

Module 6



ADDRESSING OPPORTUNITY COSTS IN THE ANALYSIS OF ECONOMIC IMPACTS ACROSS LOCAL FOOD SYSTEMS

Module 6 Overview



- Focuses on understanding two key assumptions:
 - No **resource constraints** assumption and
 - No **opportunity cost** of spending assumption.
 - How your team can correctly incorporate these two key concepts into your input-output model.
- What the no resource constraint assumption means and how you can think about it in terms of your local economy;
- What the no opportunity cost of spending assumption means and how it is typically considered when modeling economic impacts of local foods;

At this stage of the project....



- Defined its scope, specific goals and objectives, timeframe, available resources, and regional boundaries (module 1);
- Collected requisite primary and/or secondary data (module 2 for secondary data and module 3 for primary data);
- Involved a technical expert who has a thorough understanding of the terminology and limitations of input-output models, advanced training on conducting an economic impact assessment, and knowledge of its limitations (module 5)

Understanding Key Assumptions



- *The no resource constraints* assumption on the supply side –
 - i.e., gross gains in local food production must be balanced against the fact that these shifts (referred to as **countervailing effects**) will usually come in the form of a direct, acre-by-acre reallocation of existing uses of agricultural land –
- *The no opportunity cost of spending* assumption on the demand side –
 - i.e., farmers directly marketing their crops constitute a positive local economic impact, but there may also be negative impacts due to the opportunity cost of lost direct sales activity in other sectors of the economy (the wholesale and retail sectors).

Growth Scenarios as an Example



- The growth of the local food system, is often constructed by policymakers under the implicit assumption of *no resource constraints*;
 - To economists, this means that the expansion of the local food system has no local opportunity cost.
- Yet, as more specialty crops are produced to meet growing demand for local fruits and vegetables, there is unlikely to be more arable land available.
 - Accordingly, increases in specialty crop production likely mean land diverted away from another use like corn or soy production.

Opportunity Costs to Other Sectors



- Requires information about the extent to which increased consumer purchases of locally-grown food:
 - Affects other types of food purchases
 - Changes market prices and/or supply chain characteristics, or
 - Impacts land use.
- For instance, if a region's food buying dollars are shifted as a result of a "Buy Local" promotional campaign, or investments in a local food initiative can be expected to displace some food distribution
 - No secondary data to answer that question
 - No data on exactly how linkages vary across different markets

Net vs. Gross Impacts of Economic Change



- Opportunity cost should be considered from the **demand** side, and reflects the assumption that a region does not fundamentally change the amount of money spent in the food sector based on the availability of locally grown food.
- Countervailing effects refer to the same concept from the **supply** side;
 - With a few exceptions, increased production of a high-demand crop likely means land is diverted away from another use like corn or soy production.
 - Urban agriculture and reclaimed lands would be one exception

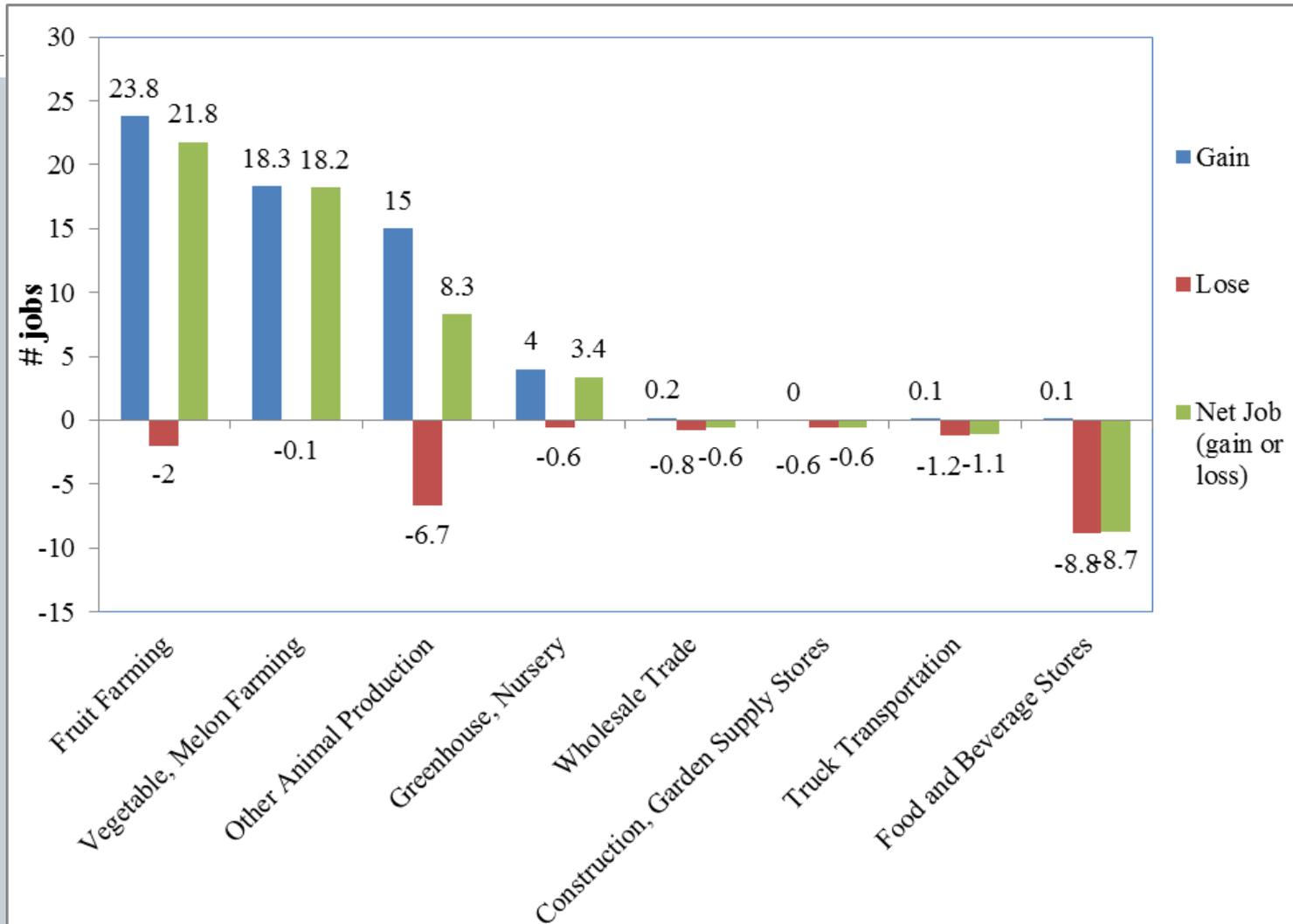
The West Virginia Case Study



- *Evaluating the Economic Impact of Farmers' Markets Using an Opportunity Cost Framework*
 - Primary data collected from producers who participate in West Virginia farmers' markets to account for the opportunity cost
 - Assuming the positive impacts associated with money spent at farmers' markets results in decreased spending at local grocery stores, building material, and garden supply stores.
- Study finds that while farmers' markets do result in a net positive impact on the state economy
 - Accounting for the opportunity cost of spending reduces the economic impact of the markets.



West Virginia Winners and Losers



Source: Hughes, D.W., C. Brown, S. Miller, and T. McConnell. 2008. Evaluating the Economic Impact of Farmers' Markets Using an Opportunity Cost Framework. *Journal of Agricultural and Applied Economics*. 40(1):253-265.

Regional Economic Development Potential and Constraints to Local Foods in the Midwest



- Study estimates county-level fresh fruit and vegetable production potentials (supply side) for the states of MN, WI, IL, MI, IN and IA, as well as expected sales based on current population (the demand side).
 - Secondary data demonstrates that the land, water, and other resources required for the growth of local foods production must come from existing conventional crop production.
 - Corn and soybean are the dominant crops in these states, and net impacts would occur from shifts to fruit and vegetable.
 - Land needed to satisfy regional fruit and vegetable demand is small, and overall production consequences would be nominal.
- <https://www.econ.iastate.edu/sites/default/files/publications/papers/p12697-2011-03-30.pdf>

Concerns about Overestimation



- Since economic impact numbers will be smaller when opportunity costs are considered or included, it can be challenging from a political standpoint
 - Where larger numbers help to ‘sell’ projects, even though its results are more defensible.
 - When embarking on economic impact analysis, we believe it is a valuable practice to adopt more standardized approaches, offer good examples of how opportunity cost adjustments can be incorporated, and learn from previous rigorous examples to support your modeling refinements
- For more information, see: Hughes, D.W., C. Brown, S. Miller, and T. McConnell. 2008. Evaluating the Economic Impact of Farmers’ Markets Using an Opportunity Cost Framework. *Journal of Agricultural and Applied Economics*. 40(1):253-265.

Resource Constraints & Local Food Systems



- It may be tempting to think that incremental gains in local food production represent pure gains in regional economic output,
 - Increases in the number of actors involved in local food production, but these gross gains must be balanced against the fact that these shifts will usually come at the direct, acre-by-acre expense of existing uses of agricultural land
 - Prudent for local foods impact analysts to assume there is a direct relationship between local food production gains and declines in other regional crop production.
 - Exceptions: Reclaimed land in and around urban areas that may be farmed temporarily or land that is idle for reasons other than its crop-producing potential.

- Uses of cropland in the U.S. demonstrates that land demands for fruits and vegetables (dominant crops in regional food systems) are comparatively meager
- 2012 Agricultural Census, of the 315 million acres of cropland harvested that year, 79.2 percent were used for traditional field crops like corn, soybeans, cotton, wheat, rice, and other small grains and oilseeds.
- Forage and hay production required 17.7 percent of nation's cropland.

Uses of Agricultural Land in the U.S. in 2012

	U.S. Acres	Percent of Total
Harvested Cropland	314,964,600	100.0%
All other crops	249,497,623	79.2%
Forage and Hay	55,775,162	17.7%
Vegetables	4,492,086	1.4%
Orchards	5,199,729	1.7%

- Vegetables, in sharp contrast, were harvested from only 1.4 percent of the total, just 4.5 million acres.
- Harvested orchard acres were 1.7 percent of the total at 5.3 million acres. Combined, vegetable and orchard production accounted for 3.1 percent of the nation's harvested cropland.

Source: U.S. Agricultural Census, USDA

Exploring Land Requirements



- In the Midwest explores land is required to supply a comparatively large population of consumers.
 - 28 types of fruit, melon, and vegetables across seven states in the upper Midwest., adjusting for existing consumption patterns, duration of growing season, the storage life of the crops, and land productivity,
- Estimated 195,669 acres needed to grow the seasonal produce demanded by 35.6 million persons
 - In perspective, 195,669 acres represented less than one percent of all cropland in the state of Iowa,
- <http://www.leopold.iastate.edu/sites/default/files/pubs-and-papers/2010-03-selected-measures-economic-values-increased-fruit-and-vegetable-production-and-consumption-upper-mid.pdf>.

Case Study: Kane County IL



- Kane County sits in the western portion of the greater Chicago-Naperville-Joliet consolidated metropolitan region.
- Regional planners requested an evaluation of the economic and farmland preservation potential of local foods development.
- <http://www.econ.iastate.edu/sites/default/files/publications/papers/p18114-2013-05-19.pdf>

Kane County Fruit and Vegetable Market Potential and Production Factors

Competitively served regional population	445,328
Acres required to meet seasonal fresh fruit and vegetable demand	2,157
Farm value in \$2011	\$ 9,452,705

Kane County, IL



- Area and Extension professionals agreed upon 24 fresh fruits and vegetables that could be competitive.
 - Yields per acre were initially estimated with the Iowa Fruit and Vegetable Market Planner decision tool.
 - Subsequently, shifts in cropland acreage required to meet local (seasonally adjusted) demand were derived from regional population and yield forecasts.
- This tool allows for “what-if” planning for crop production based on place-specific, yield estimates and area consumption expectations, see:
<http://www.intrans.iastate.edu/marketplanner/>.

Implications for Kane County economy



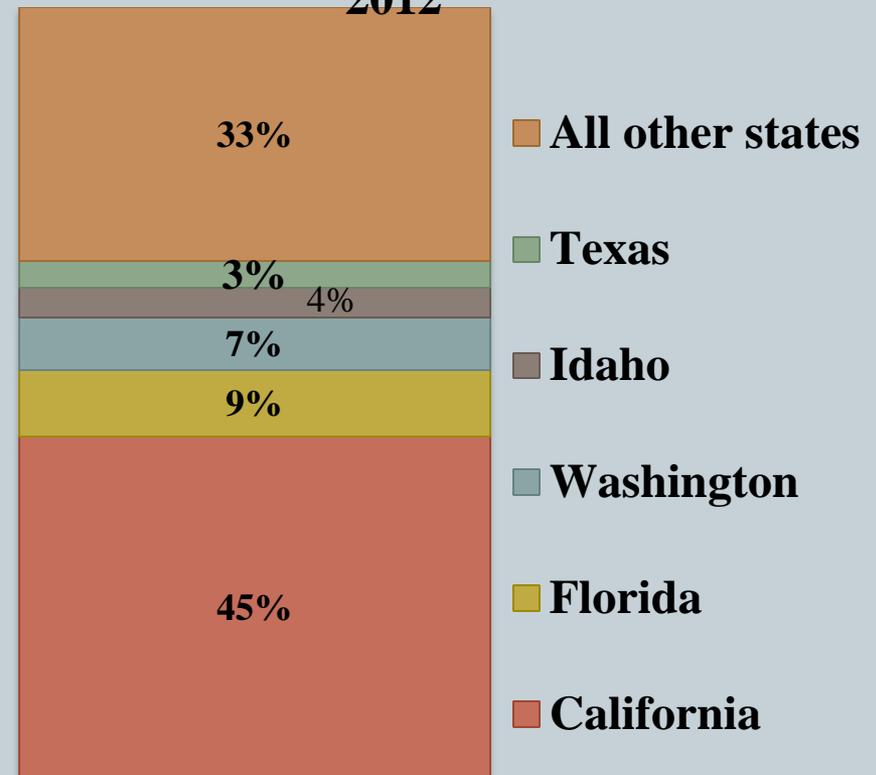
- New fruit and vegetable production could generate:
 - \$6.88 million in total output once all **direct, indirect, and induced** activities were accounted.
- Simultaneous contraction in conventional commodity farming output results in \$1.58 million reduction
- Taking all countervailing effects into consideration, the 1,000 acres shift into produce acreage may yield:
 - \$5.3 million net increase in total industrial output,
 - \$2.43 million net increase in value-added, and
 - \$1.8 million net increase in labor income based on 35 new (net) jobs in the county.

Beggar thy Neighbor Effects



- Although produce is not on the majority of US land, two-thirds of the nation's fruits and vegetables are grown in CA, FL, WA, ID, and TX
 - Meaningful shift to locally grown fruits and vegetables in other areas could affect those and other regional-export oriented agricultural economies.

Fruit and Vegetable Production Acres by State, 2012



Beggar thy Neighbor Effects



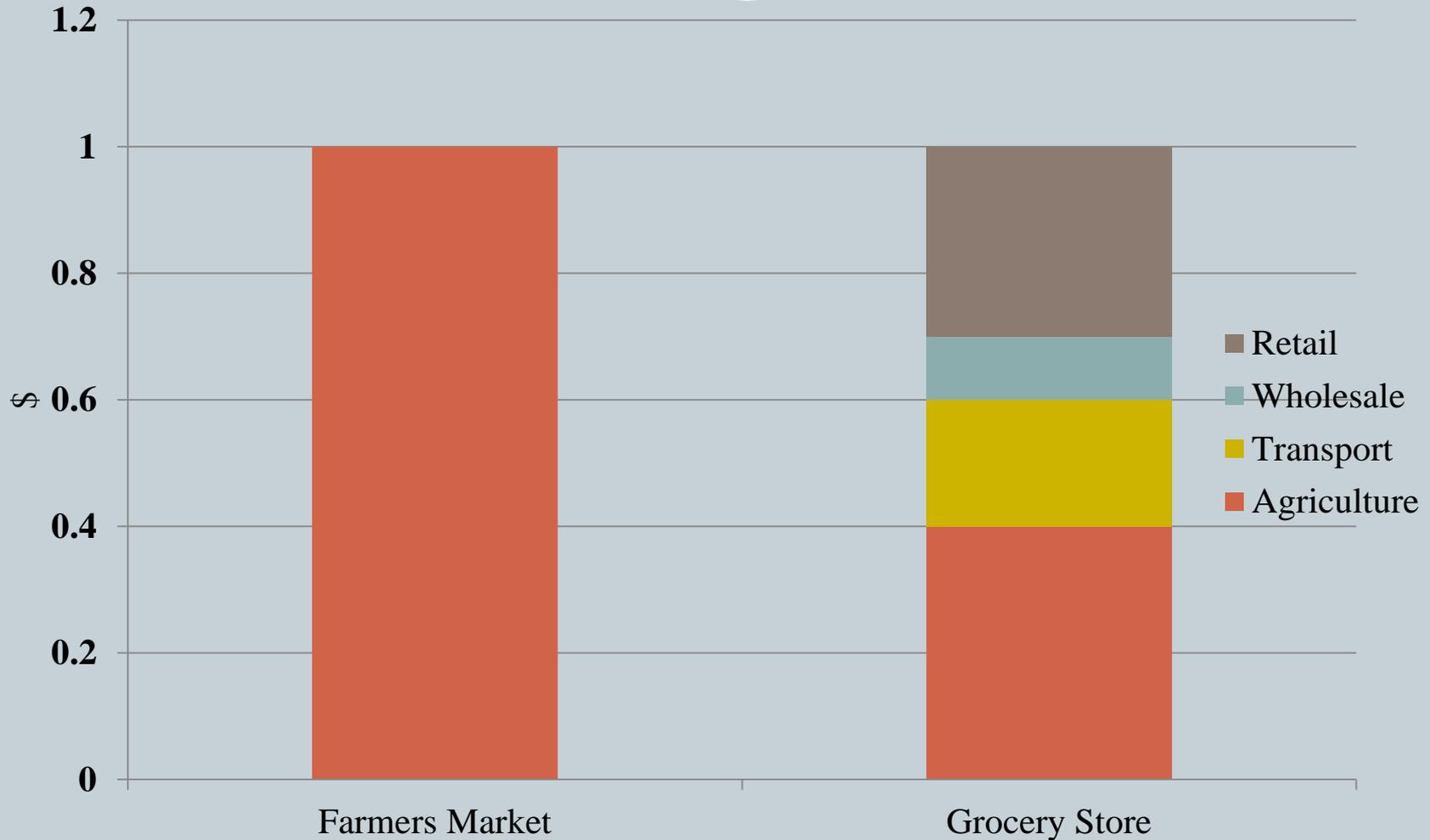
- The “beggar-thy-neighbor” dilemma where localized gains come at the expense of other regions.
 - When one region’s actions are detrimental to another’s, there is potential for retaliatory actions, but no evidence in local foods
- Issue to be acknowledged, but price is key component to local demand
 - There are limits to which local producers can compete with regions with production advantages even if premiums exist.
 - Were that not the case, more areas in the U.S. would have retained their capacities to produce for local markets.
- See, for example, Boys, Kathryn A. and David W. Hughes. “A Regional Economics Based Research Agenda for Local Food Systems.” *Journal of Agriculture, Food Systems, and Community Development*. 3(4):1-6.).

Shifting Purchases to Local Markets



- To model the impact of one dollar, we track it through the input-output based multiplier table,
 - To fully understand let's consider the concept of **margin**ing the one dollar through an input-output model
 - We can assign various parts of this retail dollar to each of these activities. In our example we can assume \$0.40 goes to the grower, \$0.20 to transportation, \$0.10 to wholesale, and \$0.30 to retail (grocery stores)
 - In IMPLAN, the margin sectors are 319 wholesale trade businesses, various retail trade sectors 320-331 including retail trade food and beverage 324 (grocery stores mostly), and various transportation sectors 332-335.

\$1 Spending on Produce, Farmers' Market vs Grocery Store



Margining



- Margining is required because commodities (goods) physically and functionally move through channels
 - Specifically transportation, wholesale, and retail marketing
- For most goods, the interface between the final consumer (buyer) is completely at the retail level.
 - As consumer we never interact directly with oil producers in a physical sense, but purchase the gas directly from a retail business and most goods are bought and sold in this manner
- By margining expenditures at the retail—or the final consumer we allocate certain portions of the retail dollar to appropriate “margin” sectors.

Margining \$1 of Produce, Farmers' Markets vs. Grocery Stores

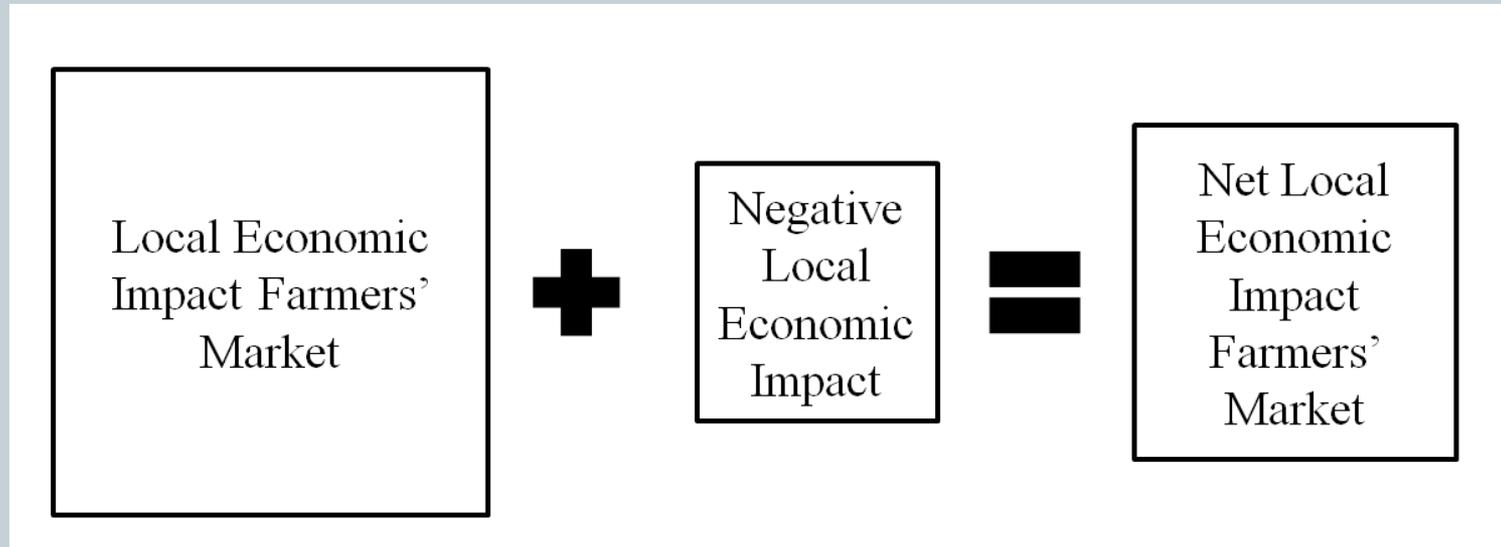


Margins Translate to Opportunity Costs



- Based on our scenario, \$1 in spending has an opportunity cost of \$0.10 in reduced sales for wholesale and \$0.30 in reduced sales in retail
 - We assume the grower of the grocery produce is not local and transportation provided by a non-local
 - But we also assume that the wholesale sector is entirely local and, obviously, the retail portion is local (since the purchase is from a local grocery store).
- The store does not have to be locally owned; rather the goods in question just have to be locally provided
 - Meaning the store would use locally provided inputs including local workers, utilities and marketing

Net Economic Impact on Local Economic of Sale at Local Farmers' Market



Case Study: Food Hub



- Schmit et al. (2013) extended this concept in examining the opportunity cost of a food hub's sales through traditional wholesale firms.
 - They estimated the degree that a food hub could take demand away from other components of the food system by reduced purchases by grocery stores and other business buyers.
- Their analysis indicates that half of the food hub's customers diverted purchases from other sources due to the availability of food hub products
 - The opportunity cost of redirect sales represented 11 percent of the gross/original food hub economic impact

Schmit, T.M., B.B.R. Jablonski, and D. Kay. 2013. "Assessing the Economic Impacts of Regional Food Hubs: the Case of Regional Access." Cornell University. September. <<http://dx.doi.org/10.9752/MS145.09-2013>>



Module 6 Takeaways



- *Opportunity costs are important.*
 - Do not fail to take into account countervailing effects or opportunity costs from the supply and demand side.
 - The bottom-line is that actual benefits may be smaller than projected benefits.
- Fixed price and lockstep production assumptions mean that model results should be evaluated with care
- Input-output models do not address ancillary benefits
 - Generating local entrepreneurs and local social capital
 - Reducing local obesity rates
 - However, these probable benefits should receive some weight in evaluating policies

Module 6 Takeaways



- Well designed studies that account for opportunity cost can point out possible winners and losers
- This provides information concerning why certain sectors could oppose the growth of local food initiatives, or, if the impact is small, such information might be used to alleviate fears with respect to opportunity costs.
- This may also present an opportunity to bring together representatives from different sectors to craft policies that minimize ‘losers’.