Handout 11

Secondary Economic Effects

Do secondary economic impacts qualify as welfare effects?

The short answer is "mostly not" but the economist needs to be in a position to explain this well, because public and political opinion is that they do qualify. Opposing such popular opinion places added burdens on the economist.

A. There is a lot of public misunderstanding regarding this topic, and it is commonplace for the untrained to accept the notion that any new public endeavor produces economic growth and net rewards. New economic activity in the form of "economic impacts" is commonly thought to be net gains or at least strongly indicative of net gains.

B. Examples of possible secondary economic effects:

- An ethanol subsidy leads to higher corn prices and higher planted corn acreage, and corn producers buy more fertilizer and other inputs and these input producers do the same plus corn handlers and transporters also have greater tasks and spend on more inputs, thereby generating "ripple effects" with further economic benefits.
- A new (or better) highway leads to additional commerce using the highway and/or located along the highway, and these businesses will be buying local inputs.
- If the local community can coax a major retailer into locating a new store within its area, additional employment will be generated.
- A publicly run facility (like a university or a museum or a wildlife refuge) attracts visitors who make expenditures on food and hotel rooms.
- Constructing a major new facility (like a big natural gas pipeline or an Olympic event facility) will involve hundreds of workers who will be spending some of their income at nearby stores and restaurants, generating additional rounds of employment and income for others.

C. To qualify as welfare effects, there need to be net changes interpretable as ΔR, ΔS, or ΔG (that is, changes in producer or consumer welfare or changes in government revenue). Do typical studies of "economic impact" succeed in indicating "welfare change"?

D. Typical approach: Input-Output Analysis or "economic multipliers" generated by Input-Output analysis:

Economy (local or regional or national) is separated into sectors plus final demand (Y). Each sector is presumed to use a fixed coefficients Leontief technology (unresponsive to price changes). An accounting equality is the basis for model elements:

$x_{11} + x_{12} + x_{13} + Y_1 = X_1$ is the equality for sector 1 of a three-sector economy.

The right hand side of this equality is total value of sector 1 output, Y_1 is amount of sector 1 output taken by final consumers, and x_{1i} are amounts taken by sector i. All entries are total $.

Define $a_{ij} = \frac{x_{ij}}{X_j}$ so for a n-sector economy the combined product flows are

$$\left\langle \begin{array}{c} a_{11}X_1 + a_{12}X_2 + \ldots + a_{1n}X_n + Y_1 = X_1 \\ a_{21}X_1 + a_{22}X_2 + \ldots + a_{2n}X_n + Y_2 = X_2 \\ \vdots \\ a_{n1}X_1 + a_{n2}X_2 + \ldots + a_{nn}X_n + Y_n = X_n \end{array} \right\rangle$$

or $\mathbf{AX + Y = X}$ with an appropriate definition of matrix **A** and vectors **X** and **Y**. Manipulating this as follows provides the main result.

$$\mathbf{Y = X - AX}$$

$$\mathbf{Y = (I - A)X}$$

$$\mathbf{X = (I - A)^{-1}Y}$$

$(\mathbf{I-A})^{-1}$ is the pivotal, descriptive result. It is the table of "requirements" for the change in the gross output of every sector needed to support $1 in final demand in any sector. In application, analysts are usually thinking about a change in baseline activity according to

$$\mathbf{\Delta X = (I - A)^{-1}\Delta Y}$$

where $\mathbf{\Delta Y}$ is an allegedly exogenous change, like the additional sales attributable to a new event as with the bulleted items on p. 1.

Individual elements of the matrix $(\mathbf{I-A})^{-1}$ tell us how a $1 change in exogenous Y_j demand affects the output of sector i (under assumptions of fixed Leontief technologies and no price responsiveness). Summing the columns of $(\mathbf{I-A})^{-1}$ give us a vector of "output multipliers": each column sum tells us how a $1 change in exogenous Y_j demand affects the combined output of all other sectors, again under rigid assumptions.

These output multipliers commonly fall in the 2 – 3 range nationally and are misconstrued widely. They are smaller at the state level (usually 1.5 – 2.0 in Texas) due to imported purchases, and smaller still for the county level.

E. From a welfare analysis perspective, the central problem with this approach reaches beyond the strong Leontief assumptive base of IO analysis (Dwyer, Forsyth, and Spurr, 2006, pp. 318-19). The prime issue is that typically emphasized IO findings speak about gross economic activity, not net rewards.

Indeed, Economic impact > Economic benefits

In fact, if we think about the percentage profitability of a typical firm – the percentage of revenue that is profit, impacts (revenue) are likely to be many times greater than benefits.

F. Perhaps the idea of "value-added multipliers" can begin to focus multiplier-styled analysis on the identification of net benefits instead of gross activity (Kelso, Martin, and Mack 1973; Miller, undated). This approach becomes feasible when at least one of the sector definitions pertains to value-added. That is, there is a value-added sector (column) into which profit and other value-added items are recorded. Countable value-added components include various

income items, such as wages, rents, profits, and interest, as well nonincome taxes (Davis 1990, p. 50).

Example: A new local policy of economic incentives will motivate a national chain to locate a new store in the city. The store will have gross revenues of $10 million. Net profit (for the chain) and added tax revenue will be $1.5 million. The local output multiplier for this sector is 2.0. The local value-added multiplier is 1.4. Assuming all these numbers are correct and applicable to the new activity, the addition of the new store to the local economy will yield $20 million in output to the local economy (including the $10 million of the store). Secondary value added will generate $600,000 ($1.5m x 0.4) in addition to the primary $1.5 million, yet much of the store's profit accrues to stockholders who likely live elsewhere. Also, we have yet to account for the fact that some of the new store's business comes at the expense of existing businesses. Not only might the new store be in direct competition with existing stores over comparable products, but the incomes of area residents are limited. If people are spending money at the new store, they must be curtailing other expenditures. [Mature applications of IO analysis such as the highly used IMPLAN model include one or more value-added sector(s) and are also capable of accounting for the issues noted above.]

G. If we are to incorporate secondary value added in benefit estimates, then biasing of benefit measures should be avoided (Davis 1990, pp. 95-97, 110-111).

1. Analytical effort should be devoted to estimating the net amount of new activity and net benefits. That is, some portion of the allegedly new activity may simply be redirected or relocated from competing or alternative activities.

Examples: Are new enterprises merely redirecting household expenditures along alternative paths (in light of limited budgets)? Are participants in a new recreational opportunity reducing their expenditures in other pursuits? To what extent are expansions of economic activity consuming valued land, labor, and other natural resource or environmental services?

2. Public policies and projects have financial costs which will have to be paid via new taxes, repurposed taxes, or user fees. All of these funds are/were also being applied in activities that are/were generating secondary effects, perhaps diffusely as in the case of tax receipts, but secondary effects are occurring nonetheless. In the interests of accuracy, these secondary costs should be recognized jointly with secondary benefits. What justification is there for believing that the net benefits or value added for the new activity are any higher than those enabled by the previous applications of these funds?

Conventional Advice: We typically do not have adequate empirical grounds for determining whether the net secondary welfare effects of a new activity exceed the net secondary welfare effects that "were" being created by those same funds (before they were redirected to the new activity). Under such conditions, it is commonly sensible as well as ethical to presume no net increase in secondary welfare effects.

H. In conclusion, the limited instances in which claims of secondary effects may have merit are as follows:

1. A lower level of government is rendering a policy/project decision that, if approved, will be paid for by funds from outside its jurisdiction. Thus, from the "accounting stance" of the lower government, secondary net benefits are not offset by secondary net costs

because the latter are external to its concern. *Examples*: local governments receiving grants from state or federal sources or developing countries using grants from international aid agencies. [Yet, if such grants can be spent on any project the local government wants, all potential projects have countable secondary effects, so does their computation via multipliers really matter?]

2. In the case of depressed or undeveloped economies there may stimulating policies or projects capable of generating secondary benefits which are not offset by secondary costs, due to the general unemployment of labor, land, and other resources. Thus, if unemployment can be said to exist, claims of net beneficial, secondary effects may be accurate as long as transfer payments are recognized. However, normal patterns of frictional or voluntary unemployment are not adequate grounds for claiming unemployment. Moreover, for analyses of multiperiod projects it may be improper to claim that a recession cycle will persist for the life of the project.
3. When a prices-endogenous study of welfare effects is performed, net benefits of a general equilibrium nature may be appropriately determined. This includes the general equilibrium methods observed by JH&S (chapter 9) as well as appropriately constructed computable general equilibrium models.

References

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Figure source: Griffin, *Water Resource Economics: The Analysis of Scarcity, Policies, and Projects*. 2nd ed. 2015, Cambridge, MA, MIT Press.