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Incorporating Economic Multiplier Effects in Public Food Procurement Decision Making

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Incorporating economic multiplier effects in public food procurement decision making

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Summary

We present an adjusted bid price tool that incorporates economic multiplier effects in public food procurement decision making processes. The tool estimates enhanced tax revenues to state governments through multiplier effects associated with in-state supplier purchasing. The deduction of the multiplier-based tax revenue from the gross bid represents the true net cost of food procurement for the state. In comparison to ad hoc scoring criteria for geographic preference bids, the method offers a straightforward estimation of value based on economic principles. When compared across local and non-local bids, the application of the algorithm also estimates the value of additional state level funding for agencies to support local purchasing that leaves the state just as well off in terms of net procurement costs. We estimate the extent of reductions in net costs and for alternative food product categories and the increases in incentives for local producers based on detailed food purchase data from the Office of General Services' three state-level food bids. We also demonstrate how the algorithm can be used as an improvement to traditional geographic preference bid procedures.

Introduction

There is growing recognition of the role public food procurement can play in promoting local food systems growth and strengthening local economies. Public agencies such as schools, healthcare, and correctional facilities are increasingly integrating local food procurement strategies into their operations because of new state policies or procedures intended to support local food producers and foster economic development.

While traditional public food procurement in the United States generally awards contracts to the lowest cost bidder, several states have revised their food procurement regulations to provide geographic preferences when awarding contracts, including tie-breaker preferences, price percentage allowances, and food purchase quotas (CFSAC 2021, Denning et al. 2010). New York State (NYS) law in particular allows consideration for "Best Value"¹, local purchasing preferences², and prioritizes contractors selling NYS food products.³ New York City (NYC) has its own local law to promote the purchase of local food products.⁴

NYS spends \$1.3 billion each year on food procurement through its agencies and publicly funded facilities (Hochul 2023) and where the level of support for local food procurement is growing. For example, the Farm to Institution NYS Program through American Farmland Trust (2021) aims to create a more robust market for NYS grown products by connecting farmers with institutional buyers. The New York City Food Policy Council is partnering with the Center for Good Food Purchasing to establish procurement guidelines for public institutions that prioritize “local, sustainable, and fair food purchasing” (CGFP 2021).

In 2018, NYS introduced a quota system with the 30% NYS Initiative (NY30) that provides an additional state reimbursement of \$0.19 per lunch meal (a 316% increase) to school food authorities (SFAs) if at least 30% of food procurement dollars are spent on NYS food products (Bilinski et al. 2022).⁵ In 2023, Governor Hochul went further with Executive Order 32 (EO32) requiring all state agencies to meet a 30% spending threshold on NYS food products by 2027 (Hochul 2023).⁶ Senate Bill S3125A passed in March 2024 to codify EO32 into State Finance Law in perpetuity (Hinchey 2024). The bill has been delivered to the State Assembly and remains in Committee.

An alternative approach to recognize the economic impacts of local food procurement to the state is for public agencies to consider multiplier effects of their food purchasing decisions. Multiplier effects are generated when local dollars are recirculated through an economy due to backward-linked local industry input purchases and local spending of labor income. This follow-on spending generates tax revenues for local and state governments. In so doing, the bid cost represents a

¹ State Finance Law (SFL) § 163(1)(j).

² General Municipal Law (GML) § 103(8-a)(a).

³ SFL § 165(4).

⁴ 2011 New York City Local Law No. 50, NYC Administration Code § 6-130.

⁵ NY30 defines a “New York Food Product” as a food item that is grown, harvested, or produced in NYS; or a food item processed inside or outside NYS comprising at least 51% agricultural raw materials grown, harvested, or produced in NYS by weight or volume (Bilinski et al. 2022).

⁶ EO32 defines a “New York State Food Product” more narrowly than NY30. They are defined as agricultural products and food items grown, harvested, produced, or processed in NYS and, for processed items, the “51% rule” applies, and they must be produced in facilities located in NYS.

gross cost to the state while the true (net) cost accounts for added state tax revenues vis a vis the multiplier effects. Food procurement procedures that allow for price percentage preferences for local food products indirectly encompass the concept of economic multiplier benefits. However, such price percentages are determined by political debates rather than sound science and ignore the fact that multiplier effects may vary across food products.

We contribute to this policy debate by developing a novel net cost bid tool whereby vendors' bids are adjusted based on customized multiplier differences. In other words, multiplier effects attributable to specific suppliers depend upon firm-level spending patterns. Our easy-to-implement adjustment method is rooted in corrected market pricing rather than ad hoc regulatory or statutory restrictions on trade. Ultimately, our proposed framework allows State agencies to compare net (rather than gross) costs across bidders when making food procurement decisions, while agency payments remain based on the gross cost bid.

The Tool

Input-Output (IO) models distinguish the effects of a shock by the economic sectors on a geographically defined economy. IO methods estimate the extent of these impacts and trace how the changes impact different sectors of the economy. The strength of this methodology is its ability to estimate indirect and induced economic effects stemming from the direct expenditures that lead to additional purchases by final users in an economy.

In our case, the direct effects represent the bid value (B) for one or a collection of food products sold by a vendor to public agencies through a bid process. The indirect effects are the additional business-to-business purchases that take place up the supply chain within the local region based on the initial direct effect. Induced effects are the additional values of industry activity that stem from household spending of labor income that result from the direct and indirect effects. For any individual sector, the sales or output multiplier is defined as the sum of the direct, indirect, and induced sales divided by the direct sales.

The net cost tool explicitly accounts for NYS economic multiplier effects of food procurement considering vendor- and product- specific characteristics when selecting winning bidders based on level of local economic activity of the direct, indirect, and induced effects. The cost of the bid (B) to the state (i.e., paid with public dollars by the state agency procuring the food) is a gross amount, while the net cost (B^*) is B less the tax revenues accruing from local business activity through the direct, indirect, and induced effects.

Determining winning bidders based on B^* provides a more complete picture of net costs to the state and incentivizes local firm participation in public food procurement. For example, consider Figure 1 where there are two bidders for a food product: one with an entirely non-local food product who bids B_{NL} and one with a local food product who bids B_L . If B_L is greater than B_{NL} under a traditional request-for-bid process (i.e., lowest gross cost) the winning bidder is the non-local bid. Since no multiplier effects accrue to the non-local product $B_{NL}^* = B_{NL}$; i.e., the gross and net costs to the state are the same. However, given multiplier effects related to the production of the local product, the net cost to the state is reduced to B_L^* . If B_L^* is less than B_{NL} the winning bidder under the net cost approach is the local bid. In this case, the **increase** in cost to the agency (A) relative to the traditional request-for-bid process is $\Delta_A = B_L - B_{NL}$, while the **decrease** in cost to

the state (S) is $\Delta_S = B_{NL} - B_L^*$. If $B_L^* > B_{NL}$, the winning bidder remains the supplier of the nonlocal product and if $B_L^* < B_L < B_{NL}$, the local product bid is the winner based on either a gross- or net-cost approach. In other words, there are no changes in costs to the state or agency in these two cases.

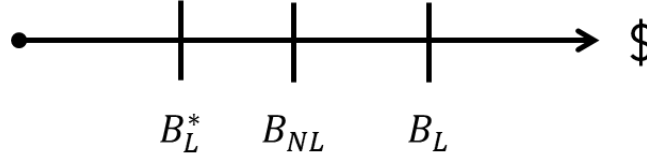


Figure 1. Example gross (B) and net (B*) bid costs by local (L) and nonlocal (NL) food products.

Vendor-Specific Bid Adjustments

The challenge in estimating economic impacts of local food procurement is in the proper delineation of specific intermediate input expenditures and value added outlays that can differ by vendor. Value added consists of employee compensation, proprietor income, other property type income, and net taxes on production and imports. Collecting primary data for each product-vendor pair may result in heterogeneous impacts; however, it will be cost prohibitive from a state or agency perspective to implement. Further, the current version of IMPLAN has 56 food product sectors, and numerous food products are contained within the aggregated industry sectors. For example, “canned fruits and vegetables manufacturing” in IMPLAN encompasses many different food products (e.g., bottled apple juice, canned tomato sauce). The tool accounts for this by margining the food-based ingredients to the raw/farm level, and accounting for the amount of them that are local.

The tool asks vendors to map their food products on bid into one of 28 aggregated sectors (Table 1) and provide the percentage of that product that is produced (for processed products) or grown (for raw products) in NYS. We refer to that percentage as the local purchase coefficient or LPC. To help map food products to sectors, a template such as that provided in Appendix A can be useful. The tool can also be customized in advance to automatically map food products to industry sectors, if known. To assist agencies in augmenting existing bid procedures for application of the tool, suggested input questions are provided in Appendix B.

To use the tool, food products are classified into one of four types: (i) raw food products, (ii) processed food products produced from two raw food product ingredients, (iii) processed food products produced from one raw food product ingredient and one processed food product ingredient, and (iv) processed food products produced from two processed food product ingredients. Obviously, processed food products may contain more than two food product ingredients. However, for practical agency and vendor implementation, we chose the top two. If the food product is provided by a wholesaler rather than the producer themselves, the tool automatically margins the gross cost into its producer and wholesale (or markup) components.

Table 1. Food product mapping and IMPLAN local purchase coefficients (LPC) for NYS.

Food product category (second round mapping)^a	IMPLAN Sector	Mapped Sector^b	Default LPC^c
Oilseeds	1	1F	14.71
Grains	2	2F	22.81
Vegetables & melons	3	3F	20.55
Fruit	4	4F	14.31
Tree nuts	5	5F	0.15
Greenhouse/nursery products	6	6F	19.82
Sugar cane/beet farming	9	7F	0.00
Other crops	10	8F	37.23
Beef cattle	11	9F	32.68
Milk from farms	12	10F	88.54
Poultry & eggs	13	11F	17.47
Other animals from farms	14	12F	21.62
Fresh fish	17	13F	10.59
Flour, rice, malt, wet corn, breakfast cereals (2)	65-68, 71	14P	16.86
Processed and blended oils and oilseeds (1)	69-70	15P	3.38
Sugars and confectioneries (9)	72-76	16P	11.13
Frozen and canned fruits, juices, vegetables (3, 4)	77, 79	17P	12.23
Frozen and canned specialty foods (1-6, 9-14)	78, 80	18P	16.84
Dehydrated food products (non-meat/dairy) (3, 4)	81	19P	8.08
Processed dairy products (12)	82-86	20P	33.00
Cakes, pastries, bakery, cookies, crackers, pasta, dough (1, 2)	87, 93-96	21P	34.31
Poultry and processed poultry meat products (13)	88	22P	4.19
Nonpoultry meat and processed meat products (11, 14)	89-91	23P	11.24
Processed fish and seafood products (17)	92	24P	8.38
Roasted nuts, nut butters, and snack foods (1-6, 9-14)	97-98	25P	28.84
Flavorings, dressings, sauces, spices, and extracts (1-6, 9-14)	100-102	26P	8.27
Coffee and tea, soft drinks and water beverages, ice (10)	99, 104-105	27P	24.08
Other manufactured food products (1-6, 9-14)	103	28P	24.06

^a IMPLAN (2024) sectors in parentheses are additional aggregated sectors used in second-round margining of food products. Since this involves food margins of already margined food products, the degree of variation of adjusted bid prices will be minimal regardless of the aggregations chosen at this level.

^b Mapped sectors 1F through 13F represent raw/minimally processed food products, while 14P through 28P represent processed food products.

^c Default LPCs are presented for New York State from IMPLAN (model year = 2019) for the aggregated food product sectors. Actual LPCs of bidded food products are used in the adjusted bid price tool based on vendor-supplied estimates.

For processed food products (i.e., food products made from fresh or processed food product ingredients), the tool considers separately the food product’s processing location and the processing or production location of its primary ingredients. Accordingly, bidders of processed food products are asked to also classify the top two food product ingredients by value according to the same list of aggregated sectors (Table 1) and give the percentage of each that is produced or grown in NYS. Agency-defined weights based on food products on bid are used in the tool to allocate multiplier impacts across product ingredient contributions.

Processed food products made from at least one processed food product ingredient require an additional round of disaggregation in the tool. However, for practical agency implementation processed food product ingredients are automatically mapped in the tool into one or more raw (farm) food product category, depending on the processed ingredient category selected by the vendor and on which IMPLAN default LPCs are used to the computation of the multipliers. For example, if the bid product is applesauce with apples (raw) and sugar (processed) as the top two ingredients, vendors are asked for LPCs for the applesauce, apples, and sugar, but not for the sugar cane/sugar beets used to produce the (refined) sugar.

Multipliers and tax revenue coefficients are applied to each component and summed up to arrive at the level of bid cost adjustment. The customized output multipliers (M) and tax (t) coefficients are shown in Table 2. Because the tool estimates the economic impacts for the food product ingredient spending separately from nonfood product ingredient spending (e.g., utilities, packaging, labor), comparable multipliers (M^*) and tax coefficients (t^*) are used for the nonfood portion of spending for each processed food sector. For raw food products (i.e., categories 1F through 9F), M and t from Table 2 are applied within the tool, while for processed food products a combination of M and t and M^* and t^* are used. For example, if unflavored fluid milk is on bid, the food product ingredient portion of spending maps to M and t for 10F (milk from farms), while the nonfood product ingredient portion of spending maps to M^* and t^* for 20P (dairy processing).

Empirical Application

We evaluate food spending by NYS public agencies on state-level bids for calendar year 2022 to estimate the extent of local food product procurement and the degree of cost adjustment (B to B^*) for local products by food product category. Since agencies still pay B , assessing the difference in bid costs (i.e., $B_L - B_L^*$) presents an upward bound estimate of the increase in agency costs if the bidders of local products were awarded contracts as a result of B^* . Recall, state and agency costs only change (i.e., decrease and increase, respectively) when $B_L^* < B_{NL} < B_L$ (like in Figure 1).

The NYS Office of General Services (OGS) manages three classes of food products on state bid: “Fluid Milk”, “Fresh Bread”, and “Food”, the last including all food products not contained within the first two. Bids are awarded by regions with five-year contracts. The solicitation processes are highly structured with specific eligibility requirements for bidders and alternatively defined regions of the state by bid class. OGS defines eighteen multi-county regions for the “Fluid Milk” bid, and four identical multi-county regions for the “Fresh Bread” and “Food” bids. Vendors can submit in more than one region and offer different prices across them (e.g., to account for differences in costs of delivery).

Table 2. Customized NYS output multipliers (M) and tax coefficients (t) by sector.^a

Sector	Description	M	t	Mt	M*	t*	M*t*
W398 ^b	Wholesale food	2.116	0.055	0.116			
T417 ^b	Truck transport	1.973	0.062	0.122			
1F	Oilseeds	1.241	0.049	0.061			
2F	Grains	1.497	0.016	0.024			
3F	Vegetables, melons	1.641	0.053	0.087			
4F	Fruit	1.390	0.054	0.074			
5F	Tree nuts	1.458	0.059	0.086			
6F	Greenhouse	1.697	0.056	0.094			
7F ^c	Sugar cane/beet	1.000	0.000	0.000			
8F	Other crops	1.749	0.042	0.073			
9F	Beef cattle	1.696	0.054	0.091			
10F	Milk from farms	2.013	0.049	0.098			
11F	Poultry, eggs	2.023	0.058	0.117			
12F	Other animals	1.375	0.060	0.082			
13F	Fresh fish	2.028	0.154	0.312			
14P	Flour, rice, cereal	1.641	0.026	0.043	1.481	0.027	0.041
15P	Proc. oilseeds	1.447	0.028	0.040	1.373	0.027	0.037
16P	Sugar, confectionary	1.779	0.039	0.069	1.700	0.039	0.066
17P	Frozen/canned F&Vs	1.735	0.037	0.064	1.654	0.037	0.060
18P	Frozen/canned specialty	1.607	0.033	0.053	1.461	0.033	0.049
19P	Dehydrated (nondairy)	1.571	0.036	0.056	1.499	0.035	0.053
20P	Dairy	2.156	0.038	0.083	1.469	0.035	0.051
21P	Bakery, dough	1.893	0.060	0.114	1.787	0.062	0.110
22P	Poultry meat	1.603	0.037	0.059	1.443	0.035	0.050
23P	Nonpoultry meat	1.679	0.039	0.066	1.471	0.038	0.055
24P	Processed fish/seafood	1.585	0.042	0.067	1.553	0.041	0.063
25P	Nuts & snacks	1.693	0.038	0.064	1.618	0.038	0.062
26P	Dressings, spices, extracts	1.693	0.037	0.063	1.579	0.037	0.058
27P	Nonalcoholic beverages	1.721	0.046	0.079	1.671	0.046	0.077
28P	Other food	1.791	0.038	0.067	1.657	0.037	0.062
Average		1.683	0.038	0.081	1.561	0.038	0.060

^a M is the multiplier, t is local and state tax revenues per dollar of total impact. M* and t* are multiplier and tax coefficients for only the nonfood intermediate inputs and value added portions of the spending pattern. Multipliers and tax coefficients customized from IMPLAN (2024).

^b W398 is the wholesale sector associated with food and nonalcoholic beverage products and T417 is the truck transportation sector used for wholesale and transport margins of products supplied by wholesale distributors.

^c 7F represents sugarcane and sugarbeet farming with zero economic activity in NYS, hence multipliers of one and a tax coefficient of zero.

The “Fluid Milk” and “Fresh Bread” solicitations involve submitting prices for a set of specific products by region. The expected annual demand for those products are provided based on historical usage. Bidders on the “Fluid Milk” solicitation must submit prices for all milk products listed as “required milk products” and are encouraged to provide prices for any other products listed as “desirable milk products” that they can offer. Awards are made by region to the lowest total cost (i.e., price times estimated quantity) based only on the required milk products. Given existing state and federal milk marketing orders, prices are adjusted over the contract period according to changes in market order prices. Similarly, bidders must bid on all “required products” for the “Fresh Bread” solicitation for each region bid. Having a relatively large set of required products effectively limits feasible bidders to processors that can produce them all (whether local or not).

The “Food” solicitation is disaggregated into two lots: commercial and retail. The commercial lot refers to products that are sold in bulk size, while the retail lot refers to products sold in grocery-size packaging. Bidders may bid on any combination of lots and regions. No required food products are specified; however, bidders must provide products in all seven OGS categories and be capable of supplying all categories to all authorized users in such region. Product categories include (i) ambient/canned/dry, (ii) baked goods, (iii) dairy (nonfluid milk), (iv) frozen, (v) meat/poultry/fish, (vi) produce, and (vii) nonfood. These requirements effectively limit feasible bidders to large wholesale vendors with broad product lines (whether local or not).

Vendors

All submitting vendors for the most recent “Food” solicitation were found “minimally qualified” by OGS and with pricing deemed “reasonable.” As such, all submitting vendors were awarded contracts. Having sufficient coverage for all regions is an important factor in their determination. Vendors included Sysco Albany LLC (Halfmoon, NY), Sysco Long Island LLC (Central Islip, NY), Sysco Syracuse LLC (Warners, NY), Renzi Food Service (Watertown, NY), H. Schrier and Company Inc. (Brooklyn, NY), Driscoll Foods Eastern (Amsterdam, NY), and Driscoll Foods Downstate (Clifton, NJ). As expected, all are relatively large broadline wholesale food distributors.

The most recent “Fresh Bread” solicitation had only one bidder and who was awarded the state contract: Bimbo Bakeries USA Inc. (Albany, NY). The most recent “Fluid Milk” bid included four bidders: Cream-O-Land Dairies LLC (Florence, NJ), Derle Farms Inc. (Bethpage, NY), Hudson Valley Fresh Dairy LLC (Poughkeepsie, NY), and Upstate Niagara Cooperative Inc. (Lancaster, NY). All but Derle Farms were awarded contracts for one or more regions. Cream-O-Land was awarded contracts for eight downstate regions, Hudson Valley Fresh was awarded the contract for region nine (Dutchess, Sullivan, and Ulster counties), and Upstate Niagara was awarded contracts for seven upstate regions. One region in northern NY received no bids. As expected, all bidders on the “Fresh Bread” and “Fluid Milk” bids are food processors.

Vendors awarded contracts must submit quarterly contract usage reports to OGS. The contract usage data come in a standardized (Excel) format based on OGS's contract reporting requirements and include date of purchase, agency buyer, product name, product description, price of the product, and, in the case of wholesale vendors, the supplier's name, supplier product number, and wholesale markup (margin). Nonfood products included in the “Food” contracts are excluded from our analysis.

Applying the Tool

Given our application to 2022 historical data, information on producer and product RPCs are not available. Accordingly, we utilize IMPLAN's full industry spending patterns and state-level LPCs. Each unique food product in the OGS data was assigned to a food product category (Table 1) to which the multipliers and tax revenue coefficients from Table 3 are applied.⁷ For the "Food" contract data we use the vendor-specific wholesale markups at the product level provided in the data.

LPCs for foods purchased under the "Fluid Milk" and "Fresh Bread" contracts (i.e., if the food products were produced in NYS) were set to one or zero based on whether the manufacturer (i.e., the contract winner) has production facilities in NYS. Similarly, LPCs for foods purchased under the "Food" contracts were set to one or zero based on whether the supplier to the wholesaler has at least one manufacturing facility in NYS.⁸ LPCs for the wholesale margin component in the "Food" contracts (i.e., whether the wholesaler is local or not) were set to one or zero based on whether or not the "ship from" zip code for the product (i.e., the location of the wholesaler's distribution facility) is a NYS zip code.

Results

Gross (B) and net (B^*) food costs from are summarized first in Table 3 by bid type, vendor, and whether products are assigned as being produced outside (nonlocal) or inside NYS (local). For the "Food" bid, all wholesalers are considered local except for Driscoll Foods Downstate that operates out of New Jersey. The percentage of total expenditures estimated as local products by bid type are 28.0, 62.6, and 100.0 for the "Food", "Fluid Milk", and "Fresh Bread" bids, respectively.

Considering locally produced products on the "Food" bid, the percent reduction from B to B^* ranges from 6.56% (Driscoll Foods Downstate) to 9.66% (Sysco Albany). The lower level for Driscoll Downstate makes sense as this vendor is the only one classified as a non-local wholesaler (i.e., no multiplier effects for the wholesale margin), but differences across vendors also reflect differences in the distribution of products sold. The percentage changes for products classified as nonlocal reflect only the local wholesale margin component of sales. Across all vendors and locally produced products, the difference between B and B^* is 7.35%, consistent with the multipliers and tax coefficients across categories (i.e., see the Mt and M^*t^* columns in Table 2).

For the "Fluid Milk" bid, all fluid milk products map to the same aggregated sector (i.e., 20P). Accordingly, the percentage reduction from B to B^* is identical across manufacturers located in NYS (8.30%).⁹ The higher percent reduction relative to all food in the "Food" bid is consistent with dairy processing's relatively high multiplier effect and mid-range tax coefficient (Table 2). The "Fresh Bread" bid shows an even higher percentage reduction (11.42%) with its mapping to 21P due to its higher tax revenue coefficient.

⁷ Approximately 21,000 unique food products are included in the contract usage data across all vendors. Product categories for each were assigned based on the product name, description, and supplier.

⁸ Approximately 2,500 unique food product suppliers are included in the contract usage data across all wholesale vendors. A Google search on each supplier determined whether they have at least one manufacturing facility in NYS.

⁹ Cream-O-Land Dairies is a milk processor located in New Jersey that sources milk from farms in multiple states. Likely some is from NYS farms but since the origins of the raw milk supplied are unknown, we assume all is nonlocal for our application.

Table 3. Gross (B) and net (B*) food costs by OGS bid class and vendor.^a

Bid Class and Vendor	Products	B	B*	B -B*	%Change
Food					
Driscoll Foods Eastern (local wholesaler)	Nonlocal	9,356,182	9,293,271	62,911	0.67
	Local	3,778,787	3,504,960	273,827	7.25
	Total	13,134,969	12,798,231	336,738	2.56
Driscoll Foods Downstate (nonlocal wholesaler)	Nonlocal	6,990,890	6,990,890	0	0.00
	Local	2,653,453	2,490,169	163,284	6.15
	Total	9,644,342	9,481,059	163,284	1.69
Sysco Albany (local wholesaler)	Nonlocal	3,453,886	3,430,496	23,390	0.68
	Local	663,025	604,626	58,399	8.81
	Total	4,116,911	4,035,122	81,789	1.99
Sysco Long Island (local wholesaler)	Nonlocal	3,720,649	3,695,444	25,205	0.68
	Local	548,387	504,528	43,859	8.00
	Total	4,269,036	4,199,972	69,064	1.62
Sysco Syracuse (local wholesaler)	Nonlocal	24,015,164	23,852,539	162,625	0.68
	Local	6,168,844	5,695,889	472,955	7.67
	Total	30,184,008	29,548,428	635,580	2.11
Renzi Food Service ^b (local wholesaler)	Nonlocal	1,969,226	1,953,108	16,118	0.82
	Local	1,246,858	1,154,291	92,566	7.42
	Total	3,216,084	3,107,399	108,684	3.38
Schrier and Company (local wholesaler)	Nonlocal	6,175,604	6,119,423	56,182	0.91
	Local	554,599	511,715	42,884	7.73
	Total	6,730,203	6,631,137	99,066	1.47
Total Food bid – non-local	Nonlocal	55,681,602	55,335,171	346,431	0.62
Total Food bid – local	Local	15,613,951	14,466,178	1,147,773	7.35
Total Food bid	Total	71,295,553	69,801,349	1,494,204	2.10
Fluid Milk					
Cream-O-Land	Nonlocal	4,925,232	4,925,232	0	0.00
Upstate Niagara Cooperative	Local	7,129,389	6,537,817	591,572	8.30
Hudson Valley Fresh	Local	1,131,174	1,037,313	93,861	8.30
Total Fluid Milk bid – non-local	Nonlocal	4,925,232	4,925,232	0	0.00
Total Fluid Milk bid – local	Local	8,260,564	7,575,131	685,433	8.30
Total Fluid Milk bid	Total	13,185,796	12,500,363	685,433	5.20
Fresh Bread					
Bimbo Bakery	Local	3,176,944	2,814,216	362,727	11.42
All bids					
Non-local	Nonlocal	60,606,834	60,260,403	346,431	0.57
Local	Local	27,051,459	24,855,672	2,195,787	8.12
Total	Total	87,658,293	85,116,075	2,542,218	2.90

^a Estimates assume full spending patterns and state-level LPCs for inputs from IMPLAN (2024).

^b Renzi Food Service includes contract usage for only the first three quarters of 2022.

^c Cream-O-Land Dairies is a milk processor located in New Jersey who sources milk from farmers in multiple states in the Northeast U.S. While some milk from farms likely originates from NYS farms, since the origins of the raw milk supplied are unknown, we assume all is nonlocal for our application.

Table 4 breaks down the aggregate results across vendors for local products from Table 3 into food product categories to highlight where existing local purchasing is most prevalent. The top five categories include 20P (all dairy, \$9.97M), 21P (all bakery, \$5.58M), 17P (processed fruits and vegetables, \$2.38 million), 22P (poultry products, \$1.06M), and 15P (processed oilseeds, \$1.03M). Differences in percentages are defined by the respective multiplier (M) and tax coefficients (t) in Table 2 and utilization of local or nonlocal wholesalers within the category totals.

Table 4. Gross (B) and net (B^*) food costs for locally produced foods across vendors and bid class, by food product category.^a

Sector	Description	B	B^*	$B - B^*$	%Change
2F	Grains	199,331	193,472	5,858	2.94
3F	Vegetables, melons	938,622	859,417	79,205	8.44
4F	Fruit	274,902	255,337	19,566	7.12
5F	Tree nuts	817	755	61	7.51
6F	Greenhouse	7,523	6,853	671	8.92
8F	Other crops	1,461	1,380	81	5.55
13F	Fresh fish	10,712	7,779	2,934	27.39
14P	Flour, rice, cereal	469,028	448,222	20,805	4.44
15P	Proc. Oilseeds	1,032,582	986,849	45,733	4.43
16P	Sugar, confection.	249,410	232,151	17,259	6.92
17P	Frzn./can. F&Vs	2,380,084	2,227,246	152,838	6.42
18P	Frzn./can. specialty	419,569	396,880	22,689	5.41
19P	Dehydrated	179,932	165,816	14,116	7.85
20P	Dairy (nonfluid milk)	1,708,632	1,566,704	141,929	8.31
20P	Dairy (Fluid Milk)	8,260,564	7,575,131	685,433	8.30
21P	Bakery, dough	2,404,747	2,134,891	269,856	11.22
21P	Bakery (Fresh Bread)	3,176,944	2,814,216	362,727	11.42
22P	Poultry meat	1,063,557	1,001,274	62,282	5.86
23P	Nonpoultry meat	824,188	771,171	53,017	6.43
24P	Proc. fish/seafood	157,661	147,942	9,718	6.16
25P	Nuts & snacks	1,025,209	955,166	70,043	6.83
26P	Dressings, spices	982,567	918,564	64,003	6.51
27P	Nonalcoholic beverages	719,144	662,472	56,673	7.88
28P	Other food	564,274	525,837	38,437	6.81
Total		27,051,459	24,855,672	2,195,787	8.12

^a Estimates assume full spending patterns and state-level LPCs for inputs from IMPLAN (2024). Locally produced products only. Purchases on the “Food” bid include local products sold by nonlocal and local wholesalers.

Policy Implications

If the locally defined products purchased on OGS contracts in 2022 were the result of implementing the net cost tool (i.e., there were nonlocal products available to purchase at a lower price and $B_L^* < B_{NL} < B_L$), agency costs on food procurement for local products would have increased by roughly 8%. Overall increases in agency costs would be in the order of 3% given that not all products purchased are local or can even be produced in NYS (e.g., bananas, citrus fruit). Accordingly, the estimated bounds on increases in overall agency costs are from three to eight percent, approaching the upper bound as the proportion of expenditures on local products increases.

Higher costs for agencies to purchase local foods can be problematic for agencies with fixed or cost-neutral budgets. However, by utilizing the net cost tool, the level of potential subsidization available by the state through its cost savings ($\Delta_S = B_{NL} - B_L^*$) to offset higher agency costs ($\Delta_A = B_L - B_{NL}$) that leaves the net cost to the state unchanged is revealed directly. These state cost savings could be used to further incentivize local food procurement and support local agriculture and food systems growth by directing those funds to the agencies faced with higher costs. Such a process will require implementation of the algorithm and documentation and reporting requirements by agencies to the state for winning and nonwinning bids, something likely addressed through new state policy or programmatic changes.

To be sure, such a policy change is in alignment with the already utilized geographic preference (GP) bids used where a higher (gross) cost of local food procurement is an acceptable outcome (within reason). GP bid practices include price as one, but not the only factor in awarding bids. Bids are commonly “scored” to determine winning bidders outright (the highest points wins) or “scored” to determine price percentage allowances or adjustments. Incorporating the net cost approach within existing GP bid processes provides a more informed scoring system that supports the intended effects of a GP bid but with a formulaic approach based on the true economic value to the state.

Table 5 describes the scoring criteria for a recent, representative GP bid administered by a SFA in Northern NYS for several whole and processed food products. In this case, contracts are awarded by product to the “lowest responsible bidder” and where the bidder with the highest total percentage points receives a 10% credit on their bid price for evaluation purposes. Percentage points for local food products follow the NY30 definition. Documentation requirements for the GP bid include traceability records to farm locations and, for processed items, a Product Formulation Statement (PFS) indicating the percentage of ingredients as local or not. Accordingly, adopting the net cost approach would require no additional documentation requirements from bidders.

All criteria are evaluated on a “yes” or “no” basis; e.g., if the bidder offers the lowest price they receive 20 percentage points, if it is a NYS food product the bidder receives 30 percentage points, etc. In so doing, the procedure ignores the distances between prices, the level of local ingredients in processed products (other than if it’s above 51% or not), and the type of bidder (e.g., producer or wholesaler). The top three criteria are explicitly valued in the net cost approach and the other criteria can be added to it, if desired. A stylized example for this scoring criteria is provided in Table 6 for beef hot dogs to which the bids are scored following the GP and net cost approaches.

Table 5. Geographic preference (GP) bid example, NYS School Food Authority. ^a

Lowest Price	20%
NYS Food Product ^b	30%
Bidder within NYS	5%
Bidder within 200 miles of Plattsburgh	5%
Has a documented food safety plan	20%
Able to deliver products to school districts	10%
Can deliver within 5 days of harvest (fresh products only)	10%

^a Bidder with highest percentage points receives a 10% credit on their bid price for the product.

^b If products partially grown and/or processed in NYS, indicate which ones

Table 6. Geographic preference (GP) bid example, beef hot dogs, GP and Net Cost scoring results.

Criteria/Attribute	Bid 1	Bid 2	Bid 3	Bid 4
Bidder location (all processors)	PA	NY	PA	NY
Percent NY beef	0	10	100	55
Price submitted	\$10.00	\$10.25	\$10.50	\$10.75
Lowest Price	20%	0%	0%	0%
NYS Food Product	0%	0%	30%	30%
NYS Bidder	0%	5%	0%	5%
Bidder within 200 miles of Plattsburgh	0%	0%	0%	0%
Documented food safety plan	20%	20%	20%	20%
Will deliver to school districts	10%	10%	10%	10%
Total Preference points	50%	35%	60%	65%
Geographic Preference price	\$10.00	\$10.25	\$10.50	\$9.68
Net Cost price	\$10.00	\$9.98	\$9.91	\$10.19

Four bidders, all processors, are bidding for the hot dog contract, two from NY and two from PA. The amount of beef sourced from local farms varies. Bid 1 has the lowest price offering at \$10.00 per pound but Bid 3 and Bid 4 qualify as NYS food products, albeit with differing levels above the 51% minimum. Following the GP scoring system, Bid 4 has the highest preference percentage points and earns the 10% discount on their price for evaluation purposes (\$9.68). In so doing, Bid 4 is the winner and the agency pays \$10.75 per pound (the gross cost).

With the net cost approach, the higher sourcing of NY beef (100%) implies that Bid 3 is the winning bid and the agency pays \$10.50 per pound (gross cost). In short, the multiplier effects associated with the higher farm sourcing of beef on Bid 3 more than offset the loss of the processing margin to PA. Note also the net cost adjustment for Bid 2 that sources 10% NY beef. Some local is beneficial to vendors (and local producers) in the net cost framework and may be more feasible than hitting a 51% target. While we can certainly construct examples where the outcomes are consistent with each other, the point is to compare a comprehensive evaluation based

on economic principles than to the lumpiness of criteria points and NYS food product definitions that, ultimately, do not reflect the true value to the state.

Conclusions

We propose an innovative tool for use by state agencies that adjusts bid prices in public food procurement processes by incorporating economic multiplier effects. Based on recent contract usage for NYS food bids, our algorithm demonstrates average impacts on the state and public agencies when considering local economic activity generated through direct, indirect, and induced effects. For locally produced products, net food costs (B^*) highlight an average degree of net pricing incentives accruable to local producers of around 8%.

We also show that dairy products, bakery products, and frozen and canned fruits and vegetables have the highest cost changes, indicating priority industries for food procurement. Overall, the results emphasize that incorporating economic externalities in public food procurement processes can promote local competitiveness, while recognizing that overall procurement will remain a mix of local and nonlocal goods. A net cost approach reduces the need for state mandates, provides incentives for local producer competition, and results in lower or no changes in costs to the state, depending on subsidization allowances.

The algorithm is pragmatically implementable at the agency and/or state level and an online agency dashboard tool is currently being beta-tested by some municipal authorities in the state. An Excel based version of the tool and additional resources are available at the link below. The tool can be customized to individual agency preferences. The link also provides access to additional information on incorporating other externalities into a net cost framework currently in development.

- <https://cornell.box.com/v/CornellTCOFProcurement>.

Additional details on the net cost approach are available here for free when published:

- **Schmit, T.M.** and X. Liu.* 2025. Incorporating economic multipliers in a bid adjustment algorithm for public food procurement decision making. *Applied Economics Perspectives and Policy*, <http://doi.org/10.1002/aepp.13523>

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Appendix A: Example food products for category mapping based on NYS state agency purchased products on state bid.

Code	Food Product Category	Example food products
1F	Oilseeds (without processing)	Oilseeds
2F	Grains (without processing)	Lentils, pea, quinoa, rice
3F	Vegetables & melons (without processing)	Cabbage, carrot, cauliflower, celery, cucumber, green bean, kale, lettuce, lettuce, onion, pepper, potato, radish, spinach, squash, tomato, fresh salads
4F	Fruit (without processing)	Apple, banana, grape, grapefruit, kiwi, lemon, mandarin, cantaloupe, honeydew, watermelon, nectarine, orange, peach, pear, pineapple, plum, strawberry
5F	Tree nuts (without processing)	Pecans, almonds
6F	Greenhouse/nursery products	Herbs, basil, bay leaf, cilantro, oregano, parsley, mushroom
7F	Sugar cane/sugar farming	Sugar cane, sugar beets
8F	Other crops	Tea, maple syrup, honey
9F	Beef cattle	Cattle from farms
10F	Milk from farms	Raw milk from farms
11F	Poultry & eggs	Eggs, chickens from farms
12F	Other animal products	Hogs, sheep from farms
13F	Fresh fish	Fish from commercial fishing
14P	Flour, rice, malt, wet corn, breakfast cereals	Corn starch, cornmeal, cereal bar, granola bar, cereal, grits, oatmeal
15P	Processed and blended oils and oilseeds	Margarine, cooking oils
16P	Sugars and confectioneries	Syrups, candies, chocolates
17P	Frozen and canned fruits, juices, and vegetables	Applesauce, beans, carrots, pickles, pimento, relish, corn, breaded eggplant, french fries, fruit cocktail, fruit cup, fruits, garlic, vegetarian gravy, green beans, juice cup, juices, onion rings, potatoes, pumpkin, salsa, barbecue sauce, tomato sauce, spinach, hummus, jelly, tomato sauce, paste, frozen sliced plantain, fruit ice slush
18P	Frozen and canned specialty foods	Baby food, egg rolls, pizza, canned beef ravioli, soups, waffles, tv dinners
19P	Dehydrated food products (non-meat/dairy)	Raisins, craisins, prunes
20P	Processed dairy products	Butter, cheese, cream cheese, whipping cream, creamers, ice cream, fluid milk, plant-based milk, yogurt

Appendix A: Example food products for category mapping based on NYS state agency purchased products on state bid.

Code	Food Product Category	Example food products
21P	Cakes, pastries, bakery products, cookies, pastas, doughs, tortillas	Bagel, biscuit, bread, bun, cookie, cracker, cake, flatbread, French toast, loaf, muffin, croissant, roll, pasta bowl, pancake, pasta, tortilla, taco shell
22P	Poultry & processed poultry meat products	Whole chicken, chicken dumpling, chicken leg, chicken patty, roasted chicken, chicken tender, chicken bite, goose bottom, omelet, chicken slider, turkey
23P	Meat & processed meat products (nonpoultry)	Ground meat, beef, lamb, pork, veal, meatball, beef patty
24P	Processed fish and seafood products	Fish patties, salmon, sardine, tilapia, tuna
25P	Roasted nuts, nut butters, and snack foods	Potato chip, tortilla chip, peanut butter, roasted sunflower, pretzel snack
26P	Flavorings, dressings, sauces, spices, and extracts	Baking soda, ketchup, mayonnaise, mustard, balsamic vinegar, salad dressings, salt, browning sauce, duck sauce, soy sauce, sweet and sour sauce, tartar sauce, teriyaki sauce, Worcestershire sauce, seasonings, spices, cooking wine, vinegar
27P	Coffee, tea, soft drinks, and water beverages, ice	Coffee, electrolyte drink, nutritional drink, soda, iced tea, bottled water, ice
28P	Other manufactured foods	Burrito, macaroni, meal kits, sandwich, sugar substitute, tofu

Appendix B – Vendor Input Questions

To assist state agencies in augmenting existing bid pricing sheet for application of the algorithm, we propose the format of the food product questions below for incorporation into existing bid pricing sheets. The questions proposed represent the set of questions for a processed food product made from two processed food product ingredients. Depending on the answers to the first question, the remaining questions may not be relevant.

1. Select the food product category from the list that most closely matches the bidded product (select one from drop down list):
 - Fresh/minimally processed food product category (1F - 13F): ____ OR
 - Processed food product category (14P - 28P): ____
2. What percent of the bidded product was made or grown in New York State? Enter a number between 0 and 100.
 - ____% Enter number 0 to 100
3. If a processed food product category in #1, select two food product categories from the list that most closely matches the top two food product ingredients in the bidded product (choose two):
 - First ingredient (select one from the drop down list)
 - Fresh/minimally processed food product category (1F - 13F): ____ OR
 - Processed food product category (14P - 28P): ____
 - Second ingredient (select one from the drop down list)
 - Fresh/minimally processed food product category (1F - 13F): ____ OR
 - Processed food product category (14P - 28P): ____
4. What percent of the of the first food product ingredient was made or grown in New York State? Enter a number between 0 and 100.
 - ____% Enter number 0 to 100
5. What percent of the of the second food product ingredient was made or grown in New York State? Enter a number between 0 and 100.
 - ____% Enter number 0 to 100

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