

64<sup>th</sup> Conference on Government Studies  
Economic development, financial constraints and service quality:  
investments and guarantees

**Public investment  
for developing the economy**

Address by the Governor of the Bank of Italy  
Ignazio Visco

Varenna, 22 September 2018



In the last decade Italy's economy experienced the most acute crisis in its history. The double-dip recession, during which GDP contracted by roughly nine percentage points, was followed by an anaemic and bumpy recovery: from 2013 to today, less than half of this lost ground has been recouped. Against this backdrop, there have been calls from many quarters for higher public spending, which can have positive effects on economic activity in the short term and on growth potential in the longer term.

The boost from increased spending is usually greater when this is financed by a deficit. It can be even stronger if the investments made are matched by private capital, increasing its returns at the margin and thereby stimulating firms' investment expenditure. In the medium to long term greater growth potential comes from creating new opportunities for economic activity and stimulating innovation; both can be achieved through the completion of material infrastructure, especially if tech-intensive, and above all through investment in research and knowledge.

In the short term the increase in GDP, measured by the 'investment multiplier', can be so strong as to exceed the growth in public debt owing to the deficit. But if this fails to trigger the longer-term effect on growth potential, the reduction in the ratio of debt to GDP will be short-lived: the deficit will continue to fuel the debt and GDP will start to grow again at a pace similar to that preceding the spending boost.

The size of the multiplier depends on a number of important variables: maximizing the direct impact on GDP requires rapid and efficient interventions and the ability to identify those capable of determining an actual qualitative and quantitative increase in public capital; maintaining orderly financial conditions is vital to prevent the 'crowding-out' of private investment, which can be discouraged by a rise in interest rates. The careful selection of the programmes to finance is also crucial for achieving the longer-term effects on growth potential; it must not penalize the resources available for immaterial infrastructure.

The constraints imposed by the high public debt must not be overlooked. An unproductive increase in the deficit would end up worsening the outlook for the public finances, feeding investor doubts and raising the risk premium on Italian government securities. This could soon put the ratio of public debt to GDP on an unsustainable course.

Given the current public finance conditions and the low efficiency of public administration, any recourse to deficit spending requires caution, to ensure that resources are actually channelled to supporting economic activity in the short and longer term. Even if an effective investment policy were to succeed in putting the economy on a higher growth trajectory, it would still be necessary to define a credible strategy within the confines of fiscal objectives and reform plans, such as to determine a reduction in the risk premium on Italian government securities. In this scenario the ratio of debt to GDP would begin to gradually decline, all the more rapidly the smaller the difference between interest payments and the nominal growth of the economy and the larger the fiscal surplus net of interest expenditure.

### ***Public investment and aggregate demand***

It is well known that so-called ‘direct’ public spending, such as that on investment, can have a stronger impact on aggregate demand than expenditure with ‘indirect’ effects, such as public transfers, a portion of which can be saved by their beneficiaries, to an increasing extent as income rises.

Any accurate assessment of the short-term macroeconomic effects of higher public investment is, however, subject to a large degree of uncertainty. The size of the multiplier (i.e. the increase in GDP generated by higher deficit spending) depends on many factors: the extent to which productive resources are utilized, the monetary policy stance and attendant financial conditions; eventual lags and inefficiencies in implementing investment programmes; and the market’s assessment of the outlook for debt sustainability following a spending hike.

Simulations made over a short to medium term horizon using the Bank of Italy’s quarterly econometric model indicate that in the most favourable scenario the multiplier is above one and the increase in GDP obtained by higher investment leads to a reduction in the ratio of debt to GDP over a five-year period (Table 1). It is reasonable to suppose that if investments are not carefully selected, or their implementation dogged by waste and inefficiencies, the multiplier would be considerably lower, nearing the (lower) one for spending on transfers. In such a scenario the ratio of public debt to GDP would rise. A similar result would obtain if the spending plan were to stoke investor fears: higher financing costs (for the public sector and therefore for the private one as well) would weaken the stimulus to economic activity from increased investment, while the deficit would widen both because of lower economic growth and the progressive rise in interest expenditure.

It is difficult to assess the potential impact of a higher deficit on sovereign risk premiums: the relationship is non-linear and volatile, influenced by many variables some of which are not immediately quantifiable. If the fiscal expansion were accompanied by a deterioration in investor confidence such as that which, for various reasons, occurred between 2011 and 2012, the impact on interest rates could, like then, be especially strong. It is impossible to apply to cases like this the estimates based on the figures recorded in advanced economies in normal financial conditions. Nor should it be forgotten that every year the State must issue around 400 billion euros in public debt.

The econometric model does not explicitly take account of the complementarity between public and private capital in firms' production function. Public investments capable of increasing the profitability of private capital, by encouraging its accumulation, can translate into higher values of the multiplier.<sup>1</sup> The empirical literature on this complementarity is extensive but – in part owing to non-negligible methodological difficulties – has not produced univocal findings. The estimated effects nevertheless confirm its importance.<sup>2</sup>

While the simulations are not fully comparable, econometric exercises conducted by other institutions nonetheless highlight the key role of the factors I mentioned earlier: the reaction of monetary policy, the ability to select investment programmes judiciously and carry them out without delay or waste, and expectations concerning future developments in public finances (Table 2).<sup>3</sup>

### ***Public investment and growth potential***

Economic analysis has long recognized that technical progress and total factor productivity dynamics are the true engine of economic growth in the advanced countries, where the driving forces of the initial rapid accumulation of physical

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<sup>1</sup> See L. Burlon, A. Locarno, A. Notarpietro and M. Pisani, 'Public Investment and Monetary Policy Stance in the Euro Area', Banca d'Italia, Temi di Discussione (Working Papers), 1150, 2017.

<sup>2</sup> Reviews of the literature are provided in: A. M. Pereira and J. M. Andraz, 'On the Economic Effects of Public Infrastructure Investment: A Survey of the International Evidence', *Journal of Economic Development*, 38, 4, 2013; W. Romp and J. de Haan, 'Public Capital and Economic Growth: A Critical Survey', *Perspektiven der Wirtschaftspolitik*, 8, 1, 2007; and P. R. D. Bom and J. E. Ligthart, 'What Have We Learned from Three Decades of Research on the Productivity of Public Capital?', *Journal of Economic Surveys*, 28, 5, 2014.

<sup>3</sup> For a review and comparison of the different estimates, see F. Buseti, C. Giorgiantonio, G. Ivaldi, S. Mocetti, A. Notarpietro and P. Tommasino, 'Capitale e investimenti pubblici in Italia: misurazione, effetti macroeconomici, criticità procedurali', Banca d'Italia, Questioni di Economia e Finanza (Occasional Papers), 2018 (forthcoming).

capital and of labour force growth have waned. An adequate endowment of public capital can facilitate the adoption of new technologies and the reorganization of production processes, also fostering the creation of new firms. It can prove essential in supporting the early development of especially innovative technologies. It must be acknowledged, however, that the relationship between public capital accumulation and economic development, while crucial, remains largely elusive.

Of course, public capital comprises not only material infrastructure – such as transport, telecommunications and energy networks – but also the body of knowledge and skills available to an economy. These two types of infrastructure, material and immaterial, share some of the characteristics of public goods, and without government intervention they would be available in insufficient quantity.

The State supports investment in immaterial capital in two ways. Directly, through scientific research in public universities and public research institutions and through the provision of education; indirectly, in the form of subsidies and tax incentives to the private sector. There is evidence that both these forms of intervention, if well designed, have a positive impact on economic growth. In a context of rapid technological change, fostering investment in human capital and improving its quality appears equally, if not more, important than investing in material infrastructure, especially in our country. Public spending on education is around 4 per cent of GDP, much lower than the euro-area average (Figure 1). Among the advanced countries, Italy's labour force has one of the lowest rankings for labour force skills.<sup>4</sup> The gap with the other countries is also pronounced for research and development, although this is due almost entirely to the private-sector component of expenditure (Figure 2).

### ***Public investment expenditure and infrastructure endowment in Italy***

In Italy, general government gross fixed capital formation has decreased in recent years and is below that recorded in other European countries (Figure 3). In nominal terms, it has fallen by an annual average of 4 per cent since 2008; while less evident, this downward trend is also visible in the rest of the euro area. As a percentage of GDP, expenditure in Italy diminished from 3 per cent in 2008 to 2 per cent in 2017; the reduction was concentrated in local government entities. The European Commission has recently estimated a public investment gap for Italy.<sup>5</sup>

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<sup>4</sup> See the OECD, *Skills Matter. Further Results from the Survey of Adult Skills*, Paris, 2016.

<sup>5</sup> See the European Commission, *Report on Public Finances in EMU*, Brussels, 2017.

It is worth bearing in mind that the economic meaning of the expenditure items does not always coincide with accounting classifications. The outlays recorded in general government accounts under the item ‘gross fixed investment’ are not entirely allocated to material infrastructure, nor do they represent the totality of the financial resources earmarked for such purposes. About half of the outlays concern other types of expenditure, for example that on plant, equipment and patents. Investment in material infrastructure is also made by non-public sector entities that nevertheless carry out public utility projects (e.g. licenced operators in the railway, motorway, energy and telecommunications sectors).<sup>6</sup> Only part of this expenditure goes through government financial accounts and is recorded under ‘contributions to investments’, a very heterogeneous item whose composition is affected by national specificities in the sectoral classification of the entities involved (within or outside the general government perimeter) and the ways in which public utilities are regulated.

Measuring a country’s infrastructure endowment is a complex exercise. One can use financial indicators based on the resources employed or instead rely on physical endowment indicators (e.g. the length and density of transport networks, energy and water supply, and telecommunications), which can also reflect topographical differences between regions and the degree of efficiency with which the resources are utilized. Finally, there are indices whose aim is to capture the overall adequacy of infrastructural networks, as far as possible taking account of potential demand, network interconnections, and congestion phenomena.

If we use indicators based on the permanent inventory method, which accumulates the time series of annual investment expenditure net of the estimated depreciation, Italy’s situation appears broadly in line with that of the major euro-area economies (Figure 4). Compared with the early 2000s, the gap has widened with respect to France, but there has been an improvement compared with Germany and Spain.<sup>7</sup>

If we take physical indicators of infrastructure endowment and set them in relation to appropriate variables of scale, we get different results. For example, relative to the population (an albeit very rough measure of the potential demand for

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<sup>6</sup> In 2017 Ferrovie dello Stato made investments amounting to about €4.5 billion (€4.3 billion in 2016), almost entirely through its subsidiary RFI SpA, which manages the rail network. Autostrade per l’Italia invested about €600 million; the second largest operator, Gavio, invested another €200 million. For the telecommunications network, TIM invested about €3.5 billion. As regards electrical infrastructure, in the two years 2016-17 Enel invested over €2.5 billion, and Terna more than €1.9 billion. For the natural gas network, Snam made investments amounting to about €2.7 billion in the last three years.

<sup>7</sup> See the IMF, *Investment and Capital Stock Dataset*, 2017.

transport), the Italian road and railway networks turn out to be much less extensive than those of France, Germany and Spain. Similarly, if we look at the minimum travel time between two regions, weighted by population, Italy is once again at a disadvantage compared with the European average, suggesting the possible effects of congestion (Figure 5).<sup>8</sup>

Finally, subjective assessments are used to measure the adequacy of a country's entire infrastructure endowment – and therefore not just transport – though great care must be taken when interpreting them. For example, the World Economic Forum produces a synthetic index covering 137 countries; Italy ranks 58th, far behind all the other major European countries.<sup>9</sup> According to a similar study conducted by the European Investment Bank in 2017 (though confined to European countries and municipal infrastructure), Italy is qualitatively analogous to Spain, but behind France, Germany and the EU average.<sup>10</sup>

All in all we can see a gap between what is suggested by the indicators constructed based on historical expenditure and what can be derived from more analytical indicators of the adequacy of infrastructure networks (Italy is found to be lagging behind the other European countries only by the second group of indicators). It could be assumed that this gap is also partly attributable to less 'efficient' completion of public works.<sup>11</sup> As I remarked earlier, efficiency is a key variable in determining the macroeconomic impact of investment expenditure, both in the short and long term.

### ***Completion of public works***

While the available data do not enable us to make systematic and detailed comparisons, there is evidence that the average completion times and costs for public works are relatively high in our country. According to the audit performed in 2018 by the European Court of Auditors, Italy has the highest constructions costs of any EU country for completed high-speed rail lines (€28 million per kilometre, compared with €12 million for Spain, €13 million for Germany and €15 million

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<sup>8</sup> See the European Spatial Planning Observation Network, *ESPON Atlas Mapping European Territorial Structures and Dynamics*, 2014.

<sup>9</sup> See the World Economic Forum, *The Global Competitiveness Report 2017-18*, Geneva, 2018.

<sup>10</sup> See the European Investment Bank, *Relazione sugli investimenti 2017/2018*, Luxembourg, 2018.

<sup>11</sup> See also the Chapter 'The infrastructural endowment', Banca d'Italia, *Annual Report for 2010* (Abridged), Rome, 31 May 2011.



for France). If we add up the costs of projects already completed with those in progress, we find that Italy's cost per kilometre rises to €33 million, as against €14 million for Spain and €15 million each for Germany and France. Our country also falls far behind in terms of completion times.<sup>12</sup>

Surveys conducted over the last decade have shown that, in Italy, the average costs per kilometre and completion times for high-speed rail lines have been about three times those of France and Spain; the average costs per kilometre for roads were more than double those of Spain. As for major projects co-financed by the European Regional Development Fund, these studies indicated time and cost overruns in Italy equal, respectively, to more than triple and double the EU average.<sup>13</sup> It does not seem that the extent of these differences can be explained merely by the distinctive orographic features of each country.

The various phases of construction have differing impacts. The length of 'transition' periods, that is, the time between the end of one procedural phase and the start of the next (for example, the planning and awarding of contracts) or between sub-phases (for example, preliminary, final and executive planning), has a considerable impact on project timelines. These periods, which are at least in part absorbed by administrative activities and inefficiencies, account for on average around 54 per cent of a project's total duration (rising to 60 per cent if one considers only the planning phase).

Over the last few years average completion times have risen. The increase has related solely to the tendering and execution phases, while the length of the planning phase has remained fairly stable. But there are wide regional variations: it is estimated that the length of time required in Sicily, Molise and Basilicata to complete the same project is more than 30 per cent higher than that required in Lombardy and Emilia Romagna.<sup>14</sup> This means that, over and above addressing a

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<sup>12</sup> The audit was carried out on the high-speed lines of six European countries and analysed more than 5,000 km of infrastructure on ten high-speed rail lines covering around 50 per cent of the existing lines in Europe. See European Court of Auditors, *A European High-Speed Rail Network: Not a Reality but an Ineffective Patchwork*, Special Report, 19, Luxembourg, 2018.

<sup>13</sup> For a discussion of this topic and the associated references see: I. Visco, 'Efficient spending on infrastructure', address by the Governor of the Bank of Italy before the Chamber of Deputies, 19 June 2012 (only in Italian); Banca d'Italia, 'Infrastructure in Italy: endowment, planning, construction', F. Balassone and P. Casadio, eds., *Seminari e Convegni (Workshops and Conferences)*, 7, 2011; and Banca d'Italia, 'The efficiency of infrastructure spending', F. Balassone, ed., *Seminari e Convegni (Workshops and Conferences)*, 10, 2012.

<sup>14</sup> See the Agency for Territorial Cohesion's report on public works completion times, *Rapporto sui tempi di attuazione delle opere pubbliche* (only in Italian), 13 July 2018.

scarcity of resources or the limitations of the applicable legislation, it is critical that we identify and spread best practices.

According to data from the National Anti-Corruption Authority on contracts awarded by Italian municipalities between 2009 and 2014, for equal contract amounts, the tendering and execution phases were shorter for negotiated procedures than they were for competitive ones (by about one year). There is, however, evidence that although there are benefits in terms of cutting times, recourse to more discretionary procedures by ‘less qualified’ contracting entities is associated with a decrease in the average productivity of the firms that are awarded contracts.<sup>15</sup>

Overall, given these considerations, the short to medium term macroeconomic impact of an increase in the resources allocated to public investment could be greater if directed towards projects that are already in progress (if chosen appropriately ex ante) instead of being used to fund new projects.

From a more structural standpoint, it is crucial that the entire planning, assessment and monitoring process be rationalized.<sup>16</sup> Improvements could result from a more accurate cost/benefit analysis during the project selection phase. A greater focus on the quality of planning (envisaged in the new Public Contracts Code) could, particularly for more complex interventions, make public investment more effective, despite extending the planning phase. More specifically, this could speed up the subsequent phases (especially the executive one), helping to stem the endemic phenomenon of bid renegotiations, which is among the main causes of time overruns and rising costs.<sup>17</sup> It is important to reduce transition times.

There could also be benefits stemming from the appropriate use of the ‘e-procurement’ systems envisaged under the new Code which, besides ensuring greater transparency, would also reduce timeframes. The proper functioning of all of these instruments depends, however, on there being competent contracting authorities that are able to use them correctly. This is why it is vital that steps be taken to raise professional standards in the public sector, starting with the measures to train the contracting authorities

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<sup>15</sup> See A. Baltrunaite, C. Giogiantonio, S. Mocetti and T. Orlando, ‘Discretion and Supplier Selection in Public Procurement’, Banca d’Italia, Temi di Discussione (Working Papers) 1178, 2018.

<sup>16</sup> See F. Balassone, ‘Programmazione di bilancio e gestione degli investimenti pubblici: un’agenda aperta’, in Banca d’Italia, ‘The efficiency of infrastructure spending’, cited above.

<sup>17</sup> See P. Sestito, ‘Recepimento delle direttive europee in materia di contratti pubblici’, Testimony on the transposition of European directives on public contracts by the Head of the Bank of Italy’s Economic Structure Division before the Standing Committee on Environment, Territory and Public Works (VIII) of the Chamber of Deputies, 16 June 2014 (only in Italian).

which, more than two years after the new Code has come into force, have yet to be implemented. Otherwise, potentially virtuous, but more sophisticated, measures may even have the effect of slowing down less competent administrations. The trend in tenders for public works contracts over the last two years – characterized by a dip in 2016 and by a significant recovery in 2017<sup>18</sup> – has varied according to the type of contracting authority: specifically, tenders decreased (in number and in value) for ‘less qualified’ contracting authorities, but rose slightly for the others (Figure 6).

### ***Investment and sustainability of the public debt***

The evidence available suggests that Italy’s infrastructure endowment is either inadequate or risks becoming so due to lack of maintenance. At the same time, it is clear that the interventions required must be accompanied by incisive improvements in the selection, planning and carrying out of public works: the fact that Italy’s infrastructure lags behind that of the other main economies is not just due to insufficient financial resources. Given its high debt-to-GDP ratio, Italy must make the best possible use of its resources; only in this way can a spending boost be consistent with debt sustainability. Deficit financing should be used with caution.

The dynamics of the debt-to-GDP ratio depend on the primary surplus and on the difference between the average cost of debt and the economy’s growth rate. When I spoke here last year, I underlined how, with an annual average growth rate of around 1 per cent, inflation at 2 per cent (in line with the ECB’s objective), and the average cost of debt approaching pre-crisis levels, the gradual attainment and maintenance of a primary surplus of around 4 per cent of GDP would enable the debt-to-GDP ratio to be lowered to 100 per cent in the space of ten years.<sup>19</sup> In that same scenario today, solely owing to the increase in the risk premium on government securities, the reduction of the ratio would be slower (Figure 7a); leaving the primary surplus at current levels, the debt-to-GDP ratio would fall slowly for a few years and then stabilize at around 120 per cent, a still high level that would continue to limit the capacity of the public finances to have a stabilizing effect during recessions and would leave Italy exposed to the turbulence of the financial markets.

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<sup>18</sup> The difficulties in adapting to the new Code may have influenced this trend. The demand for public works, though recovering, is still lower than it was prior to 2011.

<sup>19</sup> See I. Visco, ‘Sviluppo dell’economia e stabilità finanziaria: il vincolo del debito pubblico’, a speech made at the 63rd Meeting of Government Studies on ‘La tutela degli interessi finanziari della collettività nel quadro della contabilità pubblica: principi, strumenti, limiti’, Varenna, 21 September 2017. See also I. Visco, The Governor’s Concluding Remarks for 2017, in the Annual Report for 2017, Banca d’Italia, 29 May 2018.

As I have already mentioned, increasing spending on investment by means of deficit financing, without addressing growth potential, would only be of temporary benefit. Reducing the primary surplus by one percentage point of GDP compared with the current level would lead to a small decrease in the debt-to-GDP ratio thanks to the expansionary boost to economic activity; however, with no long-term increase in economic growth, the debt-to-GDP ratio would soon rise again, even if there were no negative reactions on the financial markets (Figure 7b). The situation would be different if the resources obtained by means of a larger deficit were used so as to increase growth potential and if the risk premium on Italian government securities were reduced: with annual growth of more than one percentage point and with the yields on government securities returning to the values recorded at the beginning of this year, the debt-to-GDP ratio would begin to follow a stable, albeit not particularly rapid, downward trajectory.

Above all, we must not underestimate the risks which, given the high level of public debt, an unproductive increase in the deficit would expose us to. A negative reaction on the markets – for example a 200 basis point increase in risk premiums, remaining below the level recorded at the end of 2011 – would trigger a rapid increase in the debt-to-GDP ratio; considering the negative impact on economic growth of the increase in interest rates and crisis of confidence, the ratio would soon be on an unsustainable path (Figure 7c).

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The debt reduction plan that I presented last year was an indicative scenario; it is possible to draw up prudent strategies, capable of guaranteeing the stability of the public finances combined with better growth prospects. This is the narrow path that has been much spoken of in these difficult years.

We can follow this path slowly, one step at a time, by implementing a series of interventions that gradually produce benefits until all the necessary changes have been made. Or we can try to make the path wider by setting out a comprehensive strategy designed to redirect the public finances to more productive uses and to increase the efficiency of general government, especially in spending programmes aimed at accumulating both material and immaterial public capital and at supporting business activity and innovation.

It is in any case essential that the fiscal objectives are and appear to be strongly and credibly oriented towards financial stability, and that the reforms are effectively geared towards sustained – and inclusive – economic growth.

*TABLES AND FIGURES*

**Table 1 – Macroeconomic impact of an increase (1% of GDP) in public investment expenditure financed through deficit spending according to the Bank of Italy’s quarterly econometric model**

		Years				
		1	2	3	4	5
<b>A. Baseline scenario</b>						
Real GDP	(1)	0.9	1.1	1.2	1.2	1.1
GDP Deflator	(1)	0.1	0.4	0.8	1.3	1.6
Deficit-to-GDP/ratio	(2)	0.7	0.5	0.5	0.5	0.6
Debt-to-GDP ratio	(2)	-0.5	-0.6	-0.7	-0.7	-0.4
<b>B. Reduced efficiency of investment expenditure</b>						
Real GDP	(1)	0.5	0.7	0.8	0.8	0.8
GDP Deflator	(1)	0.0	0.2	0.5	0.7	1.0
Deficit-to-GDP/ratio	(2)	0.8	0.6	0.6	0.6	0.6
Debt-to-GDP ratio	(2)	0.1	0.3	0.4	0.6	1.0
<b>C. Increase in borrowing costs (*)</b>						
Real GDP	(1)	0.9	0.9	0.8	0.8	0.7
GDP Deflator	(1)	0.1	0.3	0.7	1.0	1.2
Deficit-to-GDP/ratio	(2)	0.8	0.6	0.8	0.9	1.1
Debt-to-GDP ratio	(2)	-0.4	-0.1	0.3	0.9	2.0

(1) Percentage changes compared with the baseline scenario.

(2) Absolute changes compared with the baseline scenario (percentage points of GDP).

(\*) Permanent increase of 10 basis points in the yields on short-term government securities and of 50 basis points in the yields on medium-term government securities.

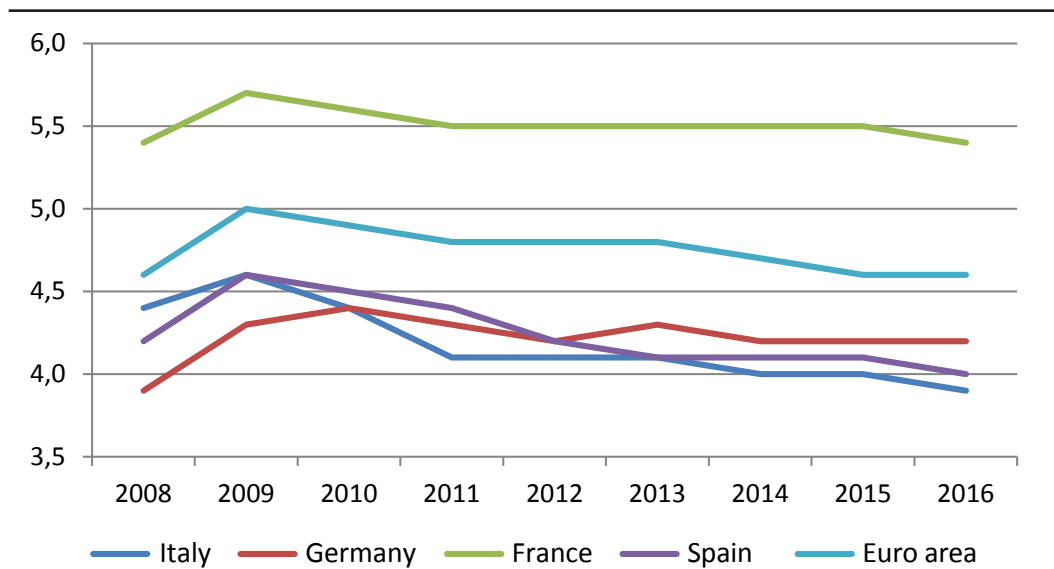
Source: F. Buseti, C. Giorgiantonio, G. Ivaldi, S. Mocetti, A. Notarpietro and P. Tommasino, ‘Capitale e investimenti pubblici in Italia: misurazione, effetti macroeconomici, criticità procedurali’, Banca d’Italia, Questioni di Economia e Finanza (Occasional Papers), 2018 (forthcoming).

**Table 2 – Macroeconomic impact of an increase in public investment expenditure: estimates of the main institutions**

	Multiplier	
	Short-term	Medium-term
<b>IMF (Panel estimates)</b>		
Benchmark	0.4	1.4
Higher efficiency	0.8	2.6
Lower efficiency	0.2	0.7
Expansionary cyclical phase	-0.5	0.0
<b>IMF (Global Integrated Monetary and Fiscal model)</b>		
Benchmark	2.0	2.5
Higher efficiency	2.2	2.8
Lower efficiency	1.8	2.2
Expansionary cyclical phase	1.0	2.5
<b>OECD</b>	0.8-1.2	1.0
<b>European Commission</b>	0.5-0.6	1.2
<b>ECB</b>		
Benchmark	1.6	1.8
Lower efficiency	1.3	1.3

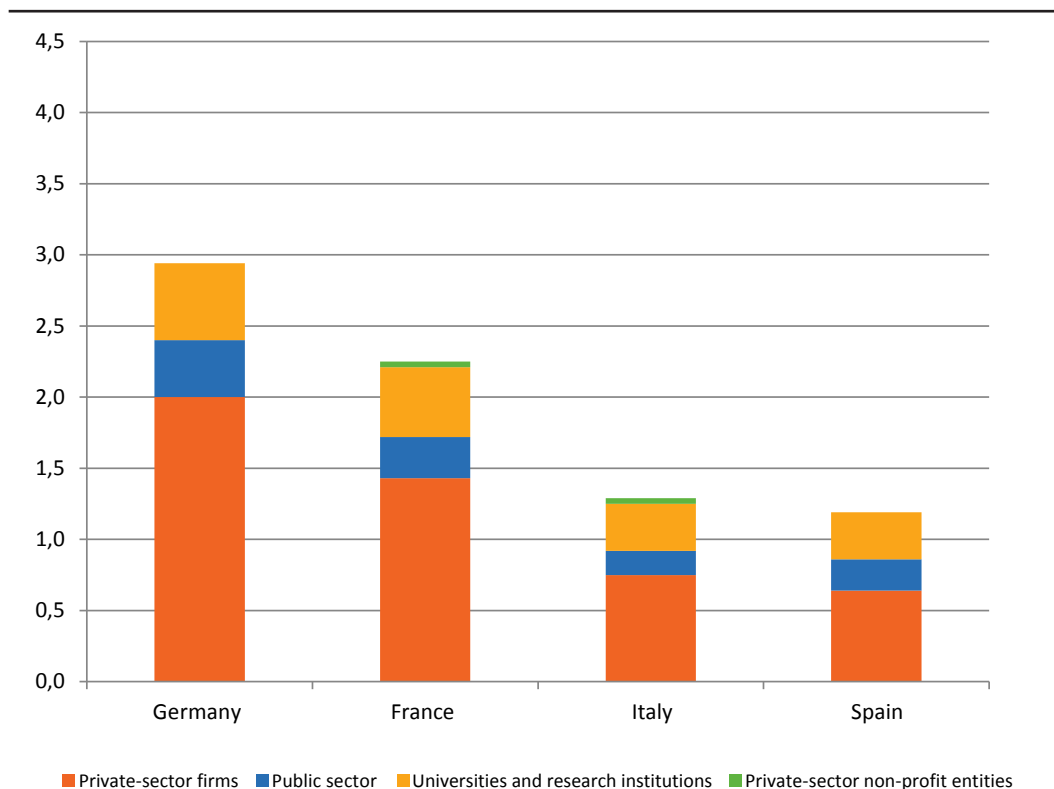
Source: F. Buseti, C. Giorgiantonio, G. Ivaldi, S. Mocetti, A. Notarpietro and P. Tommasino, ‘Capitale e investimenti pubblici in Italia: misurazione, effetti macroeconomici, criticità procedurali’, Banca d’Italia, Questioni di Economia e Finanza (Occasional Papers), 2018 (forthcoming).

**Figure 1 – Public expenditure on education  
in the main euro-area economies**  
(percentage points of GDP)



Sources: Eurostat, COFOG database.

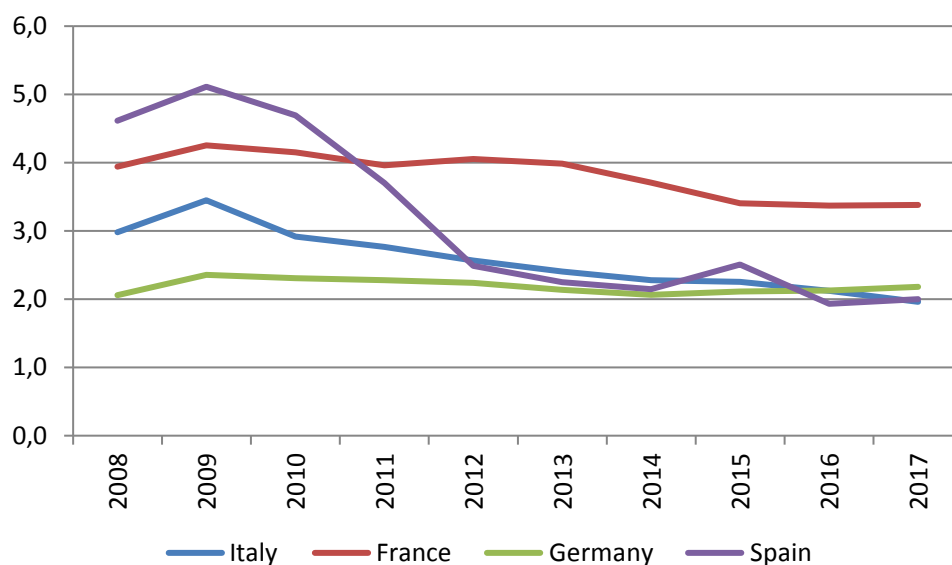
**Figure 2 – Expenditure on research and development  
in the main euro-area economies**  
(percentage points of GDP; 2016)



Source: Eurostat.

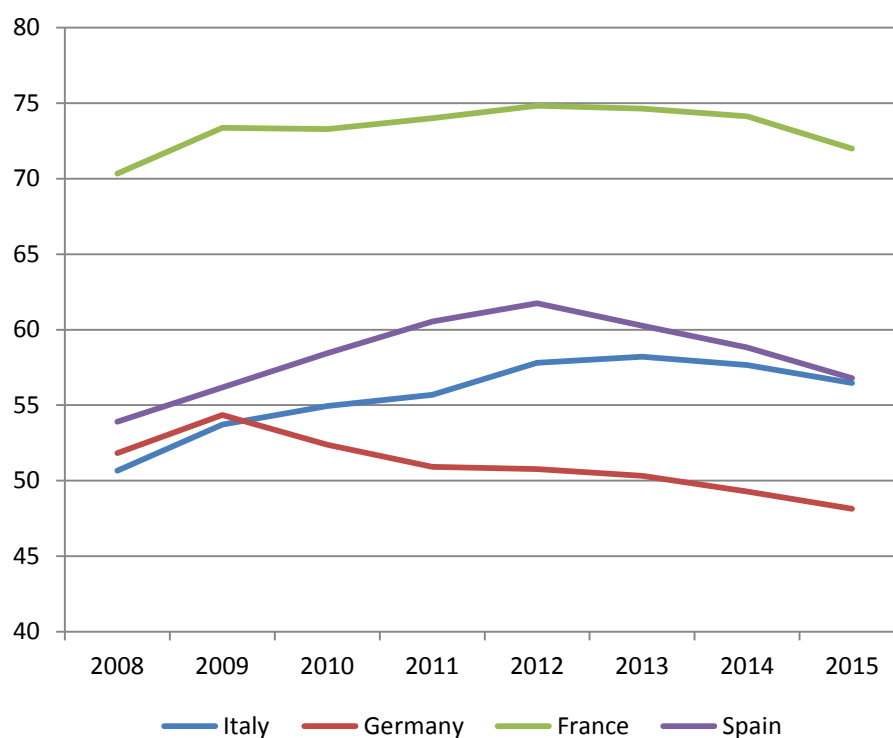


**Figure 3 – General government gross fixed capital formation  
in the main euro-area economies**  
(percentage points of GDP)



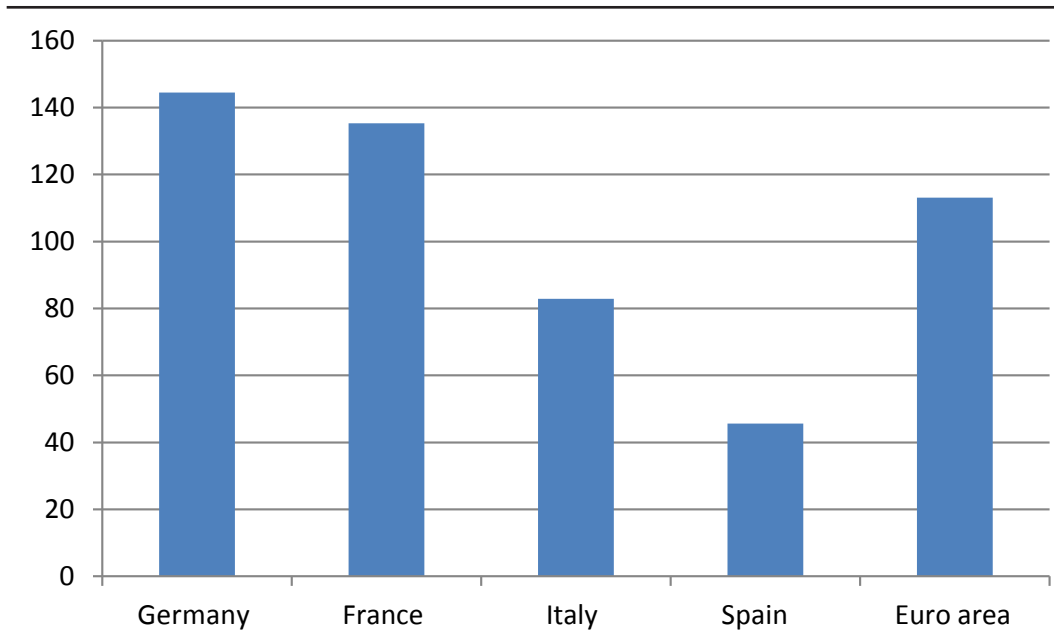
Sources: European Commission, AMECO database.

**Figure 4 – Performance of the stock of public-sector capital  
in the main euro-area economies**  
(percentage points of GDP)



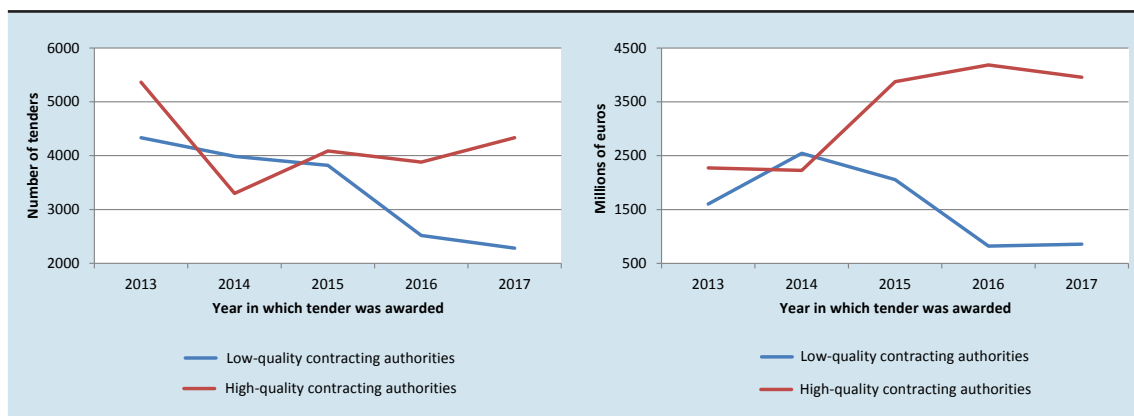
Source: IMF. The indicator was constructed for 170 countries by applying the permanent inventory method to the data on public investment expenditure from 1960 to 2015; the depreciation rate of public-sector capital is estimated separately for each country.

**Figure 5 – Transport accessibility index in the main euro-area economies**  
(EU 27= 100; 2011)



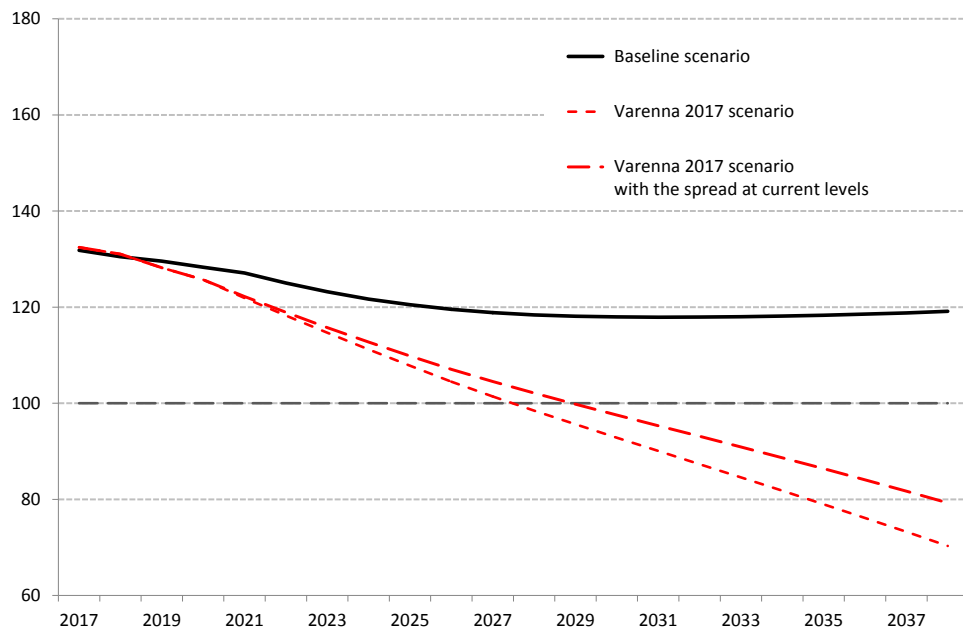
Source: European Spatial Planning Observation Network (ESPON). Share of the EU population that can be reached within four hours using intermodal travel (air, rail, motorway). The y-axis shows the value taken by the index compared with that for the EU 27, which is set equal to 100. The indicator for each country is constructed as the simple average of the provincial indicators.

**Figure 6 – Number of tenders and amounts by type of contracting authority in Italy**



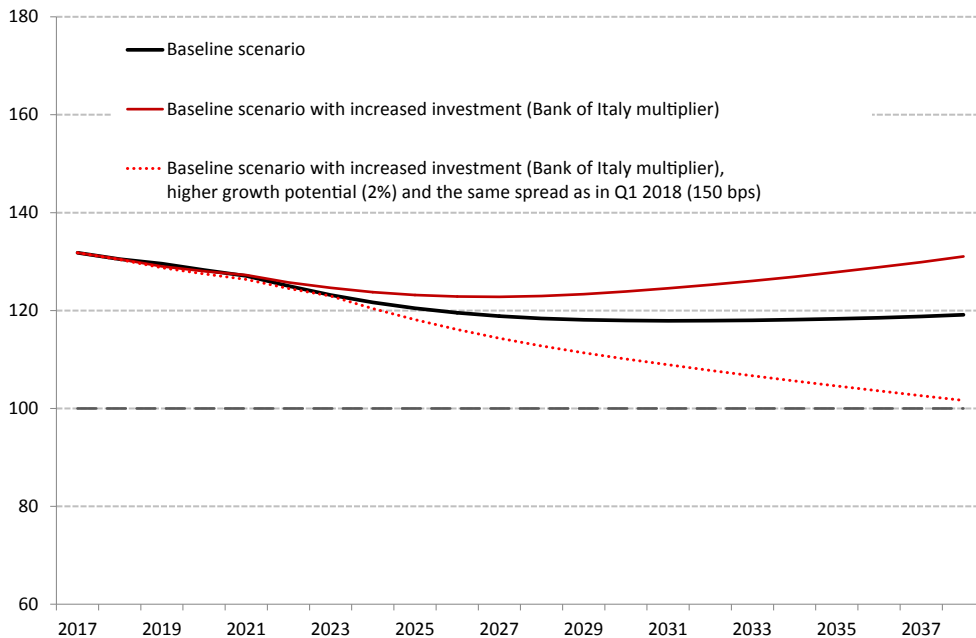
Source: A. Baltrunaite, C. Giorgiantonio, S. Mocetti and T. Orlando, 'Discretion and Supplier Selection in Public Procurement', Banca d'Italia, Temi di Discussione (Working Papers), 1178, 2018.

**Figure 7a – Performance of the debt-to-GDP ratio under different assumptions**



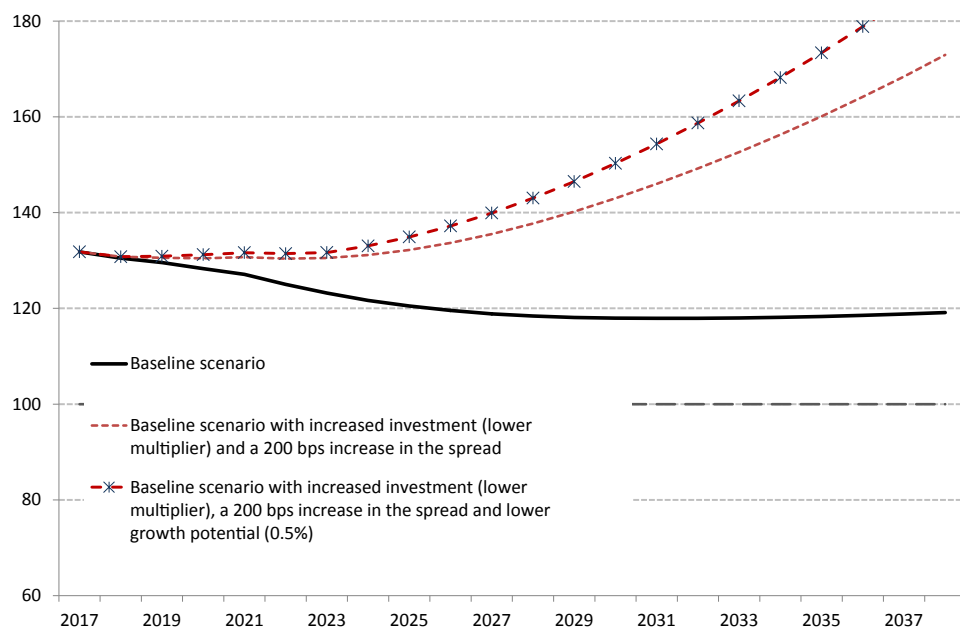
Note: The baseline scenario assumes a primary surplus equal to that forecast for this year in the 2018 DEF (1.9 per cent of GDP), the spread between Italian and German government securities remaining at current values (240 basis points for ten-year bonds), the gradual normalization of monetary policy, and growth potential equal to 1 per cent.

**Figure 7b – Performance of the debt-to-GDP ratio under different assumptions**



Note: See Figure 7a.

**Figure 7c – Performance of the debt-to-GDP ratio under different assumptions**



Note: See Figure 7a.

