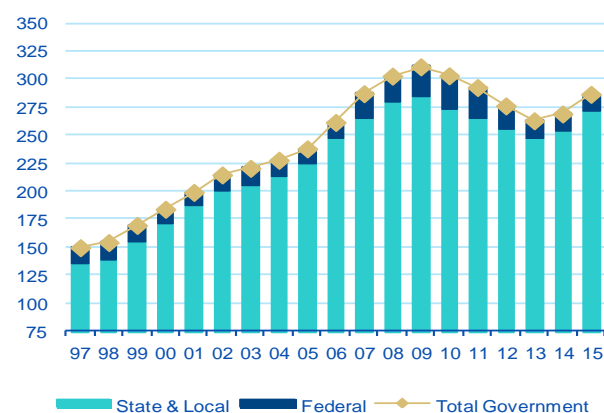


4. Infrastructure spending: a need rather than an economic stimulus

Infrastructure projects are unique compared to other types of fiscal stimulus as they have the potential to enhance both short-term and long-term growth prospects. In that regard, economists' rationalizations for substantial public expenditures on infrastructure diverge depending on whether one believes in the supply-side or demand-side effect. Infrastructure spending is considered a useful tool to generate short-term growth when economic activity is in recession and unemployment is high. Publicly financed projects help ease unemployment, boost expenditures, and are shown to have a substantial multiplier effect on growth if implemented effectively. On the other hand, investment in infrastructure is necessary to sustain and increase the living standard by means of improving health, transportation, housing, and the overall quality of citizens' life. Thus, updating and repairing infrastructure can improve productivity, enhance long-term growth, and boost U.S. global competitiveness.

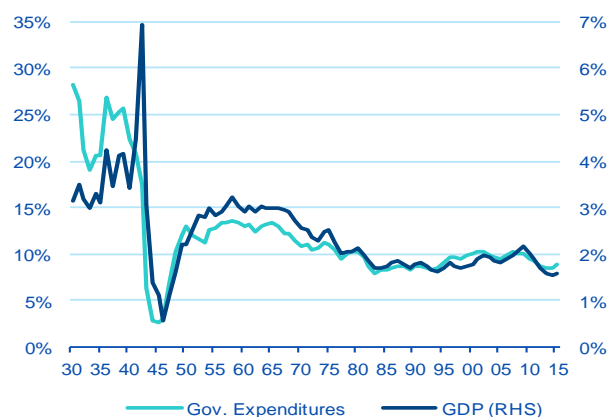
The long-term and short-term growth arguments for infrastructure spending are frequently merged with the assumption that infrastructure projects boost short-term economic growth yet also have a spillover effect on long-term productive potential. Additionally, in the current environment of persistently low long-term borrowing rates, allocation of public funds towards non-financial investments is assumed to be beneficial since the return on infrastructure investment would be higher than the interest rate on public debt.

Figure 4.1 Gross Investment in Nonresidential Structures (\$ billion, historic cost)



Source: BBVA Research & BEA

Figure 4.2 Government Gross Investment in Nonresidential Structures as Share of GDP and Gov. Expenditures (%)



Source: BBVA Research & BEA

President Obama asked Congress to pass a bill to “rebuild America” - to build a 21st century infrastructure. President Trump’s infrastructure spending pledge has been “we’re going to start spending on infrastructure big. Not like we have a choice.” Yet Fed Chair Yellen has advocated a cautious approach of not spending much on infrastructure at a time when the economy has been expanding at a steady pace: “there is not a lot of fiscal space should a shock to the economy occur, an adverse shock, that should require fiscal stimulus.”

However, empirical evidence illustrates that while long-term and short-term growth arguments are made in conjunction with one another, they contradict each other in practice and thus infrastructure projects implemented often pursue one or the other but not both. Furthermore, depending on the project, it is not a given that infrastructure spending will stimulate growth.²

A common sense approach to shrinking unemployment via infrastructure projects would be to steer those projects to counties that have high unemployment rates. Many of those counties have systemically-high unemployment and are in long-term decline because of structural industry-shifts and experience declines in both the population and in the number of businesses in operation. Urban economists would claim that these projects often end up as “bridges to nowhere” because their primary goal is to ease unemployment while the cost-benefit analyses of the projects are often ignored. The positive economic effects of unemployment minimizing projects are short lived and multipliers are low.³ “Detroit’s infrastructure was built for 1.85 million people; now, after decades of difficulty, the city has less than half that population. New construction there makes no sense and would just squander money.” (Glaeser, 2017)

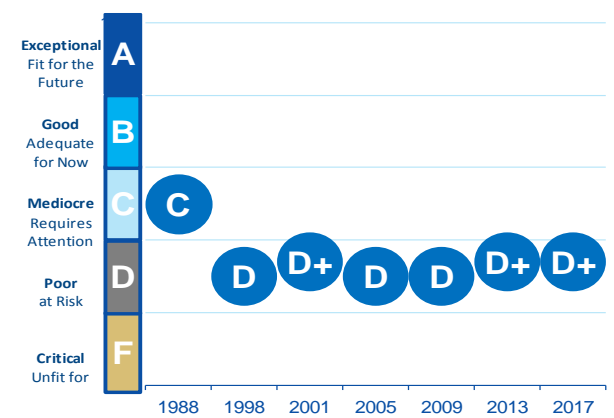
In addition, information and communication technology (ICT) and digital infrastructure have enabled virtual connectivity through cyberspace. Cyberspace has reduced the importance of geographic proximity, affecting the efficiency measures of some of existing infrastructure and how much of it is beneficial to rebuild.

On the other hand, to have a long-term economic effect and hence a multiplier above one, public infrastructure funds should be directed to high-density regions that are expanding – to generate new businesses and jobs alongside transportation infrastructure expenditures. These are usually regions that recover faster than average during recessions and have lower than average unemployment rates during expansions. An argument has also been made that complex urban infrastructure projects require a skilled labor force, to engineer and to operate machinery, which are more likely to be already employed. Studies indicate that the Recovery Act highway spending was mostly spent in the regions with already low unemployment rates and likely resulted in shifting labor from one job to another rather than hiring the unemployed.⁴

2: Glaeser (2017)

3: Glaeser (2017), Bourne and Zuluaga (2016)

4: Glaeser (2017), Gardner (2017)

Figure 4.3 ASCE Report Card


Source: BBVA Research & ASCE

Figure 4.4 ASCE Grade History by sector and cost of improvement

Category	2001	2005	2009	2013	2017
Aviation	D	D+	D	D	D
Bridges	C	C	C	C+	C+
Dams	D	D+	D	D	D
Drinking Water	D	D-	D-	D	D
Energy	D+	D	D+	D+	D+
Hazardous Waste	D+	D	D	D	D+
Inland Waterways	D+	D-	D-	D-	D
Levees	-	-	D-	D-	D
Ports	-	-	-	C	C+
Public Parks & Rec	-	C-	C-	C-	D+
Rail	-	C-	C-	C+	B
Roads	D+	D	D-	D	D
Schools	D-	D	D	D	D+
Solid Waste	C+	C+	C+	B-	C+
Transit	C-	D+	D	D	D-
Wastewater	D	D-	D-	D	D+
Cost to Improvement	\$1.3T over 5Y	\$1.6T over 5Y	\$2.2T over 5Y	\$3.6T over 8Y	\$3.3T over 10Y

Source: BBVA Research & ASCE

The reality is that many vital U.S. infrastructure sectors have been deteriorating and are a public safety issue – shifting the issue into a need rather than an economic stimulus argument. U.S. infrastructure spending has lagged behind the rising demand for it and has persistently earned an average grade of D since 1998 due to the persistent financing gap. The 2017 grade of D+ from the American Society of Civil Engineers (ASCE) means that the condition and capacity for many sectors of infrastructure are of serious concern and have a high risk of failure. For example, the number of aging dams and levees has been increasing and thus there is a fast growing number of high-hazard-potential structures, where high-hazard-potential defined as a failure of operation may result in significant economic losses and loss of life.

The ASCE released a report that estimates infrastructure funding gaps based on how much funds are needed to earn a B grade, which is a state of good repair. The report estimates an annual gap of \$144 billion over the next 10-years in funding to maintain the B grade. The report also estimates a \$3,400 per year cost to U.S. families and \$7 billion of lost accumulated sales for businesses in 10-years due to poor infrastructures. However the report neither provides estimates of nor studies the modernization of existing infrastructure and investment into ICT or any other new technologies, which would bump the U.S. up to grade A.⁵

“The studies do not presume new technologies beyond extension of existing trends in infrastructure utilization rates, and enhanced technologies that are already scheduled for implementation. Examples of such technologies not considered in these reports are high speed rail or maglev systems in surface transportation or radical expansion of renewable energy for electricity generation. In the water study, the cost of funding or developing new water supply resources was not considered. The electricity study assumed that technologies in place or planned for power generation by region would be in place through 2040.” (ASCE, 2016)

5: The only exception is aviation sector, where the study considers the cost of NextGen air traffic control technologies. NextGen is a system long promised to improve the efficiency and safety of aviation and to enhance the capacity of existing airport infrastructure (ASCE, 2016).

The Administration is working on an infrastructure bill that is expected to be released in May. Infrastructure spending was one of President Trump's campaign promises, and while the amount of infrastructure expenditures proposed is expected to be \$1 trillion over the next 10-years, matching Democrats' proposal on infrastructure, the mystery of what the proposal will contain is high. How much of the proposed infrastructure expenditures will be financed directly by government and how much will be financed by tax credits, which would incentivize public-private partnerships, is unknown. It is also unclear what type of infrastructure it will cover. What will the proposal's break-down be in terms of funding of new infrastructure versus renovating and updating the old one? And finally, will the bill incorporate projects addressing the needs of the new digital age, cyber security, and information and communication technology.

Based on a recent interview by President Trump and a speech by Secretary of Transportation Chao, the Administration's infrastructure spending proposal will seek investment of \$1 trillion over 10-years and will address transportation infrastructure, water, and "potentially broadband and veterans hospitals." It will seek to incentivize public private partnerships by including "common-sense" regulatory, administrative, and policy changes that will accelerate the permitting processes.⁶ The proposal will include refurbishment projects: "we have to refurbish to a large extent."⁷ The President plans to establish a Commission that will overlook and appropriate the funds.

Yet the primary unknown – the financing of the infrastructure proposal - will determine the likelihood of the infrastructure proposal winning approval by Congress. Democrats support government financing and will be opposed to other measures of financing, such as tax credits or any newly imposed taxes. Conservative Republicans are not keen on approving spending measures that add to the federal budget deficit. At the same time, both Republicans and Democrats that represent rural constituencies oppose the idea of financing infrastructure projects through public-private partnerships, since investment will be allocated more to urban areas because those areas have a lower risk of failing to recoup the initial investment. Meanwhile, large metropolitan areas that have the greatest need for modernization of infrastructure could be denied federal funds if they are perceived as "sanctuary cities."

"Nothing is accurate now because we haven't made a final determination. We haven't made a determination as to public/private. There are some things that work very nicely public/private. There are some things that don't. ...We are borrowing very inexpensively. When you can borrow so inexpensively, you don't have to do the public/private thing." Partial Transcript: Trump's Interview with The Times, April 5, 2017

Funding infrastructure faces a bottleneck since the demand for infrastructure spending is growing faster than the U.S. economy and thus outpacing tax revenue necessary to finance it. The elevated U.S. government debt to GDP ratio, which increased from 62.1% in 2007 to 105.3% in 2017, remains a constraint for further expansionary federal spending policy implementation. In the case of industrialized economies with public debt levels of 60% of GDP and above, large scale macroeconomic models estimate that fiscal stimulus is counterproductive and has a negative effect on GDP growth.⁸ An

6: Chao, U.S. Secretary of Transportation speech (2017)

7: The New York Times (2017)

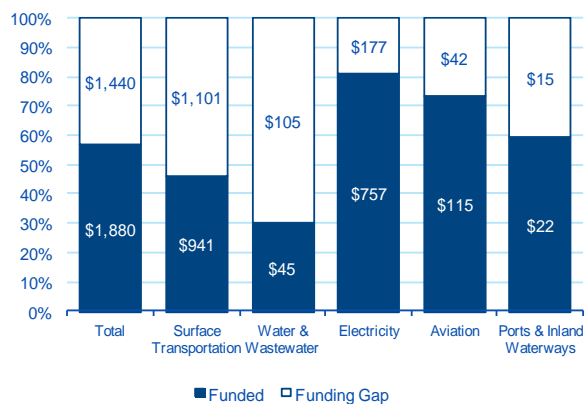
8: Ilzetzki, Mendoza and Végh (2013)

IMF study is positive on the short-term fiscal stimulus effect, concluding that productive infrastructure spending can yield a multiplier of up to 1.25. However, the study finds that constrained by fiscal sustainability, the spending will impose a drag over the medium-term on U.S. growth.⁹

Nevertheless, whether infrastructure spending is a need or is being done for stimulus purposes, public funds are the backbone of infrastructure financing for many sectors. More than 50% of projects for education, aviation, water transportation, mass transit, highways, and streets are funded by public sources, as well as 100% of passenger railroad and public safety projects. The traditional rationale for government financed infrastructure projects is that the government steps in when markets fail. Infrastructure assets have in many ways met the characteristics of a public good, namely being non-excludable and non-rivalrous, and have hard-to-monetize positive spillovers. Most public infrastructure sectors require economies of scale and, if not government owned, can lead to a natural monopoly and price control. At the same time, public financing has also drawn criticism that the projects funded have often ignored cost-benefit outcomes, have been implemented inefficiently, and were often prioritized based on electoral advantage areas rather than by actual need.

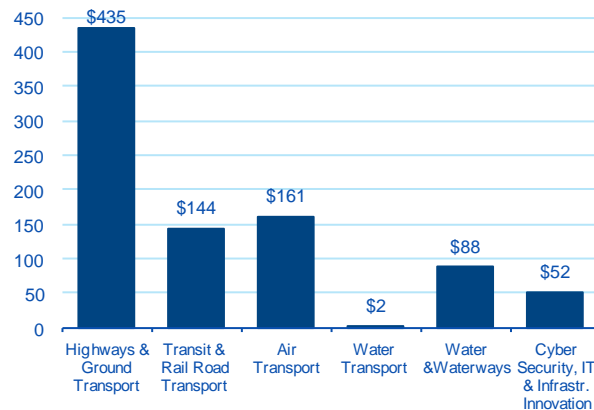
The infrastructure sectors that are dominated by private funding of 80% or greater are energy, health care, and amusement and recreation parks, while freight railroads and telecommunication have a 100% private share of funding. It is often argued that private involvement improves efficiency in both the execution and the financing of projects. The past administration, similar to the current one, has also supported Public Private Partnerships (PPPs) as they infuse private capital, provide expertise, and employ new means of efficiency to bolster infrastructure investment.

Figure 4.5 Investment Funding Gap through 2025
(\$ 2005 billions)



Source: BBVA Research & ASCE

Figure 4.6 Federal Government Outlays Projections through 2025 (\$ billions)



Source: BBVA Research & CBO

9: IMF (2017)

PPP arrangements are complex, involve large number of parties, and require lengthy and strenuous periods of negotiations on legal arrangements, the distribution of payoffs, and risk sharing. By default, infrastructure spending, like any other type of investment, yields a rate of return and will attract capital. However, infrastructure projects in the U.S. are presumed to be risky due to high upfront capital needs and lengthy timelines. Infrastructure investments are less liquid and often involve years of wait time after initial-stage planning before they start generating cash flow.

The largest portion of the responsibility to negotiate PPP arrangements often lies on the shoulders of state and local governments. Local governments carry the risks of the initial stages of the projects – negotiation and planning - which require raising money through alternative sources such as bonds and debt financing. PPPs can also cost government more than what is anticipated. For example, while under lease contracts, the local government has to compensate the private partner for lost revenue from parking meters when temporarily closing streets and from tolls that are waived while evacuating people quickly due to a natural disaster. On the other hand, while the estimates are not consistent for every PPP project, PPPs on average operate at a slightly lower cost and can deliver efficiency gains when bundling construction, maintenance, and operations.

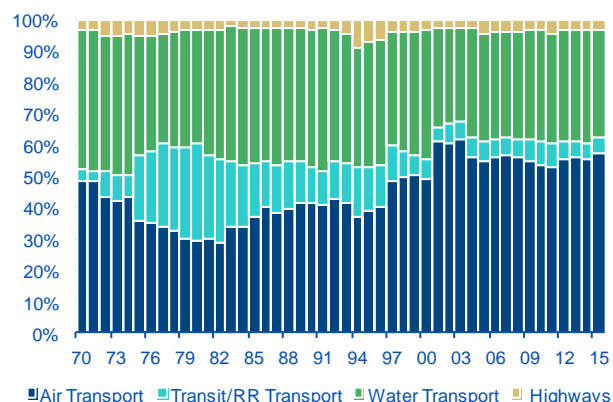
An increasingly higher number of states are exploring PPP opportunities. While predominantly in highways and ground transportation, PPPs in the U.S. currently are expanding to other sectors - power, waste and water, and social infrastructure projects. Furthermore, Pennsylvania has effectively bundled small infrastructure projects of 558 bridges into one big package and has successfully sealed PPP execution.

The reason to leverage PPP involvement is not as much about the initial financing of construction but rather is more about the efficiency gains over the whole life-cycle of the structures. When costs and benefits are measured correctly - accounting for the costs of alternatives, hidden costs, design, construction, long-term maintenance and life-cycle - PPPs can potentially deliver lower cost and higher efficiency. Additionally, since PPPs contain all three components – financial, operational, and assets - they typically incorporate innovative technologies and complete the projects within a shorter time-span.

However, there is much to be accomplished - to improve the efficiency of choosing projects appropriate for PPPs, to improve the quality of PPPs in the pipeline, as well as to address the risks and obstacles of the process. Getting involved does carry a risk of contracts being broken at the start or in the middle of projects, when the initial costs have been already incurred, due to shifts in political or popular support.

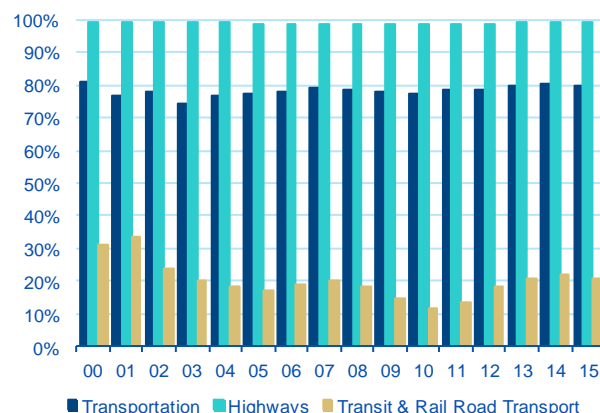
The establishment of an independent public agency, created with the mission of prioritizing infrastructure projects based on long-term growth and sustainability goal, and the development of procedures on PPPs involvement would minimize both political influence on the allocation of public funds and the political risk of entering into PPPs. Furthermore, robust and standardized procedures, early legislative approvals of projects, and establishments of break fees, would change the perception of long-term infrastructure investment as risky and would unlock untapped sources of capital from institutional investors such as pension funds, sovereign wealth funds, insurance companies, and mutual funds.

Figure 4.7 Federal Government Transportation Expenditures (% share of total)



Source: BBVA Research & BEA

Figure 4.8 State & Local Government Expenditures Share of Government Expenditures (%)



Source: BBVA Research & BEA

Bottom Line: The need for 21st century infrastructure and the cost of it - a higher public debt to GDP ratio - have to be considered in conjunction with one another. Spending on infrastructure should remain a national priority at all times. However, project prioritizations have to include an emphasis on coupling the reduction of the number of high-risk infrastructure facilities with the modernization of it, investment into cyber security, building out of broadband infrastructure, and planning for the consequences of driverless cars, the sharing economy, and other digital advancements. Since current economic conditions are on a sustainable path, federal infrastructure investment should target projects that can boost long-term growth rather than ones that can ease short-term unemployment in regions with persistently high unemployment rates.

Infrastructure investment can produce large welfare benefits, but the payoffs to the owner may not cover its costs since the benefits also accrue to the public and are not easy to directly measure or price. This suggests the need for new financing arrangements and mechanisms. PPPs can alleviate this burden in some cases but are not a solution for all situations. State and local governments have been exploiting, however un-uniformly, other types of financial arrangements such as privatization, infrastructure investment funds, private and nonprofit philanthropic partners, and crowdfunding.

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This report has been produced by the U.S. Unit

Chief Economist for the United States

Nathaniel Karp
nathaniel.karp@bbva.com
+1 713 881 0663

Filip Blazheski
filip.blazheski@bbva.com

Shushanik Papanyan
shushanik.papanyan@bbva.com

Kan Chen
kan.chen@bbva.com

Boyd Nash-Stacey
boyd.stacey@bbva.com

Marcial Nava
marcial.nava@bbva.com

BBVA Research

Group Chief Economist

Jorge Sicilia Serrano

United States of America

Nathaniel Karp
Nathaniel.Karp@bbva.com

Spain & Portugal

Miguel Cardoso
miguel.cardoso@bbva.com

Mexico

Carlos Serrano
carlos.serrano@bbva.com

Turkey, China & Geopolitics

Álvaro Ortiz
alvaro.ortiz@bbva.com

Turkey

Álvaro Ortiz
alvaro.ortiz@bbva.com

China

Le Xia
le.xia@bbva.com

South America

Juan Manuel Ruiz
juan.ruiz@bbva.com

Argentina

Gloria Sorensen
gsorensen@bbva.com

Chile

Jorge Selaive
jselaive@bbva.com

Colombia

Juana Téllez
juana.tellez@bbva.com

Peru

Hugo Perea
hperea@bbva.com

Venezuela

Julio Pineda
juliocesar.pineda@bbva.com

Macroeconomic Analysis

Rafael Doménech
r.domenech@bbva.com

Global Macroeconomic Scenarios

Miguel Jiménez
mjimenezg@bbva.com

Global Financial Markets

Sonsoles Castillo
s.castillo@bbva.com

Global Modelling & Long Term Analysis

Julián Cubero
juan.cubero@bbva.com

Innovation & Processes

Oscar de las Peñas
oscar.delaspenas@bbva.com

Financial Systems & Regulation

Santiago Fernández de Lis
sfernandezdelis@bbva.com

Countries Coordination

Olga Cerqueira
olga.gouveia@bbva.com

Digital Regulation

Álvaro Martín
alvaro.martin@bbva.com

Regulation

María Abascal
maria.abascal@bbva.com

Financial Systems

Ana Rubio
arubio@bbva.com

Financial Inclusion

David Tuesta
david.tuesta@bbva.com

CONTACT DETAILS:

BBVA Research USA
2200 Post Oak Blvd.
Houston, TX 77025
United States.

Email: bbvaresearch_usa@bbva.com
www.bbvaresearch.com
www.bbvacompass.com/compass/research/
twitter.com/BBVAResearchUSA
bbvaresearchusa.podbean.com