

## 1997 U.S. Transportation Satellite Accounts

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### Abstract:

This paper presents an expansion of the Transportation Satellite Accounts (TSAs) from the 1992 and 1996 TSAs by incorporating the other private modes of transportation, i.e., aviation, water, and rail. Currently, the TSAs provide estimates for private trucking portion of private transportation in the United States. Though important, there is a missing link of the other private modes of transportation, and incorporating the other private modes of transportation provide a complete analytical model to understand the effects of household use of transportation on the economy. The 1992 TSAs liked its predecessor's follows the analytical framework of the Transportation Satellite Accounts which maintain strong ties to the US Input-Output Accounts and the National Income and Product Accounts (NIPA).

## Section 1: Introduction

This paper presents estimates for the transportation satellite accounts (TSAs) for 1997<sup>1</sup>, which includes own-transportation for rail, aviation, and water.<sup>2</sup> Additionally, the estimates for own-account transportation for trucking are simply an update from the 1992 and 1996 TSAs as prepared by Fang et al. (1992, 1996). The TSAs are an extension of the U.S. Input-Output Accounts and satellite accounts rearrange the I-O accounts for the purpose of analyzing a sector of the economy, which cannot be fully answered, by the I-O accounts. (See the box “Satellite Accounts” in the beginning of Section 2.) Put in another way, the TSAs measure economic activity by bringing together components of that activity wherever they occur in the economy, especially those activities that are internal to a firm. In this paper, this activity is intrafirm or own-account transportation activities which are mainly being investigated. For example, transportation activities that are conducted by a chemical company’s railcar fleet when it moves its chemicals from its production facilities to its retail customers.<sup>3</sup> The present TSAs identify and aggregate these transportation activities whether they are purchased from other firms or performed by other units in the same firm and present the data on an industry and commodity basis. Giving this rearrangement of the I-O accounts, the TSAs can answer such questions as

1. What is the contribution of transportation to the gross domestic product?
2. What industries are major users of transportation?
3. What inputs are required by transportation from other industries?

As stated earlier, the development of the TSAs rely on the data from the I-O accounts and other data sources related to transportation. The I-O accounts primarily reveal information about the for-hire aspect of transportation while the own-account transportation is not identified in the published I-O accounts. More specifically, own-account transportation are included as part of the production process in the I-O accounts but in the TSAs, own-account transportation are treated as market transactions in the TSAs. Thus, the TSAs provide a more comprehensive measure for all transportation activities both in terms of their contribution to the economy and uses of inputs from other industries. The balance of this paper is as follows. Section 2 provides a background and a conceptual overview of the Transportation Satellite Accounts (TSAs). Section 3 discusses the methodological overview and data requirements in the development of the TSAs. Section 4 presents the preliminary estimates of the 1997 TSAS the results from the TSAs, and Section 5 concludes the paper.

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<sup>1</sup> The estimates for the 1992 and 1996 TSAs for own transportation of rail, water, and aviation will be forthcoming in a comprehensive report prepared by the U.S. Department of Transportation, Bureau of Transportation Statistics. A similar report has been prepared for own-transportation for trucking.

<sup>2</sup> Own-account transportation for rail would be firms (private shippers) owning their own railcars and using the services (for-hire) of Class I and II railroads to move their goods. Also own-account transportation for water would be firms owning their own water vessels while for-hire services would be these firms using tugboat services and harbor services to move their goods. Finally, for aviation, own-account transportation would firms that own their aircraft to move goods and/or people to various locations.

<sup>3</sup> To be equitable to other modes of transportation, other examples will be provided. For water transportation, the transportation activities for dredging company when it moves its heavy equipment from its site to a dredging site for a customer. Finally, for aviation, transportation activities for a

## Section 2: Background and Conceptual Overview of the Transportation Satellite Accounts

### **Satellite Accounts**

In general, satellite accounts are frameworks designed to expand the analytical capacity of the basic economic accounts without overburdening them with details or interfering with their general-purpose orientation. Satellite accounts are meant to supplement rather than to replace existing accounts and organize information in an internally consistent way that suits a particular analytical focus, while maintaining links to the existing national accounts. They typically expand a particular segment of existing accounts with more details and additional dimensions of information, including nonmonetary information. They also may use definitions and classifications that differ from those in the existing accounts. Depending on the analytical focus, the production boundary of the national accounts can be maintained or modified (BTS, 1999). The existing Transportation Satellite Accounts (TSAs), as a supplement to the U.S. Input-Output (I-O) Accounts, are developed to cover both for-hire transportation services (identified as transportation industries within the U.S. I-O accounts) and in-house transportation services conducted by businesses for their own use (not separately identified as transportation in the I-O accounts). Therefore, compared with the U.S. I-O accounts, the existing TSAs provide a more comprehensive measure of *transportation services provided by the business sector* of our economy.

The current I-O accounts and other data sources do not provide a comprehensive view of transportation activities in the economy. More specifically, the I-O accounts only identify transportation on a for-hire basis, not transportation related activities provided by a business for its own use. That is, the measurement of transportation activities in the economy consists of two components: for-hire and own account activities. For the most part, the available data on transportation activities as collected by a myriad of sources primarily collect data on physical characteristic of the transportation system, i.e., number of trips taken, number of people transported, tonnage of goods transported, and a number of firms providing transportation services. Thus, a major drawback is that these data are not measured in monetary amounts that provide more relevant information for economic analysis. More importantly, the disseminated data are often mode specific such that information on an industry level is not available. As a consequence, these data in its present form cannot be integrated effectively with the I-O accounts for examining transportation activities to the economy.

As with the 1992 and 1996 TSAs for own-account transportation for trucking, the present TSAs includes all activities related to transportation and related structures, i.e., airports, highways, water port facilities as it pertains to the movement of cargo and passengers. Table 1 provides a listing and the major components for the six (6) for-hire transportation industries from the I-O accounts and a single entity for own-account transportation as used in the present TSAs.

Table 1  
Components of Transportation Industry and Industry Output

Industry	Industry components	Industry output
<b>For-hire transportation industries</b>		
Railroads and related services; passenger ground transportation	Railroads, including AMTRAK Switching and terminal companies Freight car rental Private local and suburban passenger transportation Intercity, rural, and other bus services, including charter and school buses Bus terminal and service facilities Taxicabs	Total operating revenues <i>Less:</i> Rental receipts
Motor freight transportation and warehousing	Trucking and courier services, except air Public warehousing and storage Trucking terminal facilities	Total operating revenues <i>Plus:</i> Trucking receipts of construction firms Warehousing revenues of wholesalers Delivery and storage charges of retailers <i>Less:</i> Merchandise sales  Rental receipts
Water transportation	Deep sea and other water transportation of freight Water transportation of passengers Services incidental to water transportation, including marinas and other services	Total operating revenues <i>Plus:</i> Docking and boat cleaning and maintenance at retailers Federal excise tax on cruise ship receipts <i>Less:</i> Merchandise sales Boat repair at marinas
Air transportation	Domestic and international passenger and freight air transportation Airport terminal services	Total operating revenues <i>Plus:</i> Federal taxes on air fares, air freight, and air facilities Aircraft storage and services by wholesalers and retailers <i>Less:</i> Rental receipts Flight training and instruction
Pipelines, freight forwarders, and related services	Refined petroleum pipelines Other pipelines, including crude petroleum and natural gas Arrangement of freight and passenger transportation, including freight forwarding Miscellaneous services incidental to transportation	Total operating revenues <i>Plus:</i> Pipeline receipts by wholesalers <i>Less:</i> Rental receipts
State and local government passenger	State and local government passenger transit	Total operating revenues <i>Less:</i> Operating subsidies

transit		
<b>Own-account transportation industries</b>		
Own-account transportation	Private trucking and bus operations in all nontransportation industries	Total operating expenses of highway motor vehicles and overhead expenses <i>Less:</i> Expenses on advertising, depository institutions, security and commodity brokers, and other services unrelated to own-account transportation operations

The TSAs maintain conform to the I-O accounts in the following ways. First, the valuation conventions used in the I-O accounts are also used in the TSAs, i.e., all transactions are valued in producers' prices. Second, the industry and commodity classification system and special definitions as given in the I-O accounts are also used in the TSAs. Third, the total value added for all industries from the I-O accounts is used in the TSAs. Finally, the measurement of own-account transportation in the TSAs is similar to the I-O accounts. That is, the intermediate inputs and the valued-added inputs associated with own-account transportation such as capital consumption allowance (depreciation) and labor costs are redefined to the other industries in which the activities are primary. In fact, these are also redefined in the TSAs but to a new industry called own-account transportation. The primary distinction between the I-O accounts and the TSAs is the creation of a new industry called own-account transportation. Also the own-account transportation commodity is produced by the own-account transportation industry, and the own-account transportation is the only commodity produced. The treatment of the own-account transportation provided by an industry for owns use in the TSAs is different from the treatment of for-hire transportation used by an industry in the I-O accounts. In the TSAs, own-account transportation used by an industry includes the costs of operating its own trucks and buses; railcars; aircraft; and marine vessels, and it does not matter whether the intermediate inputs or final goods are moved. On the other hand, in the I-O accounts for-hire transportation by an industry includes the transportation expenses associated with the moving of intermediate inputs of the industry plus expenses incurred in the use of transportation.<sup>4</sup>

Data sources do exist for the other modes, but the data sources for the other modes are not as comprehensive as for private trucking TSAs. The data sources that were used in the 1997 TSAs are presented in Table 2:

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<sup>4</sup> For example, if a for-hire railcar carries coal from a coal mine to an electric power facility, the I-O accounts use table shows this activity as the electric power facility using the rail services, whether the services are purchased by the coal mining company or the electric power facility. In contrast, the use table of the TSAs would show the coal mining company using the services, or the electric power facility using the services if the own account rail of the electric power provides the service.

Table 2  
Sources of Data for the 1997 Transportation Satellite Accounts

Data	Sources
Input-Output Accounts, 1992, 1996, and 1997	U.S. Department of Commerce, Economic and Statistics Administration, Bureau of Economic Analysis, Benchmark Input-Output Accounts for the U.S. Economy, 1992, and Input-Output Accounts for the U.S. Economy, 1996, and detailed underlying data files for these accounts; and Input-Output Accounts for the U.S. Economy, 1997, and detailed underlying data files for these accounts.
Transportation and nontransportation use of energy <sup>a</sup>	Transportation energy data from Department of Energy (DOE)
Distribution weights <sup>b</sup>	1996 Truck Inventory and Use Survey (TIUS) from the Census Bureau <i>Official Railway Equipment Register</i> (“Yellow Book”) for rail Access to a confidential database by the General Aviation Manufacturers Association (GAMA) for aviation Army Corps of Engineers' Master Vessel File and the Waterborne Detailed Data File for water transportation
Other commodity inputs <sup>c</sup>	1997 annual I-O accounts from the U.S. Department of Commerce, Economic and Statistics Administration, Bureau of Economic Analysis

<sup>a</sup> The shares of total fuel and other transportation-related commodity outputs used for transportation purposes and across different transportation modes.

<sup>b</sup> The distribution weights used to allocate the total consumption of fuel and transportation-related commodities for transportation purposes across industries.

<sup>c</sup> Commodities that are not transportation-specific, but that are used in the production of transportation services.

### Section 3: Preliminary Results from the 1997 TSAs

The preliminary estimates<sup>5</sup> for the 1997 TSAs for private trucking, water, air, and rail are presented as follows:

#### **INHOUSE TRANSPORTATION FOR 1997**

<b>Mode</b>	<b>GDP Amount</b>	<b>Percent of Total GDP</b>
Aviation	4.5 billion	0.0541%
Water	9.5 billion	0.1142%
Truck	241.5 billion	2.9032%
Rail	5.0 billion	0.0601%

#### **FOR-HIRE TRANSPORTATION FOR 1997**

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<sup>5</sup> These are preliminary estimates and these estimates are subject to revision. This does not represent the complete TSA and the estimate is subject for possible revisions. But we don't expect the rail number to be too different from this preliminary estimate.

<b>Mode</b>	<b>GDP Amount</b>	<b>Percent of Total GDP</b>
Aviation	63 billion	0.7574%
Water	10.9 billion	0.1286%
Truck	112.3 billion	1.3505%
Rail	42.7 billion	0.5144%

These preliminary estimates are presented on a value-added basis. Also the estimate for private trucking has been verified with the 1992 and 1996 TSAs and the for-hire trucking/bus estimate was also verified with 1992 and 1996 Input-Output accounts. The value of GDP is 8.3 trillion dollars in 1997.

Put in context, these preliminary estimates are compared to the 1996 for hire estimates. For-hire rail in 1996 was about 41 billion dollars. Also for-hire trucking was 101 billion dollars (in-house trucking in 1996 was about 220 billion dollars).<sup>6</sup> For the modes of aviation and water, their 1996 for-hire estimates are as follows: water transportation was 11.2 billion dollars and aviation was 59.3 billion dollars.

#### Section 4: Conclusions

The expansion of TSAs to include other modes of transportation provides a more comprehensive picture of the magnitude of transportation activities which take place in the economy. Also the magnitude of transportation in the economy can be measured from two perspectives: as a share of the total output of the economy and as a share in gross domestic product (GDP). GDP is the net output of the economy while total output represents the sum of GDP and all of its intermediate inputs. Finally, the share in total output tells more about the size of the production, while the share in GDP tells more about its real contribution to the national economy as presented in Section 4.

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<sup>6</sup> On an interesting note, in 2003 the top twenty for-hire trucking companies generated revenue of about \$105 billion. This was cited in the "The 2004 Transport Topics 100 Top For-Hire Carriers," Transport Topics, July 19, 2004.

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