

Levy, S. Jay; Cadette, Walter M.

Research Report

Overcoming America's infrastructure deficit: A fiscally responsible plan for public capital investment

Public Policy Brief, No. 40

Provided in Cooperation with:

Levy Economics Institute of Bard College

Suggested Citation: Levy, S. Jay; Cadette, Walter M. (1998) : Overcoming America's infrastructure deficit: A fiscally responsible plan for public capital investment, Public Policy Brief, No. 40, ISBN 0941276473, Levy Economics Institute of Bard College, Annandale-on-Hudson, NY

This Version is available at:

<https://hdl.handle.net/10419/54287>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Public Policy Brief

**Overcoming America's
Infrastructure Deficit**

A Fiscally Responsible Plan for Public
Capital Investment

S Jay Levy and Walter M. Cadette

The Jerome Levy Economics Institute of Bard College, founded in 1986, is an autonomous, independently endowed research organization. It is nonpartisan, open to the examination of diverse points of view, and dedicated to public service.

The Jerome Levy Economics Institute is publishing this proposal with the conviction that it represents a constructive and positive contribution to the discussions and debates on the relevant policy issues. Neither the Institute's Board of Governors nor its Advisory Board necessarily endorses the proposal in this issue.

The Levy Institute believes in the potential for the study of economics to improve the human condition. Through scholarship and economic forecasting it generates viable, effective public policy responses to important economic problems that profoundly affect the quality of life in the United States and abroad.

The present research agenda includes such issues as financial instability, poverty, employment, problems associated with the distribution of income and wealth, and international trade and competitiveness. In all its endeavors, the Levy Institute places heavy emphasis on the values of personal freedom and justice.

Editor: Frances M. Spring

The Public Policy Brief Series is a publication of The Jerome Levy Economics Institute of Bard College, Blithewood, Annandale-on-Hudson, NY 12504-5000. For information about the Levy Institute and to order Public Policy Briefs, call 914-758-7700 or 202-887-8464 (in Washington, D.C.), e-mail info@levy.org, or visit the Levy Institute web site at <http://www.levy.org>.

The Public Policy Brief Series is produced by the Bard Publications Office.

© Copyright 1998 by The Jerome Levy Economics Institute. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information-retrieval system, without permission in writing from the publisher.

ISSN 1063-5297
ISBN 0-94126-47-3

Contents

Summary	3
Preface	
<i>Dimitri B. Papadimitriou</i>	7
A Fiscally Responsible Plan for Public Capital Investment	
<i>S Jay Levy and Walter M. Cadette</i>	9
About the Authors	23

Preface

During his first term in office, President Clinton noted that America faced three deficits: a federal budget deficit, an education deficit, and an infrastructure deficit. Although the budget deficit will be eliminated by 2001, it is still prominent in the minds of many policymakers, thereby reducing the ability of public policy to remedy the other two deficits. The continuing preoccupation with the budget deficit has led to a search for alternative ways of financing education and infrastructure programs and providing incentives to direct spending to those areas. Special tax-deferred and tax-free savings plans have been devised for higher education, but as yet no plan has been proposed for the financing of infrastructure projects.

In this brief, S Jay Levy and Walter M. Cadette introduce a means by which the federal government, in conjunction with state and local governments, might finance infrastructure projects without overly adding to the budget deficit. Their proposal calls for the establishment of an institution within the Federal Reserve that would purchase interest-free mortgage loans from state and local governments for infrastructure projects. Such loans would cut the total cost of the projects about in half. The only addition to spending in the federal budget would be in the form of forgone interest on Treasury securities that the Federal Reserve would no longer receive because it would hold the mortgages in place of the securities. And, as Levy and Cadette note, infrastructure investment can stimulate and even raise the growth path of the economy to a new, higher level, a factor not taken into account in their budget estimates.

The present federal budget surpluses would appear to make this a perfect time for implementing a program not only to increase spending on infrastructure projects but to raise the growth path of the economy. Levy and Cadette's proposal would accomplish both goals. We hope that their paper stimulates debate over the future direction of budget policy.

Dimitri B. Papadimitriou

Executive Director

May 1998

A Fiscally Responsible Plan for Public Capital Investment

Citizens chronically complain about dilapidated school buildings, condemned highway bridges, contaminated water supplies, and other shortcomings of the public infrastructure. In addition to causing inconvenience and endangering health, the inadequacy of the public infrastructure has been found to adversely affect productivity and the growth of the economy. Public investment, private investment, and growth are intimately linked (Erenburg 1994; Aschauer 1993).

Poor maintenance gets some of the blame for the sorry state of the nation's infrastructure. States and localities receive federal aid for building highways, but have little political incentive for maintaining them. State and local governments own 89 percent of the public, non-defense fixed capital (Bureau of Economic Analysis 1997, 37) and pay for most of the maintenance of these facilities by taxing their residents. The voters may not notice if a bridge is not painted, but they do feel the pain of taxes. When the bridge, because of neglect, is condemned, its replacement may be paid for by the federal government and often is. The officials at the ribbon-cutting usually are eager for the media attention attending such ceremonies (Regan 1994; Environmental Working Group and Surface Transportation Policy Project 1997).

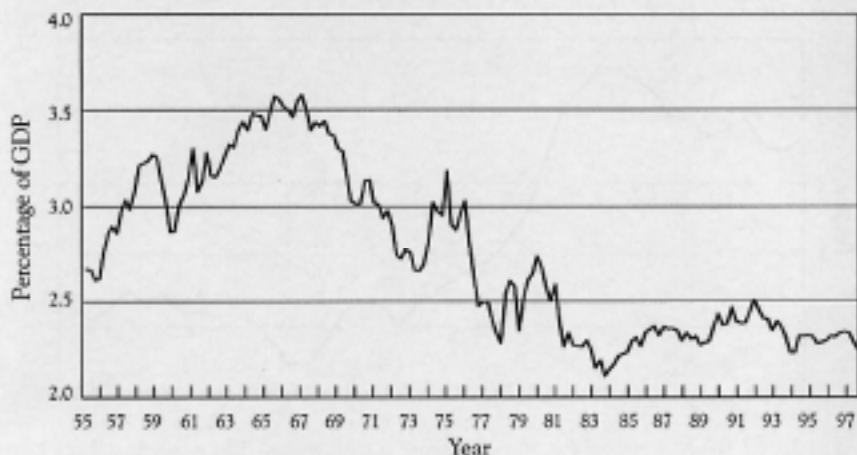
Another source of the infrastructure deficit is the federal government's method of accounting. An unfair fiscal burden is imposed on taxpayers by the federal government's practice of expensing capital projects as they are built as if they were consumed immediately. Americans, most of whom own their own homes, understand the wisdom of paying for a structure over its useful life.

The plan outlined here is designed to help the nation take a significant step toward overcoming its infrastructure deficit and in doing so promote the productivity needed to meet the competitive challenges that may arise from China, an economically unified Europe, or elsewhere in the world. The plan is fiscally sound. It follows the best accounting practices of the private sector, and it is designed to recognize the statutes that mandate a balanced federal budget. In salient ways, it advances sound fiscal operation.

The plan would provide \$50 billion a year for zero-interest mortgage loans to state and local governments for capital investment in types of projects specified by Congress and the president. Being zero-interest, the loans would cut the overall cost of projects about in half (depending on prevailing interest rates) for state and local governments. The principal of the loans would be repaid in annual installments. No mortgage would be for a period of more than 30 years, and the period of repayment would depend on the type of project. A loan to build a new sewerage disposal plant might be for 30 years, but one to rehabilitate a dilapidated school building might have to be repaid in 10 years or less. To protect the taxpayers' investment in these projects, the loans would have covenants requiring regular, effective maintenance.

The subsidizing of capital projects in the form of zero-interest loans would be a cost to the federal government. However, at small annual cost, it would achieve large and badly needed improvements in the nation's infrastructure.

In this brief we discuss the link between public investment and economic performance, the structure of a plan to finance public capital investment, the need for the federal government to support such a plan, and the implications of the plan for monetary and fiscal policy. We find that the money created by the loan process would result in a corresponding increase in real assets, and the money would be withdrawn from circulation as the assets were depreciated and the mortgages repaid. Because this investment program would raise the economy's long-term growth rate, it would be partly, perhaps entirely, self-financing.¹ In short, a national commitment to public capital can be undertaken in a fiscally prudent way. Indeed, failure to make such a commitment would irresponsibly circumscribe the American economy's future.

Figure 1 Nondefense Public Investment as Percentage of GDP

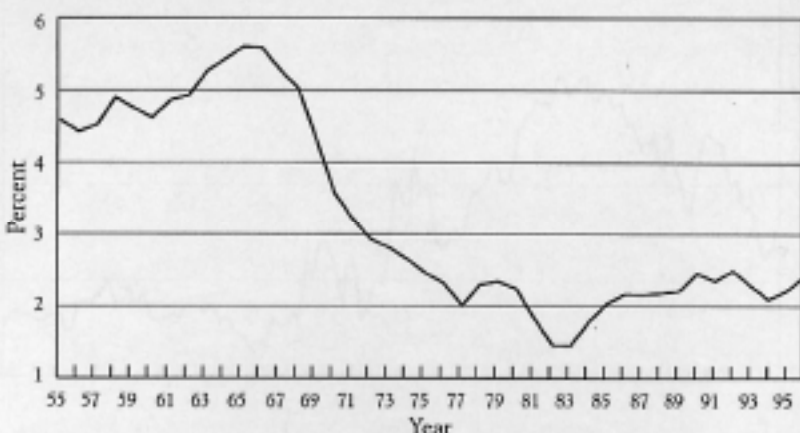
Source: U.S. Department of Commerce.

Public Capital Investment and Economic Growth

As shown in Figure 1, from 1955 through 1980 total nondefense public investment averaged 3.0 percent of GDP; from 1981 through 1997 it averaged only 2.3 percent and was below 2.3 percent in the most recent four years. A reduction in federal government investment contributed to the overall decline, but much less than reductions by state and local governments, which typically account for about 85 percent of such investment. Burdened by rising taxation, state and local taxpayers frequently were reluctant to approve bond issues to finance infrastructure. Widespread neglect of maintenance aggravated the decline in the capital stock. As shown in Figure 2, net of depreciation, the real nondefense public capital stock rose between 1977 and 1997 at a pace only half that set between 1955 and 1977.

Evidence of the inadequacy of the public capital stock is seen in such problems as unsafe bridges, urban decay, dilapidated and overcrowded schools, and inadequate airports. A General Accounting Office study found that education is seriously handicapped by deteriorating school buildings and that an investment of \$110 billion is needed to bring them up to minimally acceptable condition (General Accounting Office 1995). The absence of up-to-date public facilities in good condition takes a toll in less visible and perhaps even more important ways by

Figure 2 Nondefense Public Capital Stock (Constant Dollar, Net of Depreciation, Year-over-Year Percent Change)



Source: U.S. Department of Commerce; Levy Institute Forecasting Center estimate.

impeding private sector productivity and thereby diminishing the real income growth of the nation. Seemingly endless traffic jams, disruptions to commuter rail service, and backed-up airport runways—everyday experiences for Americans—spell waste and inefficiency for the economy at large. Congestion on the nation's highways alone costs the nation an estimated \$100 billion a year, according to the Competitiveness Policy Council (1993). And that estimate does not include the costs of added pollution and wear and tear on vehicles.

Research has highlighted the link between investment in public capital and the performance of the economy at large (Aschauer 1989, 1997c; Munnell 1990) and has shown that public and private investments are complements—public capital investment stimulates private investment (Erenburg 1993, 1994).² Every CEO who has made a decision to locate a factory near an interstate highway junction, a research laboratory in a community with good schools, or a corporate headquarters conveniently close to an airport can testify to the role that public infrastructure plays in influencing private investment.

"Infrastructure Dollars Pay Big Dividends" was the headline of a *Wall Street Journal* article (August 12, 1997) that said that "more and more state and local economic development agencies are recognizing that

unless they are prepared to invest in more infrastructure spending, they will be left behind in the jobs race." The article cites the Wadley-Donovan Group of Morristown, N.J.: "If an area does not have infrastructure in place, including basic roads, sewers, telecommunications capability, and transportation, it will not even be considered by the vast majority of companies." It also quotes Alicia Munnell, a former member of the Council of Economic Advisers: "The debate over whether spending on airports, roads and the like is unproductive has been settled. It's just silly to say it doesn't pay off."

Fazzari (1993) has examined and found false the notion that public investment leads to a reduction in private investment; the process typically is one of "crowding in," not "crowding out." Research by Aschauer (1997c) indicates that business fixed investment from the late 1960s through the late 1980s would have been 0.6 of a percentage point higher as a share of GDP had the nation dedicated an additional 1.0 percentage point of GDP to public investment.

Even if the effect on the economy of maintaining the 1955 to 1980 rate of increase in public investment were no more than half as large as the research indicates, the nation's wealth and income would now be about one-fifth higher than it is. According to Aschauer (1997a), economic growth is stimulated until the public capital stock reaches an estimated 62 percent of the value of business plant and equipment. Recent data indicate that the nation has far to go to achieve that optimal balance between public and private capital. Some states are close to the optimum, but the nationwide average value of the public capital stock is only 45 percent of the value of business plant and equipment.

Why a Federal Role

Unfortunately, for fiscal and other reasons, state and local governments have been unable to provide sufficient investment in infrastructure to come even close to providing an optimal public capital stock. Because Washington's support is needed to supplement state and local efforts, the plan described here is for a partnership between the federal and state and local governments. At least four circumstances warrant such a partnership.

1. The infrastructure deficit has become a critical national problem.
2. Federal mandates for a range of activities, from limiting pollution to caring for the poor, frequently strain the budgets of state and local governments and of their taxpayers.
3. Providing roads, schools, and other public capital benefits all Americans. They gain from a first-class interstate highway system, a well-educated workforce, and air and water reasonably free of pollutants.
4. Federal subsidies have traditionally been called upon to "even things out" across states and regions when widely disparate income levels and exposure to natural disaster have been deemed to impose inequitable burdens. State governments play a similar role within their own boundaries.

A \$50 billion a year program to increase state and local government infrastructure investment would return public capital spending to the standards of the period from 1955 to 1980. If the zero-interest infrastructure mortgages were amortized over a period of 10 years—that is, if 10 percent of the debt were repaid annually—the total outstanding debt would level off at \$300 billion after 10 years and the interest subsidy at about \$15 billion (based on early 1998 interest rates). A payback period as short as 10 years would be inappropriate if most of the investments were in new bridges, highways, and other long-lived assets. However, Congress might well decide that the program should begin with the rehabilitation of existing infrastructure.

The federal government would not be making unsound loans in the sense that it would not be running the risk that the debtors will default. Defaults on municipal bonds are rare. During the period 1992 to 1996 defaults averaged less than one-eighth of one percent of the outstanding debt (Bond Investors Association 1997).³ Generally, state and local jurisdictions are required to get their voters' approval before they can borrow to finance public improvements, and such approval would still be required. Although the interest cost would be subsidized by the federal government, state and local government taxpayers would be responsible for repaying the principal.

Investing \$50 billion annually in an \$8 trillion economy may not seem like a huge sum, but, be it private or public, investment has considerable

leverage on overall economic activity (Samuelson 1976, 228 ff.). To promote stability and steady growth, adjustments in the \$50 billion annual infrastructure investment would be warranted. During periods of expansion, especially when concerns about inflation increase, a smaller amount could be made available, while during periods of sluggish growth or recession the amount could be increased. The object would be to strike an annual average of \$50 billion over the period in which the plan was in place.

Implementing the Plan

The plan contemplates the establishment of a Federal Bank for Infrastructure Modernization (FBIM), which would buy and hold the eligible state and local government mortgages using credit supplied by the Federal Reserve. The FBIM's balance sheet would have the zero-interest state and local government mortgages on the asset side and the similarly zero-interest "deposits" of the Federal Reserve on the liability side.

The FBIM's purchases of the mortgages would be integrated into the Federal Reserve's open market operations. Through such purchases the Federal Reserve would be providing a source of liquidity to the economy at large. These purchases would displace in most circumstances the purchases of Treasury securities, customarily used by the Federal Reserve to provide reserves to the banking system.⁸

The Board of Governors of the Federal Reserve System would have the authority to vary the size of any given year's financing under the plan. It would determine whether the FBIM should be accepting mortgages at the rate of \$50 billion per year or at some other rate within a range to be stipulated in the legislation.

The FBIM would be the day-to-day administrator of the plan, but would have no scope in project selection. It would take mortgages on projects of types specified by statute and consistent with the provisions of the legislation for equitable regional distribution of the financing. Administrative costs (including the cost of any defaults) would be covered by a small fee charged to the borrower. The fee would be less than one-half of one percent of the amount financed.

The FBIM need not be built from the ground up. Indeed, its functions could be grafted onto either of two existing institutions: the Treasury Department's Federal Financing Bank, which extends loans to federal agencies that at one time borrowed in their own names, or the Federal Home Loan Bank System, which as central banker to the nation's thrift institutions is attuned to local needs.

Implications for Monetary Policy

The Federal Reserve ordinarily supports the economy's growth by purchasing Treasury securities as a means of adding reserves and currency to the system. At the end of 1997 the Federal Reserve held \$432 billion of government obligations (Federal Reserve Board 1997). If the economy, as measured by nominal GDP, were growing at an annual rate of 5 percent and the Federal Reserve increased its holdings of Treasuries by approximately the same percentage, their holdings would rise by just over \$20 billion per year, given recent levels of Federal Reserve holdings.⁵

The FBIM's purchases of the subsidized mortgages would take the place of the central bank's purchases of Treasury securities. To prevent the creation of excessive reserves, the Federal Reserve's open market desk would likely become a net seller of Treasuries. As the FBIM was buying \$50 billion of state and local government mortgages, the open market desk would be selling, say, \$30 billion of Treasuries. On balance, the character of monetary policy would not be changed in any way. Just as now, policy-makers would strive to strike the right balance between overall credit creation and credit restraint for any given background set of cyclical conditions. The Federal Reserve would still hold ample stocks of Treasury securities to be sold if it were intent on draining reserves. The Federal Reserve's implicit interest rate targets need not be affected in any way.

Given the size of the Treasury market (\$3.5 trillion of marketable securities outstanding), the Federal Reserve's sales of Treasuries to the extent envisaged are unlikely to have much, if any, impact on Treasury yields relative to the yields on other securities. As for interest rates generally, the impact of a program to subsidize state and local government mortgages would depend on the economy at large. In periods of economic slack, with loan demand down and banks rushing into the Treasury

market to put their deposits to work, it would be comparatively easy to finance an added \$50 billion of state and local government obligations (less than 1 percent of GDP) and to find private buyers for the Treasury securities that the Federal Reserve would not as a result hold in its portfolio. In those circumstances, the Federal Reserve would find a ready market for the Treasuries it was selling. Market interest rates would rise barely, if at all, as a result of the added demand for goods and services arising from the states and localities. That would not be the case if the economy were operating close to capacity and the policy objective was to curb inflationary pressures. In that instance, market interest rates might have to rise in order to finance, without inflationary consequences, the added demand for goods and services. But the plan does anticipate reduction in the level of infrastructure funding at times of cyclical strength.

Strengthening Monetary Policy

Integrating into monetary policy what is in essence a fiscal function—federal support for state and local government investment—would strengthen the Federal Reserve's ability to foster steady, noninflationary economic growth. A closer link would be forged between the money stock and the nation's real wealth because money would be created to produce real assets. The money stock, in turn, would be withdrawn as the assets depreciated. Money that represents undepreciated capital assets is sound money. To the extent that stepped-up growth of the public capital stock succeeded in raising the economy's potential growth, the Federal Reserve could aim to achieve faster growth of the money stock. The Federal Reserve, moreover, would be more effective both in cooling an economy that threatened to overheat and in spurring economic activity that faltered.

When stimulus to economic activity is called for, the Federal Reserve could give investment and thus the economy at large a direct boost by directing the FBIM to increase its purchases of infrastructure mortgages. Such a move would usually be more effective than lowering interest rates and waiting for lower borrowing costs to affect demand. Even when not having to "push on a string," the Federal Reserve has had to contend with the long and variable lags that have made traditional policy levers problematic. Indeed, the efficacy of monetary policy has

become increasingly questionable in recent years because of financial innovations. Especially important are the shift from reservable deposits to nonreservable liquid balances at mutual funds and other institutions and the enormous and rapid cross-border movement of funds.

When excessive demand and inflation threaten, the Federal Reserve has had to consider the possibly serious adverse effects of raising the Federal funds rate on bond and stock markets at home and abroad. Derivatives and their use by leveraged investors such as hedge funds have increased the vulnerability of markets to increases in interest rates. These institutions react almost instantaneously when a rise in short-term interest rates cuts into the spread on their long positions—in marked contrast to an earlier, simpler age when long-term investors tended to stick by their long positions as short rates rose. Indeed, by overtly raising interest rates, the Federal Reserve could well precipitate serious market disturbances. The change to a more speculative bond market—and, with it, to a more speculative currency market—naturally has made the Federal Reserve more cautious in tightening than in the past. Indeed, policymakers now signal moves toward higher interest rates and announce changes in policy as soon as the decisions are made.

The turmoil in Asian financial markets at the turn of the year, which echoed in U.S. markets, occurred as the U.S. unemployment rate was headed to an unusually low 4.5 percent, as reported shortages of skilled workers were becoming widespread, and as wage raises generally were accelerating. The Federal Reserve was almost certainly weighing the need for a rise in short-term rates to temper the economy's inflationary potential against the possibly destructive effects of such a move on securities and currency markets worldwide. Under the program described here, the Federal Reserve could reduce the FBIM's purchase of state and local government mortgages; it could moderate an economic expansion without overtly raising interest rates and thereby precipitating possibly quite large changes in stock and bond prices.

Implications for the Budget

Under the proposed plan, the profits of the Federal Reserve, which come from the interest income it receives on its securities holdings,

would decline. And, since Federal Reserve profits are turned over to the Treasury, federal receipts would decline commensurately. The effect of this loss of revenue on the federal budget would be quite small, however. As a rough guide, the Federal Reserve would receive about \$2.5 billion less in interest than it otherwise would during the first year of the plan's operation (in this case, the FBIM would own some \$50 billion of state and local government bonds, which would bear no interest, instead of the Federal Reserve's owning a like amount of interest-bearing Treasuries). When the program had fully matured and \$300 billion of mortgages were outstanding, the Federal Reserve's (and, in turn, the Treasury's) loss of interest receipts would be in the neighborhood of \$15 billion a year. This estimate is static, however; it should also take into account the salutary effect on long-term growth and thus on federal revenue apt to come from a higher private as well as public capital stock.

An alternative means of financing new infrastructure would have private investors buy the bonds and the federal government reimburse the issuing state and local governments for the interest expense. That approach, however, would seriously compromise the national objective of budget balance. The commitment to pay the interest subsidy would impose a budgetary obligation on the federal government for the life of the security. And it would therefore trigger budget rules that would measure the cost of the interest subsidy in present-value terms over that life and score that cost against the current year's budget. Under the rules of the Federal Credit Reform Act of 1990 (which took effect in fiscal year 1992), the long-run cost would have to be recognized initially, in contrast to the pre-1992 practice of recording expenditures on a cash basis.

That approach, moreover, would not convey the advantages of financing via an FBIM: enhanced efficacy of monetary policy in keeping the economy on a stable, noninflationary growth path and an explicit link between the money stock and the nation's real wealth. Indeed, with budget surpluses on the horizon for the first time in decades, open market operations may well have to branch out beyond Treasuries to provide for a growing economy's liquidity needs. Surpluses, moreover, would offer a unique opportunity to reverse the pattern of cramped public investment that large deficits naturally gave rise to.

The Need for Action

Bridges that have been condemned, school buildings in such disrepair that learning is jeopardized, facilities that provide water with uncomfortably high levels of contaminants, and many other infrastructure shortcomings threaten American growth and prosperity. Moreover, the growth of population, advances in technology, and the long-term economic progress of nations that compete in world markets with U.S. firms call for strong efforts to enhance productivity. The proposed program to improve infrastructure, even though limited, is a means to ensure the nation's economic future. It enables the federal government to play a vital role in bringing needed improvements about without impairing its fiscal goals and its commitment to control inflation. Keeping the promise of the future requires that the United States make provision for the basics for economic growth.

Notes

1. The decrease in the money supply that would occur as assets are depreciated would result in a smaller decline in GDP than the initial boost that would occur with the increase in the money supply. Moreover, since the initial boost would raise the long-term growth path of the economy, GDP would still be higher after depreciation than without the initial increase in assets.
2. Erenburg (1994, 14-16) also includes a good summary of the research.
3. The association states that some defaults may not result in losses to the bondholders.
4. These mortgages would not, of course, serve the exact function of Treasury securities as they would have to be held by the Federal Reserve until the securities matured and could not be sold by the Federal Reserve to drain reserves from the system.
5. Because the Federal Reserve returns most of the interest it receives to the Treasury, the federal government is in effect printing money without the restraint of an interest burden that might discourage borrowing or encourage repayment of debt. Moreover, this money is likely to pay for such ephemeral intangibles as interest, welfare, and subsidies. But the money hardly has an ephemeral presence; judging by the record, the debt that created this money is highly unlikely to be repaid. The debt bought by the FBIM would represent real wealth, such tangible assets as restored school buildings and new airports. Moreover, this debt would be repaid as the buildings, airports, and other assets depreciated.

References

- Aschauer, David Alan. 1989. "Is Public Expenditure Productive?" *Journal of Monetary Economics* 23, no. 2 (March): 177-200.
- . 1993. "Public Capital and Economic Growth." In *Public Infrastructure Investment: A Bridge to Productivity Growth?* Public Policy Brief no. 4. Annandale-on-Hudson, N.Y.: The Jerome Levy Economics Institute.
- . 1997a. "Do States Optimize? Public Capital and Economic Growth." Working Paper no. 189, The Jerome Levy Economics Institute, Annandale-on-Hudson, N.Y.
- . 1997b. "Output and Employment Effects of Public Capital." Working Paper no. 190, The Jerome Levy Economics Institute, Annandale-on-Hudson, N.Y.
- . 1997c. "Dynamic Output and Employment Effects of Public Capital." Working Paper no. 191, The Jerome Levy Economics Institute, Annandale-on-Hudson, N.Y.
- Bond Investors Association. 1997. *1997 Bond Buyer Yearbook*. New York: Bond Investors Association.
- Bureau of Economic Analysis. 1997. *Survey of Current Business*, September.
- Competitiveness Policy Council. 1993. *A Competitiveness Strategy for America*. Washington, D.C.: Competitiveness Policy Council.
- Environmental Working Group and Surface Transportation Policy Project. 1997. *Potholes and Politics: How Congress Can Fix Your Roads*. Washington, D.C.: Environmental Working Group/The Tides Center.
- Erenburg, Sharon J. 1993. "The Real Effects of Public Investment on Private Investment: A Rational Expectations Model." *Applied Economics* 25, no. 6: 831-837.
- . 1994. *Linking Public Capital to Economic Performance*. Public Policy Brief no. 14. Annandale-on-Hudson, N.Y.: The Jerome Levy Economics Institute.
- Fazzari, Steven M. 1993. *The Investment-Finance Link*. Public Policy Brief no. 9. Annandale-on-Hudson, N.Y.: The Jerome Levy Economics Institute.
- Federal Reserve Board. 1997. "Factors Affecting Reserve Balances." H.4.1 Release, Worksheet for H.4.1(a), December 26.
- General Accounting Office. 1995. *School Facilities: Condition of America's Schools*. GAO/HEHS-95-61. Washington, D.C.: General Accounting Office.
- Levy, David A. 1993. "Prepared Statement for a Hearing of the Subcommittee on Economic Development of the Committee on Public Works and Transportation, U.S. House of Representatives." The Jerome Levy Economics Institute, Annandale-on-Hudson, N.Y.
- Levy, S Jay. 1996. *Debt, Money, Equity, and Growth*. Brainstorming no. 1. Annandale-on-Hudson, N.Y.: The Jerome Levy Economics Institute.
- Levy, S Jay, and David A. Levy. 1992. "How to Restore Long-Term Prosperity in the United States and Overcome the Contained Depression of the 1990s." Special Report, The Jerome Levy Economics Institute, Annandale-on-Hudson, N.Y.

- Munnell, Alicia H. 1990. "Is There a Shortfall in Public Capital Investment?" In *Proceedings of a Conference Held at Hartwich Port, Massachusetts*. Conference Series no. 34. Boston: The Federal Reserve Bank of Boston.
- Regan, Edward V. 1994. *Infrastructure Investment for Tomorrow*. Public Policy Brief no. 16. Annandale-on-Hudson, N.Y.: The Jerome Levy Economics Institute.
- Samuelson, Paul A. 1976. *Economics*. New York: McGraw-Hill.

About the Authors

S Jay Levy is chairman of the Board of Governors of The Jerome Levy Economics Institute and an economic analyst and forecaster. In 1949 he and his father, Jerome Levy, founded *Industry Forecast* (now *The Levy Institute Forecast*), the monthly analysis of the state of the U.S. economy still published by the Levy Institute's Forecasting Center, and he remains actively involved in the Forecasting Center's programs. Levy has been a consultant to many corporations and financial institutions and has testified before various congressional committees. He is the author of *The Economics of Aging* (Public Policy Brief No. 18); with David A. Levy, *Profits and the Future of American Society* (HarperCollins, 1983); and many articles, monographs, and book reviews.

Walter M. Cadette is a senior fellow at The Jerome Levy Economics Institute. His areas of special interest include health care, international trade, Social Security, and regulation of financial institutions. In addition to his work at the Levy Institute, he is chairman of the Holy Cross Health System's investment review committee. Cadette is a retired vice president and senior economist of J.P. Morgan & Co. Incorporated and was editor of and contributor to its publications *Global Data Watch* and *World Financial Markets*. He is author of *Prescription for Health Care Policy* (Public Policy Brief No. 30) and *Safeguarding Social Security* (Public Policy Brief No. 34). Cadette received an M.A. from Georgetown University and did further graduate work in economics and finance at New York University.