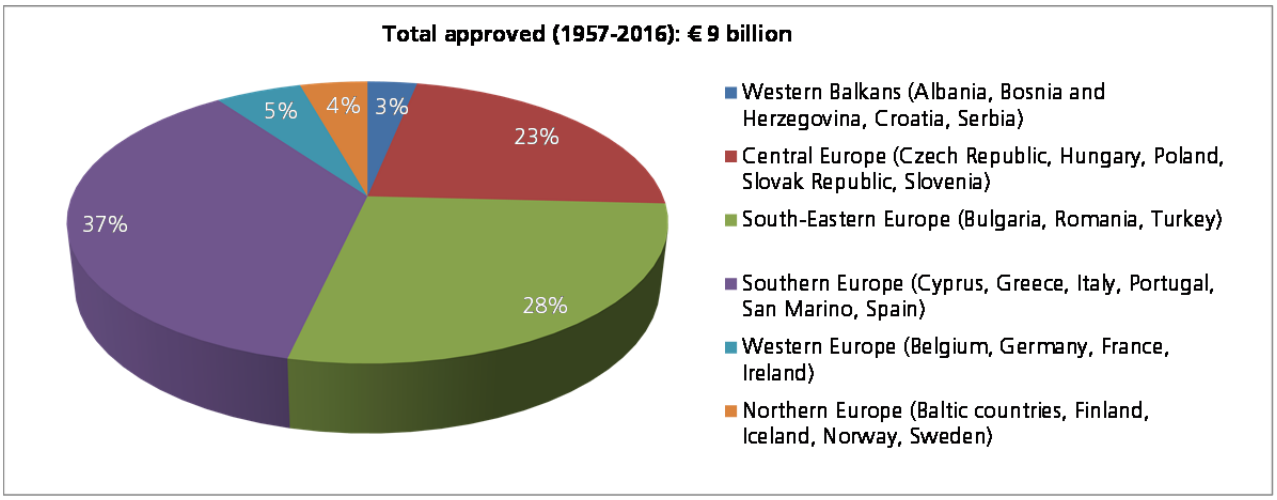


Geographic distribution

From a geographic perspective, CEB lending to local infrastructure in urban and rural areas was widespread (see Figure 5.3), with the following distribution:

- €3.3 billion or 37% of the total were financed in Southern Europe (Cyprus, Greece, Italy, Portugal, San Marino, Spain), including as much as €1.4 billion in local infrastructure projects located in Spain.
- Local infrastructure projects in South-Eastern Europe (Bulgaria, Romania, Turkey) represented €2.5 billion or 28% of the total approved between 1957 and 2016, including €2.2 billion in projects located in Turkey.
- €2 billion or 23% of the total were financed in Central Europe (Czech Republic, Hungary, Poland, Slovak Republic and Slovenia), including close to €900 million in projects located in Polish regions and cities.
- Local infrastructure projects in Western Europe (Belgium, France, Germany, Ireland) accounted for €500 million or 5% of the total. Projects in Northern Europe represented €390 million or 4% of the total approved between 1957 and 2016.
- The local infrastructure sector in Western Balkans benefited from CEB financing worth €285 million, representing 3% of the total.

Figure 5.3: Geographic distribution of CEB lending to local infrastructure projects



At country level, the Bank's largest borrowers in this sector over the period 1957-2016 were Turkey (25% of total loans approved), Spain (16%), Poland (10%), Cyprus (8%), Italy (5%) and Hungary (5%). These six countries represented 75% of the CEB's loan portfolio financed in this sector over the period 1957-2016.

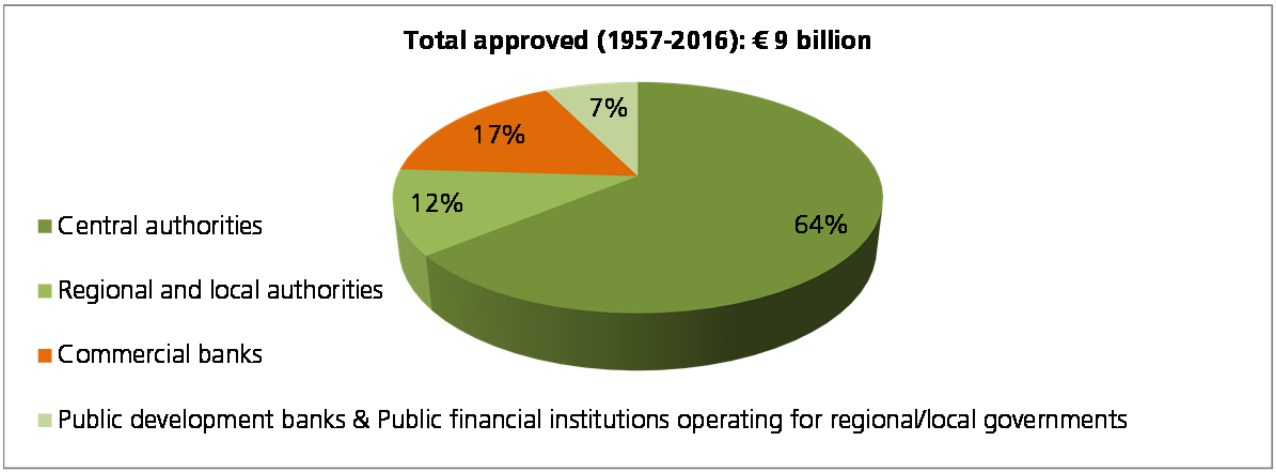
Over the last ten years, there has been a clear shift in the geographic distribution of CEB lending in this sector towards the target countries, reflecting their significant infrastructure needs and decentralisation process. While some of the main borrowers from Western and Southern Europe have decreased their shares (France, Spain) or disappeared from the portfolio (Cyprus, Ireland, Italy), the local infrastructure sector in Central European countries has particularly gained in importance. The largest borrowers were Poland (26% of total loans approved for local infrastructure projects between 2007 and 2016), Slovak Republic (12%), Czech Republic (11%) and Hungary (8%). The notable exception in the CEB's portfolio in Western Europe is Germany with 11% of total loans approved for local infrastructure projects since 2007.

Distribution channels

To reach the intended final project beneficiaries, the CEB operates via intermediaries, namely sovereigns, regional/local governments, public or private financial institutions.

Figure 5.4 shows the various public and private distribution channels used for CEB financing for local infrastructure projects over the period 1957-2016.

Figure 5.4: Public and private borrowers in CEB local infrastructure projects



Between 1957 and 2016, 83% of CEB borrowers in this sector were public, namely central (64%), regional or local administrations (12%) and public financial intermediaries that offer financial products targeting regional/local authorities (7%), while 17% of CEB borrowers were commercial banks.

During the last ten-year period, the public/private distribution of borrowers has tipped more in favour of the private sector (from 83%/17% over the period 1957-2016 to 69%/31% over the period 2007-2016), reflecting the increasing involvement of private entities in the provision and financing of local infrastructure. The CEB has mainly worked with local banking sectors within multi-project programmes involving investments in several sectors (housing, education, health, environment or historic heritage) and requiring a large, global borrower.

At the same time, the share of local infrastructure projects financed with central authorities has been significantly reduced (from 64% to 33%), while the CEB's direct lending to regional/local governments, mostly but not exclusively in the target countries, has considerably increased in relative terms (from 12% to 23%). The CEB's experience in lending to local authorities across CEB countries has been diverse in terms of the borrowers' size (ranging from small and medium-sized municipalities to big regions) and volume of CEB loans (ranging from <€1M to €200M), reflecting numerous factors such as infrastructure needs, institutional capacity, budgetary resources and the development of local capital markets.

Furthermore, around one-fourth of all CEB local infrastructure projects (totalling €2 billion in CEB loans) have been implemented in co-operation with other international financial institutions (IFIs) and/or the European Union (EU), presented in Case Study 2:

- CEB loans totalling €1.1 billion financed in conjunction with loans from the *European Investment Bank* (EIB) in Bulgaria, Cyprus, Czech Republic, France, Poland, Portugal, Slovenia and Spain, loans with the *World Bank* in Albania and Romania, loans from the *European Bank for Reconstruction and Development* (EBRD) in Bosnia and Herzegovina and Slovak Republic, and loans from the *Nordic Investment Bank* (NIB) in Lithuania.

- CEB loans totalling €560 million blended with EU Funds: in Cyprus, Czech Republic, Hungary, Poland, Portugal and Slovak Republic with *Structural Funds*; in Albania, Bosnia and Herzegovina and Serbia with grants from the *Western Balkans Investment Framework* (WBIF).

- CEB loans totalling €360 million have been co-financed with both EU Funds and loans from the EIB.

Case Studies

The three case studies reflect the various types of borrower in CEB local infrastructure projects.

Case Study 1: Co-operation with public authorities

A. Direct lending to regions
B. Direct lending to cities

Case Study 2: Co-operation with other IFIs and/or blending with EU funds

Case Study 3: Co-operation with financial institutions

A. Lending to public institutions operating for local governments
B. Lending to commercial banks

Taking into consideration the priority given to social impact within CEB projects, the case studies mainly focus on the social effects of the projects, that is direct effects on the end-beneficiaries targeted in the projects. These effects, taken from in-house operational documents, are provided by the borrower within the framework of regular monitoring of each project financed by the CEB. Upon completion, the borrower details the use of CEB funds and compliance with the pre-approved objectives, and provides information on the material and social results.

In each project presented below, the year of its approval is indicated in brackets.

Case study 1. Co-operation with public authorities
A. Direct lending to regions

REDUCING DISPARITIES BETWEEN URBAN AND RURAL AREAS IN POLAND (2010)

Objective: i) the renovation of existing or development of new local and regional road infrastructure, and cultural facilities (80% of the total) and ii) the renovation and extension of several regional hospital facilities and specialised units (20% of the total)

Borrower: Region of Podkarpackie

Beneficiaries: some 2 million inhabitants (5.5% of Poland's total) of the Region

CEB loan: 205 600 000 Polish Zloty (PLN) (equiv. to €51 million), covering 19% of the total cost of PLN 1 000 000 000

The project was implemented between 2010 and 2013.

Social effects:

The Region of Podkarpackie has a very low population density (with 118 persons per sq. km) and is the least urbanised region of the country (with only 40% of the population living in urban areas). It is located in south-eastern Poland, bordering Ukraine and Slovak Republic, and is one of the border regions of the European Union.

The social impact of this project was high as it contributed significantly to reducing disparities between urban and rural areas, improving the living conditions of local populations and to creating better conditions for sustained economic development. In particular, the project helped provide better access to the local and regional road network, including connections to national and trans-border traffic roads. The modernisation of local healthcare facilities helped develop new capacities, thus limiting the need for the inhabitants to go to other regions' hospitals to receive treatment. In addition, the renovated cultural facilities are expected to intensify the touristic attraction of the Region and increase its attractiveness for both inhabitants and businesses.

DEVELOPING REGIONAL INFRASTRUCTURE IN SLOVAK REPUBLIC (2015)

Objective: the revitalisation and modernisation of urban public infrastructure, including mainly the transport network; the reconstruction of sanitary facilities, purchase of medical equipment and ambulances in hospital and healthcare centres, the renovation of facilities for the elderly and disabled; and the renovation of museums and public libraries

Borrower: Žilina Self-governing Region

Beneficiaries: some 690 000 inhabitants of the Region, representing 13% of the country's population

CEB loan: €49.5 million, covering 72% of the total cost of €69 million
The expected implementation of this project is between 2016 and 2018.

Social effects:

This project is the first CEB financing in favour of a Slovak region and first direct IFI lending to Žilina Self-governing Region. The Region contributes with 11% to the country's GDP and ranks at number 5 out of 8 Slovak regions. The Region's GDP per capita (in PPP) is 35% below the EU average. The CEB loan will thus play an important part in contributing to the improvement of living conditions of local populations and in facilitating more dynamic and inclusive growth throughout the country. Under this programme, the CEB is providing not only long-term financing to cover local contributions by the Region but also short-term bridge financing to accelerate and facilitate the absorption of EU Structural Funds.

Case study 1. Co-operation with public authorities
B. Direct lending to cities

LUBLIN CITY'S MUNICIPAL INFRASTRUCTURE, POLAND (2013)

Objective: the development of road infrastructure, public transport services, sport and educational facilities

Borrower: City of Lublin (capital of the Region of Lubelskie) with around 350 000 inhabitants. It is also an academic centre with 72 000 students

Beneficiaries: inhabitants of Lublin and neighbouring populations

CEB loan: PLN 280 000 000 (equiv. to €67 million), covering 28% of the total cost of PLN 1 000 000 000

Social effects:

Social impact stemmed from providing higher standards of and better access to municipal infrastructure and services. The most impacting investment is the new road network construction and access to the City for the commuters, especially the large numbers of students. The investments also included a system of acoustic screens to protect residential areas from the noise and a storm drain system to receive the undesired urban run-off in order to protect groundwater and soils. Neither this, nor other investments have impacted on the natural environment, especially concerning the 'Natura 2000' sites.

As a side effect, the improved roadways also significantly facilitate the development of the City's economic potential of small creative entrepreneurship, and partnerships within the Region and with the neighbouring countries, in particular those at the eastern border. Furthermore, for some of the investments, CEB financial resources helped bridge financing gaps with EU funds, and therefore contributed to a more efficient and expeditious absorption of the latter.

MUNICIPAL INFRASTRUCTURE IN THE CITY OF TAMPERE, FINLAND (2016)

Objective: the development/renovation/extension of day-care centres, schools, health centres, premises for the elderly, sports facilities and cultural sites

Borrower: City of Tampere (with around 320 000 inhabitants)

Beneficiaries: a wide range of the local population, representing different age groups (day-care children, pupils, healthcare staff and patients, young families, participants of cultural events and library users, senior citizens, persons practising sports) and including those with a migrant background

CEB loan: €60 million, covering 26% of the total cost of €227 million
The expected implementation of this programme is between 2016 and 2018.

Social effects:

The project is developed in line with the City of Tampere Strategy "Working together for a bright future 2025". It is expected to contribute to the development of the new areas of Tampere; to address specific demographic challenges (such as increasing Tampere's overall and pupil/student populations as well as specific requirements related to the integration of citizens of foreign origin); to ensure cost-saving and efficient organisation and use of municipal infrastructure; to bring modern solutions to the living environment (competitive healthcare services, access to education and day care, active sports and cultural life); and to respond to specific issues of municipality infrastructure such as bad air quality and mould in educational buildings.

The social impact of the project should be very high, given the focus on children, pupils, young people and the elderly and beneficiaries with a migrant background, who will benefit from improved facilities and better access to services.

Case study 2. Co-operation with other IFIs and/or blending with EU funds

URBAN REVITALISATION IN NICOSIA, CYPRUS (2010)

Objective: the rehabilitation of selected urban areas that border the buffer zone in Nicosia by developing and/or modernising local infrastructure and by attracting private investments. The final objective is to revitalise the Old Town's economic activity and to attract tourism.

Borrowers: Municipality of Nicosia and the Republic of Cyprus

Beneficiaries: inhabitants of the Municipality of Nicosia

CEB loan: €40 million, covering 19% of the total revised cost of €215 million
This project is co-financed with EU Structural Funds and loans from the EIB.

Under implementation since 2010, the project is expected to be completed by 2018.

Social effects:

Nicosia is severely affected by the political situation on the Island. The City is split in two parts which are partitioned by a buffer zone. This affects vital operation and the natural expansion of the City as an entity. Therefore, the Municipality, with the support of the Government decided to develop, reconstruct and revitalise the affected areas.

The CEB's involvement in this project is to help the Municipality of Nicosia to finance investments aimed at improving living conditions in urban and rural areas. Although this project is facing delays in its implementation, it is expected to have positive effects on social cohesion by way of improving public infrastructure and services. Furthermore, investments in municipal infrastructure should generate employment both directly and indirectly, hence contribute to creating a healthy business environment and to developing the tourism sector.

COMMUNAL INFRASTRUCTURE IN REMOTE RURAL AREAS IN ALBANIA (2014)

Objective: the development of municipal infrastructure in the scarcely populated and predominantly remote rural areas of the Albanian Alps and South Coast regions

Borrower: Republic of Albania

Beneficiaries: inhabitants of the targeted areas

CEB loan: €28.7 million, covering 78% of the total cost of €36.7 million

CEB grant support: €1 million allocated in the form of technical assistance from the CEB's Social Dividend Account. Additional technical assistance was sourced from the EU's Western Balkans Investment Framework (WBIF) facility (€1 million).

The expected implementation of the programme is between 2015 and 2019.

Social effects:

Implemented by the Albanian Development Fund, this project is an important rural development programme with strong social and economic impact. It is expected to improve the living conditions of local populations by providing them access to basic infrastructure (roads, water and sewage systems, etc.) and by generating local employment opportunities. The reorganisation of local infrastructure in the Albanian Alps and the South Coast regions should also affect the currently high unemployment and poverty rates, partially caused by the lack of infrastructure and difficult access to other areas. If successfully implemented, the project can also have an important catalytic effect in terms of attracting other financing sources in the tourism sector.

Case study 3. Co-operation with financial institutions
A. Lending to public institutions operating for local governments

MUNICIPAL INFRASTRUCTURE PROGRAMME BRANDENBURG, GERMANY (2016)

Objective: i) the provision of social housing for specific target groups at socially acceptable rents (indicative amount of €240M); ii) municipal infrastructure investments (indicative amount of €60M), including social infrastructure (nursing homes, hospitals, schools, etc.), general administration and services, public order and safety, science, technology and culture, energy efficiency of buildings and municipal transport.

Borrower: Investitionsbank des Landes Brandenburg (ILB)

Beneficiaries: local populations, including vulnerable households

CEB loan: €300 million, covering 25% of the total cost of €1.2 billion
The envisaged investment initiatives are expected to be carried out over the 2016-2020 period.

Social effects:

In the current period of austerity, the value of the CEB's financing goes beyond pricing attractiveness or narrowing it down to the valuable provision of scarce capital. Indeed, authorities in Brandenburg are faced with the challenges of capital investment backlogs and migration pressures together with significant demographic changes in terms of the consequences of low birth rates and ageing population.

In addition to promoting capital investments in financially weak municipalities, the programme aims at enabling all Brandenburg municipalities to maintain, renovate, expand or scale down their local infrastructure as necessary in order to provide essential public services efficiently and reliably. Public infrastructure expansion shall focus on addressing the current challenges in terms of the provision of affordable housing and the accommodation of refugees. Finally, as a side-effect, each sub-project within the programme also provides indirect support for the local economy with positive impact on local employment.

SOCIAL INFRASTRUCTURE INVESTMENTS IN FINLAND (1997-2007)

Objective: the partial financing of social infrastructure investments, on a cost-effective basis, to improve social cohesion and contribute to environmental protection in Finnish municipalities

Borrower: Municipality Finance Plc, Helsinki

Beneficiaries: Finnish municipalities, municipal federations and municipally-controlled companies whose loans are guaranteed by a municipality

CEB loan: €400 million approved in five loans in 1997, 2000, 2003, 2005 and 2007, covering 45% of the total cost of €900 million (based on aggregate amounts)

Social effects:

These programmes have generated highly satisfactory social effects both in quantitative and qualitative terms. One in two Finnish municipalities partially finance their infrastructure investments through Municipality Finance. Within the five successful programmes, CEB financing (extended at competitive conditions and long-term tenors) supported the efforts made by the Finnish municipal sector to deliver basic services (education, healthcare and social care, social housing, drinking water and sewage systems, public transport, etc.) to their inhabitants with the lowest possible cost.

The added value of these programmes was particularly important for smaller Finnish municipalities which did not have as good access to capital markets as big cities such as Helsinki, Turku and Tampere did. Municipality Finance as an intermediary was able to provide funds to all municipalities at the best possible cost thanks to its AAA rating, regardless of the municipality's size and financial standing.

Case study 3. Co-operation with financial institutions
B. Lending to commercial banks

IMPROVING LIVING CONDITIONS IN URBAN AND RURAL AREAS IN CZECH REPUBLIC (2011, 2014, 2015)

Objective: the partial financing of infrastructure investments, including the revitalisation and modernisation of urban and rural public infrastructure, including local water treatment and network facilities, waste treatment and public transportation, rehabilitation of historic and cultural heritage

Borrower: Komerční Banka

Beneficiaries: small and medium-sized Czech municipalities; public, private or mixed companies

CEB loan: €250 million approved in three loans in 2011, 2014 and 2015, covering 50% of the total cost of €500 million (based on aggregate amounts)

Social effects:

The socio-economic impact of these programmes rests not only on the improvement of quality and accessibility of public services, energy saving measures, cleaner, more reliable and accessible public transportation, but also on the fact that CEB financial resources help to bridge financing gaps of projects co-financed by the EU funds, and therefore contribute to a more efficient and expeditious absorption of the latter.

By facilitating access to credit for the upgrade of local and regional infrastructure, the CEB contributes to creating conditions for sustained economic development and improved living standards for local populations, thereby reducing intra-regional and international disparities between Czech Republic and the more developed economies of the EU.

SUPPORTING THE VOLUNTARY SECTOR IN FRANCE (2010)

Objective: modernisation and increased accessibility of public infrastructure, including social care infrastructure and facilities, purchase of equipment; renovation of educational infrastructure and facilities for children and young people; renovation of cultural amenities in run-down areas

Borrower: Crédit Coopératif

Beneficiaries: voluntary public interest associations and foundations serving the needs of people made vulnerable by their economic situation, disability (minors and young adults) or old age (dependent elderly)

CEB loan: €100 million, covering 50% of the total cost of €200 million

Social effects:

The voluntary sector in France forms an integral part of the solidarity-based economy and plays a decisive role in the social care and education fields. Crédit Coopératif, together with its 70 branches across the country, is a major player in the French social and solidarity-based economy. CEB funding to Crédit Coopératif ensure that vital services will be provided to persons with disabilities or in ill-health, dependent elderly, young persons in precarious social situations and other vulnerable groups.

Chapter 6: The possible way ahead

This final chapter discusses the CEB's relevance in the context of the trends and challenges described in Parts I and II respectively. It also reflects on potential avenues for the Bank's continued investment in the local infrastructure sector in CEB member countries, in particular in line with the objective to promote sustainable and inclusive growth as defined in the 2017-2019 Development Plan.

▪ Responding to local investment needs in all CEB member countries, with a focus on the neediest geographic areas

Over the past fifteen years, decentralisation trends in many CEB countries (especially in the transition countries) have led to increased investment spending at sub-national government level, especially in favour of social public infrastructure. Even though degrees and forms of decentralisation vary widely across countries, all governments share a common objective to mobilise authorities with different degrees of autonomy to provide quality investments.

The CEB has an important role in promoting social investment at the local level across all its member countries. The CEB's investments in local infrastructure – involving the construction or rehabilitation of schools, playgrounds, green areas, libraries, medical and social care facilities, social aid centres, local roads and transport systems – contribute to delivering affordable and sustainable essential services to local populations.

The first Part of this study described diverse trajectories in infrastructure investment across CEB target and non-target countries since the onset of the financial crisis. While public investment has not fully recovered to its pre-crisis levels in many CEB member states, some countries have been hit particularly hard with public investment being severely stifled by fiscal retrenchment following the financial crisis.

From a geographic standpoint, the focus of CEB action could thus be placed on the countries that have experienced the most severe decline and weakest recovery in public capital investment since 2009 (identified in Chapter 2):

- Group 1: Croatia, Cyprus, Greece, Ireland, Italy, Portugal, Spain.
- Group 2: Czech Republic, Estonia, France, Germany, Lithuania, Netherlands, Poland, Romania, Slovenia.

In this respect, regional and local authorities have a huge potential to revive infrastructure investment as they play a key role in financing and managing public investment programmes. Admittedly, this potential will have to be carefully considered based on a proper assessment of infrastructure needs and of the capacity of sub-national governments to provide financing without compromising their fiscal sustainability.

Furthermore, fiscal retrenchment by governments across CEB countries has also resulted in more acute recognition of the importance of the private sector in supporting social infrastructure projects, easing fiscal constraints and improving the delivery of basic infrastructure and services to local populations. Therefore, the CEB intends to explore ways of increasing its role in supporting such investment activity in cooperation with both public and private actors, taking into account the regulatory framework and institutional capacity in each country of operation.

The CEB could also explore co-financing opportunities with various EU structural and cohesion funds which help reduce economic and social disparities across European countries and regions. Given their numerous and deep geographic and sectoral synergies, the EU and its institutions are partners of choice for the CEB. Over the coming years, the CEB will be striving towards strengthened cooperation with these European institutions and within EU funding mechanisms and facilities.

▪ Addressing the challenges of providing adequate, affordable and sustainable local infrastructure in urban and rural areas

The scale of needs in the local infrastructure sector across Europe is particularly large, given the changing demographics, increasing urbanisation, shifting migration patterns, and rising pressures from climate change. Investment in this sector should thus be a driving force in the current challenging environment, with the clear objective of improving people's welfare and quality of life. Given its exclusively social mandate, the CEB will be giving special attention to the integration of vulnerable and marginalised groups in society such as low-income households, the unemployed, the frail elderly, people with disabilities or chronic diseases, ethnic minorities and migrants.

In the face of such trends and challenges, the CEB will be adapting its action in the local infrastructure sector. Standing ready to respond to the requests of its member countries, the CEB will examine the possibility of providing financing in the following areas:

- **Urban and rural investment in infrastructure and services**

Given its social mandate, the CEB will continue to target less well-off neighbourhoods, peripheral districts or cities lacking in housing and basic services, urban infrastructure and transport, schools, medical and social care facilities, and social and cultural amenities across all its member countries. The Bank could also target investments to metropolitan areas that are at the forefront of global challenges (such as migration) and implementing global development agendas (such as the UN New Urban Agenda). In addition, the CEB will contribute to improving living conditions in underserved and remote rural areas by financing small-scale basic infrastructure and services, local road networks and environmental upgrading.

- **Silver economy**

Over the coming decades, it is expected that older people will have different needs as they age more healthily and actively than previous generations. There will be a clear need to help healthy older people remain productive and independent and to ensure that those who are frail or disabled receive care and support so that they can live in their communities for as long as possible. The availability, accessibility and affordability of adequate infrastructure and services for the elderly will therefore be crucial to ensuring decent living conditions for the older populations, and countries will have to secure adequate care for the elderly by providing a balance of home-based, community-based and hospital-based services.

In a demand-driven context, the CEB can contribute to addressing some of these needs. Based on its mandate and experience, various types of investment could be envisaged: providing old-age specific health infrastructure (including formal long-term care infrastructure), adapting housing as well as urban and rural living spaces to suit the needs of the elderly, promoting energy efficiency and the use of renewable energy in eldercare infrastructure, and investing in skills and lifelong learning. In particular, the CEB can provide financing for retirement homes, residences providing services and care, and nursing homes for the most dependent persons. From a geographic standpoint, the focus of CEB action could be on lower-density regions where population ageing and out-migration are making it increasingly difficult to sustain the provision of services.

- **Migrant integration**

The CEB will continue to provide financing for integration projects with a migrant component and targeted to vulnerable populations. In particular, the CEB will continue to finance social investment projects aimed at improving living conditions and strengthening the social inclusion of the most vulnerable groups, including those with migrant backgrounds. To this end, the Bank will continue to provide financing for local infrastructure, decent and affordable housing, skills development and job creation, while following a more localised approach and combining hard and soft investments. Although a clear focus is placed on the issues of longer-term migration, the CEB will continue to provide emergency assistance whenever needed, as it has done since its inception.

- **Urban and rural adaptation**

Existing and future buildings as well as infrastructure in urban and rural areas need huge investments, alongside those for climate-proofing, in order to keep them functioning and delivering up-to-date services. This means incorporating climate change adaptation actions into building standards and retrofitting activities, such as ensuring that sewerage systems can cope with heavier precipitation, reviewing building design to better insulate against heat and adapting the energy and transport systems to cope with higher temperatures, low water availability or flooding. Urban areas are particularly vulnerable in this respect, given the high density of people and the damage caused by urban sprawl. In this perspective, the CEB will be supporting such infrastructure adaptation investments in close cooperation with the EU as well as with national, regional and local governments in its member countries.

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As the only development bank with an exclusively social vocation in Europe, the CEB will thus continue to finance adequate, affordable and sustainable local infrastructure and services across its member countries, with a particular focus on the neediest areas. In so doing, the CEB will be making its contribution to global development agendas such as the United Nations 2030 Agenda for Sustainable Development and particularly to Goal 11: "Make cities and human settlements inclusive, safe, resilient and sustainable".

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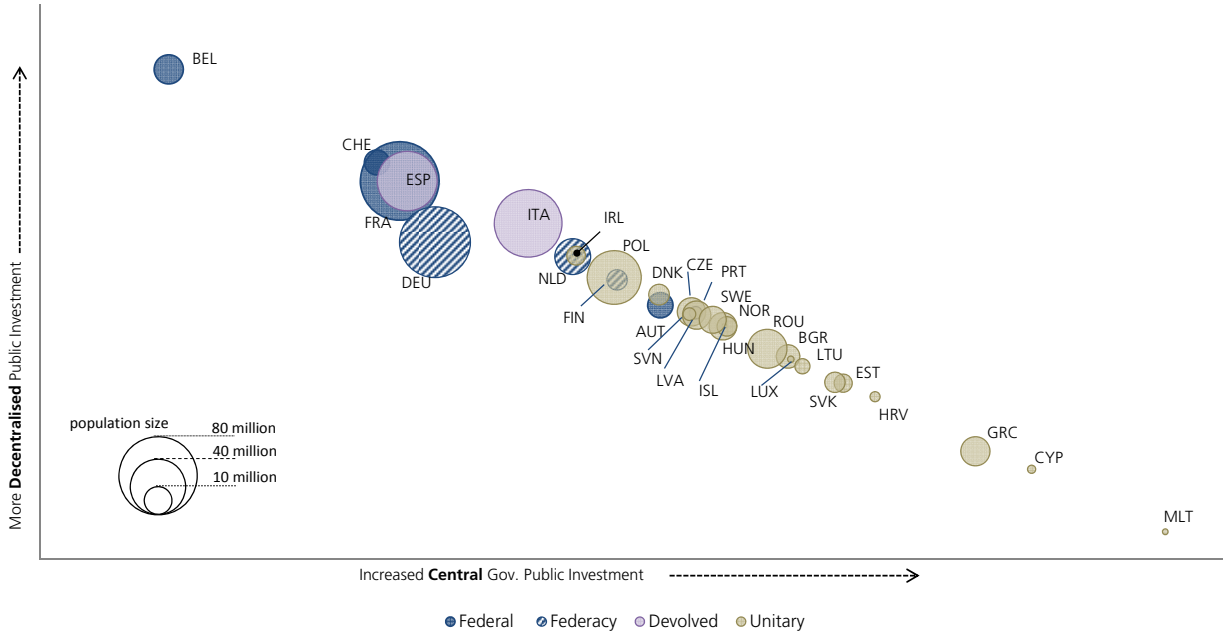
Appendix

Country codes used in Chapters 1&2

CEB target countries		CEB non-target countries	
Albania	ALB	Belgium	BEL
Bosnia and Herzegovina	BIH	Denmark	DNK
Bulgaria	BGR	Finland	FIN
Croatia	HRV	France	FRA
Cyprus	CYP	Germany	DEU
Czech Republic	CZE	Greece	GRC
Estonia	EST	Holy See	VAT
Georgia	GEO	Iceland	ISL
Hungary	HUN	Ireland	IRL
Kosovo	XKX	Italy	ITA
Latvia	LVA	Liechtenstein	LIE
Lithuania	LTU	Luxembourg	LUX
Malta	MLT	Netherlands	NLD
Republic of Moldova	MDA	Norway	NOR
Montenegro	MNE	Portugal	PRT
Poland	POL	San Marino	SMR
Romania	ROU	Spain	ESP
Serbia	SRB	Sweden	SWE
Slovak Republic	SVK	Switzerland	CHE
Slovenia	SVN		
"the former Yugoslav Republic of Macedonia"	MKD		
Turkey	TUR		

Chapter 1: Characterising public infrastructure

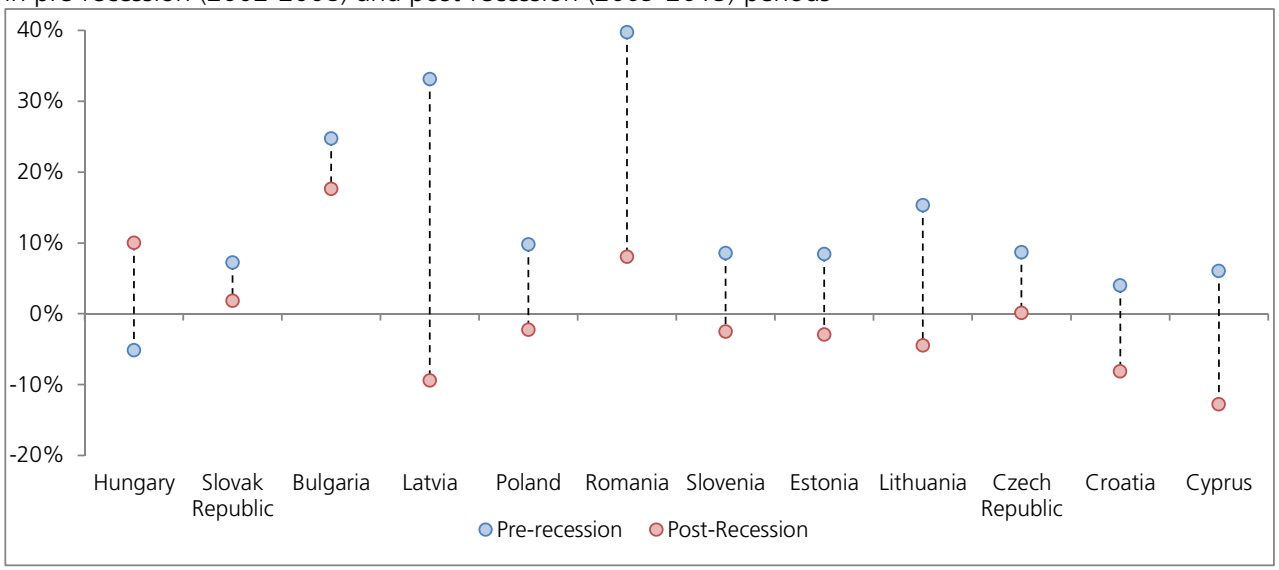
Appendix Figure 1.1: Local and state level share of public infrastructure investment by government type



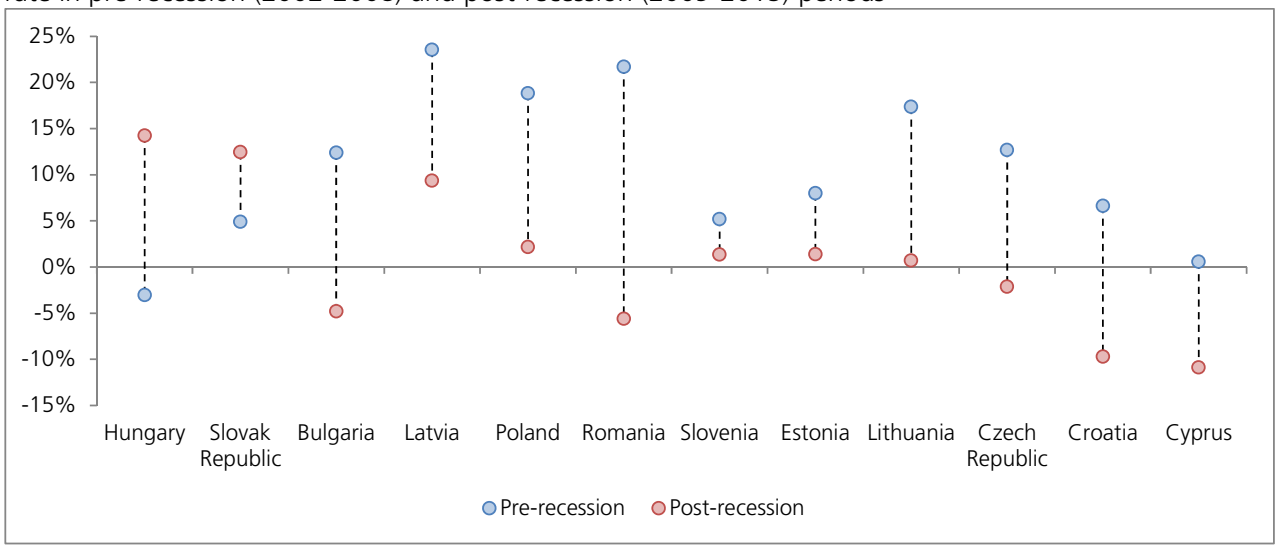
Source - Eurostat and CEB staff calculations

Chapter 2: Public GFCF growth in target and non-target counties, at central and local government levels, based on Eurostat and CEB staff calculations

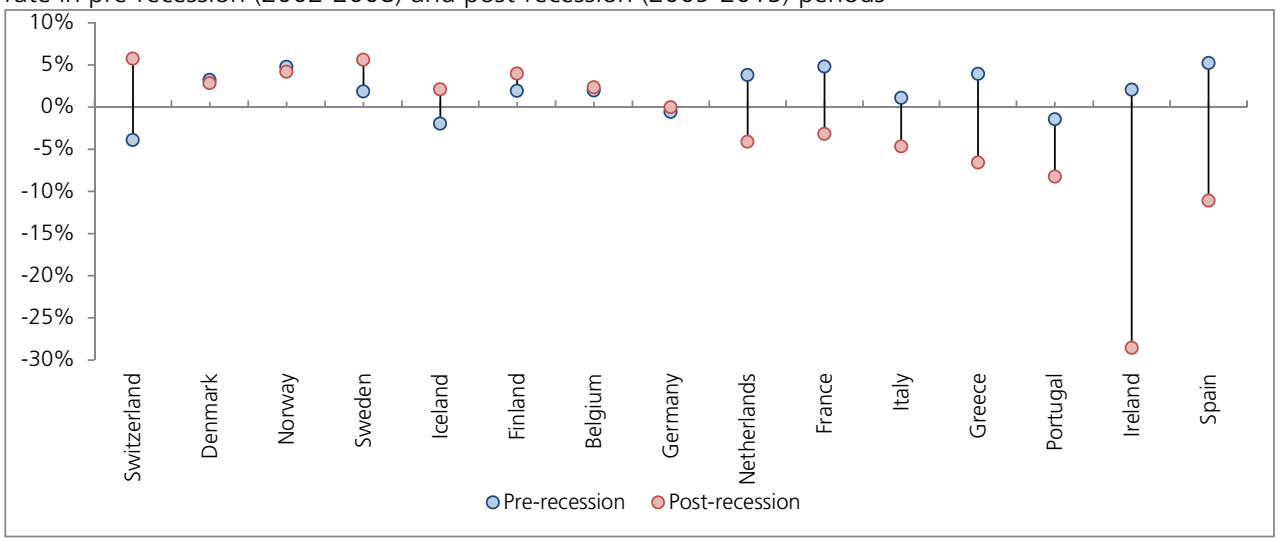
Appendix Figure 2.1: Target countries, local government level GFCF, compound annualised growth rate in pre-recession (2002-2008) and post-recession (2009-2015) periods



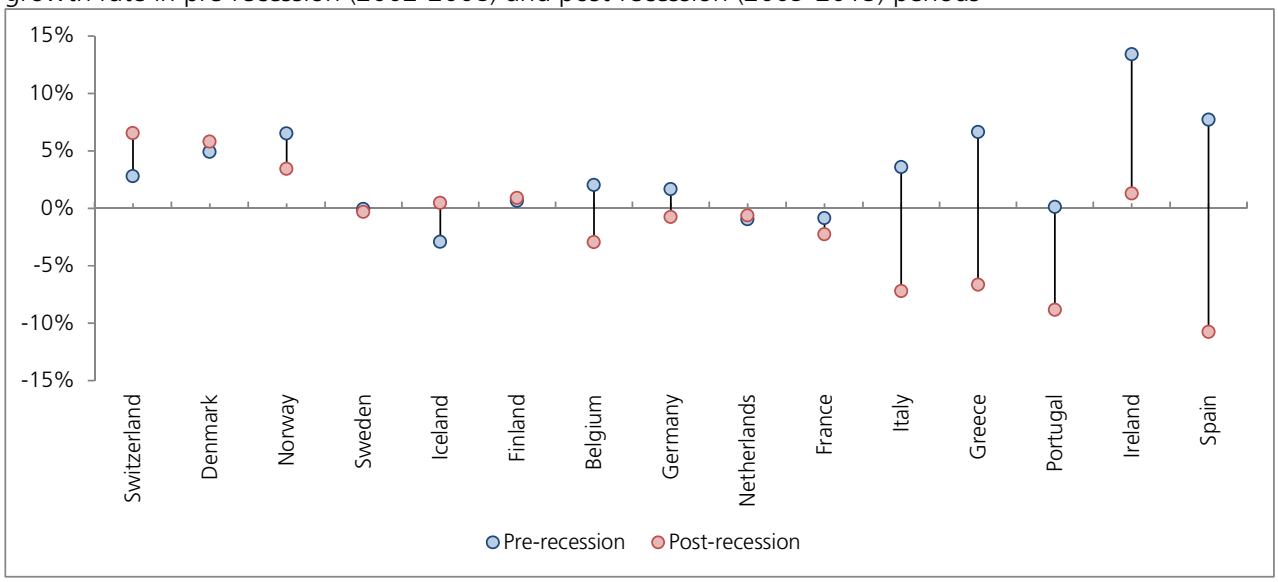
Appendix Figure 2.2: Target countries, central government level GFCF, compound annualised growth rate in pre-recession (2002-2008) and post-recession (2009-2015) periods



Appendix Figure 2.3: Non-target countries, local government level GFCF, compound annualised growth rate in pre-recession (2002-2008) and post-recession (2009-2015) periods



Appendix Figure 2.4: Non-target countries, central government level GFCF, compound annualised growth rate in pre-recession (2002-2008) and post-recession (2009-2015) periods



Chapter 2: Calculation of public capital stock

In order to calculate the capital stock of each country in Chapter 2, this study utilised the perpetual inventory method as outlined in the 2015 IMF paper entitled "Making Public Investment More Efficient",[123] which built upon earlier works of Kamp's (2006) and Gupta et al. (2014). This appendix relies heavily on the IMF methodology, with slight deviations regarding data sources.
The IMF formula to construct the capital stock is as follows:

$$K_{it+1} = (1 - \delta_{it})K_{it} + (1 - \frac{\delta_{it}}{2})I_{it}$$

Where each country i, K_{it+1} denotes the public capital stock[124] at the beginning of period t+1: δ_{it} is a time-varying depreciation rate; and I_{it} is the public gross fixed capital formation in period t.

The application of the method requires three inputs: investment flow series, the initial capital stock and the size and time profile of the depreciation rate. Following the IMF methodology, all time-series data is expressed in constant 2005 prices (in euros – deviating from the IMF dollar denomination).

For the *investment time* series we utilised the Eurostat Investment by Institutional Sectors database. This allowed us to retrieve a comprehensive time series that included government (public), business and household GFCF. Since the data-series for many countries does not begin until 2002, our time series and capital stock calculations are shorter than the IMF database (which started in 1960). All series were converted to 2005 euros, using the Eurostat 2005 GDP deflator (which can be found in the GDP and Main Components database). The benefit of utilising the Eurostat database is that all levels are denoted in euros and the methodologies employed to obtain the data are harmonised among all European countries.

The *initial capital stock* is difficult to ascertain, as data on the initial capital stock for the majority of countries is not available. We obtained the initial capital stock utilising the IMF Fiscal Affairs Department Investment and Capital Stock Dataset. Since all IMF data is denoted in 2011 international dollars, all data was adjusted to 2005-base year euros, to ensure data consistency with the investment time series data.

The availability of *depreciation rates*, similar to initial capital stock, is not available for most countries. As the IMF (2015) and Kamps (2006) indicate, the depreciation rate of capital increases relative to the increase in income levels. Thus based on the two papers' assumptions and findings, the depreciation rate of public capital increases from 2.5% in 1960 to 4.6% in 2013 for high income countries (for middle income countries the figures for 1960 and 2013 stand at 2.5% and 3.51%, respectively).

123. IMF (2015) *Making Public Investment More Efficient – Staff Report*, Washington DC
Gupta, S. et al. (2014) "Efficiency-Adjusted Public Capital and Growth
Kamps, C. et al. (2006) "New Estimates of Government Net Capital Stocks for 22 OECD Countries, 1960-2001".
124. For the purposes of this study, we only calculated public capital stock. However, it is possible to calculate private capital stock as well utilising the same method outlined here.

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