Fulfilling John Hayford's Legacy: Moving Economics Toward a New Way to Value Infrastructure

2023 Leon N. Moses Distinguished Lecture in Transportation
Northwestern University Transportation Center
Northwestern University
Evanston, Illinois

November 8, 2023

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Good evening, everyone.

To everyone here at the Northwestern University Transportation Center, it is indeed an honor to have been asked to present this year's Leon N. Moses Distinguished Lecture.

Now, if I may, here is how I intend to proceed tonight. I will begin by answering what could be a central question to the evening: "Why does a president of a Federal Reserve Bank care about transportation?"

From there, I will share a broad outline of some of the research being conducted by the staff at the Philadelphia Fed, which, I believe, can be put into action to help us achieve a stronger economic and more reliable transportation future.

I will conclude by providing my economic outlook. After all, I'll note that the Moses Lectures in 2011 and 2017 both centered on U.S. economic outlooks, so why break unnecessarily from this apparent six-year cycle? Also, I am acutely aware of the impact that interest rates and monetary policy can have on infrastructure investments.

And if time allows, I would be happy to engage in a discussion and answer any questions to add further clarity to our proceedings.

But first, my day job requires me to make one thing very clear. And that is the usual Federal Reserve disclaimer. So, please note that the views I express are my own and do not necessarily reflect those of anyone else on the Federal Open Market Committee (FOMC or in the Federal Reserve System.

Or as folks back home in the Philadelphia region know, when talking about this evening, please say, "Pat said," not "The Fed said."

Now, with all that business out of the way, let's dive in.

I should start by recognizing that I find myself in very like-minded company. My predominant area of study, after all, wasn't economics. It was civil engineering. Economics was that side project that later became my full-time job. But my way of looking at things — even in economics — is very much with that same lens I ground in my engineering days.

Now, let me take this a step further. As an economist, and especially as president and CEO of the Philadelphia Fed, my goal is to ensure a stable economy that provides opportunities for everyone to grow and succeed. As an engineer, and specifically as a civil engineer, my goal is to ensure a safe, reliable, and stable infrastructure, which provides opportunities for all communities to grow and succeed.

I know I am far from the first person to recognize this important interdisciplinary relationship. I can just look around this room to know there are many others who do as well. And fittingly enough, all the way back in 1917, John Hayford, then director of the College of Engineering here at Northwestern University, wrote an essay in the *Journal of Poli ical Economy* titled "The Relation of Engineering to Economics," from which I will read the following:

> Economics and engineering are closely related. Economics has been defined as the social science of earning a living. With the same appropriateness, engineering may be defined to be physical science applied to helping groups … to make a better living.[1]

[1] See John F. Hayford, "The Relation of Engineering to Economics," *Journal of Political Economy*, 25:1, available at uchicago.edu.

Those words ring just as true 106 years later.

But in my current capacity, I can look to the Federal Reserve's own dual mandate, the two pillars of our institutional mission that Congress handed to us in the late 1970s: price stability and maximum employment. And neither, I could argue, are achievable without some level of modern transportation infrastructure, and more specifically, *engineering* for modern transportation infrastructure.

The ability of goods and services to flow to and from markets helps ensure that prices can remain stable. And we cannot achieve maximum employment unless employers have accessible places in which to site their businesses and workers have a way to get to and from those places of employment.

Now, certainly, the Federal Reserve does not build transport infrastructure. But the monetary policy decisions we make and implement have a direct impact on the ability of those actors responsible for such actions to undertake them. I will return to this thought later in my economic outlook.

But with this overall intellectual background, where do we find ourselves at this moment? By any measure, we are at a critical time not just in our economy, but for our infrastructure. We are now roughly 70 years removed from our nation's last, great infrastructure boom, including the construction of the Interstate Highway System. And as with most things, time isn't always kind. The conditions of our infrastructure call out for broad investment, and the conditions of our economy require us to look anew at what infrastructure means to our overall health, both literally and figuratively.

Without a doubt, the United States would not be the preeminent global economy if not for our infrastructure. We are a vast nation, and our roads, bridges, tunnels, rails, and airports are very much the ties that bind the union together. But in what condition do we currently find these ties?

For the past almost 70 years, we have been in a mode to maintain the infrastructure we currently have. We became very good at fixing things, and, let's face it, we still are. Case in point: When a section of Interstate 95 in Northeast Philadelphia collapsed this summer — practically paralyzing the East Coast's most essential transit corridor — it only took a matter of days for an ingenious repair plan to be put into place and the road reopened. But in some ways, this is the exception to the usual cycle of infrastructure repair, as it took cutting through red tape and a quicker-than-usual accounting of the economic activity being lost for officials to spring into action at such speed.

Transportation infrastructure, as we all know, is expensive to undertake and often slow to accomplish.

But the I-95 collapse and rebuild could also become a pivot point for the way we look at infrastructure. I could argue that the way many have traditionally looked at infrastructure is much akin to the old Oscar Wilde line about those who “[know] the price of everything and the value of nothing.” We’ve become very good at knowing how much a project will cost, but we haven’t been as good at explaining the value of a project — the long-range economic and quality of life benefits inherent in it. And so, I would say this is not just a time for us to get better at fixing, but a time for us to take a fuller stock of the results of what we built in the first place and the long-term implications of what we may build in the future.

I-95 in Philadelphia in itself is a good example for us to examine both of these thoughts. And, at the Philadelphia Fed, it’s also perfectly located for us to do just that.

If you travel on I-95 through Philadelphia, it stands out in several ways. The first is more sensory and tactile: I-95 severed the residents of Philadelphia from the Delaware River waterfront. In the 1950s, the riverfront was overwhelmingly industrial, and the residential areas located on it were older, so little thought was likely given to the construction of an elevated highway with better water views than the newer buildings and houses to its west.

But I-95 was also constructed in an age when suburban living became the new model of the American Dream, and when highways could speed families out of city centers and into new single-family home developments, complete with yards and driveways, in neighboring counties. And when a highway was built, the noise and air pollution from that many cars and trucks helped push those who could afford it toward those new suburban developments.

Last year, two of my colleagues at the Philadelphia Fed, Vice President and Economist Jeffrey Lin and Economic Advisor and Economist Jeffrey Brinkman, took a closer look at I-95, its impact in depopulating Philadelphia, and the potential benefits of capping the highway.[2]

And Lin, I should note, is a Wildcat, having completed his undergraduate studies in economics and mathematical methods in the social sciences here at Northwestern, and studied under Dr. Leon Moses.

So, my colleagues started by looking at the population effects of freeways on central city neighborhoods, and what they found, if not startling, is still stark. The standard narrative is that freeways provide access to opportunities. And this was true in the suburbs — freeways attracted development and population. But this was decidedly not the case in central cities. Lin and Brinkman found, in central cities, a population decline of nearly one-third in the census tracts closest to freeways, while the populations in the tracts more than two miles from the nearest freeway increased by more than 50 percent. And the decline in those neighborhoods closer to a freeway makes sense, not just because of noise and pollution, but because of the negative barrier effects to local amenities — the dead-ending of streets that previously provided through access to jobs or shopping, making previously straight-forward trips longer for residents.

Lin and Brinkman also calculated the value of neighborhood amenities in areas of Philadelphia closest to freeways to be roughly 11 percent lower than in those areas farther out — and in a similar analysis, they found a 17 percent difference in Chicago.

Engineering created a means for speeding people and goods between cities and from city centers and into suburbia, and beyond. The Interstate Highway System was an enormous achievement, and it created big benefits for some. It also had enormous costs for others, especially residents of central cities.

But engineering now has the opportunity to mitigate some of that damage, to eliminate barriers to amenities, and in the process, create new economic incentives for folks to move back and opportunities for those who stayed.

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[2] See Jeffrey Brinkman and Jeffrey Lin, "The Costs and Benefits of Fixing Downtown Freeways," *Economic Insights*, Q1 2022, available at philadelphiafed.org.

We know, through both anecdotal evidence and through frontier research, that more people, especially young college graduates, are looking anew at urban living.[3][4] New work from home options means that cities and towns are competing even more on the quality of life they can offer residents. Additionally, traffic throughout the Philadelphia Metro area has become so endemic that one of those initial benefits of living in the suburbs — speedy access to the urban core — has been all but eliminated.

The Philadelphia waterfront today is a place where former warehouses and factories are being repurposed and renovated for residential and more ground-level commercial uses. The Delaware River itself is also a cleaner estuary, and one which the city has continually sought to highlight for both residents and tourists through projects like the Penn's Landing Festival Pier, the multimodal Delaware River Trail, and a just-started project to cap a one-10th of a mile portion of I-95 at Penn's Landing to become a new urban park.

And Lin and Brinkman even looked at this last idea: capping I-95 to reconnect neighborhoods with amenities. But they looked at a much bigger landscape than the current project, which is geared to only a small part of I-95 adjacent to the neighborhoods directly east of Center City and the tourist and business heart. They conceived of a project to cover a little more than four miles of I-95 and simulated its potential impact. And what their simulation suggests is a potential population boom in those neighborhoods that I-95 effectively cut off and to some extent emptied, as connections between those neighborhoods and the city at-large were remade.

They also calculated that the benefit to households in these neighborhoods at roughly $245 million per year, or $3.5 billion over the lifetime value of such a project, was greater than the estimated current cost of undertaking such a program. These are big numbers. What they point to is the significant damage that highway construction did to central city neighborhoods. What they also point to are the significant current opportunities for remediating that damage, if we can also focus on the value of these investments, instead of only the costs.

[3] See Victor Couture and Jessie Handbury, "Urban Revival in America," *Journal of Urban Economics*, September 2020, available at ScienceDirect.

[4] See Nathaniel Baum-Snow and Daniel Hartley, "Accounting for Central Neighborhood Change, 1980–2010," *Journal of Urban Economics*, 117, May 2020, available at ScienceDirect.

But it's not just about planting grass. While parks and open space are vital, we cannot discount infrastructure that could link neighborhoods together. Public transit has potentially a large role to play here. With limited exceptions of, for example, the New York City Subway or Boston's T, we often think of mass transit mostly in terms of bringing suburbanites back into cities. In Philadelphia, for example, the regional Southeastern Pennsylvania Transportation Authority (SEPTA) is often skewered by Philadelphians for a perception that it caters mostly to suburbanites — a gripe rooted in the fact that prepandemic, from 2007 to 2017, SEPTA's suburban-based Regional Rail system received the plurality of the agency's capital funds even though inner-city transit attracted far more riders.[5] Fair or not, perception matters and can sway public acceptance.

Again, this is an area where there is guiding research from the Philadelphia Fed. Economic Advisor and Economist Chris Severen looked at the economic benefits of the Los Angeles Metro Rail system, an ambitious effort to draw people from the epicenter of the nation's car culture out of their autos and into mass transit.[6]

What Severen found was a 15 percent increase in transit use when Angelenos were commuting from one neighborhood to another directly connected by Metro Rail. The increase in Metro Rail commuting in directly adjacent census tracts was 10 percent.

A common concern these days with local infrastructure investments is who benefits. Are the benefits going to incumbent residents who may have been harmed by past policy? Or are they going to incoming residents who end up displacing existing residents? On the other hand, some people might worry that transit access might actually hurt neighborhoods, for example, by introducing more noise or congestion. Interestingly, in the LA Metro case, these neighborhoods did *not* experience a lot of disruptive change. The appearance of a Metro Rail station did not bring in a new wealthy subset. What Metro Rail primarily did was to enhance resident choice of transportation options. It added an amenity in which residents found an intrinsic value — the ability to ditch their car. The added benefits of those cars that were kept off the streets, in terms of traffic, noise, and pollution, just become a bonus. More than that, it may have

[5] See Jim Saksa, "SEPTA Riders Overwhelmingly Take the Bus and Subway. Why Does Regional Rail Receive More Funding?" May 2017, available at WHYY.

[6] See Christopher Severen, "A Ticket to Ride: Estimating the Benefits of Rail Transit," *Economic Insights*, Q2 2020, available at philadelphiafed.org.

changed perceptions of transit as something only for the suburbs or wealthy residents. Again, this kind of research is helping us learn about the value of transportation infrastructure — the long-range economic and quality of life benefits.

Such infrastructure projects may be critical in undoing one of the great transportation engineering injustices of all. We now know that highways cut off people from opportunities *today*. But this might *understate* their negative effects on the next generation *tomorrow* — through increased racial segregation and the decreased intergenerational economic opportunities that continue to this day.

And this brings me to a third bit of research in which the Philadelphia Fed was involved. Economic Advisor and Economist Bryan Stuart recently teamed up with researchers from the University of Texas and UCLA.[7] Their window into these intergenerational effects was to look at the long-term economic impacts from the historical placement of railroads. And they found, true to the cliché, that there was a "wrong side of the tracks." The placement of railroad tracks cemented segregation within communities and limited the upward mobility of specifically Black children who the tracks separated from community amenities such as schools and jobs.

We can see this in Philadelphia, too, which has the unfortunate distinction of being the "poorest big city" in the nation, and the 11th most racially segregated[8] with a citywide poverty rate above 20 percent. But is this just a matter of bad luck for these families who find themselves below the poverty line? The research conducted by the Philadelphia Fed would say no. Many of these outcomes were caused by past policies. Many of them could be addressed through transportation infrastructure investments today to better connect workers, families, and opportunities.

In 2022, Larry Santucci, a senior advisor and research fellow at the Philadelphia Fed's Consumer Finance Institute, released his work in which he mapped the history of racial covenants at nearly 4,000 properties

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[7] See Eric Chyn, Kareem Haggag, and Bryan Stuart, "The Effects of Racial Segregation on Intergenerational Mobility: Evidence from Historical Railroad Placement," Federal Reserve Bank of Philadelphia Working Paper 23-18 (2023), https://www.philadelphiafed.org/the-economy/regional-economics/effects-of-racial-segregation-on-intergenerational-mobility-evidence-historical-railroad-placement.

[8] See "A Map of Racially Restrictive Covenants in the City of Philadelphia," Consumer Finance Data, https://www.philadelphiafed.org/surveys-and-data/consumer-finance-data/racial-covenants.

citywide.[9] Racially restrictive covenants were one of the tools that early 20th century developers, home builders, and White homeowners used to prevent non-White individuals from accessing certain neighborhoods and homes. Allow me a moment to explain the findings in Santucci's own words:

> We didn't see a lot in areas of the city where the housing stock was older, such as along the Delaware waterfront, where White residents may have been happy to vacate … But we did find racial covenants bordering White and non-White neighborhoods and cordoning off the up-and-coming, more suburban areas in the Northeast, Northwest, and Southwest sections of Philadelphia.

On a map, many of the areas of Philadelphia directly impacted by the growth of highways and the White flight it enabled stand out in this proposition. Santucci specifically notes the Delaware River waterfront, the example with which I opened this talk. But even today, residents in the majority Black neighborhoods of Philadelphia and the surrounding region face commute times, on average, that are 34 minutes longer per week than their White counterparts. Or put another way, in the span of a year, Black commuters lose a whole 24-hour day in commuting time that White commuters keep for themselves. That was the finding of another recent report by Severen and his Research Analyst Nassir Holden.[10]

This research can serve as the starting place for engineers and local officials, if not indeed federal ones, to take a more holistic approach to transportation. Simply making repairs, while necessary, in many ways will only extend or even exacerbate long-standing inequities and inequalities. Simply making a repair to a freeway that stands as an impediment to economic progress and equity won't remove it as an impediment — it will only solidify its standing for more years.

Simply valuing infrastructure in the same old way, usually by the flow of cars or people, is self-limiting. We should start valuing its benefits in greater totality, and especially the benefits to those who are situated near these projects. And the Philadelphia Fed's research is helping us to better define these benefits.

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[9] See "Q&A: Larry Santucci on Philadelphia's Racially Restrictive Covenants and Their Lasting Effects," Federal Reserve Bank of Philadelphia, available at philadelphiafed.org.

[10] Christopher Severen and Nassir Holden, "Not All Rush Hours Are the Same," *Economic Insights*, Q3 2023, available at philadelphiafed.org.

But certainly, these improvements will not just happen on their own or through the benevolence of others. We must pay for them. Local governments collect taxes, some of which are used for local infrastructure, but most infrastructure projects have costs that require them to be bonded out over years. Those funds allow for construction workers to be employed and for materials to be purchased.

And that is where the Federal Reserve's actions can have an impact and where I, as a member of the FOMC, recognize my place in this transportation future, if even just tangentially. But our actions on monetary policy do have a direct impact on the borrowing rates for such bonds, among so much more. Our efforts to tame inflation mean stabilizing the costs of construction and labor.

And with that, I would like to give you a brief overview of my overall economic outlook. As you are aware, a week ago, at our last meeting, the FOMC voted to hold the policy rate steady — our second consecutive hold and the third in the last four meetings after 10 consecutive interest rate hikes.

I not only voted to support keeping the policy rate steady, but I was also among the first of my colleagues to state my position that the time had come to do so, possibly for a while. Let's rewind for a moment. We did a lot in not a lot of time. We rapidly moved monetary policy into restrictive territory to tame inflation and get it heading back down to our target of a 2 percent annual rate.

Now, what we didn't do was give the folks living in this economy, whether businesses or families, a lot of time to adjust in between rate hikes. And today, if you look along the trend lines, we are experiencing a slow but steady disinflation. Interest rates remain in restrictive territory and, so long as they are, they will continue to put a damper on inflation.

Yes, this economy is proving to be resilient and at times unwilling to bend to the will of economic models, but I believe that the path we are on is the correct one.

I am not going to be swayed easily by a single month's worth of data. One month can just be an outlier and not a harbinger. But we don't know unless we have more outward months to weigh against it. With monetary policy, there are always lags. Holding the rate steady will give those lags time to catch up. It will allow us to make more measured and educated policy rate decisions going forward — decisions, which I must add, could go *either way*, depending upon what the data tell us.

But for the moment, as I said, I see a slow but steady disinflation occurring. I still expect inflation to fall below 3 percent year over year in 2024 and to get down to our 2 percent target thereafter.

I do expect GDP growth to cool off in the coming quarters, but I do not expect a recession.

Consumers have been powering recent GDP growth — more than half of last quarter's increase was due to consumers continuing to open their wallets. Time will tell if they have exhausted their pandemic-era savings and begin to ratchet down their own spending. Time will tell the full impact of the restart of student loan payments for countless borrowers. But I would also argue that a confident American consumer is not a problem. Indeed, they may be the ones ultimately capable of helping us achieve the soft landing we all envision and that has proved quite elusive in the past.

It is also clear that the labor market is coming into a much better balance. I anticipate the unemployment rate to end the year slightly elevated from where it currently stands — to about 4 percent — and to rise slowly in 2024 to about 4.5 percent before dropping again to 4 percent. That would put us back in line with the *natural rate* of unemployment, where the labor market and steady 2 percent inflation can coexist in balance.

Of course, there are many lurking uncertainties. The positive movements to settle the auto worker strikes give us hope that things may soon return to normal for workers and employers. But even then, there are still other labor actions that are slowing down other industries, such as the actors' strike.

We are also now only nine days away from a potential federal government shutdown, the impact of which would only grow the longer it goes on and could potentially trim a full percentage point off fourth quarter GDP. And of course, there are international issues that can impact our own economy.

But at the end of the day, while I see us on the path of taming inflation and protecting our economic underpinnings, I would also caution that a decrease in the policy rate is not something that is likely to happen in the short term. I ascribe to the position that rates are going to have to remain higher for longer, as the other downward pressures on inflation work in tandem with the current policy rate to return our economy to balance.

And for transportation, this higher-rate climate may have an impact on our ability to see some new projects get from the drawing board to shovels in the ground. The necessary repairs will still be done, and projects already begun will continue.

But progress is something for which America has always been known. And the more we take our eyes exclusively off the *costs* of a project to the overall economic *benefit* of a project, the more we will see that price tags, while important, aren't the only thing to consider.

We can still, if we take the research into consideration, make Oscar Wilde proud.

And with that, I will conclude my prepared remarks for this evening. I once again thank you all for the privilege to be here. I would be happy to take your questions.