

Transportation and Economic Stimulation

Zdenka Volkánová

University of Economic and Management, Prague 5, Czech Republic

Email: zdenka.volkanova@vsem.cz

Abstract—This paper discusses factors to consider when evaluating transportation economic stimulation strategies. Transportation investments can have large long-term economic, social and environmental impacts. Expanding urban highways tends to stimulate motor vehicle travel and sprawl, exacerbating future transport problems and threatening future economic productivity. Improving alternative modes (walking and cycling conditions, and public transit service) tends to reduce total motor vehicle traffic and associated costs, providing additional long-term economic savings and benefits. Increasing transport system efficiency tends to create far more jobs than those created directly by infrastructure investments. Domestic automobile industry subsidies are ineffective at stimulating employment or economic development. Public policies intended to support domestic automobile sales could be economically harmful in the long run if they increase future energy consumption and transportation system inefficiency.

Index Terms—Transportation, economic, economic stimulation, environmental

I. INTRODUCTION

Economic stimulation refers to policies and investments that increase employment and business activity. Some stimulation strategies are better than others overall because they help achieve additional strategic goals. This is particularly true of transportation investments, which result in durable facilities that have large, long-term leverage effects. For example, one government CZK may attract five state and local matching CZK, which leverages fifty private investments CZK, which influences hundreds of consumer expenditure CZK, causing thousands of CZK in long-term economic, social and environmental benefits and costs.

Walking, cycling and public transit investments help create communities where residents own fewer vehicles, drive less, and rely more on alternative modes, providing various benefits.

It is useful to distinguish between roadway rehabilitation and expansion projects [1]. There is little controversy concerning the value of basic roadway rehabilitation, sometimes called fix it first [2] or asset management (“Asset Management,” [3]). However, there is growing debate over the value of urban highway

expansion (new road links, additional traffic lanes, expanded intersections, etc.) because they tend to induce additional vehicle travel and stimulate more dispersed, automobile-oriented land use development (sprawl).

Much of this debate reflects differences in analysis scope [4]. Highway expansion advocates tend to focus on traffic congestion reduction objectives and ignore the negative effects of induced vehicle travel and sprawl¹. Advocates of investments in alternative modes tend to consider a wider range of impacts and objectives, including traffic congestion reduction, parking cost savings, consumer cost savings, accident reductions, improved mobility for non-drivers, energy conservation, pollution reductions, and public fitness and health.

This paper investigates these issues and describes specific factors to consider when evaluating such investments. It describes various trends that are changing future travel demands, evaluates the long-term economic impacts of various transport policies and programs, and identifies best practices for selecting economic stimulation investments. It evaluates arguments by highway expansion advocates that highway investments are better overall than investments in alternative modes.

II. DIRECT EMPLOYMENT AND BUSINESS ACTIVITY IMPACTS

Transportation project expenditures create jobs and business activity directly. An economic analysis tool called Input-Output Tables is used to quantify the direct and indirect jobs and business activity created by specific expenditures by tracking how dollars flow from one industry to another within a particular jurisdiction, such as a region or country.

For an overview I introduce the basic methods that are used for business valuation:

Care is needed when interpreting this information since the data are aggregated and do not necessarily reflect the specific program or project being considered. Actual economic impacts can vary significantly depending on the type of project and the geographic scale of analysis (local, regional or national).

Because input-output modeling is costly to perform, particularly for a particular situation, it is common to extrapolate available data to a particular situation. For example, the Czech Highway Administration assumes that, on average, a \$1 billion CZK of highway expenditure supported 30,000 jobs in 2011. This number

Manuscript received December 12, 2012; revised January 24, 2013; accepted February 24, 2013.

This paper is Supported by University of Economics and Management.

Project number IG VŠEM – Generátory výkonnosti IG1_2012, corresponding to Supported by University of Economics and Management

¹ Induced travel refers to additional vehicle travel those results from expansion of congested highways. Sprawl refers to dispersed, automobile-dependent, urban fringe land use development.

has been widely applied, although recent statistical analysis suggests that actual impacts are somewhat lower.

Input-output tables are generally static and backward looking in terms for factors such as domestic inputs and productivity, and so will exaggerate future job creation if industries rely more on imported goods or become more productive, both of which are expected to occur in some industries, such as petroleum and automobile production.

This type of economic analysis often assumes that the economy has excess capacity so public projects do not compete for workers, equipment and other resources with other industries – that without these government expenditures the resources would be wasted. This is often untrue. Without government projects a contractor might choose to accept other lower-profit but productive projects.

Expenditures on public transit operations (bus and train maintenance and driving) tend to create relatively large numbers of jobs. According to one study, money spent on public transport produces almost 9% more jobs than roadway repair and maintenance projects, and nearly 19% more jobs than new roadway projects, assuming half the transit funds are spent on new capital projects and half on operations [5]. Transit vehicle purchases tend to have smaller economic impacts because they are mostly imported, although this could change with improved domestic transit vehicle production.

Transportation maintenance and repair projects are generally faster to implement (minimal delay for planning or land assembly), create more jobs per dollar (little money is required for land acquisition or expensive equipment), employ more local workers (fewer tasks require specialized labor), and are more geographically distributed than large highway capacity expansion projects.

III. FUTURE PRODUCTIVITY GAINS

Since other public investments can provide greater short-term employment and business activity per CZK spent, transportation projects would not be selected if economic stimulation were the only objective. Transportation investments justified if they also increase future economic productivity by reducing business transportation costs, such as traffic congestion and energy consumption, or achieve other objectives such as improved mobility for non-drivers. As a result, investments that increase transport system efficiency and diversity, and help create more accessible land use development patterns, can be justified for their long-term economic development benefits.

Conventional project evaluation tends to exaggerate highway expansion economic benefits by ignoring induced travel effects [6]. Urban traffic congestion tends to maintain equilibrium; it gets bad enough to discourage further growth in peak-period vehicle trips. Expanding congested roadways tends to provide only short-term benefit because much of the additional capacity is soon filled with latent demand, peak-period vehicle trips that

motorists will make if roads are uncongested but will forego (they might shift defer the trip, shift route, mode or destination) if roads are congested.

Most highway expansion benefits are captured by consumers; it increases their mobility, allowing motorists to live in more distant suburbs and exurban areas. Only a small portion of these benefits are captured by businesses since commercial vehicles represent only a small portion of total traffic. Although some industrial trends, such as just-in-time production, increase the importance of road transport, other trends, such as telecommunications that substitute for physical travel, reduce its importance. More efficient roadway management, such as congestion pricing, can provide greater economic benefits by allowing higher-value trips (such as freight deliveries and business travel) to outbid lower value trips (such as SOV commuting) for scarce road space.

Conventional project evaluation also tends to undervalue public transportation service quality improvement benefits [7]. High quality, grade separated public transit attracts people who would otherwise drive on congested roadways, which reduces the point of congestion equilibrium (the level of congestion at which travelers reduce their peak-period trips). Although congestion never disappears, it is not nearly as bad as would occur without such transit services. Since transit services experience economies of scale, service quality and cost effectiveness tend to increase as demand grows, providing additional user benefits.

Roadway supply experiences declining marginal benefits: building the first paved highway to a region usually provides significant economic benefits, but each additional unit of capacity provides less net benefits [8].

After analyzing highway investments impacts on local economic activity, Peterson and Jessup (2007) conclude, “some transportation infrastructure investments have some effect on some economic indicators in some locations.” O’Fallon (2003) recommends these infrastructure investments to maximize productivity:

- Ensure macroeconomic policy is conducive to efficient resource allocation.
- Improve infrastructure efficiency through demand management and cost-based pricing.
- Recognize that reliability is particularly important to support trade and business productivity.
- Avoid infrastructure oversupply, which can have a negative impact on the economy as it draws scarce resources away from maintenance and operation of existing stocks.
- Investment in infrastructure projects should be done on the basis of national benefits and on a case-by-case basis. This implies the use of benefit-cost analysis.

IV. FUTURE TRANSPORT DEMANDS

Transportation demand refers to the amount and type of travel people choose given specific prices and service options. Current trends are changing travel demands in ways that increase the value of alternative modes (walking, cycling, ridesharing, public transit, and

telecommunications) and more accessible, multi-modal communities. Described differently, the last century was the period of the ascendancy of automobile transportation so it may have made sense to invest significant public resources in developing roads and parking facilities, but now the roadway system is mature and various demographic and economic trends make other types of transportation investments more appropriate to meet the needs of the few decades.

Highway advocates claim that automobile travel demand is large and growing while demand for other modes is small and declining [9], but this is not completely true. Motor vehicle ownership and use grew steadily during the last century, but stopped growing about the year 2000. Transit travel increased more than automobile travel during seven of the last ten years and each of the last four years.

Much of this shift in demand predated the 2011 fuel price spike. It reflects demographic and economic trends [5]:

- Aging population. As the Baby Boom generation retires per capita vehicle travel will decline and their demand for alternatives will increase.
- Rising fuel prices. This increases demand for energy efficient travel options.
- Increasing urbanization. As more people move into cities the demand for urban modes (walking, cycling and public transportation) increases.
- Increasing traffic congestion and roadway construction costs. This increases the relative value of alternative modes that reduce congestion.
- Shifting consumer preferences. Various indicators suggest that an increasing portion of consumers prefer living in multi-modal urban neighborhoods and using alternative modes.
- Increasing health and environmental concerns. Many individuals, organizations and jurisdictions are now committed to reducing pollution and increasing physical fitness.

Although public transit serves only about 2 % of total CZ trips, it serves a much larger portion of urban travel. Transit share is even higher for travel to large commercial centers, and so has relatively large economic importance. Many transit systems now carry maximum peak period capacity, constraining further growth. Increasing capacity and improving service quality would allow transit ridership growth.

Transit critics claim that consumers always prefer automobile travel and abandon alternative modes as they become wealthier, but there are many indicators that wealthy people will choose alternative modes if they are convenient, comfortable and affordable.

High levels of automobile travel result, in part, from market distortions that favor automobile transport over other modes, such as underpricing for road and parking facility use, fixed vehicle insurance premiums, and dedicate funding for roads and parking facilities that is unavailable for other modes or mobility management strategies, even if they are more cost effective overall [5]. Until such distortions are corrected, expanding congested

roadways is economically harmful overall because it exacerbates problems such as congestion, crashes and pollution emissions.

Efficient pricing and smart investments would not eliminate automobile travel demand, but this analysis indicates that at the margin (relative to current travel patterns) many Czechs would prefer to drive less and rely more on alternative modes if they had more efficient pricing, and alternative modes were more convenient, comfortable and affordable. This demand for high quality transport alternatives is likely to increase in future decades due to previously described demographic and economic trends. As a result, investments that improve the quality of user modes respond better to future demands than urban highway expansion.

Critics sometimes point out that public transit requires more public subsidy per passenger-mile than automobile travel, but this comparison is unfair [5]. About half of transit subsidies are intended to provide basic mobility (service at times and locations with low demand, and special services for people with disabilities), which requires large subsidy per passenger-mile. Transit operates on major urban corridors where any form of transport is costly to provide. In addition, automobile travel receives significant non-government subsidies such as free parking. When properly evaluated, public transit often turns out to be more cost effective and require less total subsidy than accommodating additional automobile travel on the same corridors [5].

V. CONCLUSION

Many types of public investments can increase short-term employment and business activity, but some are much better overall because they also support other strategic goals. Smart economic stimulation responds to future demands and helps achieve various economic, social and environmental objectives.

This paper indicates that highway rehabilitation and safety programs are economically beneficial, but urban highway expansion tends to stimulate more driving and sprawl, exacerbating transportation problems. Demographic and economic trends are increasing demands for alternative modes and reducing highway expansion benefits. Investments that improve alternative modes can provide the following benefits:

- Congestion reduction
- Road and parking facility cost savings
- Consumer savings
- Improved mobility for non-drivers
- Improved land use accessibility
- Accident reductions
- Energy conservation
- Pollution reductions
- Improved community livability
- Improved public fitness and health

Increasing fuel efficiency and transport system diversity is particularly important for long-term economic development. Fuel and vehicle purchases generate fewer domestic jobs and less economic activity than most other

consumer expenditures. Public transit operations create a particularly large number of jobs.

Financial support of CZ automobile manufactures is not economically justified. The subsidy required to maintain an automobile factory job is greater than the cost of a typical college education, or could finance other programs that help make the Czech economy more efficient and competitive. Investments that increase transport system efficiency create more total jobs per CZK and better prepare the economy for future demands.

REFERENCES

- [1] TROTH, Gary, Why Fast Track Fix it First "Projects are a Better Stimulus," Smart Growth America, 2009.
- [2] NGA, "Fix it first: Targeting infrastructure investments to improve state economies and invigorate existing communities," National Governors Association, 2004.
- [3] VTPI, Online TDM Encyclopedia, Victoria Transport Policy Institute 2008.
- [4] LITMAN, Todd, "Transportation cost and benefit analysis guidebook," Victoria Transport Policy Institute, 2009.
- [5] CZSTATISTIC. (2011). [Online]. Available: www.czso.cz
- [6] LITMAN, Todd, "Smart transportation investments: Reevaluating the role of highway," Victoria Transport Policy Institute, 2007.

- [7] LITMAN, Todd, "Smart transportation investments II: Reevaluating the role of public," Victoria Transport Policy Institute, 2007.
- [8] A. KOPP, "Macroeconomics Productivity Effects of Road Investments," in *Proc. 45th Congress of the European Regional Science Association*, 2006.
- [9] A. MOORE and S. STALEY, "All infrastructure spending is not created equally: Randomly pouring billions of dollars into roads won't fix america's gridlocked," Reason Foundation, 2008.



Zdenka Volkánová was born in 1962 in Bohemia, Czech Republic. She graduated from Bachelor's degree with a focus on Accounting. Subsequently graduated from the master's degree with a focus on business economics and management. Currently preparing for the defense of doctoral dissertation at the Institute of Forensic Engineering of the Technical University in Brno.

She works as a university lecturer at University of Economics and Management. In college ESMA (Spain, branch Czech Republic) teaches Managerial Accounting for MBA degree. At the same time acting as a lecturer in courses to the public with a focus on accounting, tax, controlling, management accounting, financial analysis and business valuation and property.

She is a member of the Association of Chartered Certified Accountants, Association of Accounting Brno, PwC Fraud Forum focusing on forensic accounting, is also a member of the international organization of European Economic Association (EEA). In this time she is preparing new books - Methods of Valuation Companies, Creative Accounting and criminal phenomena in the financial statements.