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Abstract

With a growing interest from policy makers in better understanding the impacts of local agricultural and food system activities, the role of small- and medium-scale producers is attracting renewed attention. Attempts to obtain accurate empirical estimates of these impacts are often complicated by a lack of available data that define specific inter-industry linkages. By utilizing a unique data set from a random sample of producers in an upstate New York region, we examine the extent of differential purchasing and sales patterns for small- and medium-scale agricultural producers relative to those derived from aggregate agricultural sector data. The supplemental data are integrated into a Social Accounting Matrix (SAM) framework to derive economic multipliers for agricultural production sectors differentiated by firm size and to assess the distributional implications of alternative exogenous policy shocks. We demonstrate that small- and medium-scale producers that market a portion of their products through direct-to-consumer marketing channels have different input expenditure patterns than other agricultural producers, relying on more local hired labor per unit of output, and purchase more of their total inputs locally. These differences lead to higher total output, value added, and labor income multipliers. Differences in the distribution of impact across sectors and value-added components resulting from exogenous shocks to agricultural sectors underscore potential benefits of policies supporting small- and mid-scale producers.

Key Words: local food systems, input-output analysis, economic impact assessment, farm size

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1 Introduction

There is a growing interest from policy makers in better understanding and quantifying the impacts on local or regional economies from expanding local agricultural and food system activities (Clancy, 2010; Jensen, 2010; King et al., 2010; Pirog and O'Hara, 2013; The National Research Committee on Twenty-First Century Systems Agriculture, 2010). Often such interests are driven by efforts focused on improving diet and health outcomes (e.g., increasing consumption of locally-produced fresh fruits and vegetables) or improving healthy food access for disadvantaged consumers (e.g., establishing farmers' markets in rural or urban food deserts). On the producers' side, support for expanding local food marketing opportunities often centers on improving access to markets and profitability.

The role of small- and medium-scale producers in developing local and regional food systems has also attracted renewed attention. The strong growth in local food systems' direct-to-consumer (D2C) marketing channels in the United States, such as farmers' markets and community supported agriculture (CSA), are dominated by smaller-scale producers (Low and Vogel, 2011). Recent attention towards the development of regional food hubs has expanded marketing efforts to retail, wholesale, and institutional channels, and these efforts are often combined with a commitment to buy from small- to medium-sized local producers whenever possible (Barham et al., 2012).[1]

Efforts to develop a better understanding of the purchasing and sales practices by small- and medium-scale producers are a vital step in quantifying the differential economic contributions from these types of producers and in designing appropriate policy interventions to support their growth and viability. Indeed, Heady and Sonka (1974) used Input-Output (IO) analysis and mathematical programming techniques to simulate that smaller farms rather than larger farms that were encouraged by agricultural policies could support greater income generation in rural communities. However, as Irwin et al. (2010) point out, empirical testing of this 'intriguing simulation result' has not yet occurred.

Attention to these efforts can also better inform public programs that support smaller-scale producers. USDA's Small Farms Program, for example, within the National Institute of Food and Agriculture (NIFA), has long supported university-level programming that recognizes small farms' roles in improving the competitiveness and sustainability of rural and farm economies (USDA, 2013). Alternative sources of grant funding are also available from USDA that target improved decision-making ability and viability of small- and medium-sized farms and ranches; the Value Added Producer Grants Program and the Agriculture and Food Research Initiative (AFRI) Foundational Program (within the Agriculture Economics and Rural Communities program area) are two current examples.

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[1] The U.S. Department of Agriculture defines a regional food hub as "…a business or organization that actively manages the aggregation, distribution, and marketing of source-identified food products primarily from local and regional producers to satisfy wholesale, retail, and institutional demand" (Barham *et al*. 2012, p.4).

Regardless of the underlying motives, efforts to assess the impacts of local agricultural and food system activities are often complicated by a lack of available data necessary for complete evaluation. Frequently, these efforts suffer from a lack the data that identify the major inter-industry linkages between these types of firms within the sectors of the food system and across other sectors of the local economy. According to Tropp (2008), the "…official tracking of direct farm sales has not kept pace with the sector's growing importance in the U.S. food system" (p. 1310). Data problems are exacerbated when the analysis depends on information that is differentiated by firm size. Analyses that rely on aggregate data may distort the size of the policy impacts, particularly where purchasing and sales patterns of the reference group are distinct.

The primary purpose of this paper is to assess the distributional sector impacts of potential policies that target small- and medium-scale producers with D2C sales relative to policies that support agricultural producers more generally. To accomplish this purpose, we must first estimate empirically the extent of differential patterns of purchases and sales between these two groups of producers. We develop estimates of these differential patterns of purchases and sales from a unique set of primary data on purchase and sales information generated from interviews with a random sample of small- and medium-scale producers in an 11-county region of upstate New York that utilize D2C outlets within their marketing portfolio. From these data, we construct the sales and purchase patterns for a D2C agricultural sector of small- and medium-scale firms (henceforth the 'small direct agricultural sector') that is distinct from the data for sales and purchases that are commonly available for an aggregate agricultural sector (henceforth the 'default agricultural sector'), but that do not distinguish purchase and spending patterns by firm size.

Finally, we incorporate this new economic sector into a Social Accounting Matrix (SAM) framework and derive their distinct economic multipliers. Importantly, we show that the small direct agricultural sector has greater inter-industry linkages than the rest of the agricultural production sector within our study area and relies less on imported goods and services. The results have important policy implications as priority may be given to expanding the small direct agricultural sector given the larger associated multiplier effects.

We begin the rest of this paper by reviewing the context of economic impact analysis in relation to recent local food system studies and the research limitations provided with available aggregate data. This is followed by a description of the data collected and its use within the SAM framework. Finally, the empirical results are discussed, along with their implications and directions for future research.

2 Economic Impact Analyses and Local Food

To conduct economic impact analyses, one must have information about inter-industry linkages both within and among sectors of an economy; i.e., as a business or industrial sector buys from and sells goods and services to other sectors of the economy and to final users, the firm stimulates additional economic activity by other businesses and within other industrial sectors. A SAM is an accounting system that links the economic transactions within an economy among production sectors, factors of production, and institutions. The SAM is often characterized as an expanded IO model that captures the nature of the distribution of income in a more comprehensive way. The SAM documents linkages and circular interdependencies among production, the distribution of payments to factors of production, and the distribution of income among various categories of household groups (Miller and Blair, 2009). Given D2C sales are, by definition, direct sales to households, SAM techniques are more appropriate than IO models in conducting economic impact analyses related to expansion of activity in local food systems.

Most economic impact assessments of local food systems are based on IMPLAN (IMpact Analysis for PLANning) data and software from the Minnesota IMPLAN Group (MIG) (e.g., Otto and Varner, 2005; Hughes et al., 2008; Henneberry et al., 2009, Swenson, 2011a, 2011b, 2010; Gunter and Thilmany, 2012). To facilitate the construction of SAMs for the nation, as well as for states, individual counties, and individual zip codes, MIG compiles data from a wide variety of sources, including the Bureau of Economic Analysis' Regional Economic Accounts, the U.S. Census Bureau's County Business Patterns, National Household Personal Consumption Expenditures, the Annual Survey of Manufacturers, and the U.S. Department of Agriculture's National Agricultural Statistics Service.

The widespread use of IMPLAN as an economic modeling tool stems in part from the simplicity by which economic multipliers can be generated, as well as by the fact that the models can be modified quite easily. The number of economic assessments of local food systems exploits this flexibility in the use of the IMPLAN software and database. The majority of local food system economic assessments utilize IMPLAN to determine the impact of import substitution; i.e., the economic impacts from decreasing reliance on foreign or domestic imports of intermediate production inputs through increases in production and utilization of locally grown or processed foods (e.g., Cantrell et al., 2006; Kane et al., 2010; Leung and Loke, 2008; Conner et al., 2006; Swenson, 2011b, 2010). In general, these studies assess economy-wide impacts from scenarios that consider increased consumption of locally-grown foods.

As with any economic impact analysis of this kind based on an IO model or a SAM, measures of the economic multipliers and other impacts are conditioned by the static framework assumed in the model—which imply that prices are constant, production takes place according to fixed-proportion, linear homogenous production functions, and production capacity is unlimited. These limitations are of little consequence if the policy changes or other direct changes in the economy are relatively small compared with the overall size of the local economy.

The one exception that is perhaps critical in the study of local food systems relates to the general lack of information that distinguishes input purchases and output sales by firm size. The economic sectors reflect average purchase and sales patterns across all firms in the sector; thus, it is impossible to distinguish differential expenditure patterns of firms in the default IMPLAN default data. For this reason, the estimates of the impacts from increased local food sales based on existing IMPLAN data may be misleading if the small direct agriculture sector has different patterns of input expenditures (e.g., different production functions) and/or they purchase a different proportion of their inputs from local sources. In a relatively recent study, Hughes et al. (2008) point out that IMPLAN data may not reflect the input expenditure patterns of producers likely to participate in local and regional food systems, and they suggest that an area of future research could include making adjustments to default IMPLAN input coefficients to reflect more accurately the behavior of small operations. In an earlier study, Lazarus et al. (2002b), caution that the aggregation of all types of swine operations into a single sector may be particularly problematic for the purpose of any analysis of the economic impacts for the swine industry at a time of major structural changes in the industry.

By augmenting the IMPLAN database with the primary data needed to construct a new small direct agriculture sector, we can do much to overcome one of the major shortcomings. Primary data collected from a target population can be used to adjust IMPLAN model parameters to bring the SAM closer to local economic conditions. This paper builds on previous local food system studies that use primary data to augment or adjust IMPLAN data. While these studies attempt to quantify the differential aspects of particular local food system supply chains or sectors; e.g., farmers' markets (Otto and Varner, 2005; Hughes et al., 2008; Henneberry et al., 2009), farm-to-school programs (Gunter and Thilmany, 2012), and meat processing (Swenson, 2011a), none have looked specifically at the issue of differential economic impacts based on firm size. Platas (2000) and Lazarus et al. (2002a) estimate the differential economic impacts of exogenous shocks to alternative hog sectors differentiated by type of operation and firm size. This study adapts their data collection protocols to collect individual producer data on costs of production and levels of local spending with an application to local food systems impacts within a regional economy.

3. Material and methods

A mixed methods approach is utilized to address the research objectives, where data from a case study area are collected and combined within the modeling framework of SAMs. Following Yin (1998), we focus on a regional case study area. This strategy reduces the uncertainty surrounding access to the requisite data, and it facilitates the collection of the detailed data on expenditure and sales patterns.

2.1 Case Study Data

In 2011, data from agricultural producers were collected within an 11-county region in upstate New York referred to as the Capital District (CD) region.[2] A team of Cornell Cooperative Extension (CCE) educators in the region identified farmers in each county that marketed at least a portion of their farm products through D2C outlets. The team identified 752 farms, a total remarkably consistent with data from the 2007 Census of Agriculture which reported that there were 797 farms in the region with D2C sales in 2007 (USDA, 2007b).

With limited resources, we could not interview the entire population of farms that were identified with D2C sales.[3] Instead, we contacted a total of 130 farmers, each farmer being selected randomly from the population list, by county. The number of farms drawn from each county was based on the distribution of all farms in the region according to farm counts by county from the 2007 Census of Agriculture (USDA, 2007a). To illustrate, according to the 2007 Census of Agriculture, 4% and 11% of all farms in the CD region were located in the counties of Fulton and Columbia, respectively. Therefore, 4% and 11% of all surveyed farms were randomly drawn from the compiled lists of farms in these respective counties. In cases where a farmer refused to participate, another farm was randomly drawn. Of the 130 farms contacted, 116 participated

[2] The Capital District region in New York State includes the counties of Albany, Columbia, Fulton, Greene, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, Warren and Washington.

[3] Due to the detailed and sensitive nature of the data required, we found that only through person-to-person interviews were we able to obtain the information necessary for analysis.

during the summer of 2011. A total of 97 interviews (75%) contained complete information and from which 82 were identified as small or mid-scale farms (i.e., had sales less than $500,000).

The interview protocol was designed to collect detailed information about the amount and location of farm expenditures (inputs) and farm sales (outputs).[4] Farmers were asked to provide their 2010 annual farm expenditures by item category, and the proportion of each expenditure purchased locally; i.e., purchased within the 11-county region. Expenditure categories and average expenditures per farm, differentiated by location of expenditure, are shown in Table 1. While the proportion of local expenditures varied by category, overall, 82% of expenditures reported in the survey were local.

[Table 1 here]

Farmers were also asked to provide total sales for 2010, along with the percentages of sales by commodity category (e.g., fruits, vegetables, dairy). Several farms produced multiple types of commodities, but were classified in terms of the commodity with the highest sales. According to this primary commodity classification scheme, the distribution of farms is: 15% fruit; 27% vegetables; 6% dairy; 23% meat/livestock; 12% greenhouse/nursery; and 17% other crops. Finally, farmers were asked to provide their annual sales by marketing channel and the proportion of these sales classified as local. Average sales per farm by marketing channel and location are reported in Table 2. Local sales exceeded non-local sales in all D2C and intermediated channels. Overall, 90% of sales were reported as local.[5]

[Table 2 here]

2.2 IMPLAN Data

By default, the entire economy is represented by 440 sectors within IMPLAN. Each IMPLAN sector is represented by a single, static production function – a mathematical expression that relates the quantity of inputs required to produce the resulting output (Lazarus et al., 2002b; Liu and Warner, 2009).[6] Total expenditures in each sector are distributed to intermediate purchases (i.e., local purchases of intermediate inputs from other sectors), payments to value added (i.e., employee compensation, proprietor income, other property type income, and indirect business taxes), intermediate imports (i.e., intermediate inputs purchased from outside the local economy, from domestic or foreign markets), and other sources (e.g., transfers to households, investments).

Using 2010 IMPLAN data, two multi-county models were constructed of the CD region - one that utilizes the default agricultural sector (Model 1), and one that explicitly separates out the small direct agricultural sector (Model 2). In both models, IMPLAN's 440 industrial sectors

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[4] A copy of the interview protocol is available upon request from the corresponding author.

[5] Sales locations should ideally reflect where geographically the products are destined for consumption or processing; however, this is sometimes unknown. Producers were instructed to use the operating location of the buying agent/firm if known (e.g., a food processing plant, a grocery store, or a local food distributor). If the buyer's place of operation or residence was unknown (e.g., consumers at a farmers' market, or wholesale auction barn), they were instructed to use the location of where the sales take place.

[6] For an in-depth discussion of how production functions are constructed within IMPLAN, see Lazarus et al. (2002b).

were initially aggregated into 20 composite sectors following the two-digit NAICS aggregation scheme provided within IMPLAN (MIG, 2012).

The default agricultural sector was then created from the 2-digit NAICS sector that includes the agricultural production sectors along with forestry, fishing, hunting, and support activities for agriculture and forestry sectors. Specifically, agricultural commodity sectors with activity in the region were separated from the 2-digit sector and then combined to create the default agricultural sector. Agricultural commodity sectors include oilseed farming, grain farming, vegetable and melon farming, fruit farming, greenhouse, nursery and floriculture farming, all other crop farming, cattle ranching and farming, dairy cattle and milk production, poultry and egg production, and all other animal production. Also separated from this 2-digit NAICS sector, and defined separately, was the 'support activities for agriculture and forestry' sector, as this sector will be mapped to several expenditure categories in the case study data.

A third adjustment to the 2-digit NAICS aggregation scheme was to create a new 'intermediated sales' sector encompassing alternative types of non-D2C marketing channels utilized by small direct agricultural sector producers. According to the survey, small direct agricultural sector producers had intermediated sales to restaurants, packers/distributors, grocery/specialty retail stores, food processors, other farmers (for resale D2C), elevators/mills, auctions, and other marketing institutions (Table 2). Accordingly, the relevant food manufacturing, retail food, and food service sectors within IMPLAN were separated from their respective aggregate 2-digit NAICS sectors and consolidated into a new intermediated sales sector. By creating this sector, we were able to adjust the intermediated sales (output) patterns in the small direct agricultural sector distinctly from those in the default agricultural sector. D2C sales, as described below, were apportioned to households as they represent sales made directly to households.[7]

2.3 Integrating primary data into SAM model

Up until this point, both models were created using the methodology as described above. However, in Model 2, the survey data were utilized to apportion transactions in the default agricultural sector into two distinct sectors: the small direct agricultural sector and the other agricultural sector (i.e., everything other than the small direct agricultural sector).[8] To do so, we must determine the total size of the small direct agricultural sector—effectively calculating a new expenditure column and a new sales row to the SAM.

Since the survey data provide estimates of average expenditures and sales per farm, the average estimates were scaled up by the total number of small direct agricultural sector farms in the region. The original population of farms identified with D2C sales in the CD region irrespective of farm size was 752 (see above), and 82 of the 97 farms with complete data (84.5%) were classified as either small- or medium-scale. Accordingly, we estimate the total number of small direct agricultural farms in the region at 635 (752 x .845). Subsequently, each of the average expenditure and sales values per farm were multiplied by 635 to estimate total small direct agricultural sector expenditures and sales.

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[7] The construction of the model up to this point was done within the IMPLAN (ver. 3) software.

[8] The SAM IxI transactions matrix at this stage was exported from IMPLAN into Excel. Disaggregation of the default agricultural sector, along with all of the computations that follow, were conducted in Excel.

Farm survey expenditure categories were then mapped to their corresponding IMPLAN sector (Table 3). Some expenditure categories were mapped to the small direct agricultural sector itself (i.e., livestock grain, livestock forage/bedding, and replacement livestock) and represent intra-sector purchases; i.e., small direct agricultural sector producers were assumed to purchase these inputs from other small direct agricultural sector producers in the region. Total local expenditures for the small direct agricultural sector, by IMPLAN category, were deducted from the corresponding SAM column expenditure within the default agricultural sector. All transactions remaining in the default agricultural sector were allotted to the other agricultural sector (i.e., the default agricultural sector no longer exists as its expenditures were reassigned to the two new sectors).[9] Importantly, this procedure does not change the size of the overall economy, but reallocates total local expenditures into its two distinct components. To complete the expenditure side, all non-local input purchases were apportioned to domestic trade (imports).[10]

[Table 3 here]

Within a SAM framework, there is an accounting identity in which the value of total outlays (input expenditures) in each sector must equal the value of total outputs. Our survey results showed that whereas average sales per farm (total outputs) for the small direct agricultural sector were $100,856 (Table 2), average input expenditures per farm were only $83,161 (Table 1). The difference ($17,695) should represent payments to owners (as value added contributions). In IMPLAN these payments will show up as payments to proprietors (proprietor income) or to other property income (as rents, royalties, and corporate profits), with different assumptions on how these payments are ultimately distributed within and outside the local economy. We lacked primary data that would be needed to determine the split between these two accounts. Instead, the distribution was based on IMPLAN's allocation between these two components in the default agricultural sector (i.e., 77% to proprietor income and 23% to other property type income). As with average expenditures per farm, total sector contributions to these two accounts were estimated by multiplying each value per farm by 635.

Just as expenditures for the small direct agricultural and other agricultural sectors were disaggregated from the default agricultural sector (i.e., using SAM column transactions), output or sales must be similarly disaggregated (i.e., using SAM row transactions). Average sales per farm ($100,856) were initially apportioned into two accounts – 65% into D2C sales and 35% into intermediated sales following Table 2, and then scaled up by the size of the sector (635 farms). Then, sales designated as non-local were allocated to domestic trade (as exports); i.e., 6% of D2C sales and 16% of intermediated sales (Table 2). The balance of D2C sales were classified as sales to households.

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[9] Note that local fuel oil expenses were originally mapped to the aggregated 2-digit NAICS retail trade sector (Table 3). However, IMPLAN transactions data for the default agricultural sector showed significantly smaller total purchases with the retail trade sector. Accordingly, all fuel oil expenses were assigned as nonlocal transactions and included in domestic trade (i.e., imports). In so doing, our multiplier results are likely under-estimated since local fuel expenditure could not be taken into account.

[10] It may be more accurate to assign these non-local input expenditures into a mix of domestic and foreign trade sectors, but we lacked the requisite information to make this distinction. As these input expenditures are non-local (exogenous), the domestic versus foreign trade decision will not impact our results.

The allocation of intermediated sales is more complicated since a component of them includes (by assumption) sales to local small direct agricultural producers. Following the mapping of expense categories to within-sector transactions (Table 3), local expenditures from Table 1 for livestock grain, livestock forage/bedding, and replacement livestock were scaled to the size of the sector. The balance was apportioned to the intermediated sales sector.

Disaggregating the default agricultural sector into the small direct agricultural and other agricultural sectors completes the development of the SAM transactions for Model 2. Under a certain set of assumptions (i.e., constant returns to scale, excess capacity, and perfect complementarity), the models can be converted into multiplier models and used for impact analysis.

2.4 Calculating Multipliers

Impact analysis is used to assess changes that are expected to occur within the economy in the short run due to the actions of an exogenous 'impacting agent' (e.g., a change in federal government spending). To convert a transaction model into a multiplier model, sectors must be divided into two mutually-exclusive groups depending on whether their activities are endogenous or exogenous to the economy. Endogenous sectors affect and are affected by changes in the region (in other sectors), and it is these feedback effects that form the theoretical foundation of the multipliers (Miller and Blair, 2009).[11]

Computationally, the first step in obtaining the multipliers is to calculate the SAM coefficients (a_{ij}). To calculate the SAM coefficients, every endogenous entry (z_{ij}) in the SAM transactions model is divided by the corresponding column total (X_j), where z_{ij} equals the monetary value of the flow from sector *i* to sector *j* and X_j equals the total monetary value of sector *j*: $a_{ij} = z_{ij}/X_j$. This procedure creates the matrix of SAM coefficients $\mathbf{A} = [a_{ij}]$. The inverse matrix, $[\mathbf{I} - \mathbf{A}]^{-1}$, produces a unique solution for the X_j's in terms of the exogenous variables. Thus, we can express endogenous changes as they relate to external shocks: $\Delta\mathbf{X} = [\mathbf{I} - \mathbf{A}]^{-1}\Delta\mathbf{d}$, where $\mathbf{X} = [X_j]$ is the vector of endogenous expenditures, and $\mathbf{d} = [d_j]$ is the vector of exogenous variables. The inverse, $[\mathbf{I} - \mathbf{A}]^{-1}$, is called the matrix of multipliers because it magnifies an initial output change in the exogenous vector by a constant multiple.[12]

Once computed, the total effect of the multiplier (or total output impact) can be broken down into three effects: direct, indirect, and induced. The direct effect is equal to the initial shock introduced by the exogenous impacting agent. Indirect effects are changes in round-by-round inter-industry transactions that result when supplying (input) industries respond to increased demands from the directly affected industries (e.g., impacts from non-wage expenditures). Induced effects reflect changes in household spending that result from income changes in the directly and indirectly affected industry sectors (Ribeiro and Warner, 2004). In addition to the total output multiplier, the matrix of multipliers also provides information about the impact on labor income and other value added.

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[11] The present study assumes that capital, all federal government and state/local government, domestic trade, and foreign trade sectors are exogenous.

[12] For further definition, see Miller and Blair (2009, p. 245).

2.5 Shock

To understand the extent of differential economy-wide impacts from the small direct agricultural sector, we imagine two separate hypothetical scenarios where an exogenous policy shock (e.g., federal government spending) increases final demand by $1,000,000 in the targeted sector.[13] In the first scenario, we use Model 1 to consider a policy shock applied to the default agricultural sector; i.e., without considering differential purchasing and sales activities by size of producer. In the second scenario, we use Model 2, and the policy shock is assumed to directly impact the small direct agricultural sector but not the other agricultural sector. Through 'shocking' each sector separately, we can assess the differences in total output and distributional impacts across sectors, thereby examining the extent to which disaggregating the local production agriculture sector results in changes in the regional economic impacts of local food system activities.

As the initial stimulus is hypothetical, the magnitude of the shock is less important to our analysis than the relative trends in the correspondingly affected sectors. In other words, our analysis is less concerned with the direct impacts (the $1,000,000) than with the indirect and induced impacts. Accordingly, we focus on the total indirect and induced impacts (i.e., the total generative multiplier effect in the economy) and summarize the distribution of these effects across sectors of the economy.

We also consider the implications of the alternative policy shocks on the implicit payments to the value added components, particularly those associated with labor income effects - employee compensation and proprietor income. Differential benefits to total value added; i.e., differential contributions to an economy's gross domestic product, may be particularly useful in justifying spending of public monies to support the changes in final demand.

3 Empirical Results

3.1 Local Purchasing Patterns

Utilizing the survey data and following the sector disaggregation procedure described above, the distributions of expenditures per dollar of output were computed. The results demonstrate acute differences in production functions and reliance on imports between the default agricultural and small direct agricultural sectors (Table 4). In total, local intermediate purchases and payments to value added were higher for the small direct agricultural sector than the default agriculture sector; i.e., $0.397 and $0.441 versus $0.319 and $0.378, respectively. Accordingly, intermediate imports were distinctly lower for the small direct agricultural sector; i.e., $0.162 versus $0.296.

[Table 4 here]

In terms of intermediate purchases, higher reliance on local purchases (per dollar of output) for utilities, construction (repairs), professional services, and support activities for agriculture and forestry were evident for the small direct agricultural sector. The backward linkages with the agricultural support activities were particularly strong for the small direct agricultural sector ($0.198) compared with the default agricultural sector ($0.030). Lower reliance on transportation and warehousing services for the small direct agricultural sector ($0.008 versus $0.014) may be indicative of small direct agricultural farms conducting more of these activities themselves.

[13] Final demand is the value of goods and services produced and sold to final users (institutions). Final use means that the good or service will be consumed and not incorporated into another product.

Lower real estate and rental costs (other than property taxes) were also apparent ($0.014 versus $0.070) for the small direct agricultural sector. Purchases of intermediate inputs directly from manufacturing sectors were not observed for the small direct agricultural sector farms, but were relatively strong for the default agricultural sector (i.e., including the non-food manufacturing and intermediated sales sectors). Finally, intra-sector agricultural production purchases were slightly higher for default agricultural sector ($0.046) than for the small direct agricultural sector ($0.035).

Total payments to local value added per dollar of output were higher for the small direct agricultural sector following a higher reliance on employee compensation ($0.196 versus $0.148) and indirect business taxes ($0.057 versus $0.015) per unit of output.[14] The differences in local purchasing patterns and payments to value added impact the calculation of the regional multipliers that we turn to next.

3.2 Estimated Multipliers

Following the computation of the direct requirements ($\mathbf{A}$) above, $[\mathbf{I} - \mathbf{A}]^{-1}$ was computed to derive the sector-level multipliers. Our particular interest centers on the computed output, total value added, and labor income multipliers for the default agricultural, small direct agricultural, and other agricultural sectors. As expected from Table 4, the multipliers are higher for the small direct agricultural sector. The estimated total output (or sales) multiplier is 2.04 for the small direct agricultural sector, compared to 1.84 for the default agricultural sector. A multiplier of 2.04 implies that for every dollar of output delivered to final demand in the small direct agricultural sector, another 1.04 dollars of output are produced in other backward-linked sectors of the local economy (indirect and induced effects).

While the authors cannot find other comparable local foods production multipliers differentiated by firm size in the literature, Platas (2000) estimated higher output multipliers for smaller farrow-to-finish and finish-only operations based on 1998 data for a single county in Minnesota. The implied total output multipliers were 1.53 and 2.17 for the small farrow-to-finish and finish-only hog operations compared to 1.46 and 1.78 for the respective large-sized operations (p. 86). The default IMPLAN pork production sector estimate was 1.77 (p. 86).

Higher payments to total value added and labor income (employee compensation and proprietor income) per dollar of output should also contribute to higher value added and labor income multipliers. Specifically, we compute the total value added multiplier for the small direct agricultural sector of 2.40 compared to the default of 2.38. The comparable labor income multipliers are 2.32 and 2.28, respectively.

3.3 Distributional Impacts of Agricultural Sector Shocks

What is not apparent from the multipliers or the input coefficients (Table 4) is the distribution of the sectoral impacts from an exogenous policy shock. These impacts depend on not only the inter-industry linkages between the agricultural and other sectors, but also on the composite of all inter-industry linkages between the sectors in the economy, and the induced impacts between sectoral changes and household consumption. Table 5 shows the distributional impacts (both

[14] Indirect business taxes consist of excise taxes, property taxes, fees, licenses, and sales taxes paid by businesses (MIG, Inc. 2012)

indirect and induced) of a $1,000,000 hypothetical exogenous shock implemented to each of the default and small direct agricultural sectors. Consistent with the multipliers described above, a shock to the small direct agricultural sector elicits a larger overall additional output impact throughout the economy, $1,039,986, compared to $840,896 through a shock in the default agricultural sector.

[Table 5 here]

Comparisons across agricultural sector shocks show considerably higher indirect and induced effects in the manufacturing and intermediated sales sectors for the shock to the default agricultural sector ($114,904) relative to the shock to the small direct agricultural sector ($18,137). In contrast, the indirect and induced effects on support activities for agriculture and forestry are much higher with a shock to the small direct agricultural sector ($256,612 versus $32,077), representing more than 25% of the initial shock. By contrast, and due to higher intra-sector agricultural purchases, a shock to the default agricultural sector has larger indirect and induced impacts on all agricultural sectors ($52,343) compared to the small direct agricultural sector shock that induces a total of $45,465; albeit, the differences are quite small.

The higher value added and labor income multipliers for the small direct agricultural sector are reflected in higher estimated valued added contributions from the exogenous shock (Table 5). Due to higher reliance on labor inputs per unit of output, the exogenous shock increasing final demand in the small direct agricultural sector largely influences the resulting impact on employee compensation ($480,579), compared to the default agricultural sector ($366,473). Much larger indirect and induced impacts from the support activities for the agricultural and forestry sector, a sector with high labor requirements per unit of output, also support this result.

4. Discussion and Conclusions

The results of this paper elicit two main conclusions, which have significant policy implications. First, as demonstrated by the SAM coefficients, the small direct agricultural sector in the CD region has different patterns of input use per unit of output compared to purchase patters for agricultural sector operations in the aggregate. Put differently, the SAM coefficients found in the default IMPLAN agriculture sectors do not accurately reflect activities of the small direct agricultural sector. This is a significant result, as studies relying on default IMPLAN agriculture sectors that attempt to calculate the impact of local and regional food systems do not reflect an accurate picture of impact of the small- and mid-scale farms that dominate D2C sales channels.

Second, studies that calculate the impact of local food systems utilizing default IMPLAN agriculture sectors may under-estimate the true magnitude of the local economic impact from the expansion of these sectors. We provide evidence that the small direct agricultural sector purchases more of its inputs per unit of output locally. For our study area, the small direct agricultural sector is more integrated into the local economy, and it has a larger corresponding total *local* output impact. Accordingly, per unit increase of final demand, the small direct agricultural sector will elicit a higher multiplier impact throughout the *local* economy relative to other agricultural operations.

From a policy perspective, these conclusions provide preliminary evidence that policymakers concerned with increasing overall economy-wide impact (total output impact) through supporting an increase in final demand for agriculture should provide 100% of any incentive or stimulus to the small direct agricultural sector. As discussed above, when maximizing total output effects are the exclusive goal of government spending, it is always rational to spend all of the money in the sector with the largest output multiplier (Miller and Blair, 2009).

Policy goals and objectives of resource-limited entities, however, may not be this simplistic. As policymakers are also likely concerned with ensuring the greatest total household consumer impact, it is perhaps equally important to look at the total labor income and total value added contributions induced from the associated policy shocks in the agricultural sectors. While this study reports on only one case study region, our results show higher value added and labor income contributions from a policy shock that increases final demand in the small direct agricultural sector than with an equivalent policy shock in the default agricultural sector (Table 5). This is due largely to the small direct agriculture sector's higher reliance on hired labor per unit of output and a higher utilization of inputs from the support activities for agriculture and forestry sector—a sector with high relative labor requirements itself. Furthermore, since many of the services included in this sector require employees with specialized skills (e.g., breeding, crop and livestock professional services, spray crop chemicals/herbicides), it is likely that demands for these services foster growth in skilled labor, rather than low-wage labor.

4.1 Future Research

While important, this type of economic impact assessment does not provide insight into the long-run impacts of a particular policy shock. SAM models provide a snapshot of the economy at a given point in time. To provide a longer term perspective, it may be important to determine the extent to which the small direct agricultural producer's purchases of local inputs affect their profitability; i.e., is it more profitable to purchase inputs from a non-local source? Based on USDA survivability data, Platas (2000) and Lazarus et al. (2002a) note that small and mid-scale hog operations are less likely to be in operation five years into the future, than are large-scale operations. Thus, an assessment of how increased local purchases by the small direct agricultural sector may contribute to or impede profitability is a key point for future research. The answers may have significant repercussions for selecting appropriate policies.

This study also does not address the within-sector distributional impacts. Because of data limitations and disclosure concerns for individual agricultural production sectors (e.g., fruits and vegetables, livestock, dairy), we could not investigate policies targeted to specific agricultural production sectors. Given distinct differences in agricultural production activity across regions, a more micro-level approach would help to identify effective sector-based policies.

References

Barham, J., Tropp, D., Enterline, K., Farbman, J., Fisk, J., Kiraly, S., 2012. Regional food hub resource guide. Washington, D.C.: U.S. Department of Agriculture, Agricultural Marketing Service. http://www.ams.usda.gov/AMSv1.0/foodhubs (verified 21.02.13).

Cantrell, P., Conner, D., Erickcek, G., Hamm, M., 2006. Eat fresh and grow jobs. East Lansing, MI: Michigan Land Use Institute and The C.S. Mott Group, Michigan State University.

Clancy, K., 2010. A priority research agenda for agriculture of the middle. http://www.agofthemiddle.org/archives/2010/05/a_priority_rese.html (verified 21.02.13).

Conner, D., Knudson, W., Hamm, M., Peterson H.C., 2006. The food system as an economic driver: Strategies and results from Michigan. East Lansing, MI: The C.S. Mott Group, Michigan State University. <http://www.mottgroup.msu.edu/mottgroup/community_food_systems> (verified 21.02.13).

Gunter, A., Thilmany, D., 2012. Economic implications of farm to school for a rural Colorado community. Rural Connections 6, 13–16.

Heady, E.O., Sonka, S.T. 1974. Farm size, rural community income, and consumer welfare. Am. J. Agric. Econ. 56, 534–542.

Henneberry, S.R., Whitacre, B., Agustini, H.N., 2009. An evaluation of the economic impacts of Oklahoma farmers markets. J. Food Distrib. Res. 40, 64–78.

Hughes, D.W., Brown, C., Miller, S., McConnell, T., 2008. Evaluating the economic impact of farmers' markets using an opportunity cost framework. J. Agric. and Applied Econ. 40, 253–265.

Irwin, E.g., Isserman, A.M., Kilkenny, M., Partridge, M.D. 2010. A century of research on rural development and regional issues. Am. J. Agric. Econ. 92, 522-553.

Jensen, J.M., 2010. Local and regional food systems for rural futures. Columbia, MO: Rural Policy and Research Institute.

Kane, S., Wolfe, K., Jones, M., McKissick, J., 2010. The local food impact: What if Georgians ate Georgia produce? Athens, GA: Center for Agribusiness and Economic Development, University of Georgia.

King, R., Hand, M.S., DiGiacomo, G., Clancy, K., Gomez, M.I., Hardesty, S.D., Lev, L., McLaughlin, E.W., 2010. Comparing the structure, size, and performance of local and mainstream food supply chains. Washington, DC: U.S. Department of Agriculture, Economic Research Service. http://www.ers.usda.gov/publications/err99/ (verified 21.02.13).

Lazarus, W.F., Platas, D.E., Morse, G.W., Guess-Murphy, S., 2002a. Evaluating the economic impacts of an evolving swine industry: The importance of regional size and structure. Rev. Agric. Econ. 24, 458–473.

Lazarus, W.F., Platas, D.E., Morse, G.W., 2002b. IMPLAN's weakest link: Production functions or regional purchase coefficients? J. Reg. Analysis and Policy 32, 33–49.

Leung, P., Loke, M., 2008. Economic impact of increasing Hawaii's food self-sufficiency. Economic Issues E1-16. Manoa, HI: University of Hawaii Cooperative Extension. www.ctahr.hawaii.edu/oc/freepubs/pdf/EI-16.pdf (verified 21.02.2013).

Liu, Z., Warner, M., 2009. Understanding geographic differences in child care multipliers: Unpacking IMPLAN's modeling methodology. J. of Reg. Analysis and Policy 39, 71–85.

Low, S.A., Vogel, S., 2011. Direct and intermediated marketing of local foods in the United States. Washington, DC: U.S. Department of Agriculture, Economic Research Service. http://www.ers.usda.gov/publications/err-economic-research-report/err128.aspx (verified 21.02.2013).

MIG, Inc., 2012. IMPLAN: Knowledge Base. https://implan.com/v4/index.php?option=com_multicategories&view=categories&cid=200&Itemid=71 (verified 21.02.13).

Miller, R., Blair, P., 2009. Input-output analysis: foundations and extensions. New York, NY: Cambridge University Press.

Otto, D., Varner, T., 2005. Consumers, vendors, and the economic importance of Iowa farmers' markets: An economic impact survey analysis. Ames, IA: Leopold Center for Sustainable Agriculture, Iowa State University. http://www.leopold.iastate.edu/pubs-and-papers/2005-05-farmers-markets (verified 21.02.13).

Pirog, R., O'Hara J.K., 2013. Economic analysis of local and regional food systems: Taking stock and looking ahead. East Lansing, MI: MSU Center for Regional Food Systems. May.

Platas, D.E., 2000. Economic and fiscal impacts of different sizes of swine operations on Minnesota counties, PhD thesis. St. Paul, MN: University of Minnesota.

Ribeiro, R., Warner, M., 2004. Measuring the regional importance of early care and education: The Cornell methodology guide. Ithaca, NY: Cornell University. http://economicdevelopmentandchildcare.org/documents/methodology_guide/MethodologyGuide_Section5.htm (verified 21.02.13).

Swenson, D., 2011a. Exploring small-scale meat processing expansions in Iowa. Ames, IA: Leopold Center for Sustainable Agriculture, Iowa State University. http://www.leopold.iastate.edu/pubs-and-papers/2011-04-small-scale-meat-processing (verified 21.02.13).

Swenson, D., 2011b. Measuring the economic impacts of increasing fresh fruit and vegetable production in Iowa considering metropolitan demand. Ames, IA: Leopold Center for Sustainable

Agriculture, Iowa State University. http://www.leopold.iastate.edu/pubs-and-papers/2011-04-metropolitan-demand (verified 21.02.13).

Swenson, D., 2010. Selected measures of the economic values of increased fruit and vegetable production and consumption in the upper Midwest. Ames, IA: Leopold Center for Sustainable Agriculture, Iowa State University. http://www.leopold.iastate.edu/pubs-and-papers/2010-03-selected-measures (verified 21.02.13).

The National Research Committee on Twenty-First Century Systems Agriculture, 2010. Toward sustainable agricultural systems in the 21st Century. Washington, D.C.: The National Academies Press. http://www.nap.edu/catalog.php?record_id=12832 (verified 21.02.13).

Tropp, D., 2008. The growing role of local food markets: Discussion. Amer. J. Agric. Econ. 90, 1310–1311.

U.S. Department of Agriculture (USDA). 2007a. Census of Agriculture, State and County Profiles. Washington, DC: National Agriculture Statistics Service, http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/New_York/index.asp (verified 14.03.13).

U.S. Department of Agriculture (USDA). 2007b. Food Environment Atlas. Washington, DC: Economic Research Service. http://www.ers.usda.gov/data-products/food-environment-atlas/download-the-data.aspx (verified 21.02.13).

U.S. Department of Agriculture (USDA). 2013. Family and Small Farms. Washington, DC: National Institute of Food and Agriculture. http://www.nifa.usda.gov/nea/ag_systems/in_focus/small_farms.html (verified 03.05.13).

Yin, R., 1998. The abridged version of case study research, in: Bickman, L., Rog, D., (eds)., Handbook of Applied Social Research Methods. Thousands Oaks, CA: Sage Publications, pp. 229–259.

Table 1
Average operating expenses per farm, by category and location of expenditures, 2010.[a]

Category	No. of firms with non-zero expenditures	Average Expenditures by Category [b] Local ($)	Non-local ($)	% Local	Total ($)
Hired labor	46	18,386	151	99	18,537
Fuel, oil	74	6,863	321	96	7,185
Machine/ building repair	67	5,987	820	88	6,808
Machine hire, trucking	13	720	167	81	887
Record keeping, analysis services	23	803	0	100	803
Taxes	66	5,324	233	96	5,558
Real estate rental/ lease	21	1,331	0	100	1,331
Insurance	61	3,291	851	79	4,143
Utilities	59	4,640	250	95	4,891
Livestock grain	23	2,667	445	86	3,112
Livestock forage/ bedding	12	397	0	100	397
Replacement livestock	12	246	351	41	597
Veterinarian	18	455	33	93	488
Breeding	3	48	75	39	123
Livestock professional services	4	452	7	98	459
Other livestock expenses	7	268	5	98	273
Fertilizer and lime	50	3,435	388	90	3,823
Seeds and plants	50	1,958	6,453	23	8,412
Spray crop chemicals/ herbicide	32	2,510	494	83	3,005
Crop professional services	9	365	196	65	562
Other crop expenses	15	1,274	203	86	1,478
All other operating expenses	45	6,504	3,772	63	10,277
Total expenses	82	67,934	15,226	82	83,161

[a] Source: Author survey. Numbers may not add due to rounding.
[b] Average expenses are averages computed across all small- and medium-scale farms surveyed (N=82). Local expenditures are those that occur within the 11-county Capital District region.

Table 2
Average sales per farm, by market channel and location of sales, 2010.[a]

Sales channel	No. of firms with non-zero sales	Average Sales by Category [b]			Total ($)
		Local ($)	Nonlocal ($)	% Local	
Direct-to-Consumer (D2C):					
Farmers' market	32	10,581	914	92	11,495
Farm stand	69	40,259	188	99	40,446
U-pick	16	3,294	54	98	3,348
CSA	12	5,586	1,220	82	6,806
Internet/mail order	8	366	1,294	22	1,660
Other	12	1,370	343	80	1,714
Total D2C	82	61,457	4,012	94	65,469
Intermediated:					
Restaurant	20	3,501	566	86	4,067
Packer/distributor	8	5,093	1,756	74	6,849
Grocery/specialty store	22	6,087	2,553	70	8,640
Processor	3	310	253	55	563
Other farmers	10	5,411	91	98	5,503
Elevator/grain mill	4	2,424	182	93	2,607
Auction	8	2,875	284	91	3,158
Other	5	3,999	0	100	3,998
Total Intermediated	51	29,701	5,685	84	35,387
Total sales	82	91,156	9,698	90	100,856

[a] Source: Author survey. Numbers may not add due to rounding.
[b] Average sales are averages computed across all small- and medium-scale farms surveyed (N=82). Local expenditures are those that occur within the 11-county Capital District region.

Table 3
Mapping of survey expenditure categories to corresponding IMPLAN sectors.

Survey Expense Category	IMPLAN Sector or Valued Added Account
Hired Labor	Employee compensation (value added)
Fuel Oil [a]	Non-food retail trade
Machine/ building repair	Construction
Machine hire, trucking	Transportation & Warehousing
Record keeping/ analysis services	Professional Services
Taxes	Indirect business taxes (value added)
Real estate rental/ lease	Real estate & rental
Insurance	Finance & insurance
Utilities	Utilities
Livestock grain	Small direct agricultural sector
Livestock forage/ bedding	Small direct agricultural sector
Replacement livestock	Small direct agricultural sector
Veterinarian	Professional Services
Breeding	Support activities for ag & forestry
Livestock professional services	Support activities for ag & forestry
Other livestock expenses	Support activities for ag & forestry
Fertilizer and lime	Support activities for ag & forestry
Seeds and plants	Wholesale Trade
Spray crop chemicals/ herbicide	Support activities for ag & forestry
Crop professional services	Support activities for ag & forestry
Other crop expenses	Support activities for ag & forestry
All other operating expenses	Support activities for ag & forestry

[a] Local fuel oil expenses were originally mapped to the 2-digit NAICS retail trade sector. However, IMPLAN data for the default agricultural sector showed significantly smaller expenditures with the retail trade sector. Accordingly, all fuel oil expenses were assigned as nonlocal transactions and included in domestic trade (i.e., imports from outside the region).

Table 4
Summary of expenditure patterns per dollar of output for the default agricultural sector and the small direct agricultural sector

	Value of purchases per dollar of output	
Industry Sector/Value Added Component	Default agriculture	Small direct agriculture
Default agricultural sector [a]	0.046	na
Small direct agricultural sector [a]	na	0.035
Other agricultural sector [a]	na	0.000
Support activities for agriculture and forestry	0.030	0.198
Utilities	0.015	0.049
Construction	0.005	0.019
Intermediated Sales	0.045	0.000
Non-food manufacturing	0.017	0.000
Wholesale trade	0.020	0.021
Transportation and warehousing	0.014	0.008
Finance and insurance	0.032	0.035
Real estate and rental	0.070	0.014
Professional services	0.006	0.013
Other sector purchases	0.014	0.004
Total intermediate purchases	0.315	0.397
Employee compensation	0.148	0.196
Proprietor income	0.050	0.043
Other property type income	0.166	0.145
Indirect business tax	0.015	0.057
Total payments to value added	0.378	0.441
Intermediate Imports	0.296	0.162

[a] This table reports results from Model 1 and Model 2. The Default agricultural sector exists in Model 1 and the Small direct agriculture sector and the Other agriculture sector exist in Model 2; i.e., Model 2 splits the Default agricultural sector into two distinct sub-sectors based on the survey data.

Table 5
Total indirect and induced sector impacts and value added contributions from $1,000,000 exogenous policy shock to alternative agricultural sectors.

	Sector of exogenous shock:	
Industry Sector/Value Added Component	Default agriculture	Small direct agriculture
	------------- USD ----------	
Industry sector impacts:		
Default agriculture [a]	52,343	na
Small direct agriculture [a]	na	37,902
Other agriculture [a]	na	7,564
Support activities for agriculture and forestry	32,077	256,612
Utilities	26,942	65,805
Construction	10,060	25,547
Intermediated sales	82,782	341
Non-food manufacturing	32,122	17,796
Wholesale trade	42,706	49,342
Transportation and warehousing	27,099	25,036
Finance and insurance	111,467	125,462
Real estate and rental	165,597	126,690
Professional services	36,445	53,018
Other sectors	230,310	248,871
Total industry sectors	840,896	1,039,986
Contributions to value added:		
Employee compensation	366,473	480,579
Proprietor income	85,287	73,956
Other property type income	380,966	375,093
Indirect business tax	68,238	128,728
Total value added	900,064	1,058,356
Total labor income [b]	481,760	554,535

[a] This table reports results from Model 1 and Model 2. The Default agricultural sector exists in Model 1 and the Small direct agriculture sector and the Other agriculture sector exist in Model 2; i.e., Model 2 splits the Default agricultural sector into two distinct sub-sectors based on the survey data.
[b] Labor income changes equal the sum of changes to employee compensations and proprietor income.

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