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A Transportation-Driven World-Class Economy: New Jersey at Risk

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New Jersey's economy has been successfully reinvented several times, and each occasion significantly enhanced the well-being of the state and its people. Most recent is the transformation to a leading-edge, knowledge-driven, information-based economy, which has yielded the highest median household and family incomes among the 50 states. However, it is important to observe that every period of economic progression in New Jersey was built upon earlier investments in transportation infrastructure. Now, as the twenty-first century unfolds, the relationship between economic growth and infrastructure investment is again becoming a major public policy issue as the state confronts an era of diminishing transportation resources.

At the beginning of the twentieth century, New Jersey was positioned at transportation's leading edge. So too was the state's economy, with its manufacturing dominance built directly on the foundation of an advanced railroad infrastructure. As the highway era emerged in America in the 1920s, New Jersey again stood at the forefront of transportation investment, and this provided the initial underpinning for the state's great post-World War II prosperity. The unique postindustrial economic position of New Jersey in the final half of the twentieth century would not have been achieved without a continually enhanced transportation infrastructure.

The same is true in the twenty-first century. Today's successful global economy requires a comprehensive, multimodal, global transportation grid. If New Jersey fails to invest in its component of that transportation grid, it will cease to be a competitive player in the global economy.

Executive Summary

The precondition for every phase of economic advancement in New Jersey was a foundation of leading-edge transportation infrastructure. The post-World War II transportation-economic experience amply demonstrates this reality.

- All of New Jersey's postwar economic and demographic advances were predicated on successive major additions to the state's transportation infrastructure—increments of new transportation capacity that preceded and facilitated subsequent economic growth. There were three distinct waves of net new transportation investment that took place during this era.
- The post-World War II prosperity of the late 1940s and 1950s was based on a pre-war infrastructure in New Jersey that was one of the finest state highway systems in the country. During the 1920s, an innovative and effective coordination between New Jersey's transportation needs and transportation funding was instituted. Subsequently, in the late 1920s and throughout the 1930s, substantial investment was made in the system, and numerous nation-leading highway innovations were instituted, among them the first divided highway and the first cloverleaf interchange.
- This first-wave highway infrastructure was the envy of America. When World War II ended and

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the civilian economy began to explode from the war's pent-up demand, this basic system provided the highway capacity and accessibility to accommodate the strong postwar economic growth through 1960.

- As the 1960s commenced, the state highway system exceeded 1,900 miles in length. However, even with substantial upgrading and improvements, it was approaching its capacity limitations. Transportation funding constraints emerged in the late 1940s and became pervasive in the 1950s. These constraints greatly hindered any further major expansion of the system. Capacity shortfalls were about to impact the economy.
- However, the completion during the 1950s of the state's first two toll roads—the New Jersey Turnpike and the Garden State Parkway—provided the second wave of additional transportation investment necessary to sustain robust economic growth. Just as New Jersey had created a nation-leading state highway system prior to World War II, it created a network of nation-leading toll roads in the postwar years. These bold responses—representing more than 300 miles of new carrying capacity—facilitated and supported the economic success of the 1960s, which set job-growth records that still have not been surpassed. The New Jersey economic powerhouse of the time appeared unstoppable. Unfortunately, it was, in fact, derailed.
- The exciting economic and demographic advances of the 1960s, buoyed by the new capacity provided by the state's toll roads, ultimately succumbed to the economically challenged 1970s, which paralleled the lagging pace of transportation improvements during that decade. This was a period when New Jersey's—and the Northeast region's—economic superiority was confronted by a major domestic challenger: a surging Sunbelt capturing increased shares of America's economic and demographic growth.
- The Sunbelt's emerging prosperity was based significantly on the new mobility spawned by the Dwight D. Eisenhower National System of Interstate and Defense Highways. Prior to the Interstate system, the Sunbelt—excluding California—lagged badly in both transportation infrastructure and economic growth.
- However, during the 1960s and 1970s, New Jersey trailed in developing its share of the Interstate system, with numerous missing links inhibiting its transportation effectiveness. The Sunbelt states, recognizing the linkage between transportation and economic growth, greatly accelerated transportation investment. As a result, new patterns of regional connectivity quickly emerged.
- The once unique advanced transportation infrastructure of New Jersey, and the efficient accessibility to major economic markets that it provided, was beginning to be challenged, and in numerous cases surpassed, in many parts of the Sunbelt. By homogenizing transportation costs, the Interstate system created genuine national domestic markets, rendering southern firms much more cost competitive in serving northeastern markets.
- Transportation funding shortfalls throughout the 1970s in New Jersey—worsened by the failure of several transportation bond issues prior to 1979—and the lack of significant new capacity additions, other than some segments of the still incomplete Interstate system, had damaging economic repercussions.
- Still, renewed economic advances were then achieved in the 1980s and 1990s. This shift was based on the new mobility and accessibility generated by the completion of the Interstate Highway System, the third wave of transportation investment. Although the Interstate Highway System was designed in the 1950s, it took until

the early 1990s before it reached its final length of 415 miles in New Jersey. But a system bound for completion bulwarked the strong economy of the 1980s, and the system's final capacity additions were in place just in time to accommodate the major economic expansion of the 1990s.

- In addition to the Interstate system, the third investment wave included the creation of New Jersey Transit (NJ Transit) in 1979, which led to substantial improvements in commuter rail and bus operations as the 1980s advanced. This was pivotal for the resurgence of a number of urban economies in the 1980s and 1990s, as was the institution of select ferry services.
- Thus, there have been three massive capacity-enhancing increments of new transportation infrastructure in New Jersey: (1) the original state highway network initiated in the 1920s and continually improved in the decades that followed; (2) the state's toll roads; and finally, (3) the Interstate system and the revitalization of the state's public transit infrastructure. Each provided the foundations for a successive wave of demographic and economic growth and for major advances in the state's standard of living over the past six decades.
- In addition, based upon the three waves of transportation capacity additions, the reinvention of the state's economy during the second half of the twentieth century was total. A goods-producing economy was transformed into a service-producing society. Moreover, these trends accelerated during the final two decades of the twentieth century! New Jersey stands on the upper rungs of the nation's economic ladder.
- However, two dilemmas now confront New Jersey. Much, if not all, of the new transportation capacity provided by the Interstate system, to say nothing of the two

predecessor capacity increments, is essentially used up. No new equivalent-in-scale addition to the state's highway infrastructure is in New Jersey's future as land-use controls, environmental regulation, and constraints on land availability preclude new road projects of the size of the highway investments of the twentieth century. In other words, there will not be an "Interstate System II."

- Instead, what is feasible and necessary is a sustained upgrading of all aspects of the state's transportation infrastructure, with capacity gains secured through new technologies, efficiencies, and connections. The goal of such investments is to improve existing systems so as to reduce congestion-related time and cost increases on businesses, workers, residents, and governments that result from transportation constraints. Such increases have the potential to significantly damage the state's economy and reduce its rate of growth of income, jobs, and private investment.
- The second dilemma is that, with another transportation funding crisis now upon the state, New Jersey faces a 1970s redux when economic growth lagged, employment increases slowed, and other regions of the country surged ahead on the strength of transportation infrastructure advantages. Will New Jersey's future revisit the past when, in the absence of appropriate investment in transportation, the state suffered economically? Or will the political courage emerge, as it has before, to craft appropriate policy solutions? No less than the state's economic future hangs in the balance. New Jersey must take the high road in making effective and immediate decisions to provide the transportation investments required to maintain the quality of its residents' lives and enhance their ability to work in a world economy where success is ever more dependent on access, speed, and movement.

A Transportation-Driven Economy

There are strong linkages between accessibility, efficient transportation systems, economic advancement, and standard of living. Throughout most of the twentieth century, New Jersey had a nation-leading, highly competitive transportation system—and a nation-leading economy built upon and supported by that transportation system. However, the causal linkage between the two was not fully appreciated, and New Jersey's strong economy was taken for granted. Now, as the twenty-first century unfolds, the importance of this linkage is again coming to the fore.

With accelerated and sustained technological innovation, the penetration of the Internet into all aspects of business, and the full emergence of a knowledge-based information-age economy, conventional wisdom expected the pressures on basic transportation systems to ease. In actuality, the new knowledge-based economy is more dependent on efficient transportation than in the past. For example, the movement of information in huge quantities and at incredible speeds by fiber-optic cable was supposed to significantly reduce the movement of people and goods. Instead, it has generated a need for even more mobility and increased transportation demand.¹

Telecommuting, expected to grow because of the increased ability to work effectively at a distance, has been minimal to date and is likely to remain only a niche sector of the overall economy. The new economy is housed in office buildings, founded on instant communication and close interaction among its workers. Offices have become the factory floors of the new economy, where an increasing share of the nation's output is produced. A key priority of

transportation systems is to facilitate the movement of knowledge-based workers to their office workplaces. Knowledge-based industries will be the major growth sectors of the economy—assuming that there is sufficient and efficient commutation capacity.

A harsh corporate discipline of cost minimization, necessitated by unrelenting global competition, has developed and is certain to characterize the decades ahead. Comprehensive logistical systems are increasingly critical to this cost discipline and future economic growth and quality of life. Efficient supply-chain management places enormous demands on transportation systems. Just-in-time inventory control in manufacturing and retailing led to new advances in corporate efficiency, significant productivity improvements, and resulting cost savings, but at the same time required, for its effectiveness, large increases in the volume of truck shipments and deliveries. Information technology now makes it possible to specify optimum daily inventory levels in both the production and consumption sides of markets through strict cost efficiency criteria. But the actual adjustment of those inventories requires many more deliveries of smaller quantities of product on a much more frequent basis than in the past.

This direct relation between knowledge and movement applies not only to manufacturing but to every service-providing sector of the economy. Parcel services deliver not only real copies of critical documents but the full range of computer, software, and office equipment and supplies—critical inputs for the new postindustrial “factory floors”—on a just-in-time basis. Cost-efficient Internet shopping, both consumer and business driven, is capturing an increasing share of sales and likewise generates additional increases in delivery-service traffic. Every increment of economic advancement demands an equivalent increment of transportation services advancement. These are just a few of the new

¹ Other fundamental shifts in the economy based on technological changes led to similarly unexpected results compared to initial predictions. The promise of computerization was supposed to create the paperless office. But reality turned out quite differently. Instead, paper consumption has soared to new record levels!

transportation stresses and demands that are emerging as the economy sprints ahead.

The bottom line is that a global economy requires a comprehensive global transportation grid. If New Jersey is not an efficient component of that transportation grid, the state cannot continue to be a competitive component of the global economy. New Jersey is confronting a major crisis in transportation funding; thus, it is important to stress the scale of the bleak economic consequences that can result from a faltering transportation system. This first section of the report provides a historical perspective on transportation's effect on economic well-being and economic advancement.

A Historical Perspective

Transportation technology was one of the earliest priorities for human development, coming before agriculture and probably right after weapons. The ability to move people, supplies, and materials became the key to human and economic growth and fundamentally shaped the distribution and location of entire populations. Early overland trade routes, stretching across continents and using animal power—horses, oxen, camels, mules—connected vastly different societies and permitted the growth of commerce and the development of centers of population and economic activity. Water transportation especially, from human-powered canoes, rafts, and other vessels, to ships with fixed sails, and then to ships that could sail against the wind, enabled the economic development of maritime nations throughout the world. Natural harbors, estuaries, and rivers into the interior defined the location of cities and connected hinterland sources of raw materials and natural products to markets and trade. Road building for various types of vehicles such as coaches, carriages, wagons, and carts pulled by horses and other animals provided linkages between water-based cities and trading centers. Canal building

and barge transportation, still using animal power, advanced the opening of new areas for commercial development and settlement, establishing further connections to natural water bodies and population centers. Canals offered cheap and highly efficient transportation that could reliably move large amounts of material relative to hauling such cargo overland on roads that were all too frequently subject to deterioration and damage.

Then, beginning in the early-nineteenth century, and with an increasing rapidity of change in technology, the development of mechanically powered transportation modes had profound effects on the location of people and the rate and scale of economic growth. In Europe and America, the steamship, the railroad, coal-fired ocean-going ships, and the motor vehicle led to ever more economically efficient means of transportation. With these inventions came the ability to transport goods, raw materials, and people in ever-larger numbers much more cheaply and rapidly than the animal-dependent roads and canals and the wind-driven sailing ships that had for centuries been the dominant transportation technologies. The development of powered flight, and in its current evolution, the jet engine, provided even further economies in the time and costs of transporting people and some types of cargo. A brief review of these increasingly sophisticated and efficient modes of transportation technologies is useful.

Fixed, smooth, standardized metal rails with steam-driven locomotives transformed the development of the United States and offered vast areas of the country efficient connections to markets, cities, and major water transportation sources. The railroads also linked the nation's cities and enhanced the capacity of urban areas to offer even further economies of scale with the ensuing additional concentration of commerce, industry, and population. But railroads, even in their electrified form, gradually (though not completely) lost their cost advantages to motor vehicles for the transportation of people. They retained some cost advantages for the movement of freight, although they have been surpassed in terms

of efficiency by trucks for the movement of many types of goods and materials.

Ships driven by coal-fired engines, first by the iron-screw propeller and then by steam turbine and diesel engines, grew in size and complexity and are now able to carry enormous tonnages of material in standardized containers. The growth of ports connected to railroads and highways led to ever-larger volumes of international trade in goods and materials and in the flow of people. Until supplanted by the airplane, the cruise liner had its run of transportation dominance in moving wealthy people across oceans in elegant fashion as well as transporting large numbers of people in the cramped confines of steerage class. Today's vast fleet of super-sized oil tankers ply the world's oceans distributing oil to fuel the cars, trucks, planes, and other ships that, in turn, move the cargoes of the world's economies and their peoples.

The internal gasoline-fired combustion engine changed the world in a manner unlike any other transportation technology. It provided access to cheap, rapid, individual transportation for millions of people. It spawned vast and increasingly sophisticated hard-surfaced highway, bridge, and tunnel networks to replace the unpaved, rutted roads of horse- and animal-powered transportation. It affected how people live and defined prevailing culture; it led to the dispersal and deconcentration of housing and businesses; it profoundly changed land-use patterns; and it permitted new locations for economically viable business growth. Truck transportation emerged as the dominant, efficient mode of moving most goods and materials. The motor vehicle also imposed enormous costs in terms of lives lost, injuries, congestion, and air pollution damages on the very same populations that so eagerly and enthusiastically embraced the speed, low cost, instant accessibility, and personal freedom it provided.

The prevailing historical pattern has been that new transportation technologies emerge, compete, complement, and replace older ones because of cost and scale advantages. These new technologies dramatically affect the location of economic and human activity and determine how we live and how

well we live. Because these technologies so deeply affect human welfare and our economy, they are highly appropriate subjects for public policy.

Ensuring the efficient movement of people and goods, and doing so in ways that support economic growth and human well-being while simultaneously avoiding the damaging effects to both that result from poorly operating transportation systems, is a formidable responsibility of all levels of government.

New Jersey Transportation: The Early Period

The economic imperatives of New Jersey's location have provided powerful, although changing, advantages throughout the years. Positioned on the Atlantic Ocean with deep-water access ports, bounded by the large and navigable Hudson and Delaware Rivers, and located between New York and Philadelphia, New Jersey has benefited enormously because of its geography, its ready access to markets and people, and the mobility bestowed on it by its transportation systems. This was true when it was a colony, dependent on ships and ports and rudimentary roads. It was true when it was a fledgling state in the new American Republic with its expanding agricultural and trading economy supported by road improvements, steamboats, canals, and early railroad connections. It was true in the post-Civil War era when industrialization and manufacturing became dominant, and population and urbanization grew rapidly based on numerous railroads with their links to and within the state's cities, to the state's ports, and to New York City. It was true in the late-nineteenth and early-twentieth centuries with hints of suburbanization developing along the state's extensive rail lines. Suburbanization accelerated and became the dominant spatial and economic dynamic in the second half of the century as state highways, toll roads, and the Interstate system centrifugally dispersed people and businesses in the new service-oriented, knowledge-based, information-dependent economy.

Road and bridge improvements in New Jersey in the late-eighteenth and early-nineteenth centuries

linked the state's towns and ports and also increased the efficiency of transportation to New York and Philadelphia. Private toll roads, known as turnpikes, grew in number, quality, and mileage, and along with improvements in wagons and carriages reduced travel times needed while increasing the amount of agricultural products, raw materials, and finished goods moving to ports for shipment abroad and to other states. Nevertheless, it was the development of canals and railroads that led to the major economic advances of New Jersey in the nineteenth century. The Morris Canal, completed in 1831, connected Phillipsburg on the Delaware River to Newark, and then subsequently to Jersey City on the Hudson River, using a complex lock-and-plane system that covered a 1,674-foot change in elevation across its 102 miles. It was a major engineering accomplishment, and the large and sustained volume of traffic it carried on animal-drawn and steam-powered barges of coal, iron, timber, and various agricultural products was a boon to the villages, towns, and cities throughout the entire region it traversed.

The Delaware and Raritan Canal, conceived and built in the same period, connected Bordentown on the Delaware River with New Brunswick on the headwaters of Raritan Bay. Completed in 1834 and covering 44 miles with 14 locks, it became a major route for coal and agricultural products. Pennsylvania coal, transported on New Jersey canals, fueled the growing need for heating, ship power, and steam transportation in the country and beyond. It also provided the essential fuel for New Jersey's rapidly expanding manufacturing sector. Traffic on both canals peaked in the 1860s, with the volume on each canal frequently exceeding the tonnage on the longer and more famous Erie Canal in New York.

However, as railroads in New Jersey proliferated and offered faster and cheaper transportation of heavy materials, the economic viability of canals declined. Although both of New Jersey's major canals remained in commercial operation into the 1920s and 1930s, railroads rapidly became the

dominant mode of commercial and passenger traffic in the years after the Civil War. By the end of the nineteenth century, a large number of railroads densely connected New Jersey's cities and towns. The electrification of some rail lines provided trolley service within cities and to adjacent developing towns.

The railroads supported New Jersey's rapidly growing manufacturing economy and provided the extensive, low-cost links for raw materials and finished goods to flow into and from the region and its ports to the rest of the country and the world. Railroads connected the extensive ferry routes from Jersey City and other locations along the Hudson River to New York City. They provided efficient and large-capacity access for New Jersey residents to the expanding and increasingly well-paid financial and professional-sector job base of the City. This transportation infrastructure became the foundation for the development and attractiveness of high-income New Jersey suburbs.

But just as the railroads replaced the canals as the state's dominant transportation mode after the Civil War, they increasingly faced relentless competition from cars and trucks for both passenger and freight traffic in the middle decades of the twentieth century. The focus of transportation shifted from private rail lines to the public construction of highways, bridges, and tunnels, and their connection to the state's towns, cities, ports, and airports.

Throughout all the profound changes in the state's economy, from its agrarian beginnings to the post-Civil War dominance of manufacturing and then to the service-based information economy of the late-twentieth century, the precondition for success at each stage was the support of an effective and efficient transportation system. Transportation was, and remains, the key requirement to rapidly, securely, and cheaply moving agricultural products, manufactured goods, raw materials, and basic fuels—coal and then petroleum—and ultimately, and above all, the workforce that produces everything.

Table 1
Employment Growth in New Jersey

<u>Decade Employment Change</u>			<u>New Jersey's Record Expansions</u>	
Period	Employment Change		Period	Employment Change
	Number	Percentage		
1940–1950	342,800	26.1	February 1961–April 1970	615,000
1950–1960	360,000	21.7	April 1982–March 1989	622,000
1960–1970	589,100	29.2	May 1992–December 2000	578,000
1970–1980	454,100	17.4		
1980–1990	574,800	18.8		
1990–2000	359,400	9.9		
Source: New Jersey Department of Labor.				

The Post–World War II Transportation–Economic Experience

All of New Jersey's economic and demographic advances of the post-World War II period were predicated on successive major additions to the state's transportation infrastructure—increments of new transportation capacity that preceded and enabled subsequent economic growth. The post–World War II prosperity of the 1940s and 1950s was based on a pre-war infrastructure that was one of the finest state highway systems in the country. The economy and demography of the 1960s was then buoyed by new capacity provided by the state's toll roads. However, it is important to note that process works in reverse, and the lagging economy of the 1970s paralleled the lagging pace of transportation capacity additions and improvements in that decade. Then, the economic advances of the 1980s and 1990s rested upon the new mobility spawned by the completion of the Interstate Highway System. Thus, there have been

three massive capacity-enhancing increments of new transportation infrastructure. They, in turn, provided the foundations for each wave of demographic and economic growth—and for the major advances in the state's standard of living—over the last half-century.

Era 1: The Immediate Postwar Years— Prosperity Reigned

In 1917, the New Jersey Legislature created the State Highway Department and designated 15 routes as the state's highway system.² Although renumbered and constantly improved, these routes—such as US 1&9, US 46, US 130, and US 206—still form the skeletal backbone of today's state highway network. In 1926, the State Senate requested a more comprehensive system, and a means of funding it, to cope with growing highway problems. The result, at the time, was the innovative and effective coordination between New Jersey's transportation needs and transportation funding.

² This history draws heavily upon a New Jersey Department of Transportation report, *People—The Transportation Connection* (October 2001).

Subsequently, in the late 1920s and 1930s, substantial investment was made in the system, and numerous nation-leading highway innovations were instituted, such as the first divided highway and the first cloverleaf interchange. Signature projects of this era include the Pulaski Skyway (US Route 1&9) and the Edison Bridge. The Skyway—a designated civil engineering landmark, completed in 1932, was a limited-access elevated freeway directly linking the cities of Newark and Jersey City. The Edison Bridge (US Route 9) across the Raritan River was the longest and highest span of its type in the United States when completed in 1939.

The advanced highway infrastructure put in place during this period was the envy of America. When World War II ended, and the civilian economy began to explode from the war's pent-up demand, New Jersey's highway system provided the capacity and accessibility to accommodate the growth that would come. Between 1940 and 1960, the state's economy expanded by nearly 703,000 jobs, or by more than 50 percent (table 1). The state highway system provided the mobility and access for this large increase in workforce and population.

Era 2: The 1960s and 1970s— Decades of Contrast

As the 1960s commenced, the state highway system exceeded 1,900 miles in length. However, even with substantial upgrading and improvements, it was approaching its capacity limitations. The period of strong postwar economic growth through 1960 had been sustained principally on this network. But transportation funding constraints that emerged in the late 1940s were pervasive by the 1950s and greatly hindered further major expansion of the system. Capacity shortfalls and constraints were about to impact the economy. Still, completion of the state's first two toll roads during the 1950s provided

the significant transportation increment necessary to accommodate the robust economic growth that would occur during the decade of the 1960s. Just as New Jersey had created a nation-leading state highway system prior to World War II, it created a network of nation-leading toll roads in the postwar years.

Construction of what is now known as the Garden State Parkway began in 1947. It was planned by the State Highway Department as the State Route 4 Parkway. Because of funding constraints, however, only 19 miles had been completed by 1952. The State Legislature ultimately created the New Jersey Highway Authority to finish the route's construction as a toll road and then to operate and maintain it. The Parkway's entire 164-mile length opened in 1955, an impressive increase from the 19 miles operational only three years earlier.

Similarly, the New Jersey Turnpike, with its original section fully completed in 1952, was initially planned as a state-long Route 100 superhighway, acknowledging that Routes 1 and 1&9 would not be able to accommodate projected economic growth. Again, funding constraints necessitated the reliance on a toll road 142 miles in length. This was another New Jersey first: the largest bond issue at the time—\$225 million—to build a toll road.

These bold responses—representing more than 300 miles of new carrying capacity—facilitated and supported the economic success of the “roaring 60s,” which set new economic records that still have not been surpassed.³ Driving the state's record-long 110-month economic expansion between 1961 and 1970 were an accelerating service sector, sustained growth in manufacturing, rapid suburbanization from New York City and Philadelphia, and a potent boost from Vietnam War spending. Employment increased by 29.2 percent, or 589,100 jobs, during the 1960–1970 decade, and by 615,000 jobs during the 1961–1970

³ While the total toll-road mileage length is only about 16 percent of the more than 1,900 miles of the state highway system, the toll roads' strategic location in critical, demand-stressed, transportation corridors and their multiple-lane configurations render their overall impact much greater than their length alone. In fact, their total *lane* mileage represents a much higher proportion of the lane mileage of the state highway system, where there still are a number of two-lane roadways.

expansion (table 1). The New Jersey economic powerhouse of the time appeared unstoppable.

Unfortunately, it was, in fact, derailed. The boom of the 1960s ultimately succumbed to the “troubled 1970s.” This was a decade when New Jersey’s—and the Northeast Region’s—economic superiority was confronted by a major domestic challenger: a surging Sunbelt capturing increased shares of America’s economic and demographic growth.

The Sunbelt’s emerging prosperity was based significantly on the new mobility provided by the Interstate system (the Dwight D. Eisenhower National System of Interstate and Defense Highways). Prior to the Interstate system, the Sunbelt—excluding California—lagged badly in both transportation infrastructure and economic growth. During the 1960s and 1970s, New Jersey trailed in developing its share of the Interstate system, with numerous missing links inhibiting its transportation effectiveness. The Sunbelt states, however, recognized the linkage between transportation and economic growth and forged ahead. As a result, new patterns of regional connectivity quickly emerged. The once unique advanced transportation infrastructure of New Jersey, and the efficient accessibility to major economic markets that it provided, was beginning to be challenged, and in numerous cases surpassed, in many parts of the Sunbelt. By homogenizing transportation costs, the Interstate system created genuine national domestic markets, rendering southern firms much more cost competitive in serving northeastern markets.

Transportation funding shortfalls throughout the 1970s in New Jersey—worsened by the failure of several transportation bond issues prior to 1979—and the lack of significant new capacity additions outside of some incomplete Interstate segments, had significant and damaging economic repercussions. The state’s employment gain in the 1970s slipped to 454,000 jobs, nearly 25 percent below that of the 1960s, and the decade’s employment growth rate plummeted to 17.4 percent from the 29.2 percent of the previous decade. At the same time, the newer competitive transportation infrastructure in the

Sunbelt was instrumental in its emerging economic prosperity.

Era 3: The 1980s and 1990s— Two Great Booms

Although the Interstate Highway System was designed in the 1950s, it was actually the early 1990s before it was completed in New Jersey. Stretching more than 415 miles in length in the state, its major components today include Routes I-78, I-80, I-95, I-195, I-280, I-287, and I-295. Its first substantial impact on the economy was realized during the 1982–1989 economic expansion, which set a new record employment gain (622,000 jobs). The basic transportation framework of this expansion was the new mobility and accessibility provided by an Interstate system bound for completion. And the system’s final capacity additions were in place just in time to accommodate the economic growth (578,000 jobs) of the subsequent 1992–2000 expansion (table 1).

The signature spatial force of these two expansions was the growth of commercial office space accessed primarily by the completed—or nearly completed—Interstate system. It was the 1976 opening of the new AT&T world headquarters along I-287 in Basking Ridge that legitimized new market locations and set the stage for the following decade, when the great 1980s office-building boom dramatically reshaped the regional economic landscape. In 1980, New Jersey was a non-player in the regional office market, but by 1990 the 11-county northern and central New Jersey region emerged as the fifth largest metropolitan office market in the country! Eighty percent of all the rental office space ever built in the state’s history went up during the 1980s, much of it in growth corridors defined by the Interstate system. And New Jersey’s lofty status as the fifth largest office market in the United States was maintained during the boom years of the 1990s.

In 1980, northern and central New Jersey had 25 million square feet of commercial rental office space. By 2000, this had exploded to 170 million square

Table 2
Sector Employment 2003, Percentage Distribution,
and New Jersey Share of the Nation

	Employment Distribution		NJ Share of U.S.
	NJ	U.S.	
Total	100.0%	100.0%	3.1%
Educational and Health Services	13.5	12.8	3.3
Professional and Business Services	14.4	12.3	3.6
Trade, Transportation, and Utilities	22.1	19.5	3.5
Financial Activities	7.0	6.1	3.5
Leisure and Hospitality	8.1	9.3	2.6
Government	15.7	16.6	2.9
Other Services	3.8	4.2	2.8
Construction	4.0	5.2	2.4
Natural Resources and Mining	0.0	0.4	0.3
Information	2.6	2.5	3.2
Manufacturing	8.8	11.2	2.4

Source: New Jersey Department of Labor; U.S. Department of Labor, Bureau of Labor Statistics.

feet—a near-sevenfold increase in one generation—representing a massive ratcheting up of office-development intensity. As is now well recognized, the new information-age economy in New Jersey is principally housed in office buildings. Offices are the factory floors of the new economy, where an increasing share of the state's economic output is produced. In the absence of the Interstate system, New Jersey's office market would never have attained its current scale or high-profile status. Nor would the economy have been able to transform itself.

In addition to the Interstate system, the creation of NJ Transit in 1979 led to substantial improvements in commuter rail and bus operations as the 1980s advanced. This was pivotal for office development in urban areas such as Newark and along the Hudson River waterfront. Moreover, the creation of Hudson

River ferry service was also instrumental in the waterfront's success. In the absence of commuter service improvements and new ferry systems, office development would have been far less successful in such urban markets.

The Great Economic Transformation

Service employment is the broad benchmark of the new information-age economy. While this transformation began in earnest during the 1961–1970 expansion, it accelerated sharply during the past two decades. The state gained 615,000 private service-

producing jobs during the 1982–1989 boom, an increment far greater than the *total* employment increase of any decade in history. This was followed by 566,000 additional private-sector service jobs added in the 1992–2000 expansion. The nearly 1.2 million service jobs gained during the two booms represented the full transformation of New Jersey from an industrial manufacturing economy to a postindustrial,

knowledge-based, information-age economy. In 1950, manufacturing accounted for 45.6 percent of the state’s jobs, while private services accounted for 38.7 percent. By 2000, only 11.6 percent of the state’s employment base was in manufacturing, while 69.7 percent was in private services. There are now more than 2.9 million service jobs in New Jersey compared to fewer than 345,000 in manufacturing.

Compared to the nation as a whole, the state has significant employment concentrations (i.e., higher proportional shares than elsewhere in the nation) in professional and business services; financial activities; education and health services; information; and trade, transportation and utilities (table 2). Underrepresented sectors in the state include leisure and hospitality, government services (due to lower relative federal employment in New Jersey), and manufacturing. This employment profile is consistent with the state’s high-ranking national office market (fifth largest), its high-ranking warehouse/logistics/distribution market (third largest), and its high-ranking consumer market (highest median household/family income among the 50 states).

Table 3
Total Personal Income
New Jersey and the United States
1970 to 2003

	New Jersey Share of Total National Personal Income	Ratio: Per Capita Income, New Jersey to Nation
1970	4.2%	1.18
1980	3.8	1.16
1990	3.9	1.26
2000	3.8	1.27
2003	3.8	1.28

Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Grounded on three eras of transportation capacity additions, the reinvention of the state’s economy during the second half of the twentieth century was total and complete. A goods-producing economy was transformed into a service-producing society. Moreover, these trends accelerated during the final two decades of the twentieth century! As a result, New Jersey has been a major economic “winner.” Obviously, transformations of the scale that have taken place in the state have inevitably produced significant casualties—particularly former manufacturing workers—as general prosperity has increased substantially. While no single measure can capture the “bottom line,” relative income is a useful barometer. Total personal income gauges broad economic market strength, while per capita personal income measures individual economic capacity and the scale of personal spending power.

The ratio of New Jersey’s per capita personal income to that of the nation captures the relative economic performance of the state during the post-1970 transition. Between 1970 and 1980, when transportation investment and the economy lagged in New Jersey (while both boomed in the Sunbelt), the state’s per capita income fell from being 18 percent

higher than that of the nation to 16 percent higher, indicating a decline in New Jersey's relative economic position (table 3). The service sector failed to expand fast enough to fully compensate for manufacturing income losses. But as transportation investment, office building, and the service economy soared during the 1980s and 1990s, this income ratio improved dramatically, to 1.26 in 1990 to 1.27 in 2000 and to 1.28 in 2003. Thus, per capita income in New Jersey grew from being 16 percent higher than that of the nation in 1980 to 28 percent higher by 2003.

Moreover, this higher relative per capita income performance has enabled the state to maintain an approximate 3.8 percent share of total national personal income since 1980.⁴ Because New Jersey now has only 3.1 percent of the nation's population, a share that has been consistently declining during the past three decades, maintaining the state's income share over the past two decades is a remarkable achievement.

Public Transportation Infrastructure, Service, and Economic Development

Commuter and freight transportation investment/disinvestment also have had significant ramifications for the state and regional economy. Historically, while New Jersey did not have comprehensive *systems*, it did have a *set* of the finest rail and bus services in the nation, with numerous

private companies comprehensively serving most of the state and providing reliable and ready access to New York City and Philadelphia. In the first half of the twentieth century, there were two unique features of the New Jersey economy. First, the state served as one of the key epicenters of the nation's manufacturing/industrial economy—the largest in the world. The state's preeminent national role was predicated on the unique concentrations of rail-freight accessibility, which was subsequently supplemented by early highway development. In turn, the enormous rail yards along the Hudson River in New Jersey—along with comprehensive freight lighterage systems—underpinned New York's once-powerful manufacturing sector by providing the means to distribute its products throughout the nation.

Second, New Jersey was, and still is, home to a unique concentration of commuter-driven affluent bedroom communities. The early private rail, ferry, and bus commuter lines to New York City and Philadelphia underpinned the development of some of the strongest residential markets in the nation. This infrastructure afforded New Jersey residents access to among the highest-paying jobs in the nation, bolstering personal income in the state and creating powerful consumer markets. Similarly, the commuter transportation services provided the economies of New York City and Philadelphia a potent workforce from New Jersey, the absence of which would have substantially limited their economic growth potential.

By the 1960s, money-losing private rail and bus commuter lines began to deteriorate. In 1966, a multimodal New Jersey Department of Transportation (NJDOT) supplanted the New Jersey Highway Department. Under its auspices,

⁴ Areas of high population growth can have high rates of total personal income growth while showing little change in per capita personal income; i.e., income growth can be solely a function of population growth. In the case of New Jersey, the increase in absolute total income, and the maintenance of national share of income, is made more difficult by the state's lower population growth. Therefore, growth must rely more on increases in per capita income.

a Commuter Operating Agency was created to oversee public transit. It distributed subsidies to private rail and bus carriers to support commuter services. But these services, particularly to New York City, deteriorated throughout the 1970s due both to significant funding constraints (three transportation bond issues had failed between 1967 and 1979) and the bankruptcy of the private railroads serving the state and region. This deterioration made New York City a much less desirable place to work and contributed to its sagging economy. Between 1969 and 1979, New York City lost 519,000 jobs, almost 14 percent of its employment base.

NJ Transit, an independent arm of the New Jersey Department of Transportation (NJDOT), was created in 1979 to confront the deteriorated state of bus and rail commuter systems and to take over the bankrupt rail services. Its goal was not only to repair and expand existing services but to forge a seamless transit system from disconnected private bus and rail companies built a century earlier. In addition, voters approved a transportation bond issue in 1979 that included resources for transit rehabilitation. Both events initiated the long process of transit revitalization. The subsequent passage of the Transportation Trust Fund in 1984 provided further funding just as the bond issue's resources were depleted.

NJ Transit's improved service certainly contributed to New York City's economic upswings of the 1980s and 1990s. Reversing the sharp decline of the 1970s, New York City added 263,000 jobs in the 1982–1989 economic expansion and 441,000 jobs in the expansion between 1992 and 2000. These were primarily knowledge-based service jobs located in a revitalized Manhattan office market that thrived during both growth periods.

This improved accessibility to New York City's jobs also fed back into New Jersey's residential real estate markets. The opening of Midtown Direct service in 1996 provides a case example of the economic effects of transportation investment. Midtown Direct, one of NJ Transit's largest capital investment projects, provided rail linkages via the former "Kearny Connection," enabling trains on the Morris & Essex Line to directly access the Northeast Corridor and to proceed to Pennsylvania Station in Manhattan without transferring. Previously, all trains on the Morris & Essex Line terminated in Hoboken, where midtown commuters would have to transfer to PATH. This produced much easier and shorter commutes for large numbers of commuters and communities.

It also produced higher real estate value increases in those communities having direct access to this new service.⁵ The extraordinary positive economic impact of public rail accessibility in the closing period of the twentieth century replicated that of private rail service in the early period of the century—higher property values in the affected suburban communities.

Moreover, the impact of Midtown Direct service following the sustained upgrading of NJ Transit helped shift the location advantage in New York City to midtown Manhattan.⁶ The parallel upgrading of New York's Metropolitan Transportation Authority's suburban commuter rail service also contributed to accessibility improvements to Midtown and reinforced this new economic advantage. Even before 9/11, rents and occupancy levels in the Midtown office market far exceeded those of lower Manhattan.

Planning is currently under way for the construction of a new commuter rail tunnel under the

⁵ Juliette Dellecker Michaelson, "Walk-and-Ride: How MidTOWN DIRECT Has Affected Residential Property Values within Walking Distance of Train Stations" (Master's thesis, Columbia University, May 2004).

⁶ Ridership on NJ Transit trains to Manhattan increased by more than 50 percent between 1992 and 2000, while PATH ridership increased by 35 percent. And most of the new jobs added in Manhattan in the 1980s and 1990s were filled by commuters, not by Manhattan residents. See Rosemary Scanlon and Edward S. Seeley, Jr., *At Capacity: The Need for More Rail Access to the Manhattan CBD* (New York University, Rudin Center for Transportation Policy & Management, November 2004).

Hudson River connecting to a new passenger train station at 34th Street in Midtown. The tunnel and station are seen as pivotal to the economic future of New York City. Economic expansion and employment growth have become constrained by transportation infrastructure capacity. NJ Transit services to Penn Station have recently been increased significantly, and the daily volume of riders, now at more than 40,000 commuters, is near capacity. The rail tracks to Penn Station date from the early years of the twentieth century, and there is no ability to accommodate additional train traffic.

New Jersey residents hold an estimated 75 percent of all new jobs in Manhattan. Further employment growth in the City is dependent on increasing access across the Hudson River. Although total employment in New York City remains over 200,000 jobs below the most recent peak in 2000, development on the West Side and redevelopment in Midtown require additional commuter capacity. The proposed rail tunnel and station would also significantly reduce car and bus traffic across the Hudson River, alleviating the congestion that routinely chokes Midtown and the vehicle crossings over and under the Hudson. These traffic jams impose significant and rising costs on commuters and businesses and damages to the competitive position of the region.

The proposed new rail tunnel and rail station are examples of the type of large increment to transportation capacity that could significantly benefit the economy on both sides of the Hudson River. The project, of course, would have to compete for funding with other similarly large transportation infrastructure proposals, but it demonstrates the close linkages between mobility, access, and economic success. The existing passenger rail infrastructure—Pennsylvania Station and its track lines—is now nearly 100 years old. The regional economy has changed several times and grown by several magnitudes since the infrastructure was constructed. Proponents of the project argue it is now time to enable the regional economy to continue to change and expand. The new, additional

transportation infrastructure would allow workers to access jobs and employers to access workers in a more cost-efficient manner.

Warehouse, Distribution, and Logistics

Another powerful indication of the linkage between transportation and economic advantage is the state's unique role in logistics and distribution. New Jersey is the third largest commercial industrial warehouse center in America, trailing only Los Angeles and Chicago. The state has more than 750 million square feet of warehouse space predicated on a series of transportation/goods-movement assets: Port Newark, the Elizabeth-Port Authority Marine Terminal, Newark Liberty International Airport, the New Jersey Turnpike, the Interstate system, the state highway network, and extensive freight rail facilities. Distinct economic submarkets are port-driven distribution sectors, regional (New York metro) and superregional (Boston to Washington) functions, and Manhattan/New York City-serving sectors.

The economic linkage extends even further than warehousing. Because of the state's dominant East Coast position in warehousing/distribution and efficient access to international air travel, New Jersey has become the site of U.S.-based headquarters of foreign corporations that heavily utilize New Jersey's ports and logistical system. Thus, the state's white-collar service sector also reaps benefits from the transportation assets that make New Jersey so attractive to foreign distributors and their headquarters management functions.

Port Investment and Economic Development

The economic impact of transportation-dependent warehousing/distribution functions has been bolstered by the recent resurgence in ship traffic to New Jersey's ports. In relative decline through most of the post-World War II period, marine traffic started to experience explosive growth as the twentieth century came to a close. Trade through New Jersey's ports, once increasingly challenged by other North American seaports, grew at twice the

national average since 1998. This resurgence reflected a change in global shipping and the emergence of China as the global factory floor. New super-sized “warehouse” ships now sail directly from Asia and provide “all water” route services to the East Coast. This increasingly is replacing the “land bridge,” although not yet surpassing it, where goods are unloaded on the West Coast and transported to the New Jersey–New York region by rail.

This renaissance, however, will continue only if based on sustained investment by The Port Authority of New York and New Jersey and the Army Corps of Engineers. Capacity constraints—including the lack of deep channels to accommodate the new generation of freighters—have the potential to abort future growth. Considerable waterfront-investment projects, rail yard expansions, new warehouses/distribution centers, and the largest and most expensive harbor-dredging projects in the nation’s history are currently under way.⁷ The economic benefits of the shipping resurgence have been substantial to date. Longshoremen jobs, long in decline, have started to grow again, and employment in port services, transportation, warehousing, and marine insurance and banking has increased. But continued port investment will be required to increase capacity to meet demand, or that demand—and its economic and employment benefits—will migrate to more visionary East Coast competitors.

Ferry Service and Economic Growth

Until the opening of service of the Hudson and Manhattan “Tubes” in 1908 and the Pennsylvania Railroad tunnel under the Hudson River in 1910, ferry service provided public transportation links between New Jersey and New York. But by the early 1970s, as bridges and tunnels were built and rail service declined, ferry service between New Jersey completely disappeared. In 1986, privately owned NY Waterway began ferry service between Weehawken

and midtown Manhattan. The system then expanded in tandem with the development of “Wall Street West” and the “Hudson River Gold Coast,” typified by the new office towers along the New Jersey side of the Hudson River. This development would have been much more limited in scale and location without the provision of ferry service.⁸ Today, because of the scale of development along the “Gold Coast,” Hudson County is the largest Class A office market in New Jersey, surpassing Morris and Bergen Counties. And Jersey City now has more office space than downtown Pittsburgh.

Conclusion: Back to the Future, or Further Progress?

With the depletion of the Transportation Trust Fund, New Jersey faces a 1970s redux when economic growth lagged, employment increases slowed, and other regions of the country surged ahead on the strength of transportation infrastructure advantages. Will New Jersey’s future revisit the past when, in the absence of appropriate investment in transportation, the state suffered economically?

For the past six years, through good times and bad, New Jersey has generally outperformed the nation. This is attributable to several factors—a balanced business sector, the state’s high income and wealth position, and its well-educated workforce. However, a fundamental underlying reason for New Jersey’s economic success is the investment the state previously made in its multimodal transportation system. The close linkage between economic development and transportation capacity requires public action to ensure that the strong performance of the New Jersey economy continues in a national

⁷ See Eric Lipton, “New York Port Hums Again, With Asian Trade,” *New York Times*, November 22, 2004.

⁸ In addition, PATH service was also critical in providing access to the new office complexes.

and world economy dominated by ever-increasing competition and technological change.

In the postwar era, New Jersey's economy and residents benefited enormously from the 1,900 miles of state highways built before World War II, the 142 miles of the New Jersey Turnpike, and the 164 miles of the Garden State Parkway. An additional 415 miles of the Interstate Highway System in New Jersey were completed in 1992. Since then, the state has added 625,000 jobs, translating to 625,000 work trips each morning *and* each evening that consume much, if not all, of the new transportation capacity provided by the Interstate roads.

No equivalent addition to highway infrastructure is in New Jersey's future as land-use controls, environmental objections, and constraints on land availability preclude new road projects of the scale of the highway investments of the twentieth century.

Instead, continual and significant upgrades of all aspects of the state's transportation infrastructure are required—rail, port, and highway. The expansion for 35 miles of the New Jersey Turnpike between Exits 8A and 6 is the type of project that will characterize future road and rail infrastructure investments. The goal of such investments is to improve the existing system so as to reduce cost increases on businesses, workers, residents, and governments that result from transportation constraints. Such cost increases have the potential to significantly damage the state's economy and reduce the rate of growth of income, jobs, and private investment.

A future that portends transportation gridlock distressingly and convincingly conveys, perhaps like no other single aspect of quality of life, the prospect of intolerable time and money costs of operating and living in New Jersey. If congestion and transportation costs rise significantly because of inadequate investment, existing businesses and residents will increasingly choose to relocate outside of the state and region. Moreover, location choices

by potential new businesses and new households will also be negatively affected.

The magnitude of the costs imposed on business and individuals from inadequate transportation is staggering. Studies of highway congestion costs indicate that the current costs of congestion in the region are very significant and have been increasing rapidly. The estimated annual costs of congestion in the NY-Newark, NY-NJ-CT urban area were \$7.1 billion in 2002, up 54 percent since 1996.⁹ Out of 85 urban areas studied, the region ranked second in total congestion costs and in total annual hours of delay (394.7 million hours). The congestion costs incurred by each peak-time traveler were approximately \$900 per year, up by 31 percent from 1996. Each peak-time traveler experienced 50 hours of congestion delays annually. Total congestion costs for the Philadelphia urban area, which includes significant parts of New Jersey, were estimated at \$1.8 billion in 2002, tenth highest in the nation. Total congestion costs of the Philadelphia region have increased by 95 percent since 1996.

These estimates of congestion costs do not include the delay costs experienced by rail commuters, by businesses using rail and port connections, and by air travelers due to transportation capacity and system constraints. Since transportation investment requires significant time from authorization to implementation, further increases in congestion costs of the magnitude experienced recently have the potential to significantly damage the region's economy. Delay in investing to ensure the state's collective mobility begets decline and decay in the ability of people and businesses to live, work, and function in New Jersey. This imperative cannot be delayed. New Jersey must take the high road in making effective and immediate decisions to provide the transportation investments required to maintain the quality of its residents' lives and enhance their ability to work in a world economy where success is ever more dependent on access, speed, and movement. ■

⁹ See David Schrank and Tim Lomax, *The 2004 Urban Mobility Report* (Texas Transportation Institute, Texas A&M University System, September 2004). Congestion costs include the money value of time, commercial costs per hour of delay, and additional fuel costs.

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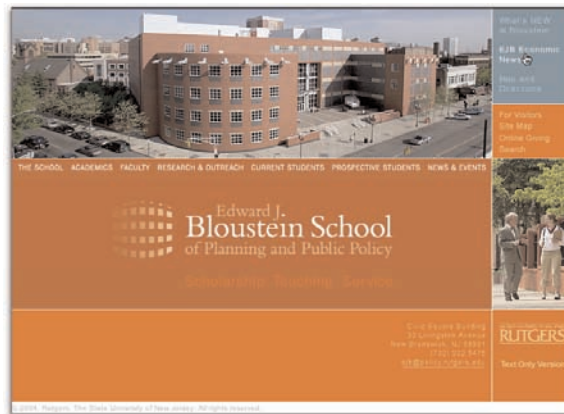
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