Application of the Input-Output Model to the Analysis of the Economic Impacts of Transport Infrastructure Investment in Australia

Topic: Sector specific analyses: services II
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1. Background

The scope of the Australian land transport system – which primarily includes roads, mass transit systems, and rail – is vast and increasingly congested. Passenger and freight traffic are expected to grow substantially in the future, requiring continued investment in land transport systems (BTRE, 2006). With the rapid deterioration of economic conditions and rising unemployment, public investment is back on the policy agenda – as a job-creation program linked to the need to revitalise the nation's crumbling land transport infrastructure.

Controversies often rage over whether such investments are efficient or whether the money would be better spent on other public projects. For this investment to have the greatest positive effect on emerging transport problems, government agencies therefore need ways of assessing the economic benefits that arise from transport projects to see whether they are sufficient to justify the cost. Conventional transport Cost-Benefit Analysis (CBA) largely concentrates on counting the direct impacts of a project, which are principally time and cost savings (ATC 2006). Economic impact analysis assesses how some direct benefits and costs of investment convert to indirect effects on the local, regional, or national economy or on a particular sector of the economy, such as changes in wages and employment, purchases of goods and services or tax revenue. Economic impact analysis includes a number of factors other than those that meet the stricter criteria for inclusion in a CBA framework. As a result, these types of factors have not been incorporated into the cost-benefit calculation (OECD, 2002).

Despite this, it is argued here that the inclusion of economic benefits via appropriate economic data, such as changes in wages, consumption and tax revenue, will help to produce estimates of the direct and indirect economic implications of a potential action, such as the undertaking of a large infrastructure-type investment. The application of economic models such as Input-Output (IO) has been beneficial in evaluating the economic impacts to government agencies assisting a major project. However, IO results often have not been presented in a manner useful for policy makers to weigh up the costs and benefits of an infrastructure project (Layman, 2004).

In this research, we ask whether economic benefits results from IO analysis can be incorporated into the strict discipline of a conventional CBA framework, and whether the two methods can in fact enhance each other.

2. Research Objectives

The research has three broad and interrelated goals;
-Providing a taxonomy of economic impacts (that is, to define a set of categories of benefits that might arise);
-Reviewing conventional methods of assessment that are currently used by government agencies to measure economic impacts; and
-Introducing an IO-based CBA model that incorporates IO results which are often not captured by a conventional CBA assessment.

3. Methodology

This research focuses on an investigation of incorporating IO results into a conventional CBA

assessment for transport project analysis. It will use input-output and CBA techniques as follows:

Modeling the Economic Impact of the Project
Commonly, IO results from the advent of a transport project are presented as;
-Increased Gross Regional Product (GRP) or GDP;
-Increased regional employment; and
-Increased government revenues.

In this research, we focus on measuring economic welfare gain in terms of real consumption. A major strength of IO models is their ability to take investment and production/wages and calculate estimated consumption. Focusing on consumption also automatically removes many of the costs incurred at the advent of the project. Consequently, real consumption is considered as the best practical measure of economic welfare gain.

Cost-Benefit Analysis
-First principles analysis, in which the rational as to why the project should be assisted is determined;
-Estimation of the benefits (real consumption, government revenue and wage bill);
-Estimation of government expenditures and subsidies; and
-Calculation of summary variables such as the Net Present Value and Benefit-Cost Ratio.

4. Data Sources
-Australian Input-Output Tables from the Australian Bureau of Statistics.
-Transport statistics published by the Department of Infrastructure, Transport and Regional Economics.
-GDP-deflator for personal consumption expenditures from the Australian Bureau of Statistics.

5. Expected Results
This research asks whether results from IO analysis can be condensed down to the strict discipline of a CBA. Building on a hypothetical simulation, it endeavors to demonstrate that the two methods can in fact enhance each other and that IO-based CBA model is applicable to major infrastructure project analysis.