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**One of TACIR's goals is to bring useful information to Tennessee's residents and to everyone who is interested in understanding the challenges public policy makers face. As part of that continuing effort, we are preparing a policy brief to examine the expected onset of rural interstate highway congestion, which may be linked to specific sectors of the Tennessee economy. The brief should be available in early 2012.**



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# Transportation's Share of Tennessee's GDP Matches Transportation's Share of the U.S. Economy *and Why That's Good News*

*by Reuben Kyle, PhD, and Kale Driemeier, MCRP*

Transportation literally drives the economy, as raw materials are delivered to manufacturers who in turn send their finished products on to their markets. The U.S. interstate highway system provides the arteries between agricultural, manufacturing, distribution, and retail points throughout the country. Tennessee's location in the mid-South puts our state at the center of both the north-south and east-west distribution corridors, with four major interstates traversing the state, yet much of that traffic has both an origin and a destination outside of Tennessee. So, how important is transportation to Tennessee's economy and how does Tennessee compare to other states?

To better understand the role and importance of transportation to the economy of Tennessee, an estimate of the ratio between the cost of transportation services and the state gross domestic product (GDP) was calculated for all 50 states and the District of Columbia (see Table 1). The result shows that Tennessee's ranking is directly in line with the national percentage (5.2%) and is in the middle of the range of values for all states, from a low of 4.0% for Delaware to a high of 7.4% for Wyoming. Among the southeastern states, Tennessee's transportation dependency ranks slightly below the regional percentage of 5.5%. The map on page 3 shows the breakdown of states by their transportation dependencies.

Tennessee's ranking in the middle range is good news as it will result in less negative economic effect from fluctuations in gas prices and shipping costs yet still result in a positive effect when shipping and manufacturing activities increase.

The transportation percentages of GDP reflect the structure of each state's economy. The two states most dependent on transportation (Wyoming and Alaska) have economies that are also heavily dependent on natural resources, mining, and agriculture (including fishing), all of which entail high transportation costs (see Table 2). The states with the lowest ratios tend to have economies in which information and financial services constitute

a large share of their state GDPs. Transportation is a smaller element in the production of those services. Consequently, these states' economies are much less dependent on transportation.

Still, to some extent, this analysis understates the importance of transportation for Tennessee. A report by the Federal Highway Administration indicates that, among the 50 states, more ton-miles of truck shipments pass through Tennessee than through any other state. One consequence of this situation is that Tennessee's interstate highway capacity is heavily consumed by shipments with little connection to Tennessee's economy.

**Table 1. Transportation Industry Component of Gross Domestic Product (GDP) by State**
**(GDP in millions)**

| Rank | State | GDP 2009 | Transportation Percent of GDP | Rank | State | GDP 2009 | Transportation Percent of GDP |
|---|---|---|---|---|---|---|---|
| 1 | Wyoming | $36,760 | 7.4% | 27 | Maryland | $285,116 | 5.3% |
| 2 | Alaska | $45,861 | 7.1% | 28 | Maine | $50,039 | 5.3% |
| 3 | West Virginia | $61,043 | 6.3% | 29 | Florida | $732,782 | 5.3% |
| 4 | North Dakota | $31,626 | 6.2% | 30 | Missouri | $237,955 | 5.3% |
| 5 | Oklahoma | $142,388 | 6.2% | 31 | Washington | $331,639 | 5.3% |
| 6 | Montana | $34,999 | 6.2% | 32 | Indiana | $259,894 | 5.3% |
| 7 | New Mexico | $76,871 | 6.1% | 33 | Virginia | $409,732 | 5.3% |
| 8 | Louisiana | $205,117 | 6.1% | 34 | Oregon | $167,481 | 5.2% |
| 9 | Mississippi | $94,406 | 6.0% | ***NA*** | ***United States*** | ***$14,014,800*** | ***5.2%*** |
| 10 | Hawaii | $65,428 | 5.9% | 35 | Tennessee | $243,849 | 5.2% |
| 11 | Texas | $1,146,650 | 5.9% | 36 | Colorado | $250,664 | 5.2% |
| 12 | Kentucky | $155,789 | 5.8% | 37 | North Carolina | $407,032 | 5.2% |
| 13 | Alabama | $166,819 | 5.8% | 38 | Michigan | $369,671 | 5.2% |
| 14 | Arkansas | $98,795 | 5.8% | 39 | Ohio | $462,015 | 5.1% |
| 15 | Idaho | $53,661 | 5.8% | 40 | Wisconsin | $239,613 | 5.1% |
| 16 | South Carolina | $158,786 | 5.7% | 41 | Minnesota | $258,499 | 5.1% |
| 17 | Nebraska | $86,411 | 5.7% | 42 | California | $1,847,050 | 5.0% |
| 18 | Nevada | $125,037 | 5.6% | 43 | Illinois | $631,970 | 5.0% |
| 19 | Kansas | $122,544 | 5.6% | 44 | Pennsylvania | $546,538 | 5.0% |
| 20 | District of Columbia | $98,892 | 5.5% | 45 | New Hampshire | $59,086 | 4.9% |
| 21 | Arizona | $249,711 | 5.5% | 46 | New Jersey | $471,946 | 4.9% |
| 22 | Utah | $111,301 | 5.5% | 47 | Rhode Island | $47,470 | 4.9% |
| 23 | Georgia | $394,117 | 5.4% | 48 | Massachusetts | $360,538 | 4.5% |
| 24 | South Dakota | $38,255 | 5.4% | 49 | New York | $1,094,100 | 4.5% |
| 25 | Vermont | $24,625 | 5.3% | 50 | Connecticut | $227,550 | 4.4% |
| 26 | Iowa | $136,062 | 5.3% | 51 | Delaware | $60,660 | 4.0% |

Source: TACIR analysis of data from the Bureau of Economic Analysis, U.S. Department of Commerce, and the Research and Innovative Technology Administration, U.S. Department of Transportation.

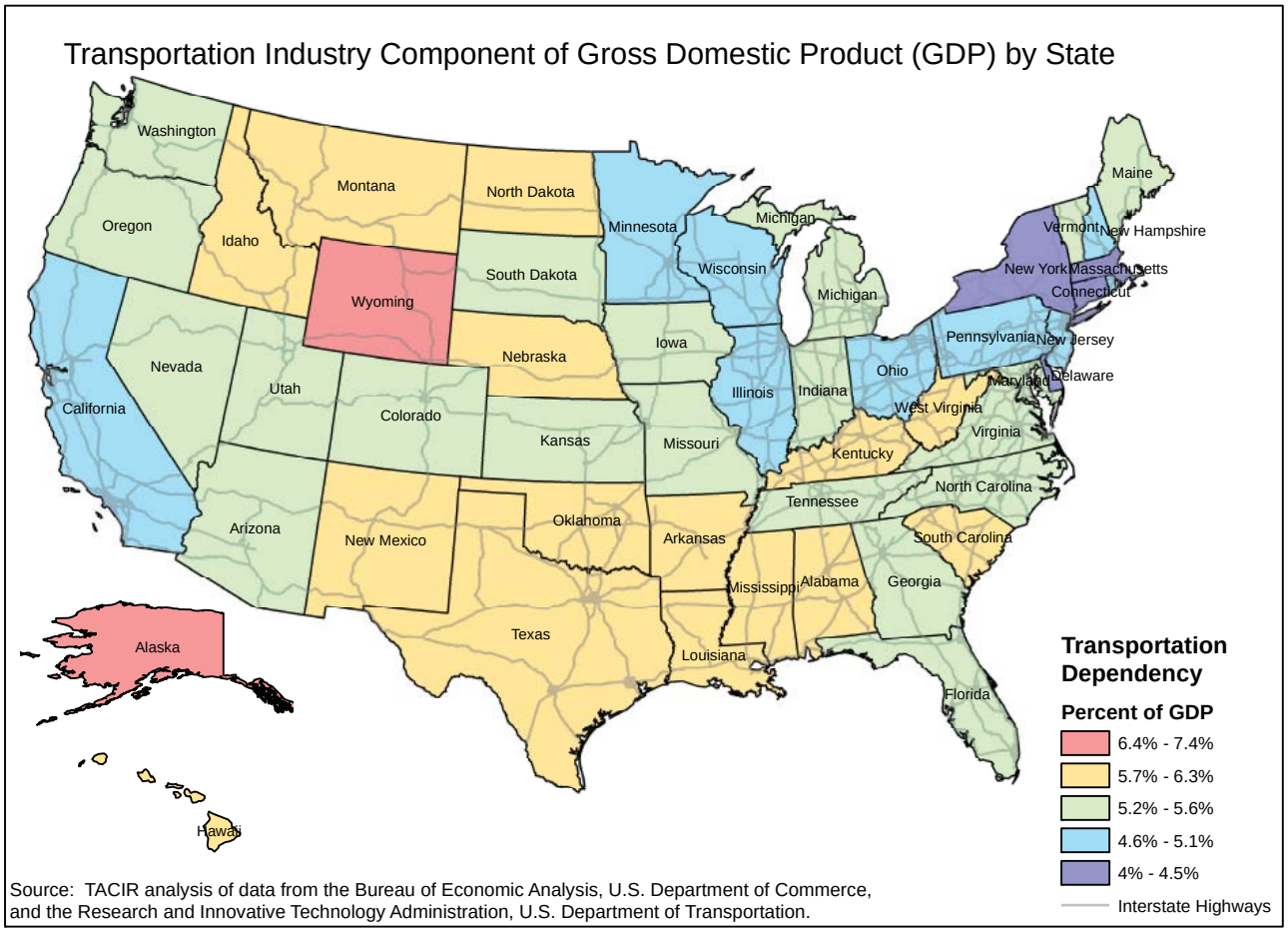
**Table 2. Total Transportation Services Cost by Commodities: 1997**
**(cents per dollar of commodity output)**

| Commodity | Percent Transportation Content |
|---|---|
| Information | 1.2 |
| Financial services | 1.7 |
| Educational and health services | 2.8 |
| Professional and business services | 3.4 |
| Manufacturing products | 4.1 |
| Leisure and hospitality | 5 |
| Other services | 6 |
| Trade | 8.2 |
| Other (primarily government) | 9.2 |
| Natural resources and mining | 9.5 |
| Utilities | 10 |
| Construction | 14.5 |

Source: Transportation Satellite Accounts, Bureau of Transportation Statistics, U.S. Department of Transportation.*

## What goes into TACIR's transportation dependency calculation?

The U.S. Department of Transportation estimated the contribution of transportation services to each of the industries covered by the North American Industrial Classification System (NAICS). In a 2011 report by the Bureau of Transportation Statistics of the U.S. Department of Transportation, transportation satellite accounts were developed as a supplement to the U.S. Input-Output Accounts.* These transportation satellite accounts provide data on the costs of both for-hire transportation and in-house transportation services. The report aggregates direct transportation costs in cents per dollar of commodity output in a grouping of 12 industry sectors, each of which includes several NAICS industries.




Source: TACIR analysis of data from the Bureau of Economic Analysis, U.S. Department of Commerce, and the Research and Innovative Technology Administration, U.S. Department of Transportation.

*Bureau of Transportation Statistics, Research and Innovative Technology Administration, 2011. Transportation Satellite Accounts: A Look at Transportation's Role in the Economy. Washington, DC: U.S. Department of Transportation. http://www.bts.gov/publications/transportation_satellite_accounts/2011/ (accessed November 1, 2011).

To estimate the total cost for each sector in a state's economy, the gross domestic product for all 50 states and the District of Columbia was obtained from the BEA of the U.S. Department of Commerce. The latest BEA data that had the detail needed to ensure that the GDP sectors matched the Transportation Satellite Accounts (TSA) transportation cost data was from 2009. The dollar value of output for each of the 12 sectors was multiplied by the corresponding TSA transportation cost to arrive at the total transportation cost for the sector. Those costs were then summed for all sectors of the state's economy.

To provide a measure of the relative importance of transportation services, the total transportation cost is divided by the state's GDP. Thus, for Tennessee, the transportation cost percentage is 5.2% of the state's GDP of $243.8 billion for 2009. There is a slight but statistically relevant negative relationship between the transportation dependency percentage and the size of the state's economy as measured by its GDP; in other words, as GDP rises, transportation dependency decreases. The implication is that larger states tend to have more diverse economies, and thus, the transportation-dependent industries account for a relatively smaller share of those states' economies.