

RESEARCH DIGEST • 3RD QUARTER 2021

INFRASTRUCTURE ECONOMICS

Infrastructure has been one of the few bipartisan issues in US politics in recent years. However, until lately there has been little actual progress on infrastructure legislation despite areas of agreement between Democrats and Republicans. The Biden administration has made infrastructure investment a centerpiece of its economic agenda. Earlier this year, the administration released proposals for its \$2.6 trillion American Jobs Plan (AJP) and \$1.8 trillion American Families Plan (AFP), with the former focused mostly on traditional infrastructure projects (i.e., transportation, broadband, etc.) and the latter emphasizing “human” infrastructure investments in areas, such as education, healthcare, and climate. After debating the proposals for several months, the Senate eventually reached a bipartisan agreement to authorize some elements of the AJP in the Infrastructure Investment and Jobs Act, which includes roughly \$550 billion in new spending. Democrats are pursuing many of the remaining elements of the AJP and AFP via the budget reconciliation process, which only requires a simple majority. They have proposed \$3.5 trillion in new mandatory spending, which they plan to partially pay for with tax increases on corporations and higher income households. While there is still plenty of uncertainty about the size and composition of both bills, the consensus is that Congress will approve a major increase in infrastructure spending at some point soon.

With a large influx in infrastructure investment seemingly around the corner in the United States, the third quarter 2021 edition of Research Digest features three papers on the economic effects of public infrastructure.

- The first paper analyzes the economic impact of public infrastructure spending across the business cycle and finds it boosts GDP once on impact and more significantly after six to eight years;
- the second paper features a debate between two preeminent economic policy scholars on how to best fund infrastructure investments in a post-COVID-19 economy; and
- the third paper investigates the current state of US infrastructure, and while the authors suggest it isn't in as poor shape as some claim, they acknowledge there are specific areas for improvement.

Published September 24, 2021

ROADS TO PROSPERITY OR BRIDGES TO NOWHERE? THEORY AND EVIDENCE ON THE IMPACT OF PUBLIC INFRASTRUCTURE INVESTMENT

Sylvian Leduc and Daniel Wilson, Federal Reserve Bank of San Francisco, June 2012

Public infrastructure investment often plays a significant role in countercyclical fiscal policy. Yet, its economic impact and how that varies with the business cycle remain under debate. To better assess this relationship, the authors examine the effects of unanticipated federal highway grants on economic activity in the United States. They find that grant shocks positively affect GDP both on impact and more significantly after six to eight years. These results are driven by a transmission channel between the initial funding shock and the eventual increase in economic activity.

Infrastructure expenditure is often a key component of government stimulus packages, but its economic benefits remain under heavy debate. Proponents see infrastructure expenditures as effective measures in boosting short- and long-term economic activity, while opponents view them to yield little economic benefits, or as “bridges to nowhere.” Using data on federal highway grants from 1993–2010, the authors measure the effects of unanticipated increases in grants on state-level economic activity. Existing literature studying the effects of public highway spending suggests that this should have a positive outcome on economic output and local earnings.

The authors find that federal highway grants positively impact state-level GDP at two time periods—on impact, and more significantly after six to eight years. The corresponding GDP multipliers ranged from 1.0–3.0 on impact to a peak of 3.0–7.0 at six to eight years. Their analysis on other economic variables show that the grant shocks do not have a meaningful initial impact on employment, unemployment rate, and wages. Nonetheless, all three measures, as well as personal income and GDP per worker, were positively impacted after six to eight years. The authors attribute these results to a delay between the initial grant shock, the actual construction activity over a three- to five-year period, and the subsequent improvement in productivity and overall economic activity. Their concurrent study on sectors most directly impacted by highway infrastructure, such as trucking and retail sales, which also exhibited significant growth after a similar delay, supported their findings.

The authors extend the analysis to examine if the economic benefits of federal highway grants are dependent on economic conditions. First, they compare responses during recessionary versus expansionary periods. They find that while the initial impact on GDP is only statistically significant during recessions, the effect is also much larger. In particular, the February 2009 American Recovery and Reinvestment Act (ARRA), which authorized a sizable one-time increase of \$27.5 billion in highway grants, had a meaningfully larger short-term effect on GDP. Second, the authors analyze if economic responses depend on the level of slack in the economy. They find that federal highway grants have a stronger impact on fast-growing states as compared to slow-growing states over both the short- and long-run, which suggests that highway spending may be more effective in facilitating strong economic growth rather than boosting weak growth.

The authors conclude that highway spending has a positive impact on GDP during recessionary periods, especially during times of very high economic slack and/or when monetary policy is at the zero-lower bound, as evidenced by the meaningfully larger ARRA impact in 2009. However, they acknowledge that given its limited impact on short-run employment, highway spending may be less effective as a countercyclical stimulus measure, especially as it appears to be more effective in stimulating sustained growth amid a strong economic backdrop. Lastly, as the economic benefits of highway spending eventually fade, this form of government expenditure may not have a permanent effect on productivity and economic activity.

DEBATE: FUNDING INFRASTRUCTURE INVESTMENT IN A POST-COVID-19 ECONOMY

Larry Summers and Ed Glaeser, *Voices on Infrastructure*, McKinsey & Company, January 2021

Earlier this year, McKinsey & Company published a broad report on restarting economies with infrastructure investment. Included, was a debate between two leading economic policy scholars, Larry Summers and Ed Glaeser, on funding infrastructure investments in the post-COVID-19 economy. Summers argues increased infrastructure spending would help boost the post-COVID-19 economy, while Glaeser asserts that infrastructure spending is important on its own, but money should be spent efficiently for end-use purposes, not to prop up the economy. Both economists agree the government needs to invest in infrastructure for the future benefit of the US economy.

Larry Summers argues increasing infrastructure spending is crucial to the post-COVID-19 economic recovery. At a time of low GDP growth projections, he suggests it is important to fund projects that could have positive externalities or longer-term effects, especially those which are unlikely to be funded by the private sector. Additionally, unemployment remains high, meaning labor costs for such projects are relatively low and will provide jobs to individuals who would otherwise be receiving welfare. Summers also believes that since real interest rates are near historical lows, the borrowing costs to fund projects are lower now than they are likely to be in the future. In other words, the opportunity cost of spending more on infrastructure is too good to pass up.

Ed Glaeser agrees with some of Summer's points but disagrees that more spending is needed to support the recovery. He argues additional infrastructure spending is important on its own when done for the right reasons, but it should not be used as a counter-recessionary tool. In fact, he suggests doing so is a great way to waste tens of billions of dollars on projects with little economic benefit to society, such as the near empty People Mover in Detroit. Rather, infrastructure spending should focus on delivering value to end-users, not simply putting people to work. This approach leads to more efficient spending and better outcomes for society. Glaeser believes a user-fee model would help ensure projects maximize benefits and minimize costs, while also reducing the proportion of the costs that fall on the poor.

While Summers and Glaeser don't agree on the need for additional infrastructure spending to fuel the economic recovery, they do agree on a lot of infrastructure-related topics. For example, both economists agree that infrastructure projects need to be more critically analyzed, spending needs to be done more efficiently, and visionary

spending on infrastructure is critical to the United States' competitiveness in the future. Additionally, they both agree infrastructure spending should help create equitable outcomes throughout society and adjacent projects, such as education and safety measures, should also be supported through federal funding.

INFRASTRUCTURE ECONOMICS

Joseph Briggs, et al., Goldman Sachs Economics Research, April 2021

Infrastructure investment is a centerpiece of the Biden administration's economic agenda. This follows the widely held beliefs that US infrastructure is in poor shape and in need of an upgrade and that infrastructure investment also provides broader economic benefits. In this piece, the authors investigate the current state of US infrastructure, how infrastructure investment has evolved over time, and the long-term economic effects of infrastructure investment. They conclude that while US infrastructure is not in as poor shape as some claim, there are areas for improvement.

There is a consensus that US infrastructure is in poor shape and in dire need of repair and reinvestment. Yet, this might be an oversimplification of the issue at hand. The authors point out supporting data are mixed and varies by infrastructure category. Current investment in infrastructure is near historical averages but the composition of investment has evolved. The Bureau of Economic Analysis (BEA) divides infrastructure into three broad categories: traditional infrastructure (e.g., transportation, utilities), social infrastructure (e.g., education, health), and digital infrastructure (e.g., broadband, cloud computing). Since the 1980s, the private sector has played a growing role in infrastructure investment and now accounts for about 65% of new infrastructure investment, compared to a historical average of 55%. At the same time, there has been a rise in social and digital investment, areas where the private sector has historically played a larger role, which have offset a decline in traditional infrastructure investment.

As a result, some measures send a worrying signal about the quality of America's traditional infrastructure. Analysis suggest investment has not kept up with rising usage. Road congestion and traffic delays have both increased over time and electrical production capacity has trended down, while blackouts due to major disruptions have become more frequent. Another concern is that much of the traditional infrastructure in the United States is more than 60 years old. Old infrastructure is less reliable and more costly to maintain. Goldman estimates that it would cost at least \$2 trillion to \$4 trillion to restore the average age of America's traditional infrastructure to its 1970 level, with highway restoration accounting for much of the cost.

With an increase in infrastructure investment, the White House also aims to boost GDP in two ways. First, the increase in investment will directly boost output when the spending initially occurs. Second, the increase in productivity resulting from this investment will eventually raise the level of potential GDP. The direct effect is easier to measure. For example, Goldman estimates that the White House's initial \$2.6 trillion American Jobs Plan (AJP) would add a modest 0.25% of GDP in 2022 and peak at about 0.5% of GDP from 2023–26. However, it would raise total infrastructure investment to 4.5% of GDP, the highest level since the early 1970s. The long-term effects

on GDP are more difficult to measure. Although, studies have shown that traditional infrastructure investment (i.e., much of what is included in the AJP) typically results in higher economic returns than non-core investments. The authors conclude, even though US infrastructure might not be in as poor shape as commonly believed, there are clear areas of weakness and opportunities for improvement that also potentially carry broader economic benefits. ■

Copyright © 2021 by Cambridge Associates LLC. All rights reserved.

This report may not be displayed, reproduced, distributed, transmitted, or used to create derivative works in any form, in whole or in portion, by any means, without written permission from Cambridge Associates LLC ("CA"). Copying of this publication is a violation of US and global copyright laws (e.g., 17 U.S.C.101 et seq.). Violators of this copyright may be subject to liability for substantial monetary damages.

This report is provided for informational purposes only. The information does not represent investment advice or recommendations, nor does it constitute an offer to sell or a solicitation of an offer to buy any securities. Any references to specific investments are for illustrative purposes only. The information herein does not constitute a personal recommendation or take into account the particular investment objectives, financial situations, or needs of individual clients. Information in this report or on which the information is based may be based on publicly available data. CA considers such data reliable but does not represent it as accurate, complete, or independently verified, and it should not be relied on as such. Nothing contained in this report should be construed as the provision of tax, accounting, or legal advice. Past performance is not indicative of future performance. Broad-based securities indexes are unmanaged and are not subject to fees and expenses typically associated with managed accounts or investment funds. Investments cannot be made directly in an index. Any information or opinions provided in this report are as of the date of the report, and CA is under no obligation to update the information or communicate that any updates have been made. Information contained herein may have been provided by third parties, including investment firms providing information on returns and assets under management, and may not have been independently verified.

The terms "CA" or "Cambridge Associates" may refer to any one or more CA entity including: Cambridge Associates, LLC (a registered investment adviser with the US Securities and Exchange Commission, a Commodity Trading Adviser registered with the US Commodity Futures Trading Commission and National Futures Association, and a Massachusetts limited liability company with offices in Arlington, VA; Boston, MA; Dallas, TX; Menlo Park, CA, New York, NY; and San Francisco, CA), Cambridge Associates Limited (a registered limited company in England and Wales, No. 06135829, that is authorized and regulated by the UK Financial Conduct Authority in the conduct of Investment Business, reference number: 474331); Cambridge Associates GmbH (authorized and regulated by the Bundesanstalt für Finanzdienstleistungsaufsicht ("BaFin"), Identification Number: 155510), Cambridge Associates Limited, LLC (a registered investment adviser with the US Securities and Exchange Commission, an Exempt Market Dealer and Portfolio Manager in the Canadian provinces of Alberta, British Columbia, Manitoba, Newfoundland and Labrador, Nova Scotia, Ontario, Québec, and Saskatchewan, and a Massachusetts limited liability company with a branch office in Sydney, Australia, ARBN 109 366 654), Cambridge Associates Investment Consultancy (Beijing) Ltd (a wholly owned subsidiary of Cambridge Associates, LLC which is registered with the Beijing Administration for Industry and Commerce, registration No. 110000450174972), and Cambridge Associates Asia Pte Ltd (a Singapore corporation, registration No. 200101063G, which holds a Capital Market Services License to conduct Fund Management for Accredited and/or Institutional Investors only by the Monetary Authority of Singapore).