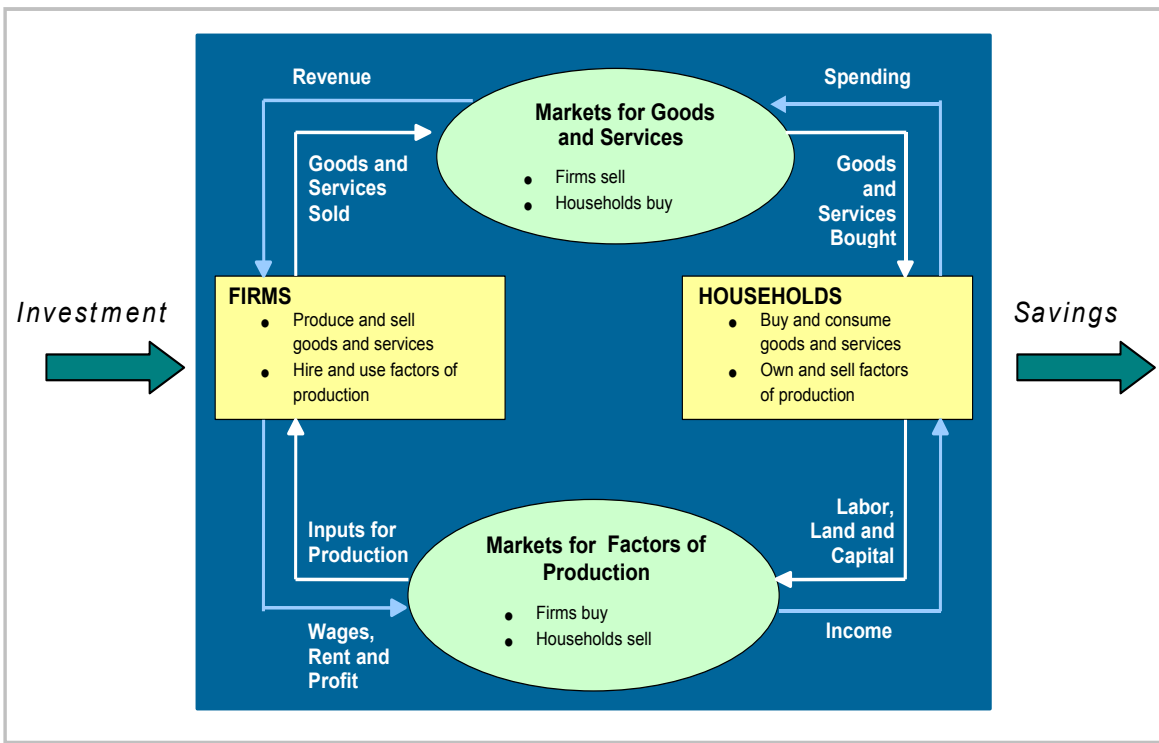


2 ECONOMIC ANALYSIS FRAMEWORK

In order to present the economic impact of the Ohio Hub Study, it is important to understand the character of the different economic benefits to be quantified, and from a state and local perspective the impact of transfer payments³ that arise from building and developing the system.

A model of the economy [12] shows that an economy is circular in character, with two equal sides (see Exhibit 2.1). On one side of the economy is the consumer side – the market for goods and services – in which consumers buy goods and services by spending the income earned by working for a commercial enterprise. Consumers also save money and invest that into firms as a capital contribution. An analysis of the impact of a transportation investment in the market for goods and services quantifies the consumer surplus of projects, by showing how much money individuals save because a given project (i.e., the highway improvement) reduces their cost of travel, or makes their travel more efficient.

Exhibit 2.1: Simple Economic Model



The notion that a transportation project can be worthwhile if travel is made more cost effective is based on the idea that not only the cost but the time of a trip has value. This maxim is agreed to by most transportation companies and by business travelers as well as by both academia and important transportation authorities such as the United States Department of Transportation. Additionally, academic and empirical research has shown that this concept holds true for commuters and recreational travelers as well [13].

³ A 'transfer payment' is the redistribution of an economic benefit to the government, corporation or individual. See: [11], pp.: 75-80.

Considerable research has been carried out to both identify the theoretical justification for value of travel time and to quantify its value.

On the other side of the economy is the market for factors of production, and most importantly, the market for land, labor and capital, which individuals provide to firms in exchange for wages, rent and profit. From the perspective of policy makers and the local community, this side of the economy is very interesting as it shows how investment in a new transportation infrastructure increases the efficiency of the economy and creates new jobs, income and wealth, and expands the tax base.

One of the most important aspects of the circular economy model is that it shows that any project has two impacts, one in the consumer market – the benefits to users; the second, in the factor of supply side of the economy – the benefit to the community in terms of improved welfare due to increases in jobs, income and wealth. For the economy to reach equilibrium, both sets of benefits must be realized. As such, the benefits of a project are realized twice, once on the demand side and once on the supply side. As a result, there are two ways to measure the productivity benefits of a transportation project, and in theory, both measurements must equal each other [11]. This is a very useful property since in specific analysis one can be used to check the other, at least at the aggregate level. This is very helpful and provides a check on the reasonableness of the estimates of project benefits.

However, in assessing the benefits of a transportation project, it is important not to double-count the benefits by adding supply side and demand side benefits together⁴. It must be recognized that these two sets of benefits are simply different ways of viewing the same benefit. The two markets are both reflections of and measure the same thing. For example, if both sets of benefits equal \$50 million, the total benefit is only \$50 million but expressed in two different ways: travelers get \$50 million of travel cost-benefits and the community gets \$50 million in jobs, income, increased profits and an expanded tax base.

Therefore, if a given transportation project is implemented, equivalent productivity benefits will be seen in both the consumer market for goods and services (as the economy benefits from lower travel times and costs) as well as in the supply side factor markets. In the supply side market, improved travel efficiency is reflected in more jobs, income and profit. For a given transportation investment therefore, the same benefit occurs on both sides of the economy. In the consumer markets, users enjoy lower travel costs and faster travel times. On the supply side of the economy, the factor markets take advantage of the greater efficiency in transportation. As a result, both sides of the economy move to a new level of productivity in which both sides of the economy are balanced in equilibrium.

To measure the cost-benefit of a project to the nation, the USDOT cost-benefit framework uses a demand side analysis to measure the consumer surplus (the value of time savings to travelers as well as resource savings like reduced energy, accidents, and emissions. While supply side spending and productivity benefits are not factors of a USDOT cost-benefit study, they have a very real impact on the performance of the local economy.⁵ Two methods that develop estimates of job and wealth creation are those of the input/output analysis and economic rent. An input/output analysis quantifies the short-term impacts of

⁴ FHWA Web site, Economic Analysis Primer at: <http://www.fhwa.dot.gov/infrastructure/asstmgmt/primer08.htm>

⁵ In a USDOT cost-benefit analysis, capital spending associated with a project is treated as a cost of the project rather than as a benefit to the community. At a local level however, capital spending is considered a benefit. In economic terms, it is a "transfer payment" to a specific community from outside the study area. The reason a local community considers project costs as a benefit is that this transfer of wealth produces a sizeable stimulus to the local economy.

the initial capital investment on direct and indirect jobs created by the construction spending. Capital spending is measured as a cost in a demand side analysis. However, if the capital spending is made by the federal government the transfer of money to build the project is often seen as a 'benefit' by the local community. It is however, more correctly considered as a transfer payment as it is not in itself adding anything to the US economy, even though it is adding to the local economy. In contrast, an economic rent analysis estimates long-term productivity impacts and job creation that directly relate to the improvement in the efficiency of the economy and is similar in size to the amount of consumer surplus generated by the project.

While an input/output analysis shows how the investment of funds will interact and flow to local businesses, an economic rent analysis shows how transportation and the performance of a new transportation facility raises the efficiency of the economy. This efficiency improvement creates jobs and income, and raises local property values to reflect the improved desirability of living or working in the area.

An input/output analysis produces a "static" evaluation that does not capture productivity benefits identified by consumer surplus and economic rent analysis. For example, an input/output analysis shows only the ripple effect of spending money that does not distinguish between building a road (which may have significant productivity benefits) and military or security spending, which at face value does little to improve the performance of the economy.

In total, the jobs created by a project include –

- **Direct construction jobs** for building and operating the transport facility
- **Indirect jobs** created by the ripple effect on local business that the construction expenditures have during the construction period, and finally
- **Productivity-driven jobs** that are attracted by the increased productivity of the new transfer facility and the associated earnings in existing jobs.

The first two job categories are calculated by the input/output analysis, while the third job category, which reflects the long-term restructuring of the economy and productivity benefits, is estimated by the economic rent methodology. The first two categories of job creation are being addressed in report produced by GEM team and are not developed here. The third category of job creation was developed by TEMS, Inc. and is addressed here.

Two effective techniques have been developed for measuring both the demand (consumer surplus) and the supply (economic rent) side of the Ohio Hub regional passenger rail system. In each case the fundamental economic rationale for the technique is discussed and its underlying theory will be evaluated.

Specific methods for applying these two economic theories will be identified and appropriate measurement techniques will be developed. In particular the issue of travel utility (including generalized cost) and its effective measurement will be addressed.