

Challenges in an Aging Society: Presidential Address to APPAM¹

Katherine Swartz

We are at a critical juncture in American public policy—as you are well aware. We are facing the largest debt in our history along with a severe recession and the highest unemployment rate since 1983. At the same time, we are grappling with pressing social policy and national security issues that are extremely difficult to resolve—they require more money and touch upon entrenched differences of opinion about the role of government.

The types of research we all do has made the current debates far more informed than they were 50 years ago. We have the ability to estimate likely effects of various proposed policy changes, and our empirical findings are critical components of behavioral assumptions in models we use to predict likely programmatic effects. Although we can (and should) congratulate ourselves and this association for vastly improving public debates about policy proposals, it's time to move to another level in how we view issues. The policy problems we are confronting today are interconnected more than ever—energy policies intersect with environmental and transportation issues, environmental pollutants impact our health care spending, and educational attainment affects our economic competitiveness and national security—to name just a few of the intersections. Their interrelations deserve far more emphasis in the public discourse about the problems confronting the country. They have everything to do with how we analyze options for addressing the policy choices before us.

I want to make two arguments in this talk/paper.

1. The country has to increase its investments in productivity-enhancing activities. Investments in our infrastructure—human and physical—are necessary for future productivity and prosperity. Within the next 20 years, the ratio of working age adults to people over age 65 is going to drop from just

¹ It has been an honor and a privilege to be the president of APPAM this past year, and a distinct pleasure of the job is getting to know many members more than I had before I became president. I also am indebted to many members of this association for stimulating my thinking since college days and to those of you who wrote many of the papers that I found helpful when preparing this talk. I especially want to thank the following for their comments and suggestions on earlier drafts of the paper and to excuse them from any blame for errors that remain: Henry Aaron, James Hammitt, James Hester, Frank Levy, Richard Murnane, Joseph Newhouse, Theda Skocpol, and Martin Wachs. I also want to acknowledge Dan and Joanna Rose, who generously sent Frank and me to China, and thereby focused my thinking about the urgency for productivity enhancing infrastructure in the US.

I also want to note that in many ways what I am talking about in this address is directed at Americans. I am glad the fall research conference has become a forum for more comparative sessions with exchanges of information about what seems to work in dealing with common problems. But here, I am focusing on the United States.

under 5 to just under 3. If we don't invest in our productive capacity, our standard of living will fall. In addition, we are facing stiff competition from abroad in developing new technologies—we cannot count on maintaining our current economic leadership position.

2. The funds for these investments have to come from a combination of public and private sector monies. Taxes need to be raised and government incentives for private firms to engage in investments have to be part of the mix. Slowing health care spending—a frequently invoked “solution” for saving money to be used elsewhere—is not going to happen any time soon, and it is not the panacea some would have us believe.

I will end on a third point, related directly to the role or mission of public policy schools and programs.

PRECEDENTS FOR GOVERNMENT-LED INVESTMENTS TO INCREASE PRODUCTIVITY

Before turning to the types of investments needed now to increase productivity, it is useful to consider a few of the investments that were led by government over the past 200 years. These investments were funded by a mix of public and private monies and driven by community recognition that they would not happen without federal, state, or local government leadership. In an era when raising taxes is often viewed as out of the question, it is worth remembering that the emergence of the U.S. as the world economic leader in the 20th century was due in no small part to public investments in education and infrastructure that occurred between the mid-1800s and now.

Education

As Claudia Goldin and Lawrence Katz showed in their 2008 book, the rapid increase in years of school attainment in the U.S. between the beginning and the end of the 20th century was extraordinary—and was matched by an average annual productivity growth rate of almost 2.5 percent between 1905 and 2005 (Goldin & Katz, 2008, Table 3). As economist Jim Rebitzer pointed out, if output per hour were normalized to 1 in 1915, this growth rate implies that output per hour would be 9 in 2009—and if we removed the direct effect of education from this growth rate, the 2009 figure would be 6.6 instead of 9. This decomposition calculation implies that over the course of 90 years, the increase in educational attainment made us 36 percent richer.²

The precedents for government and community spending on public education go back to the early 1800s. In Goldin and Katz's review of the history of educational expansion in the U.S., two features stand out (Goldin & Katz, 2008). First, there was a strong belief early on in our history that educational opportunities would be available to all—that it would be public education. Second, the desire for education and community support for education was strong even during the years of westward expansion and settlement in the Midwest and Western states. This community support is particularly evident in the “high school movement” from 1910 to 1940, when much of the rapid increase in American educational attainment in the 20th century occurred. In 1910, only one in five 15- to 18-year-olds were enrolled in public or private high schools; by 1940, almost three-fourths of this age group were in high school, and half of all young adults were high school graduates (Goldin & Katz, 2008).

² Private communication, October 2009.

For native-born cohorts of people who were 24 years old sometime between 1900 and 1975, the increase in educational attainment was an amazing 6.2 years—almost a year per decade (Goldin & Katz, 2008). Then the growth in educational attainment abruptly slowed. It hardly grew at all for cohorts born between 1951 and 1965, and only slowly rose for cohorts born between 1965 and 1975. The average educational attainment of a child born in 1975 was only half a year more than that of someone born in 1951. What is striking about the educational slowdown in the U.S. in the roughly 5-year span from 1975 to 1980 is that high school completion rates of adults aged 25 to 29 suddenly stopped increasing (National Center for Education Statistics, 2009b, Table 8).

Physical Infrastructure to Move People and Goods

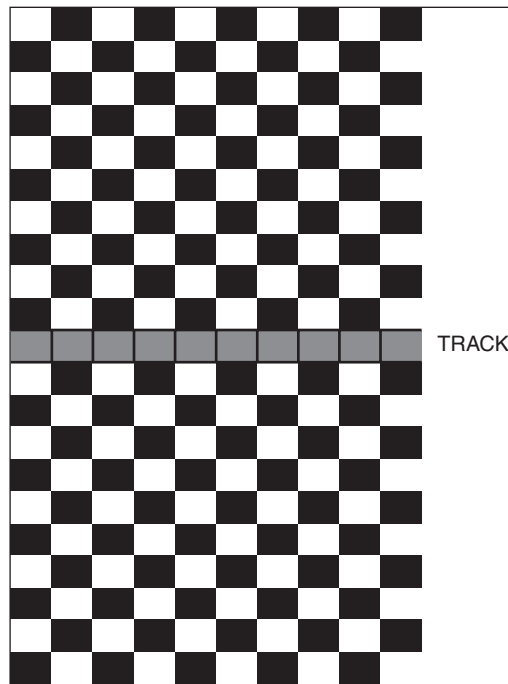
Four earlier government-led investments in physical infrastructure stand out:

The *Erie Canal* in New York State had been a dream of a number of people since at least the late 1700s as a route to the Great Lakes and potential future commerce if the country expanded westward. In 1817, after a number of attempts to build the canal had failed, Governor DeWitt Clinton convinced the New York legislature to authorize \$7 million for the construction costs of the canal. The canal opened in 1825—and within 11 years, it recouped the entire cost of the construction from tolls charged to shippers, and the state paid off the bonds early (Bernstein, 2005). The canal was envisioned as being a route to the west and providing a way for producers of goods on the East Coast to sell to people on the frontier. But by 1847—just 22 years after the canal opened—the tonnage of goods bound for the East Coast exceeded that going west. The Erie Canal allowed the U.S. to export grain to Europe, which was reeling from bad harvests and social unrest.³ The idea that the U.S. might become a major exporter of grain was something no one imagined 30 years earlier, but the canal made it possible for the U.S. to take advantage of changes elsewhere in the world.⁴

In contrast to the lack of federal financing or participation in the building of the Erie Canal, the history of building the *transcontinental railroad* is one of strong federal involvement. The federal government chartered two private companies that were given strong incentives to achieve a goal that could be done only with government funding and orchestration. Remarkably, the building of the railroad started with the Pacific Railroad Act of 1862—in the midst of the Civil War, when the Union had no money to give out. Instead, it gave first 10 and then 20 square miles of land grants in checkerboard fashion on either side of the track to the companies for each mile of track completed (see Figure 1). This land turned out to be quite valuable because in many places there were natural resources under the surface: precious minerals, coal, natural gas, and oil. The federal government also issued bonds that were essentially low-interest loans to the railroad companies: \$16,000 for each mile of track laid on flat land, \$32,000 for every mile of track laid in foothills, and \$48,000 for each mile of track laid in mountains. Not much happened between 1862 and 1864, but by the spring of 1869—within just five years—the transcontinental railroad was completed (Ambrose, 2000). What is remarkable is the change the railroad brought to the country. Just two decades before the transcontinental railroad was a reality, people had been walking and riding in covered wagons to get to California and the West Coast. The railroad changed all that—and made it possible

³ The repeal of the Corn Laws in England did not occur until 1846; in the decades before the repeal, there was great social unrest because of food shortages.

⁴ Although the canal ultimately lost out to railroads in carrying passengers because they were faster, the canal could transport cargo more cheaply than the railroads. The major expansion of the canal (and renaming as the Barge Canal) in the early 1900s was due to its continuing role in providing cheap freight transport.



Note: Each black square represents a square mile of land given to the railroad company.

Figure 1. Illustration of federal land allocations to railroad companies for each mile of track completed for the transcontinental railroad (10 square miles of land on both sides of track—5 on each side—for each mile of track laid).

for goods to be shipped from the east to the west (and vice versa) in weeks rather than the months it took to travel around the tip of South America.

Similarly, President Eisenhower finally was able to do what people had dreamed of since at least the 1920s—obtain sufficient funds to begin building an *interstate highway system*. It helped that Eisenhower, as a young lieutenant colonel in 1919, had accompanied the first transcontinental military motor convoy from Washington, D.C., to San Francisco (Siasoco, 2009).⁵ It took the convoy two months to make the trip, much of it on dirt roads and bridges that were not intended for such traffic. The Federal-Aid Highway Act of 1954 authorized \$175 million for the construction of an interstate highway system, but within two years it was clear to Eisenhower that more money was needed to construct what he had in mind. The subsequent Federal-Aid Highway Act of 1956 contained a budget of \$25 billion, with the federal government responsible for 90 percent of the costs and states the remaining 10 percent.

Without President Eisenhower's vision, it is doubtful we would have built the interstate system. The building of the interstate highways may have caused the country not to build more urban mass transit systems and a high-speed railroad system linking many urban areas, but there is no question that the interstate highway system connected previously remote areas of the country. It enabled raw materials and finished goods to move quickly around the country—contributing to

⁵ The recently reopened Smithsonian Museum of American History has a 4-minute movie with original clips of the Army convoy's trip and spectacular difficulties.

the growth in productivity in the 1960s and later (Federal Highway Administration, 2004). The interstate highway system changed the country in much the same way the transcontinental railroad did 100 years earlier.

More recently, the federal government's investment in basic information technology that led to the development of the Internet paid off in big ways. The growth in labor productivity between 1995 and 2003 to 2004 (which was almost two times the rate between 1974 and 1990) is now widely viewed as having been driven by information technology. In particular, producers of computer hardware and software were able to achieve very large efficiency gains—making them both more powerful and cheaper—and it appears that workers started to understand how to make more use of computers starting in the last half of the 1990s (Oliner & Sichel, 2000).⁶

This history tour tells us that investments in physical infrastructure generally occurred because leaders had a vision of the importance of being able to move people, goods, and services around the country easily and quickly. Investments in education occurred in part because community leaders viewed education as increasing job opportunities.⁷

TYPES OF INVESTMENTS NEEDED NOW

The lessons from the last 150 years strongly suggest that periods of higher rates of productivity growth have been enabled by investments in education and physical infrastructure. Today, we are again at a crossroads where the decisions to be made about investments in the country's future are critically important.

Three areas where I believe the country needs to invest much more in order to improve productivity in the next few decades are education, developing alternative energy sources, and improving existing or building new physical infrastructure. The U.S. currently spends just over \$1 trillion (about 7.4 percent of GDP) on education. Three-quarters of this spending is by state and local governments, and the other quarter is split almost evenly between federal funds and private sector sources (National Center for Education Statistics, 2009b). Total spending on infrastructure in 2004 was a little over \$400 billion in 2004 dollars (Congressional Budget Office, 2008).⁸ About \$60 billion of this (15 percent) was spent by the federal government. The rest was almost evenly split between private sector sources and state and local governments (\$175 billion and \$170 billion, respectively). Federal spending on infrastructure is dominated by spending on transportation—nearly three-quarters of the \$60 billion—and half went to highway construction alone. Schools, highways, and water systems accounted for 80 percent of the \$170 billion of state and local government spending, and energy and telecommunications investments accounted for 80 percent of the \$175 billion of private sector spending.

Education

Comparisons with European nations show that although they were far behind the U.S. in educational attainment until roughly 1975, since then they have equaled or exceeded U.S. rates among people who were 25 to 39 years old by the beginning of

⁶ It is noteworthy that the recent economic stimulus bill included \$400 million to start up and fund the Advanced Research Projects Agency–Energy (ARPA-E), which is a second generation of the ARPA in the Department of Defense that funded the basic research in information technology.

⁷ Theda Skocpol pointed out to me that education also was viewed by many as a way to promote a more inclusive democracy, not a small objective with waves of immigrants expanding the population.

⁸ The May 2008 report by the Congressional Budget Office states that 2004 is the most recent year available with comprehensive data on spending on infrastructure from government and private sector sources.

this century. Clearly, the slowdown in educational attainment here after 1975 was not being experienced in most of Europe during the last decades of the 20th century. Similarly, educational attainment in China, Japan, India, Korea, and other Asian nations has expanded rapidly in the last several decades.

What is distressing about the relative decline in educational attainment in the U.S. over the last three decades is that it occurred during a period when there was an increase in real spending per student (National Center for Educational Statistics, 2009a). Real current expenditures per student increased 44 percent between 1986 and 2006, when the number of children in public schools grew by 25 percent.⁹ However, most of this growth in spending per student did not go to spending on buildings, teacher salaries, or curricula. Many school buildings have deteriorated. Estimates of investments needed to modernize school buildings (or bring them to a “good state of repair”) range from one-time investments of \$142 billion to \$360 billion beyond current spending (Congressional Budget Office, 2008). The average salary for public school teachers in 2006–2007 was \$50,816, about 3 percent more in real terms than it was a decade earlier (National Center for Education Statistics, 2009b). Over the last two decades, public school teachers’ salaries have risen at the rate of inflation.

The link between educational attainment and productivity growth is not fully understood—but as Goldin and Katz (2008) put it, “As technological change races forward, demands for skills—some new and some old—are altered.”¹⁰ And most important, at least during the last 100 years, new technologies rewarded people with general skills—math, science, and the ability to read and write well—skills that enable a person to adapt to changing technologies. More recently, highly analytic skills have been in demand—skills that enable people to think imaginatively about how cells talk to one another (immunology), how to store more information in smaller spaces (computer chip design), and so forth.

There are numerous examples of efforts over the past 100 years to alter how we teach elementary and secondary school students to think about problems. One has only to go back to changes in math and science textbooks spurred by the launching of the *Sputnik* satellite—many of you probably learned biology, chemistry, physics, and math in what was then a newer approach of hands-on experiments, where among other things we had to figure out why some experiments didn’t work.¹¹ (Perhaps that is why so many of us are attracted to evaluation research.) School districts today, whether because of efforts to save money on lab supplies and equipment or worries about students hurting themselves, all too often do not let students work out problems or do lab experiments by themselves.

For those of you lucky enough to hear Dick Murnane’s Spencer Foundation Award lecture, he provided a tour de force discussion of the difficulties in finding what works to improve educational competencies, especially for disadvantaged children (Murnane, 2009). Murnane and others in this association have far more knowledge than I do about the efforts to improve the quality of teachers in elementary and secondary schools. But the economic returns to education over the last century and the widening inequality of incomes in the past three decades strongly suggest that we need to improve the quality of teachers and the learning environment in which our children spend so much of their day. Not only will such investments

⁹ Current expenditures are distinct from money spent on capital projects, interest payments on debt, and other educational programs which are not part of elementary and secondary education. State administration expenditures also are excluded from current expenditures. In the 2005–2006 school year, current expenditures per pupil in public elementary and secondary schools were \$9,391 (in 2006–2007 dollars) (National Center for Educational Statistics, 2009a).

¹⁰ Goldin and Katz (2008, p. 352).

¹¹ See, for example, the Web site of the American Association of Physics Teachers with the keyword “PSSC” for histories of how physics teaching changed in the 1950s.

improve productivity, but they also will improve intergenerational economic mobility (Haskins & Sawhill, 2009; Murnane, 2009).

Developing Alternative Energy Sources

Developing renewable energy sources that do not emit greenhouse gases is essential for expanding our productive capacity and bringing the U.S. to the forefront of creating technologies that do not depend on fossil fuels. If the U.S. wants to be free of threats from oil-producing countries, we have to develop such alternatives quickly. Significantly, the U.S., China, and India are the three top producers of coal and users of coal-produced electricity—and these other two countries also are on a quest to create technologies for alternative energy sources that the rest of the world will want to buy. We want to be sure that we also are inventing new technologies that will yield jobs. In addition, unless we are able to develop alternative energy sources, we are bequeathing an environmentally altered world to our grandchildren.

The American Recovery and Reinvestment Act of 2009 (the economic stimulus bill) includes \$3 billion for research and development at the Department of Energy (two-thirds of which is for renewable energy research), and President Obama proposed adding another \$15 billion annually for renewable energy research. These are significant increases in funding—in 2008, the Department of Energy's Office of Energy Efficiency and Renewable Energy had a budget of just \$1.7 billion. In addition, the administration's budgets include larger amounts of federal funding of renewable energy development via tax credits and grants for companies and people to shift to renewable energy sources. Although these incentives are revenue losses, they signal the importance of private-public ventures in developing the most efficient alternatives to fossil fuels and technologies to use such alternatives. That said, there are concerns with the implementation of the stimulus bill. It appears to favor building of wind farms and placing solar panels on buildings rather than stimulating research on how to build more efficient windmill turbines and solar collectors (Talbot, 2009).

The real costs of relying on fossil fuels also are increasing because of what they are doing to the environment and human health. To really increase incentives to develop alternative energy sources, these externality costs need to be reflected in the prices of the fossil fuels. Half of the electricity generated in the U.S. today comes from coal-burning power plants, which are responsible for 60 percent of sulfur dioxide emissions, 30 percent of carbon dioxide emissions, and a third of the mercury emissions in the U.S. (Glick, 2001; Revkin, 2009). By comparison, renewable energy sources accounted for not quite 10 percent of all electricity generated in April 2009—more than two-thirds of which was from hydroelectric and only a third was from wind, biomass, geothermal, and solar sources combined (Talbot, 2009; National Research Council, 2009).¹²

The pollution currently emitted by our power plants, especially the coal-fired power plants, has implications for our health care spending. Just this past October, the National Research Council (NRC) of the National Academy of Sciences (2009) released a report estimating the health costs due to emissions from electricity-generating power plants and motor vehicles (excluding trains, ships, and airplanes). The report focused primarily on air pollution. It did not include an estimate of the health effects of pollution of rivers, lakes, and groundwater from toxic chemicals and heavy metals that are captured in power plant scrubbers installed to reduce air pollution and then released into water near the plants (Duhigg, 2009). The NRC

¹² The U.S. also has aging nuclear power plants (supplying 19 percent of our electricity)—and many experts believe we need to reverse the deterioration in nuclear manufacturing skills and technology (Bullis, 2009b).

estimated that the emissions from fossil fuels used in power plants alone cost the country \$120 billion a year in premature mortality and morbidity (for example, asthma and chronic bronchitis).¹³ And this is no doubt just a slice of the health impacts of toxic pollutants.

The health consequences of toxic chemical emissions all point to the need to develop alternative energy sources that are clean. It is also clear that market-based environmental policies (such as cap and trade programs) designed to reduce hazardous emissions should be expanded to target some of these other toxic waste pollutants. Moreover, the NRC report's findings that the health costs of coal-fired power plants' pollution were concentrated in some areas of the country suggests there are distributional consequences that need to be incorporated in market-based environmental policies intended to reduce pollution. In addition to reducing aggregate pollution across the U.S., we want to provide incentives that will encourage the generators of toxic pollutants closest to large shares of the population to switch to clean energy sources early.

Improving Existing—and Building New—Physical Infrastructure

Increasing our infrastructure—both maintaining what we have in place and constructing new infrastructure—has to be a high priority so we can move people and goods rapidly and efficiently in the future. Between 1956 and 2004, public spending on infrastructure capital (adjusted for inflation) grew by an annual rate of just 1.7 percent (Congressional Budget Office, 2008). The pace picked up after 1987, and through 2004 real public spending grew at an annual rate of 2.1 percent. In the earlier period, almost all of the investments were in the interstate highway system, and the latter period includes funds under the Intermodal Surface Transportation Efficiency Act (ISTEA) and subsequent acts that added public transit to the eligible uses of federal funds (Congressional Budget Office, 2008). As a share of GDP, federal investments in infrastructure have remained relatively constant, however. A major factor in our ability to prosper in the past was our ability to take advantage of changing demands for goods and services and to quickly supply those demands. Two areas of infrastructure that require government leadership stand out—they will not happen quickly without a concerted effort led by government.

(1) *High-voltage energy transmission lines*—the electric power grid—are currently inadequate to bring the wind and solar power that could potentially be generated in many of our rural areas to the urban centers where demand for electric power is high. The reasons for the inadequacy of the transmission lines are nuanced, not surprisingly. But one effect of the deregulation of electric energy in the 1990s is that local utilities no longer have much incentive to invest in the grid, and neither the states nor the federal government have taken responsibility for maintaining and upgrading the transmission infrastructure. The bottom line is that inadequate infrastructure to transmit high voltage electricity is stalling investment plans in solar and wind farms. Private sector investment in new technologies that can harness the variability inherent in renewable energy sources will follow if we can guarantee the transmission of the power.

The current high-voltage transmission network in the U.S. consists of about 164,000 miles of transmission lines, and half of that is more than 40 years old (Talbot, 2009; Bullis, 2009a). Researchers at the National Energy Research Laboratory (in Golden, Colorado) estimate that if the U.S. wants to get 20 percent of its

¹³ Of particular note in the report, coal burning was the single greatest source of such costs. However, only a small number of the 406 coal-fired power plants the study examined, which generate 95 percent of all electricity from coal-fired plants, were responsible for the majority of costs due to pollution from coal-fired power plants, and they were generally the oldest and used coal that was high in sulfur. The plants with large damages were located primarily in the Ohio River Valley, Mid-Atlantic, and the South.

electricity from wind farms by 2030, we need to build 12,650 miles of new transmission lines (at an estimated cost of \$60 billion) to bring wind farms onto the grid (Talbot, 2009).

In addition to being inadequate in scope, the current high-voltage transmission network is “dumb.” Upgrading the transmission network would reduce the amount of excess capacity that grid operators need and make it possible to connect smaller wind and solar farms (and other renewable energy sources) to the transmission grid. Smart-grid technologies use meters to monitor electricity use in homes, office buildings, and industrial facilities so electricity use can be curtailed quickly when demand peaks. This has immediate implications for how many new power plants need to be built in the next several decades. One estimate suggests that if just a quarter million home appliances, such as clothes dryers, were outfitted with meters that respond to signals from utilities to turn off when there is peak demand for electricity, it would reduce the need for one coal-burning power plant (Bullis, 2009a). Another estimate, by the Brattle Group, is that overall electricity consumption could be reduced by 6 percent with the installation of smart-grid technologies, and peak demand would drop by as much as 27 percent (Talbot, 2009).

Many utilities have already started to install the meters and other technologies needed to modernize the electric transmission grid and make the electricity infrastructure more efficient. The economic stimulus bill contains \$4.5 billion to improve the electric grid with new technologies that will enable the grid to respond to variations in the supply of energy from variable sources such as wind and solar (including storing power) and variations in demand for electricity. A century ago, when electrification was first spreading across the U.S., there was an enormous uptick in technological innovations designed to increase the efficiency in how electricity was moved from generating plants to industries and homes, and in machinery and appliances that could use the electricity. The stimulus funding is intended to promote a similar uptick in efficiency and productivity. It is noteworthy that Italy’s largest utility started installing smart meters in most homes earlier in this decade, and Sweden recently made it mandatory for all customers to have smart meters (Economist, 2009).

(2) *Transportation initiatives* that are part of an overall blueprint for national transportation priorities for the next 50 years need much greater public funding. Improving the efficiency of moving people within urban areas and between urban areas that are within 400 miles of one another would significantly improve currently congested transit corridors (roads and air corridors) and reduce greenhouse gas emissions. Oil use for transportation accounts for about a third of overall energy-related greenhouse gas emissions in the U.S., and the transportation sector is the second largest source of greenhouse gas emissions after electricity production (Bipartisan Policy Center, 2009). As several recent reports strongly suggest, the U.S. does not have a coherent plan for investing in transportation infrastructure for the future, and energy and environmental issues are not well integrated with transportation investments (Puentes, 2008; Bipartisan Policy Center, 2009).

A coherent plan for our transportation investments ought to take account of at least three issues. First, the efficiency of our existing transportation system could be greatly enhanced by technological developments so that simply building more highways would not be the “answer” to reducing congestion. Such new technologies include “smart” cars that would allow people to join their cars together in pods or mini-groups of cars—on-board computers would maintain safe but very short distances between the vehicles so that more cars could be on the current roadways and yet travel at speeds we would consider unsafe today. Such technology is now being used in several major urban transit systems to enable more trains to travel through the system than had originally been thought optimal.

Second, within the next two decades, one-fifth of the population will be 65 years of age and older. Alternative transportation options to replace individual car driving

will be in high demand. European cities are well ahead of us in responding to the aging of their populations and the rising real costs of fuel—over the last two decades, many medium-size cities (such as Edinburgh and Lyon) have been building light-rail lines with rail cars that do not require climbing stairs to enter. Developing transportation systems that make it easier for older people to stop driving also could contribute to restructuring town and urban centers, so people could age in place in the communities where they've lived most of their lives. This is another example of where the interconnections between policy issues (housing for the elderly and increasing transportation efficiency) can alter and improve analyses of policy options.

Third, the efficiency of our transportation system could be improved and greenhouse gas pollution could be reduced if we had a more coherent transportation plan for connecting urban areas within 400 to 500 miles of each other. A recent study by researchers at the Brookings Institution makes the point that 30 percent of all air passengers in the year between April 2008 and March 2009 traveled no more than 500 miles (Tomer & Puentes, 2009).¹⁴ Because half of all airplane departures are for flights of less than 500 miles, it is not surprising that the biggest travel delays are connected to the airports serving at least six metropolitan areas: New York, Chicago, Philadelphia, Miami, Atlanta, and San Francisco.¹⁵ Moreover, the number of flights handled by the U.S. air traffic control system each day is expected to increase from 50,000 in 2008 to 80,000 by 2025 (Gugliotta, 2009). But the Next Generation Air Transportation System (NextGen), which is intended to replace the Federal Aviation Administration's current air traffic control system, is not likely to be operational before 2017 (Tomer & Puentes, 2009). An obvious way to relieve congestion in the skies is to move the short-haul passenger traffic to the ground via high-speed rail systems such as those that connect the large- and medium-sized cities in Europe and Japan. Equally important, high-speed rail service has a smaller pollution-emission footprint than short-haul flights. Most of the carbon emissions from air traffic occur at takeoff and landing, so reducing the number of short-haul flights also would mesh with environmental goals.

The point here is that transportation planning and analyses of options for transportation infrastructure investments should interact with environmental and energy issues as well as social issues such as the aging of the population. Accounting for the real costs of alternative energy sources and changes in urban growth in response to demographic shifts will increase the efficiency of the transportation system.

In sum, I am arguing that investments in education, alternative energy sources, and the physical infrastructure for energy transmission and transportation should be expanded—but wisely. The investments should be done with a coherent vision of how they will contribute to productivity growth and to interconnected policy goals such as reducing pollution and the changing needs of an aging population.

PAYING FOR SUCH INVESTMENTS

How do we finance these types of investments? The projects I am describing will require both public and private participation in financing. I am confident that the private sector will invest in opportunities that it views as profitable. But I am less

¹⁴ The metropolitan areas surrounding New York and Los Angeles are involved in the 10 busiest air traffic corridors, most of which are distances of less than 500 miles (for example, Los Angeles–San Francisco, Los Angeles–Phoenix, and New York–Washington, D.C.).

¹⁵ Extreme weather in these cities is not the cause of delays in arrivals or departures—the major cause of their delays is the aging of the national aviation system (NAS). Nationally, the NAS accounts for 46 percent of the delays in the 10 largest metropolitan areas (Tomer & Puentes, 2009).

confident that the general public and our public policymakers will believe that we can afford the complementary public investments that are needed to pursue these projects. Many of you know far more than I about finance, but I see three general alternatives for the public financing of these types of investments: slowing the growth in health care spending, public-private funding with government incentives for greater private investments, and higher taxes and bond issues. I will discuss slowing the growth in health care spending at length because I know more about it and I do not see it as the magic wand so many others do.

Slowing the Growth in Health Care Spending

Slowing the spending on health care appears at first glance to be a strong contender for finding money to pay for the investments I've described. The rationale goes something like this: In 2007, the most recent year for which we have data, total health expenditures in the U.S. were \$2.2 trillion—almost \$7,500 for every person in the U.S. (Hartman et al., 2009). Health care spending also accounted for 16.2 percent of our gross domestic product (GDP). The rate of growth in health care spending has outpaced that of the GDP by 2.3 to 2.5 percentage points for the last several decades—and there is every indication this will continue unless something dramatic changes.

Spending for health care also accounts for increasing shares of our government budgets and our personal budgets. Medicare and Medicaid now account for 20 percent of the federal budget. For states, Medicaid accounts on average for 22 percent of budgets—just ahead of education spending. The Congressional Budget Office forecast last June that federal spending on Medicare and Medicaid combined (now roughly 5 percent of GDP) will equal almost 10 percent by 2035 (Congressional Budget Office, 2009). All of these points increasingly are being used by some to argue for capping the growth in Medicare and Medicaid spending.

Capping health care spending is the wrong answer. The *entitlement* of elderly people and poor people to medical services is not the cause of rising health care spending. The problem is that the rate at which health care spending is increasing is faster than the rate at which the economy is growing.¹⁶ In particular, the problem is that the health care system does not contain incentives for efficient delivery and use of health care. Getting such incentives in place will take time—at least a decade, and likely longer. Such incentives require investments in intermediate steps. One such step is the creation of an on-going body of analyses of what are cost-effective modalities of treatment for people who have particular symptoms or diseases. The paper published yesterday¹⁷ in the *New England Journal of Medicine* with findings that the old-style way of doing cardiac bypass surgery has better survival rates than a newer surgical method is the type of effectiveness analysis that is needed (Shroyer et al., 2009). Within the world of medicine, there are thousands of randomized controlled trials of pharmaceuticals—but trials for procedures have been rare, particularly when people become convinced that it would be unethical to treat someone in the “old” way (Gerber & Patashnik, 2006).

Another step to creating incentives for health care providers to be more efficient involves reorganizing how physicians, hospitals, and other health care providers work with each other. Accountable care organizations have been proposed as one such reorganization; these larger, multi-provider organizations could be paid on a capitated (per person) basis (Welch, 1989; Fisher et al., 2006, 2009). But reorganizing physicians and other providers takes a long time, as Lee and Mongan (2009) pointed out in a recent book detailing their experiences with

¹⁶ Henry Aaron has made the same point (2009a, 2009b).

¹⁷ November 5, 2009

attempts to reorganize physicians in one of the country's premier hospital-physician networks.

Creating incentives for efficient production of health care services also could involve increasing cost sharing required of people when they seek medical care or limiting the services that are covered by health insurance to those services that provide benefits at least close to the cost of producing them. But these options are unlikely to have much impact on health care spending. Half of the population has annual health care expenditures of less than \$500—and this half accounts for only 3 percent of all health care spending. At the other end of the distribution, people in the top decile account for 70 percent of all spending, and people in the very top 1 percent account for 30 percent of all spending (Berk & Monheit, 2001; Monheit, 2003). Consumer cost-sharing requirements are not likely to affect their health care choices. Limiting or restricting health care services to those with low benefits but high costs takes us back to the need for more analyses of the effectiveness of various procedures and diagnostic tests—which, as I said, will take time.

Reducing payments to health care providers is also dubious. Reducing payments to health care providers is frequently suggested as a way of slowing health care spending growth. Although such a move would have an immediate impact on the level of health care spending, it would not affect the underlying growth rate of spending. The recent history of attempts to rein in spending on Medicare is indicative of both how difficult it is to reduce payments to providers and why health care spending continues to grow at a relatively high rate. Medicare has significant market power—in 2007, it paid 19 percent of total health care spending (Hartman et al., 2009). (Although private health insurance paid just over a third of total health care spending, private insurance is really an aggregation of several thousand insurers, no one of which has the market power to affect total hospital spending.) Hospital care has long been the target of efforts to slow health care spending because for decades it has accounted for the largest share of spending. Only 30 years ago, in 1980, hospital care accounted for 40 percent of the just over \$250 billion we spent on health care (Hartman et al., 2009).

Twenty-five years ago, in an attempt to reduce spending on hospital care (which was primarily for in-patient or overnight care), Medicare implemented a prospective payment system (PPS) for hospital reimbursement for beneficiaries. In a nutshell, the PPS created reimbursements for around 500 diagnosis-related groups (DRGs) and, with a few adjustments for geographic location of the hospital and other hospital characteristics, paid an average amount for taking care of a Medicare beneficiary with a diagnosis in a DRG. This created strong incentives for hospitals to move people out of the hospital sooner. What few policy analysts or policymakers appreciated in the early 1980s was that a number of advances and innovations in medicine were about to come on the scene. Examples of these innovations include magnetic resonance imaging (MRI) machines, introduced in 1983, and laparoscopic clip applicators with 20 automatically advancing clips, which made laparoscopic surgery easier for surgeons and were introduced in 1990. These changes, together with the incentives in PPS to reduce hospital lengths of stay, led to more surgeries and procedures being done on an outpatient basis, reducing the share of spending going to hospital care. By 1998, spending on hospital care had fallen to 33 percent of total health expenditures, and in 2007 it was 31 percent—still the largest share of total spending but far lower than in 1980 (Levit et al., 2000).

However, as the costs of doing many procedures and surgeries declined, including especially the costs of recovery time because they can be done with laparoscopes or endoscopes, an unexpected—but totally predictable—outcome occurred. More people wanted to have the procedures—for example, cataract surgery or hip and knee replacements. Insurance plans have covered these newer types of surgeries and procedures because they are less costly and because they became the standard “norm” of treatment. The increase in volume of procedures and surgeries

in response to a decline in price is a benefit to many people—they have had an increase in the quality of their lives as a result. But this outcome also raises a cautionary flag because it increased overall health care spending, and the rate of spending increases did not markedly slow.

What is clear from the attempts to reduce Medicare payments to hospitals and physicians is that technological changes in how we provide medical care and diagnose what is wrong with someone have greatly outpaced the reductions in payments. As a result, the norms of care—the types of procedures and diagnostic tests that should be done when a person presents with various symptoms—changed rapidly over the last three decades. We see this in the increased volume and intensity of services associated with a hospital stay or visits to physicians. The fact that most providers still are paid on a fee-for-service basis means that even when the fees are reduced, the shift in the standards of care are causing greater health care expenditures. Moreover, because the technological changes are making it less costly to do various surgeries or procedures to treat conditions that used to be considered untreatable or quite risky, there has been a marked increase in the number of people who are now being treated for a wide variety of conditions. This is a good outcome, but it also contributes to the growth in total health care spending.

It is clear to most health policy analysts I know that we need to reset the norms or standards of care provided when people present with particular symptoms or diagnoses. Equally, we need to alter people's expectations about what constitutes good medicine. And therein lies the problem: How do we do this? What types of incentives and reorganization of health care providers will accomplish this? There is plenty of room here for APPAM researchers interested in conducting the evidence-based research we do so well. But fair warning: This is difficult and will take time—I am guessing at least a decade and more likely at least two decades.

Thus, the choices for slowing the growth in health care spending are not easy, they are sure to provoke opposition from health care providers and manufacturers of medical devices and pharmaceuticals, and they are unlikely to “free up” significant monies any time soon. As I say, the real focus ought to be the more efficient production of health care—a larger topic than what I am focusing on here.

Public-Private Ventures and Raising Taxes

The remaining alternatives for financing investments in what are basically public goods take us back to public finance. As I noted, the history of public-private ventures in infrastructure investments has a long tradition in this country—the building of the transcontinental railroad is a dramatic example of such funding. Especially if we want to encourage private investments in new technologies, this type of partnership financing makes sense. Government agencies and committees cannot possibly direct the development of all new possibilities for new technologies. Using tax credits and backing of bond issues to encourage private sector investments in new construction and new technologies is one way of providing incentives to the private sector to invest in ways that meet national goals.

Many of the investments I have been describing also have payoffs in terms of expected benefits that will occur several decades from now—for example, the physical infrastructure investments. Those should rightly be financed through the issuance of long-term government bonds because future generations will be gaining from the investments. Moreover, because we expect these investments to yield greater productivity, the burden of paying off the bonds in the future will be less than the burden of increasing taxes for these activities now.

We also have to make the case that raising taxes to help pay for these investments and to pay down the national debt is in our national interest. Political leaders obviously believe that raising taxes is off the table as an option. Certainly the

conference roundtable discussion on the budget crisis in the states did not leave room for optimism about politicians' appetite for raising taxes.¹⁸ But I believe that those of us in this association need to speak more forcefully about why this attitude is foolhardy. Compared to other OECD nations, we pay very low taxes. Our future productivity depends on the types of investments I have described—and higher income will enable us to pay down the debt faster. In addition, the widening disparity in the income distribution over the last two decades provides support for returning the marginal income tax rates for people in the top decile of the income distribution to pre-2001 levels.

THE MISSION OF PUBLIC POLICY SCHOOLS AND CURRICULA

Finally, how does all this relate to how we teach public policy analysis and management? The discipline of public policy analysis is all about determining why some issue is a public policy problem and then, using the best evidence-based research we can muster, evaluating options that address the reasons a public policy is needed. There is no question that compared with 50 years ago, today we have far better knowledge of the likely effects of options for addressing a wide range of issues that are squarely within the public realm. Much of this improved knowledge is a result of the work done by members of APPAM and the large numbers of people now in government and the private sector who have degrees from public policy programs.

But, as I noted at the beginning, the problems facing the country are difficult, often with implications for possible outcomes that will not be seen for 30 or 50 years or more, and the problems are complicated by the interactions and connections between many of them. Dealing with these problems requires, I believe, adding another level to what we focus on in public policy programs. This could be done in part with a course that surveys the landscape of major public policy issues and exposes public policy students to the interconnections of many of these problems and options for addressing them. Precisely because we have interdisciplinary interests, public policy programs are particularly well suited to providing the wider context to policy issues.

I might add that it is a good thing that public policy programs increasingly are creating courses for undergraduates, too. They also are the public who must be convinced that paying more in taxes or issuing government bonds to pay for investments in education and infrastructure are necessary for increasing the productive capacity of the country.

CONCLUDING COMMENT

To sum up, the country is at a critical crossroads in its history right now. The public policy problems we are facing are complex and interrelated, and the demographic changes that are about to significantly change our country are not well understood by large numbers of people. If Americans are to continue to enjoy high standards of living, we will need to provide future generations with the means to achieve the high productivity growth rates that marked the first 75 years of the last century. Substantial investments in education, alternative energy sources, and our physical infrastructure are a start.

Objective analyses absolutely have to be part of our efforts to get the country to focus on the needs to invest in these activities. But we also have to provide policymakers and the public with a view of the “landscape” of how these issues are

¹⁸ APPAM Annual Research Conference, Roundtable: The Budget Crisis in the States: Short Term Fixes and Long Term Dilemmas, November 5, 2009.

interconnected and why policies that account for the interconnections will improve the country. I believe members of this association not only can do this, but we must.

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