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Stocks of Wealth and the Value-Added Food and Agriculture Sector

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Despite substantial effort to conceptualize wealth as supporting positive community economic development, little research tests the relationship between development outcomes and community wealth. This research assesses the relationship between the value-added food and agriculture business (VAFAB) sector and stocks of community wealth by leveraging a new dataset of stocks of community wealth and National Establishment Time Series data. We find significant relationships between the growth of VAFAB establishments and employment and stocks of community wealth. These results have implications for economic developers and policy makers in prioritizing investments should they want to grow the local VAFAB sector.

Key words: community capitals, community development, food policy, food systems, NETS data

Introduction

Growing scholarly consensus argues for the need to reframe development opportunities through the lens of wealth. This literature argues that supporting regional development requires investing in a broad range of assets and expanding outcome evaluation from market measures (e.g., regional output, gross regional product, wages, or employment) to wealth measures (e.g., Arrow et al., 2013; Pender, Marré, and Reeder, 2012; Jablonski and Payton Scally, 2021). There is also literature that argues that the value-added food and agriculture business (VAFAB) sector may be one catalyst to increase a wide range of community assets by leveraging increased consumer interest and local factor endowments to capture price premiums that are shared across the supply chain and embedded in community (Clark et al., 2021). Policies encouraging and supporting value-added agri-food systems have been consistently growing in the United States at both the state and federal levels for the past 4 decades (Clark and Jablonski, 2018), yet there has been no systematic evaluation of the relationship between the VAFAB sector and community wealth.

Herein community "wealth" is defined as assets net of liabilities (Pender, Marré, and Reeder, 2012). In addition to the usual focus on physical and financial capital, assets may include human capital (e.g., Becker, 1993), intellectual capital (e.g., Romer, 1986), natural capital (e.g., Costanza and Daly, 1992), social capital (e.g., Arrow, 1975; Putnam, 1995), political capital (e.g., Booth and Richard, 1998), and cultural capital (e.g., Flora, Flora, and Gasteyer, 2015). Although there is

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significant literature that conceptually develops a comprehensive wealth framework and suggests how it should be applied to economic development (e.g., Pender, Marré, and Reeder, 2012; Pigg et al., 2013), less research is focused on empiricizing stocks of assets. Most measurement has focused on a single type of capital (e.g., Rupasingha, Goetz, and Freshwater, 2006; Arrow et al., 2013; Schmit et al., 2017). Ratner and Levy (2014) highlighted that the lack of data measuring stocks of wealth makes it difficult to compare how investments or programs across regions or topic impact assets.

We use the definition offered in Clark et al. (2021) to guide our definition of the VAFAB sector, which is a portfolio of food and agricultural businesses engaged in value chains, with a commitment to community. Value chains, defined as "strategic alliances between farmers or ranchers and other supply chain partners that deal in significant volumes of high-quality, differentiated food products and distribute rewards equitably across the chain" have been linked to social networks in addition to built capital (Diamond et al., 2014, p. 1). As such, there is reason to believe that the VAFAB sector requires different stocks of wealth than other sectors. As a result of this broader distribution of benefits across the supply chain, research has found that the VAFAB sector creates opportunities for producers and rural communities (e.g., Jablonski et al., 2017; Schmit et al., 2017; Bauman, Thilmany McFadden, and Jablonski, 2018, 2019).

Accordingly, Congress and the US Department of Agriculture have supported specific opportunities for the VAFAB sector in rural communities through programs and policy initiatives. For example, the USDA Rural Development's Value-Added Producer Grant program, which began in 2001, provided 2,345 grants worth $318 million to farmers and ranchers between 2001 and 2015 (Rupasingha and Pender, 2018). More recently, the Biden administration committed $1 billion to expand and diversify the independent meat and poultry processing sector to support agricultural producers and spur rural economic development (The White House, 2022). Thus, understanding the relationship between the VAFAB sector and stocks of rural wealth may have important implications for future policy investments.

This research contributes to the literature by leveraging a new dataset of stocks of community wealth (Schmit et al., 2021) and restricted-access National Establishment Time Series (NETS) data to take a comprehensive community asset-based approach to the case of the VAFAB sector to analyze the effect of stocks of wealth on the local VAFAB sector. Importantly, we reduce potential bias resulting from a "missing variable" problem by employing a dataset measuring comprehensive stocks of community wealth. Additionally, we contribute to replicable analysis by using more standardized measures of stocks of wealth.

Data

We use two sources of data in our analysis. First, we compiled data on changes in the number of establishments and employment from National Establishment Time Series (NETS) data. Second, we use indicators compiled by Schmit et al. (2021). All data used in the analysis are at the county level.

NETS Data

The NETS is a longitudinal establishment database developed by Walls and Associates using business establishment-level data from Dun and Bradstreet (D&B) Market Identifier (DMI) files. The starting point for the NETS Database was 26 annual snapshots of the full DMI file that tracked over 60 million establishments between 1990 and 2015. Each business establishment is assigned a unique Data Universal Numbering System (DUNS) number, which is constant over time and follows

the business when it moves or when it is acquired by another firm. The NETS includes data on nearly every US business establishment that has operated in the US since 1990.[1]

We follow DiCarolis et al. (2017) in defining the VAFAB sector.[2] The exception is that we omit North American Industry Classification System (NAICS) codes that are relevant to agriculture but not to food (e.g., forestry). Additionally, our focus is on VAFAB that we determine via the NETS database to be "residential" or locally owned.[3] We follow Fleming and Goetz (2011) in using the categorization developed by the Edward Lowe Foundation to define residential or locally owned firms as those located and headquartered in the same county, while nonresident firms are located in the county but headquartered elsewhere.

Stocks of Community Wealth

Following Schmit et al. (2021), we use a multivariable indexing approach relying on principal components analysis (PCA) to define our stocks of community wealth. Schmit et al. conducted a comprehensive literature review that identified multiple variables associated with measures of community capital stocks. The result is a set of indicators for each of the capital assets from secondary data at the county level. As we describe in detail below, our dependent variable uses data from 2010–2015.[4] Accordingly, for the Schmit et al. indicators more recent than 2010, we find the most similar older data available. Using older data is important as it allows us to assess how stocks of wealth impact the changes in the VAFAB sector from 2010 to 2015. Table 1 reports descriptive statistics for each of the indicators by type of capital.[5]

[1] Data based on D&B DMI files have been criticized in the past as not suitable for analysis (e.g., Crane and Decker, 2019). These criticisms claim that births and younger/smaller businesses are underreported and that there are discrepancies between the total US employment figures in DMI files and data published by the Bureau of Labor Statistics. Additionally, there are concerns that a considerable share of employment data in the NETS is not actual but imputed. This is because when the raw D&B files from which NETS data are constructed are missing observations on establishments (e.g., if there is a delay in detecting a new establishment), D&B picks up an establishment that indicates it was born a year or two earlier and the NETS data are backfilled. However, several studies (e.g., Kunkle, 2011; Neumark, Zhang, and Wall, 2007; Neumark, Wall, and Zhang, 2011) that investigated the accuracy of NETS data did not agree with some of these criticisms. Neumark, Wall, and Zhang (2011) found that the claim of underreporting of births in the NETS is without merit, demonstrating that NETS data have better coverage of small businesses compared to those reported under the Statistics of Business data as NETS includes nonemployers (a business that has no paid employees and is subject to federal income tax; US Census Bureau, 2016). Further, Neumark, Wall, and Zhang found that the NETS database always indicates whether a particular employment number is imputed, making it possible to check whether results are robust to the use of imputed data. Barnatchez, Crane, and Decker (2017) conducted a review of NETS data and concluded that the main discrepancies between NETS and official sources are largely driven by differences among small establishments, with NETS data much more fully representing establishments with fewer than 10 employees.

[2] We used the following NAICS codes to define the VAFAB sector: 111, 112, 1151, 311, 3121, 423820, 4244, 4245, 4248, 42491, 44422, 4451, 4452, 4453, 446110, 447110, 4529, 49312, 49313, 7223, 7225. Note that the more digits included in the NAICS identifier, the more specific the subsector. So, for example, DiCarolis et al. (2017) identified sector 42 for the wholesale sector in the 2012 NAICS 2-digit identifier, but then identified seven subsectors at the 4-digit NAICS level that had agricultural or food processing components. Accordingly, we use 6-digit NAICS where we want to more specifically identify what we are defining as VAFABs.

[3] Based on previous research, we use "local ownership" to operationalize the VAFAB sector. Many recent studies have substantiated the findings of Mills and Ulmer's (1946) seminal study, which found that small manufacturing (including those with local ownership) led to more balanced economic lives and higher levels of civic welfare. Kolko and Neumark (2010) found that owners of businesses who reside in the community have the best interests of the community in mind, and Fleming and Goetz (2011) found a positive relationship between local ownership and economic growth for small firms. Rupasingha (2017) found evidence that local entrepreneurship positively impacts local economic performance, increasing county per capita income growth and employment growth and decreasing poverty.

[4] Although causality runs in both directions between community wealth and development of the local VAFAB sector, we focus on the effects of wealth on the VAFAB sector for two primary reasons. First, we do not have data on changes in stocks of wealth over time but do have data on changes in the local VAFAB sector. Second, the VAFAB sector is more dynamic than the changes in the stocks of wealth. For example, the natural amenities index (one of our indicators of the stock of natural capital) is largely static over time.

[5] Schmit et al. (2021) made all of their data publicly available here: https://github.com/schmi-ny/county-level-community-capital-stocks. Note that the github site also provides maps of the data that show, by principal component, where there is missing data.

Table 1. Capital Asset Descriptive Statistics

Variable Description	Data Source	Mean	Std. Dev.
Built capital, highway and broadband infrastructure	Author derived	0.020	1.130
Percentage of population with access to fixed terrestrial broadband at ≥ 25 Mbps download/3 Mbps upload, June 2011	Derived from National Telecommunications and Information Administration (2011) data	27.410	35.478
Inverse of population-weighted mean distance in km to the nearest interstate highway on-ramp or intersection, 2007	Dicken, Williams, and Breneman (2011)	0.110	0.116
Cultural capital, arts and cultural institutions	Author derived	0.001	1.363
Cultural capital, creative capital	Author derived	-0.010	1.145
Percentage of workforce employed in the arts (creative class), 2007–2011	US Department of Agriculture (2014), US Census Bureau (2014)	16.130	5.766
Public libraries per 100,000 population, 2012	Kushner and Cohen (2018)	17.381	22.012
Creative industry businesses per 100,000 population, 2009	Kushner and Cohen (2018)	188.575	117.669
Author-constructed racial diversity index from 0 (no diversity) to 10 (complete diversity), 2010	US Census Bureaub (2010)	3.360	2.195
Museums per 100,000 population, 2015	Kushner and Cohen (2018)	24.332	28.660
Financial capital, financial solvency	Author derived	0.019	1.213
Per capita cash and security holdings less government debt, 2007	US Census Bureau (2007)	0.208	2.528
Per capita bank deposits, FDIC-insured institutions, 2016	Federal Deposit Insurance Corporation (2016)	22.028	50.670
Per capita no. of owner-occupied units without a mortgage, 2010	US Census Bureaua (2010)	0.125	0.043
Human capital, health-related aspects	Author derived	0.053	1.618
Human capital, food and health security	Author derived	0.057	1.169
Percentage of adult population with at least a bachelor's degree, 2010	US Census Bureaua (2010)	2,459.784	1,156.140
Health Factors Z-Score, 2013	Robert Wood Johnson Foundation (2013)	0.019	0.469
Health Outcome Z-Score, 2013	Robert Wood Johnson Foundation (2013)	0.026	0.707
Percentage of population food secure, 2010	Feeding America (n.d.)	84.565	4.041
Percentage of population with health insurance, 2010	Robert Wood Johnson Foundation (2010)	82.225	5.904
No. of primary care physicians per 10,000 population, 2010	Robert Wood Johnson Foundation (2010)	5.639	3.882
Natural capital, natural amenity scale and share of acres in national forest	Author derived	0.003	1.263
Natural capital, prime farmland	Author derived	0.003	1.006
Natural Amenities Scale, 1999	McGranahan (1999)	0.030	2.307
Percentage of farmland acres designated as prime farmland, 2012	US Department of Agriculture (2012)	0.061	0.140
Percentage of total acres with conservation easement, 2016	US Endowment for Forestry and Communities (2016)	1.415	2.788
Percentage of total acres in conservation-related programs and woodlands, 2017	US Department of Agriculture (2017)	1.480	2.603
Percentage of total acres in national forests, 2017	US Forest Service (2017)	4.627	12.158

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Table 1. – continued from previous page

Variable Description	Data Source	Mean	Std. Dev.
Social capital, no. of social establishments and nonprofits per capita	Author derived	0.024	1.103
No. of social establishments per 1,000 population, 2009	Rupasingha, Goetz, and Freshwater (2006); Rupasingha (2017)	1.446	0.708
Percentage of eligible voters who voted, 2008	Rupasingha, Goetz, and Freshwater (2006); Rupasingha (2017)	58.838	8.801
US Population Census response rate, percentage, 2010	Rupasingha, Goetz, and Freshwater (2006); Rupasingha (2017)	71.252	10.531
No. of nonprofit organizations per 1,000 population, 2009	Rupasingha, Goetz, and Freshwater (2006); Rupasingha (2017)	7.531	18.595
All establishments, per 10,000 population, 2010	Walls and Associates (2015)	854.2	312.7
All establishments, per 10,000 population, 2015	Walls and Associates (2015)	785.3	288.9
All employment, per 10,000 population, 2010	Walls and Associates (2015)	4839.9	1602.3
All employment, per 10,000 population, 2015	Walls and Associates (2015)	4954.8	1689.5
Local VAFAB establishments, per 10,000 population, 2010	Walls and Associates (2015)	141.2	154.7
Local VAFAB establishments, per 10,000 population, 2015	Walls and Associates (2015)	133.6	142.5
Local VAFAB employment, per 10,000 population, 2010	Walls and Associates (2015)	600.7	410.0
Local VAFAB employment, per 10,000 population, 2015	Walls and Associates (2015)	598.1	381.3

Notes: VAFAB stands for the value-added food and agriculture business sector. Indicators to measure the stocks of wealth are taken directly from Schmit et al. (2021), except for their additional indicators for built capital that use food and beverage manufacturing establishments and other manufacturing establishments. We exclude these two variables, given that they are captured in our dependent variables. Further, where possible we use the closest available data from 2010 and older to account for the fact that our dependent variable measures changes from 2010–2015.

Once the indicators were compiled, Schmit et al. (2021) used PCA to reduce the dimensionality of the data, facilitating a focus on the indicators within each capital type that accounts for the most variation. They followed Kaiser's rule (e.g., Nunnally and Bernstein, 1994) and retained only factors with eigenvalues exceeding 1.0 and rotated the factor loadings matrix to obtain the highest possible correlations on the fewest possible factors. We modified this approach by removing a few of their indicators for built capital that were the same or closely related to our outcome measures. Table 2 provides the promax component loadings on indicator variables and the residual share of the variance unexplained.

The PCA retained nine components reflecting different types of community wealth, including one reflecting built capital (access to broadband and to interstate highways); two reflecting types of cultural capital, one we refer to as "arts and cultural institutions" (loading heavily on number of public libraries and museums per capita) and one labeled "creative cultural capital" (employment per capita in the arts and number of creative businesses per capita); one reflecting financial solvency (per capita cash and security holdings less government debt and per capita number of owner-occupied housing units without a mortgage); two reflecting aspects of human capital mainly related to health, including "health factors and outcomes" (health factor Z-score and health outcome Z-score)[6] and

[6] The Robert Wood Johnson Foundation (2010, 2013, 2017) calculates Z-scores as both "health outcome" and "health factor" measures based on indicators with different scales (percentages, rates, and averages of survey responses or other metrics). Each Z-score is relative to the other counties in that state (i.e., not compared to an absolute standard) and reported in the metric of standard deviations. A positive Z-score indicates a value higher than the average of counties in that state, and a negative Z-score indicates a value for that county lower than the average of counties in that state. Health Outcomes includes measures for length of life (e.g., premature death) and quality of life (e.g., poor or fair health, poor physical health days, poor mental health days, low birthweight). Health factors include health behaviors (e.g., tobacco use, diet and exercise, alcohol use, sexual activity), clinical care (e.g., access to care, quality of care), social and economic factors (e.g., education, employment, income, family and social support), and physical environment (e.g., environmental quality, housing and transit) (Remington, Catlin, and Gennuso, 2015).

Table 2. Promax Component Loadings on Indicator Variables and Residual Unexplained Variation (N = 2,682)

Capital	Variable	Comp1	Comp2	Unexplained
Built	Percentage of population with access to fixed advanced telecommunications	**0.707**		0.308
	Inverse of population-weighted mean distance to the nearest interstate highway on-ramp or intersection	**0.707**		0.308
Cultural	Public libraries per 100k population	**0.625**	−0.092	0.231
	Museums per 100k population	**0.651**	0.129	0.226
	Percentage of workforce employed in the arts, 2007–2011	−0.167	**0.635**	0.357
	Creative industry businesses per 100k pop.	0.137	**0.756**	0.248
	Racial diversity index	−0.373	−0.023	0.743
Financial	Per capita cash and security holdings less government debt	**0.697**		0.329
	Per capita number of owner-occupied units without a mortgage	**0.703**		0.316
	Per capita bank deposits	0.142		0.972
Human	Health factor Z-score	**0.574**	−0.081	0.169
	Health outcome Z-score	**0.565**	−0.238	0.234
	Percentage of pop food secure	0.381	0.104	0.550
	Percentage of pop with health insurance	−0.214	**0.702**	0.348
	Percentage of pop with at least a bachelor's degree	0.403	0.298	0.290
	Number of primary care physicians per 10k population	0.102	**0.597**	0.378
Natural	Natural amenities scale	**0.643**	−0.202	0.313
	Percentage of total acres in national forests	**0.577**	−0.035	0.474
	Percentage of farmland acres designated as prime farmland	−0.082	**0.922**	0.117
	Percentage of total acres with conservation easements	0.197	0.018	0.938
	Percentage of total acres in conservation-related programs and woodlands	−0.461	−0.336	0.536
Social/political	Number of social establishments and nonprofits per capita	**0.633**		0.470
	Number of nonprofit organizations per 1k population	0.347		0.840
	Percentage of eligible voters that voted	**0.665**		0.415
	Census response rate	0.193		0.951

Notes: Comp 1 and Comp 2 represent the first and second principal components on which the variables loaded. Bolded values reflect the variables upon which each component is loading. Unexplained represents the proportion of the variance that is not explained.

"access to health care and health insurance" (share of population with health insurance and per capita number of primary care physicians); two reflecting natural capital, including "natural amenities and forestland" (natural amenities scale and percentage of acres in national forests) and "prime farmland" (percentage of farmland acres designated as prime farmland); and one reflecting social and political capital (number of social establishments and nonprofit organizations per capita and percentage of eligible population that voted).

Econometric Analysis

We estimate separate regression models to assess whether the effects of community wealth types on changes in numbers of locally owned VAFAB establishments and in employment in locally owned VAFAB establishments reflect impacts of the wealth types on business growth in general or whether they affect the locally owned VAFAB sector differently than they affect other sectors in the local economy. To do this, we define the key VAFAB outcomes in county i ($VAOV_i$) as (i) the change from 2010 to 2015 in the number of locally owned VAFAB establishments per 10,000 population and (ii) the change from 2010 to 2015 in employment in locally owned VAFAB establishments per 10,000 population. Table 3 describes the percentage changes in VAFAB employment and establishments that are locally owned from 2010 to 2015. For comparison purposes, we estimated two additional regression models using the changes from 2010 to 2015 in the total number of business establishments per 10,000 population and in total employment per 10,000 population as dependent variables.

We regressed the county-level outcome variables on the nine asset indices defined above ($K_{ij}, j = 1 \ldots 9$). We included as control variables the US Department of Agriculture (2013) *Rural-Urban Continuum Codes* ($RUCC_{ir}, r = 1 \ldots 8$) to account for effects of population size and urbanicity of communities and state-level fixed effects ($S_n, 1 \ldots 46$) to capture unobservable differences in state factors that may affect value-added outcomes (equation 1).[7] We also included five additional control variables ($X_{ik}, k = 1 \ldots 5$):[8] (i) the county population size in 2010, (ii) percentage population growth between 2010 and 2015, (iii) median household income in 2010, (iv) the real value of large foundation grants per capita, and (v) the real value of USDA Value-Added Producer Grants (VAPG) per capita provided to organizations based in the county between 2005 and 2010. In our base models, we estimated these models using ordinary least squares (OLS):

$$VAOV_i = \alpha + \sum_{j=1}^{9} \beta_j K_{ij} + \sum_{k=1}^{5} \gamma_k X_{ik} + \sum_{r=1}^{8} \delta_r RUCC + \sum_{n=1}^{46} \theta_n S_n + e_i. \tag{1}$$

There are some potential concerns with the use of OLS estimation, including the potential endogeneity of the capital stock variables (i.e., that they may be correlated with the error term in equation 1, resulting in biased estimates). Such a correlation could be present if the capital stocks are affected by VAFAB and other business developments (reverse causality), if capital stocks and the outcome variables are responding to unmeasured factors that lead to correlations between the capital stocks and the outcomes (omitted variable bias), or due to measurement error in the capital stock variables. The reverse causality concern was addressed in part by using to the extent possible variables measured in 2010 or earlier to estimate the capital stock variables. However, this may not completely resolve the endogeneity concern, especially if the problem is due to omitted variables or to measurement error.

To address the endogeneity issue, we used Lewbel's (2012) instrumental variables (IV) approach, which relies on heteroskedasticity in the errors of the first-stage equations in a system of structural equations to identify the structural parameters of the system. The strength of Lewbel's approach is that it does not require exclusion restrictions—such as assuming the availability of exogenous instrumental variables—that affect the endogenous explanatory variables but that do not directly affect the outcomes. That is the problem we face, since we do not know of any exogenous variables that would affect the community wealth stocks but not the business outcomes directly. The key identifying assumption in Lewbel's approach is that some of the explanatory variables are

[7] The 2013 edition of the RUCC codes are based on 2010 Population Census data (US Department of Agriculture, 2013). We excluded Alaska and Hawaii, focusing on the contiguous United States. We further excluded the District of Columbia from the analysis as it does not have Census of Agriculture data available. Rhode Island was not included in the analysis because of missing values of data for some variables.

[8] We are grateful to an anonymous referee for suggesting inclusion of these control variables.

Table 3. Percentage Change in VAFAB Employment and Establishments That Are Locally Owned, 2010–2015

NAICS Description	NAICS	Change EMP (N)	Change EST (N)	Change EMP (%)	Change EST (%)
Crop Production	111	−57,185	−8,653	−6.2	−2.2
Animal Production and Aquaculture	112	−19,209	−10,368	−4.1	−6.1
Support Activities for Crop Production	1151	−3,050	−1,197	−2.2	−7.0
Food Manufacturing	311	38,579	5,842	4.3	9.5
Beverage Manufacturing	3121	11,681	562	9.3	6.6
Farm and Garden Machinery and Equipment Merchant Wholesalers	423820	−7,884	−1,935	−9.7	−16.3
Grocery and Related Product Merchant Wholesalers	4244	−15,640	203	−2.5	0.3
Farm Product Raw Material Merchant Wholesalers	4245	10,467	5,272	8.8	19.1
Beer, Wine, and Distilled Alcoholic Beverage Merchant Wholesalers	4248	12,492	3,538	7.4	29.0
Farm Supplies Merchant Wholesalers	42491	−4,133	−1,461	−4.3	−8.6
Nursery, Garden Center, and Farm Supply Stores	44422	−17,592	−4,793	−16.3	−22.4
Grocery Stores	4451	−34,133	−18,263	−1.7	−9.3
Specialty Stores	4452	−19,083	−5,585	−7.7	−9.3
Beer, Wine, and Liquor Stores	4453	−14,982	−4,554	−8.6	−10.6
Pharmacies and Drug Stores	446110	15,788	1,718	4.9	4.4
Gasoline Stations with Convenience Stores	447110	−24,348	−5,694	−13.5	−17.2
Other General Merchandise Stores	4529	108,790	−1,423	67.9	−5.2
Refrigerated Warehousing and Storage	49312	18,888	−257	87.7	−18.1
Farm Product Warehousing and Storage	49313	−1,377	−278	−15.0	−20.7
Special Food Services	7223	54,469	4,136	19.5	15.2
Restaurants and Other Eating Places	7225	1,554,452	121,044	23.2	23.6
	Total	1,606,990	77,854	11.6	4.5

Notes: VAFAB stands for the value-added food and agriculture business sector. NAICS stands for the North American Industry Classification System. EMP stands for employment. EST stands for establishments.

uncorrelated with the product of the error terms in the first- and second-stage regressions across all pairs of equations in the system. As shown by Lewbel, this assumption holds with correlated errors across equations resulting from a common factor structure of the errors, which may result from measurement error or omitted variables (as may be reasonable to expect in our case). An additional requirement of Lewbel's approach is that the error terms in the first-stage equations for the endogenous explanatory variables be heteroskedastic.

In our application, we assume that the Rural-Urban Continuum Codes (RUCC) are exogenous variables.[9] Although counties' RUCCs change over time in response to change in population and

[9] The Lewbel IV models were not estimable when including the state-level fixed effects, so these were excluded from the Lewbel IV regressions.

commuting patterns, changes in counties' RUCC from one decade to the next are not common. For example, fewer than 15% of the counties in our sample experienced RUCC changes between the 2003 and the 2013 edition of the codes. Nevertheless, to help insure exogeneity, we use the 2003 edition of the RUCC in the Lewbel model.[10]

Instrumental variables used in estimating equation (1) (with the capital stock variables. K_{ij}, and control variables, X_{ik}, treated as endogenous) are generated by multiplying centered values of each exogenous variable by the residuals from first stage reduced-form regressions for the capital stocks and control variables. Under Lewbel's (2012) assumptions, these instrumental variables are uncorrelated with the error term in equation (1). Identification is thus possible under these assumptions, although as Lewbel notes, there may be problems of weak identification without additional external instruments or sufficient heteroskedasticity in the first-stage regressions. As discussed in the next section, weak identification is indeed prevalent in our Lewbel IV results.

Another concern is that spillover effects of capital stocks or other factors in neighboring counties may affect VAFAB development in a county, possibly resulting in omitted variable bias. A related concern is that of spatial autocorrelation (i.e., spatial correlations in the error terms among neighboring counties). To address these potential issues, we estimate a spatial Durbin error model (SDEM) that includes spatial lags of the explanatory variables (not including spatial lags of the state fixed effects)[11] and accounts for spatial autocorrelation in the error term among neighboring counties (LeSage and Pace, 2009). In the SDEM we used a queen contiguity weights matrix that identifies polygons sharing boundary points as neighbors.

All regression models, except the SDEM, used the Huber–White estimator of standard errors, which is robust to heteroskedasticity (White, 1980). Since the regressions are cross-sectional, there was no concern about possible serial correlation in the error term.

Results and Discussion

OLS Model Results

Table 4 reports the results of the OLS regressions, excluding the state fixed effects coefficients.[12] Statistically significant (at the 5% level) positive associations between the capital stock variables and at least one outcome variable are evident for built capital, creative cultural capital (number of local VAFAB establishments), human capital related to health factors and outcomes (number of all establishments and all employment), human capital related to access to health insurance and health care (all outcomes except all employment), natural amenities-related natural capital (number of local VAFAB establishments), and prime farmland-related natural capital (number of local VAFAB establishments and all establishments). Statistically significant negative associations between the capital stock variables and at least one outcome variable are evident for arts and cultural institutions-related cultural capital (all outcomes except all employment) and social/political capital (all outcomes).

Lewbel IV Model Results

Given the potential endogeneity of the capital stock variables, we investigated the robustness of these results using Lewbel's (2012) instrumental variable (IV) regression approach (Table 5). Unfortunately, the instrumental variables created by the Lewbel IV approach are weak predictors

[10] The 2003 edition of the RUCC codes is based on 2000 Population Census data.

[11] The SDEM was not estimable with the spatial lags of the state fixed effects included.

[12] The full OLS regression results are reported in Table S1 in the online supplement (see www.jareonline.org).

Table 4. Ordinary Least Squares (OLS) Regression Results (N = 2,820)

Dependent Variable: Change from 2010 to 2015 per 10,000 Population				
Explanatory Variable	**Local VAFAB Establishments**	**All Establishments**	**Local VAFAB Employment**	**All Employment**
Built capital, highway and broadband infrastructure	0.734**	7.923***L	1.518	41.914***L
	(0.298)	(1.611)	(2.421)	(16.012)
Cultural capital, arts and cultural institutions	−3.420***L	−5.709***L	−10.250***L	44.917
	(0.902)	(1.861)	(2.652)	(37.771)
Cultural capital, creative capital	1.813***L	−2.164	−1.058	8.151
	(0.539)	(2.128)	(2.860)	(17.574)
Financial capital, financial solvency	−0.197	−1.519	2.670	−6.992
	(0.283)	(1.575)	(2.931)	(13.009)
Human capital, health factors and outcomes	0.629	6.977***	3.138	45.872***
	(0.415)	(1.279)	(2.270)	(16.856)
Human capital, access to health insurance and health care	2.221***L	9.016***	11.900***	25.308
	(0.457)	(1.697)	(2.673)	(18.859)
Natural capital, natural amenities and forestland	1.975***L	−0.127	1.726	−16.041
	(0.408)	(1.572)	(2.869)	(18.705)
Natural capital, prime farmland	0.437***L	3.084***	−1.481	4.528
	(0.161)	(0.780)	(1.512)	(13.072)
Social/political capital, social establishments and nonprofits, voter participation	−2.507***L	−6.900***L	−9.260**	−39.260**
	(0.730)	(1.774)	(3.705)	(17.172)
R^2	0.5193	0.6519	0.1872	0.1139

Notes: Values in parentheses are robust standard errors. Single, double, and triple asterisks (*,**, ***) indicate coefficient statistical significance at the 10%, 5%, and 1% level, respectively. VAFAB stands for the value-added food and agriculture business sector. Intercept and coefficients of control variables (real large foundation grants per capita in 2005-2010, real VAPG grants per capita in 2005–2010, population in 2010, median household income in 2010, percentage population growth 2010–2015, RUCC categories, and state-level fixed effects) are not reported to save space. Full results are included in the online supplement. 2013 Rural-Urban Continuum Code (RUCC) are based on 2010 Population Census data. Excluded RUCC category is RUCC 9: nonmetro, not adjacent to a metro area, and completely rural.

[L] Indicates statistically significant (at 5% level) coefficients that are also statistically significant in the Lewbel model (see Table 5 and Table S2 in the online supplement). All coefficients with an L superscript were of the same sign in the Lewbel model as in the OLS model.

of the capital stock variables.[13] With weak instruments, the IV results may be more biased than the OLS results (Bound, Jaeger, and Baker, 1995). Another problem suggested by the diagnostics at the bottom of Table 5 is that the overidentification tests in the regressions for the number of all establishments and local VAFAB employment indicate a rejection of the assumption that the different sets of instrumental variables sufficient to identify the model converge in probability to a single best estimate of the parameter vector, with p-values of 0.031 and 0.013, respectively. However, this rejection could result from heterogeneous effects of the endogenous explanatory variables and

[13] The problem of weak identification in the Lewbel IV regressions is indicated at the bottom of Table 5 by the value of the Kleibergen–Paap rank F-statistic, 2.769. STATA does not report the critical values of this test statistic because the number of instrumental variables (112) and the number of endogenous explanatory variables (14) in these IV regressions exceed the values for which the critical values have been estimated by Stock and Yogo (2005). The critical values estimated by Stock and Yogo to achieve a maximum bias relative to OLS are an increasing function of the number of instrumental variables and a decreasing function of the maximum percentage bias and of the number of endogenous explanatory variables. With 30 instrumental variables and a maximum bias of 10%, the smallest critical value (for three endogenous explanatory variables) reported by Stock and Yogo (2005, Table 1) is 10.77. Although we do not know the critical value of this test for our case, a value as small as 2.769 for a maximum relative bias of 10% appears unlikely.

Table 5. Selected Lewbel Instrumental Variables Regression Results, Capital Variables Only (N = 2,820)

Dependent Variable: Change from 2010 to 2015 per 10,000 Population				
Explanatory Variable	**Local VAFAB Establishments**	**All Establishments**	**Local VAFAB Employment**	**All Employment**
Built capital, highway and broadband infrastructure	−0.088 (0.566)	16.621*** (3.552)	5.487* (2.902)	73.511*** (19.26)
Cultural capital, arts and cultural institutions	−4.823*** (0.511)	−6.405*** (2.442)	−13.190*** (2.251)	20.856 (16.51)
Cultural capital, creative capital	2.067** (0.836)	3.680 (4.808)	1.795 (4.060)	54.672** (26.99)
Financial capital, financial solvency	−0.241 (0.386)	3.206 (2.216)	3.015** (1.442)	15.444 (13.88)
Human capital, health factors and outcomes	1.577*** (0.568)	3.353 (3.693)	1.773 (2.915)	39.211 (22.08)
Human capital, access to health insurance and health care	2.545*** (0.698)	5.811 (4.065)	1.881 (3.488)	−31.817 (24.44)
Natural capital, natural amenities and forestland	2.713*** (0.498)	6.056** (2.829)	7.927*** (2.329)	−25.624 (16.22)
Natural capital, prime farmland	0.488*** (0.158)	−0.072 (1.350)	−0.038 (1.130)	−2.504 (11.36)
Social/political capital, social establishments and nonprofits, voter participation	−4.041*** (0.779)	−8.162** (3.359)	−6.245 (3.918)	−12.969 (18.80)
Centered R^2	0.4448	0.2154	0.1505	0.0305
Underidentification test, Kleibergen–Paap rank LM statistic (p-value)	207.74*** (0.0000)	207.74*** (0.0000)	207.74*** (0.0000)	207.74*** (0.0000)
Weak identification test, Kleibergen–Paap rank F-statistic	2.769	2.769	2.769	2.769
Overidentification test, Hansen J statistic (p-value)	117.40* (0.0884)	125.66** (0.0313)	131.59** (0.0133)	117.31* (0.0893)

Notes: Values in parentheses are robust standard errors. Single, double, and triple asterisks (*,**, ***) indicate coefficient statistical significance at the 10%, 5%, and 1% level, respectively. VAFAB stands for the value-added food and agriculture business sector. Intercept and coefficients of control variables (real large foundation grants per capita in 2005–2010, real VAPG grants per capita in 2005-2010, population in 2010, median household income in 2010, percentage population growth 2010–2015, 2003 RUCC categories, and state-level fixed effects) are not reported to save space. Full regression results are reported in Table S2 in the online supplement. The Lewbel models used two-step generalized method of moments (GMM) estimation.

does not necessarily imply that the IV model is invalid (Parente and Santos Silva, 2012).[14] Despite these concerns, we report in Table 5 the coefficients of the capital stock variables from the Lewbel IV models as a check on the robustness of the OLS results.[15]

Most of the statistically significant results for the capital stock variables in the OLS models are of the same sign and statistically significant in the Lewbel IV models. The robust findings (indicated by a superscript "L" in Table 4) include (i) the positive coefficient of built capital in the regressions for the number of all establishments and all employment; (ii) the negative coefficient of arts and

[14] Rejection of the overidentification restrictions is commonly taken to imply a rejection of the validity of the instrumental variables, but it has been shown that acceptance of these restrictions is neither necessary nor sufficient for instrument validity (Parente and Santos Silva, 2012).

[15] The full Lewbel regression results are reported in Table S2 in the online supplement.

cultural institutions in the regressions for number of local VAFAB establishments, all establishments, and employment in local VAFABs; (iii) the positive coefficient of creative cultural capital in the regression for number of local VAFAB establishments; (iv) the positive coefficient of access to health insurance and health care in the regression for number of local VAFAB establishments; (v) the positive coefficients of natural capital related to natural amenities and prime farmland in the regression for number of local VAFAB establishments; and (vi) the negative coefficients of social/political capital in the regressions for number of local VAFAB establishments and all establishments.

Some coefficients that are not statistically significant or only weakly statistically significant (at a *p*-value greater than 0.05) in the OLS models are more statistically significant in the Lewbel models: (i) creative cultural capital in the regression for all employment, (ii) financial capital in the regression for local VAFAB employment, (iii) human capital related to health factors and outcomes in the regression for number of local VAFAB establishments, and (iv) natural amenity-related natural capital in the regressions for number of all establishments and local VAFAB employment. Other coefficients are statistically significant in the OLS models but not statistically significant in the Lewbel models: (i) built capital in the regression for number of local VAFAB establishments, (ii) human capital related to health factors and outcomes in the regressions for all establishments and all employment, (iii) human capital related to access to health insurance and health care in the regressions for number of all establishments and local VAFAB employment, (iv) natural capital related to prime farmland in the regression for number of all establishments, and (v) social/political capital in the regressions for local VAFAB employment and all employment.

Relative Magnitudes of Associations of Capital Stocks with Outcomes

It is difficult to interpret the magnitudes of the regression coefficients of the capital stock variables since those variables are principal component scores without a straightforward quantitative interpretation. To facilitate comparison of the relative size of coefficients of the capital stock variables, Table 6 reports standardized regression coefficients for these variables based on the OLS regressions.[16] The largest standardized coefficients are statistically significant, though some statistically significant standardized coefficients are smaller than statistically insignificant ones. Most of the statistically significant coefficients in the OLS regressions are also statistically significant and of the same sign in the Lewbel model, as indicated by a superscript "L" in the table. Because of concerns about possible endogeneity bias in the OLS models and bias due to weak instruments in the Lewbel models, we focus here on statistically significant coefficients that are robust in both the OLS and Lewbel models.

Human capital related to access to health insurance and health care has the largest positive association with the number of local VAFAB establishments: A 1-standard-deviation increase in this variable is associated with a 0.14-standard-deviation increase in this outcome variable. Natural capital related to natural amenities and forestland and creative capital also have robust positive associations with growth in the number of local VAFAB establishments (0.13 and 0.11, respectively). Built capital has smaller positive associations with growth in the number of all establishments (0.09) and all employment (0.08). Prime farmland has a relatively small positive association with growth in the number of local VAFAB establishments (0.02). Cultural capital related to arts and cultural institutions has the largest negative associations with growth in the number of local VAFAB establishments (−0.25), all establishments (−0.08), and local VAFAB employment (−0.14). Social/political capital also has a relatively large negative association with growth in the number of local VAFAB establishments (−0.15) and a smaller negative association with growth in all establishments (−0.08).

[16] A standardized regression coefficient is the value of the regression coefficient multiplied by the standard deviation of the explanatory variable divided by the standard deviation of the dependent variable. It effectively measures the relative magnitude of the regression coefficients in standard deviation units. The full results are reported in Table S3 in the online supplement.

Table 6. Standardized Coefficients for Capital Stock Variables from OLS Regressions

Dependent Variable: Change from 2010 to 2015 per 10,000 Population				
Explanatory Variable	**Local VAFAB Establishments**	**All Establishments**	**Local VAFAB Employment**	**All Employment**
Built capital, highway and broadband infrastructure	0.045**	0.092***L	0.018	0.078***L
Cultural capital, arts and cultural institutions	−0.252***L	−0.080***L	−0.144***L	0.102
Cultural capital, creative capital	0.112***L	−0.025	−0.012	0.015
Financial capital, financial solvency	−0.013	−0.019	0.033	−0.014
Human capital, health factors and outcomes	0.055	0.115***	0.052	0.123***
Human capital, access to health insurance and health care	0.140***L	0.108***	0.143***	0.049
Natural capital, natural amenities and forestland	0.135***L	0.002	0.022	−0.034
Natural capital, prime farmland	0.024***L	0.032***	−0.015	0.008
Social/political capital, social establishments and nonprofits, voter participation	−0.149***L	−0.078***L	−0.105**	−0.072**

Notes: Values in parentheses are robust standard errors. Single, double, and triple asterisks (*,**, ***) indicate coefficient statistical significance at the 10%, 5%, and 1% level, respectively. VAFAB stands for the value-added food and agriculture business sector. Intercept and coefficients of control variables (real large foundation grants per capita in 2005–2010, real VAPG grants per capita in 2005-2010, population in 2010, median household income in 2010, percentage population growth 2010–2015, 2003 RUCC categories, and state-level fixed effects) are not reported to save space. Full regression results are reported in Table S3 in the online supplement. The Lewbel models used two-step generalized method of moments (GMM) estimation.

L indicates statistically significant (at 5% level) coefficients that are also statistically significant in the Lewbel model (see Table 5 and Table S2 in the online supplement). All coefficients with an L superscript were of the same sign in the Lewbel model as in the OLS model.

Spatial Durbin Model Results

After estimating the OLS models, we conducted a global Moran's I test and a Lagrange multiplier (LM) diagnostic for spatial autocorrelation. The Moran's I test rejected the null hypothesis of no spatial autocorrelation in all models and the LM test rejected it for all models except the regression for all employment. Based on these tests, we estimated a SDEM to account for both spatial autocorrelation and spatial spillover effects. The results of the SDEM for the capital stock variables in the own county and in neighboring counties are reported in Table 7.[17] The value of λ—the parameter reflecting spatial autocorrelation of the error term—is positive and statistically significant in all the SDEM regressions except the regression for all employment. This supports the SDEM as preferable to the OLS model for those outcome variables.

All the statistically significant results (at the 5% level) for own-county effects of capital stocks shown in Table 4 are robust to accounting for spatial spillovers and spatial autocorrelation. In all cases, statistically significant coefficients of the capital variables in Table 4 are of the same sign, similar magnitude, and statistically significant in Table 7. Some additional coefficients of own-county capital stocks are statistically significant in Table 7 but only weakly statistically significant in Table 4. These include the coefficient of arts and cultural institutions in the regression for the number of all establishments (negative and weakly statistically significant in Table 4, negative and statistically significant in Table 7) and the coefficient of arts and cultural institutions in the regression for all employment (positive and weakly statistically significant in Table 4, positive and statistically

[17] The full SDEM regression results are reported in the Table S4 in the online supplement.

Table 7. Selected Spatial Durbin Error Model Regression Results–Capital Variables Only (N = 2,820)

Dependent Variable: Change from 2010 to 2015 per 10,000 Population				
Explanatory Variable	**Local VAFAB Establishments**	**All Establishments**	**Local VAFAB Employment**	**All Employment**
Local value of capital variables				
Built capital, highway and broadband infrastructure	0.875*** (0.336)	6.830*** (1.504)	0.950 (2.404)	43.791*** (15.725)
Cultural capital, arts and cultural institutions	−3.038*** (0.286)	−6.885*** (1.288)	−9.064*** (2.008)	37.448*** (13.108)
Cultural capital, creative capital	1.583*** (0.362)	−1.860 (1.627)	−2.268 (2.570)	10.692 (16.800)
Financial capital, financial solvency	0.037 (0.500)	−0.722 (2.244)	1.310 (3.539)	−3.728 (23.115)
Human capital, health factors and outcomes	0.256 (0.275)	7.136*** (1.233)	2.673 (1.974)	43.074*** (12.915)
Human capital, access to health insurance and health care	1.891*** (0.343)	8.151*** (1.544)	11.310*** (2.409)	25.329 (15.724)
Natural capital, natural amenities and forestland	1.132*** (0.414)	1.143 (1.836)	2.184 (3.029)	−16.201 (19.834)
Natural capital, prime farmland	0.357 (0.271)	4.043*** (1.209)	−1.886 (1.974)	3.815 (12.924)
Social/political capital, social establishments and nonprofits, voter participation	−2.122*** (0.332)	−5.522*** (1.493)	−8.517*** (2.343)	−41.202*** (15.306)
Spatial lag of capital variables				
Built capital, highway and broadband infrastructure	−0.052 (0.717)	0.077 (3.300)	−0.596 (4.679)	−14.367 (30.305)
Cultural capital, arts and cultural institutions	−0.383 (0.657)	12.839*** (3.022)	−2.762 (4.270)	7.236 (27.635)
Cultural capital, creative capital	0.733 (0.780)	0.825 (3.586)	−3.213 (5.097)	24.606 (33.017)
Financial capital, financial solvency	−1.217 (1.246)	−9.118 (5.701)	9.985 (8.218)	8.897 (53.252)
Human capital, health factors and outcomes	0.737 (0.549)	−2.922 (2.526)	4.028 (3.592)	10.847 (23.277)
Human capital, access to health insurance and health care	−1.385* (0.755)	0.002 (3.467)	3.946 (4.929)	−18.327 (31.916)
Natural capital, natural amenities and forestland	1.069* (0.644)	−3.723 (2.934)	−0.416 (4.348)	−11.762 (28.267)
Natural capital, prime farmland	0.301 (0.718)	−2.019 (3.321)	1.357 (4.582)	24.696 (29.596)
Social/political capital, social establishments and nonprofits, voter participation	−2.771*** (0.721)	−9.214*** (3.324)	−5.377 (4.645)	−37.659 (30.042)
λ	0.287***	0.352***	0.040	0.0122

Notes: Values in parentheses are standard errors. Single, double, and triple asterisks (*, **, ***) indicate significance at the 10%, 5%, and 1% level, respectively. VAFAB stands for the value-added food and agriculture business sector. λ is the spatial error autocorrelation variable. SDEM model was not estimable with lags of state fixed effects, so these were not included. Intercept and coefficients of control variables (real large foundation grants per capita in 2005–2010, real VAPG grants per capita in 2005-2010, population in 2010, median household income in 2010, percentage population growth 2010–2015, RUCC categories, and state-level fixed effects) are not reported to save space. Full regression results are provided in Table S4 in the online supplement.

significant in Table 7). All other coefficients are statistically insignificant in both Tables 4 and 7. The SDEM results thus strengthen our confidence in the robustness of the statistically significant results in Table 4, including a few that are only weakly statistically significant.

Some of the coefficients of the spatial lagged capital stock variables are statistically significant in the SDEM, including the coefficient of the spatial lag of arts and cultural institutions in the regression for number of all establishments (+ effect) and the coefficients of the spatial lag of social/political capital in the regressions for the number of VAFAB establishments and number of all establishments (− effect). These results suggest that some of the capital stocks have spillover effects on neighboring counties and vice versa, especially on changes in the number of business establishments. As with own-county effects of the capital stocks, the spillover effects of the capital stocks appear to have a stronger impact on the number of business establishments than on employment.

Other Robustness Checks

In addition to investigating the robustness of our results to alternative econometric models, we also investigated robustness of the results to an alternative definition of VAFAB sector, to the inclusion or exclusion of some control variables, and to the exclusion of outliers. These checks revealed little change in the qualitative results.[18]Most of the statistically significant results shown in Table 4 are also robust to dropping the control variables other than the RUCC categories and state fixed effects from the regressions.[19] Exceptions include the coefficients of built capital and natural capital related to prime farmland in the regression for number of local VAFAB establishments, the coefficient of cultural capital in the regression for number of all establishments, and the coefficients of human capital related to health factors and outcomes and social/political capital in the regression for all employment. In all of these cases the coefficients are of the same sign but smaller in magnitude and statistically insignificant in the regressions excluding this set of control variables.[20]

Including population density in the regressions made little difference to the results. Dropping three outlier observations with unusually large values of some of the capital stock variables changed only three of the statistically significant coefficients of the capital stock variables in Table 4—the coefficient of natural capital related to prime farmland in the regressions for number of local VAFAB establishments and all establishments and the coefficient of social/political capital in the regression for all employment—to being less statistically significant, though still of the same sign and of similar magnitude.[21]

[18] In Table S6 in the online supplement we report the results of OLS models of change in the number of local VAFAB establishments and local VAFAB employment using a more restrictive definition of VAFAB establishments that includes only agricultural production and food and beverage manufacturing (APFBM) establishments. This alternative definition excludes agricultural and food product wholesalers, retailers, warehousing and storage, agricultural input suppliers, food services and restaurants. Almost all the coefficients of the capital stock variables using this alternative definition of the VAFAB sector are of the same sign and statistical significance as those reported in Table 4, though in most cases smaller in magnitude than the coefficients in Table 4. This is consistent with fact that the definition of the sector used in Table S5 in the online supplement represents a subset of that used in Table 4.

[19] The regression results discussed in this paragraph are not reported to save space. These are available upon request.

[20] The smaller magnitude and statistical insignificance of the coefficients in the models without several of the control variables is a result of omitted variable bias. For example, as shown in Table S1 in the online supplement, percentage population growth between 2010 and 2015 has a significant negative partial association with all the outcome variables. Excluding this variable from the regressions will thus tend to bias downward the coefficient of any variable that has a positive partial correlation with the omitted population growth variable and bias upward the coefficient of any variable that has a negative partial correlation with that variable. Since the built capital variable has a positive partial correlation with the population growth variable, the coefficient of the built capital variable tends to be downward biased when that variable is omitted from the regression. The net effect of omitting all the variables that were omitted in this robustness check is more complex but is reflected in the differences in the regression coefficients when those variables are omitted compared to when they are included.

[21] The three outlier observations had values of cultural capital related to arts and cultural institutions, financial capital, or natural capital related to prime farmland greater than 20, much larger than the standard deviation or the nearest values of these variables. With those observations excluded, the coefficient of natural capital related to prime farmland in the regression for local VAFAB establishments is 0.432 (p-value = 0.177), the coefficient of natural capital related to prime farmland in the regression for all establishments is 2.838 (p-value = 0.081), and the coefficient of social/political capital in the regression for all employment is −28.08 (p-value = 0.060).

Discussion

Considering the results that are statistically significant (at the 5% level) in the OLS models and robust in the Lewbel IV models and the SDEM models, our results suggest that built capital related to access to interstate highways and broadband infrastructure promotes growth in the number of all types of business establishments and growth in total employment. These results accord with previous research that infrastructure in general contributes to economic growth (e.g., Núñez-Serrano and Velázquez, 2017) and that broadband in particular contributes to economic growth (e.g., Kolko, 2012; Whitacre, Gallardo, and Strover, 2014).

Human capital reflecting access to health insurance and health care appears to promote growth in the number of local VAFAB establishments. Places lacking access to health services may have greater difficulty recruiting workers and businesses, undermining the prospects for business startups in the local VAFAB sector. The positive association between access to health care and economic activity is consistent with numerous studies showing positive economic multiplier impacts of health care services (e.g., Miller, Pender, and Hertz, 2017) and negative economic impacts of rural hospital closures (e.g., Holmes et al., 2006). This finding is also consistent with Schmit et al. (2021) in their analysis of farmers with direct sales; they find small positive indirect spillovers for human capital reflecting access to health insurance and health care.

Creative cultural capital appears to contribute to growth in the number of local VAFAB establishments, perhaps by attracting or reflecting the type of people more likely to start or patronize such businesses. This finding is consistent with arguments and evidence about the importance of the creative class or a creative milieu in promoting economic dynamism in general (Florida, 2002) and in rural communities in particular (Wojan and Nichols, 2018). Similarly, Schmit et al. (2021) found positive spillovers between the stocks of creative industries and percentage of farms with direct sales. Although this factor contributes to growth in the number of local VAFAB businesses, we did not find significant effects of creative capital on growth in VAFAB employment or in the overall number of businesses or employment. The breadth of impacts of this form of community capital appears to be narrower than the impacts of some other forms of capital.

As with creative capital, natural capital related to natural amenities and National Forest land and natural capital related to prime farmland appears to contribute to growth in the number of local VAFAB establishments but not to growth in other outcomes. The positive effect on the number of local VAFAB establishments may be related to the fact that high-amenity areas have been shown to attract entrepreneurs who want to live in them (e.g., Li et al., 2015). Additionally, as most entrepreneurs are either nonemployers or small business owners (US Census Bureau, 2016), these businesses are reflected more in the number of establishments than in employment numbers. The importance of prime farmland is as one would expect regarding agricultural-based economic development. These results are consistent with the findings of Schmit et al. (2021); the stocks of natural capital (both prime farmland and natural amenities/conservation) were found to be positively associated with the percentage of farms that utilize direct market channels.

Some of the other capital stock variables have robust negative associations with development in the local VAFAB sector and with business development more generally. Cultural capital related to arts and cultural institutions (museums and libraries) is negatively associated with growth in the number of local VAFAB establishments, all establishments, and local VAFAB employment. This result may reflect the fact that the presence of such cultural institutions is strongly associated with large urban areas. Although we control for the degree of urbanicity using the RUCCs (and population density in one of our robustness checks), these variables may be too coarse to capture the effects on our results of a high degree of urbanicity in some cultural centers. Variations in urbanicity within RUCC categories may be associated with both variations in the presence of arts and cultural institutions and variations in VAFAB development, leading to potential omitted variable bias. This issue is worthy of further investigation in future research.

Another capital stock with a robust negative relationship with local VAFAB development and with growth in all establishments is social and political capital related to the number of social establishments and nonprofits per capita and to voter participation. We postulate two potential reasons why this may be the case and suggest future research to conduct more in-depth investigation. First, the literature on social capital has established that places with more in-migration tend to have less participation in social organizations (Schiff, 1992; Putnam, 1995), while in-migration may be associated with more dynamism in the local VAFAB sector and with small businesses in general. Second, growth of local VAFAB establishments may be associated with more informal social establishments rather than formal associations or nonprofits (Payton Scally et al., 2020).

Conclusion

This research leveraged and revised a new dataset of stocks of rural community wealth (Schmit et al., 2021) and restricted-access NETS data to take a comprehensive asset-based approach to the case of the VAFAB sector. Our analysis focused on the relationship between development in the VAFAB sector and stocks of wealth. We analyzed, in separate regression models, the change from 2010 to 2015 in the number of locally owned VAFAB establishments per 10,000 population and the change in employment in locally owned VAFAB establishments per 10,000 population. For comparison purposes, we estimated two additional regression models, using the changes in the number of all business establishments and in total employment from 2010 to 2015 per 10,000 population as dependent variables.

This research has four overarching findings. The first is that there are significant relationships between the growth of VAFAB establishments or VAFAB employment and stocks of community wealth. That said, growth in the number of local VAFAB establishments appears to be more dependent than employment in local VAFAB sectors on stocks of several local assets, including creative cultural capital, natural capital related to natural amenities/forestland, and prime farmland. We postulate that this is likely due to the number of establishments being more closely related to and reflective of small businesses and entrepreneurs compared to employment, which likely reflects larger businesses to a greater extent. Second, we find that some types of capital affect development in the local VAFAB sector more than they affect development of all businesses and believe that some of these differences may be attributable to people- versus place-based wealth. Third, some of the capital stock variables that have relatively large positive impacts on development in the local VAFAB sector and other sectors are more amenable to investment than others. Though it may be difficult to increase the stock of assets like natural amenities and forestland, there may be opportunities for communities to develop other assets (e.g., creative capital, access to health insurance and health care). Finally, although we expected that growth in the number of local VAFAB establishments and employment would be positively associated with rurality, we find that per capita growth in the local VAFAB sector was slowest in the most rural counties, especially those remote from metro areas. This is consistent with slower per capita growth in all types of businesses and employment in the most rural counties.

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Online Supplement: Stocks of Wealth and the Value-Added Food and Agriculture Sector

Becca B.R. Jablonski, John Pender, Allison Bauman, Anil Rupasingha, and Jill K. Clark

Table S1. Ordinary Least Squares Regression Results (Robust Standard Errors in Parentheses)

Dependent Variable: Change from 2010 to 2015 per 10,000 Population

Variables	Local VAFAB Establishments	All Establishments	Local VAFAB Employment	All Employment
Built capital – Highway and broadband infrastructure	0.734**	7.923***	1.518	41.91***
	(0.298)	(1.611)	(2.421)	(16.01)
Cultural capital – Arts and cultural institutions	−3.420***	−5.709***	−10.25***	44.92
	(0.902)	(1.861)	(2.652)	(37.77)
Cultural capital – Creative capital	1.813***	−2.164	−1.058	8.151
	(0.539)	(2.128)	(2.860)	(17.57)
Financial capital – Financial solvency	−0.197	−1.519	2.670	−6.992
	(0.283)	(1.575)	(2.931)	(13.01)
Human capital – Health factors and outcomes	0.629	6.977***	3.138	45.87***
	(0.415)	(1.279)	(2.270)	(16.86)
Human capital – Access to health insurance and health care	2.221***	9.016***	11.90***	25.31
	(0.457)	(1.697)	(2.673)	(18.86)
Natural capital – Natural amenities and forestland	1.975***	0.127	1.726	−16.04
	(0.408)	(1.572)	(2.869)	(18.70)
Natural capital – Prime farmland	0.437***	3.084***	−1.481	4.528
	(0.161)	(0.780)	(1.512)	(13.07)
Social/political capital – Social establishments and nonprofits, voter participation	−2.507***	−6.900***	−9.260**	−39.26**
	(0.730)	(1.774)	(3.705)	(17.17)
Real value of large foundation grants per capita, 2005−2010 ($ 2010)	0.000334	0.00487	−0.00824*	−0.0313
	(0.000748)	(0.00327)	(0.00428)	(0.0373)
Real value of Value-Added Producer Grants per capita, 2005−2010 ($ 2010)	−0.136	−0.0241	−0.373	−0.848
	(0.0919)	(0.210)	(0.421)	(1.408)

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The material contained herein is supplementary to the article named in the title and published in the *Journal of Agricultural and Resource Economics* (*JARE*).

Table S1. – continued from previous page

Variables	Local VAFAB Establishments	All Establishments	Local VAFAB Employment	All Employment
Population, 2010 (10,000 persons)	0.000342	0.0903	−0.0555	0.544
	(0.0129)	(0.0572)	(0.124)	(0.559)
Median household income, 2010 ($ 2010)	−8.12e−05	−9.81e−05	−0.000173	−0.00179
	(5.58e−05)	(0.000207)	(0.000358)	(0.00259)
Percent population growth, 2010−2015	−0.982***	−3.368***	−2.983***	−23.99***
	(0.106)	(0.496)	(0.509)	(3.050)
2013 RUCC 1 (large metro)	10.86***	58.33***	55.29***	121.5**
	(1.708)	(7.016)	(9.556)	(61.19)
2013 RUCC 2 (medium metro)	10.39***	53.60***	46.25***	91.61
	(1.684)	(6.359)	(10.04)	(62.57)
2013 RUCC 3 (small metro)	12.27***	53.18***	49.81***	176.9***
	(1.694)	(6.754)	(8.621)	(67.91)
2013 RUCC 4 (nonmetro, adjacent to metro with large town)	9.943***	39.76***	40.49***	83.13
	(1.630)	(5.829)	(8.976)	(62.63)
2013 RUCC 5 (nonmetro, not adjacent to metro with large town)	10.03***	34.80***	37.53***	143.6*
	(1.852)	(7.618)	(9.714)	(76.42)
2013 RUCC 6 (nonmetro, adjacent to metro with small town)	8.872***	24.30***	27.85***	125.2**
	(1.510)	(5.398)	(7.590)	(57.10)
2013 RUCC 7 (nonmetro, not adjacent to metro with small town)	6.608***	7.362	25.06***	116.1**
	(1.590)	(5.785)	(7.611)	(57.36)
2013 RUCC 8 (nonmetro, adjacent to metro, completely rural	11.78***	27.92***	46.36***	46.04
	(1.859)	(6.947)	(8.584)	(45.86)
Alabama	−0.411	−94.37***	10.85	−244.2***
	(3.315)	(15.56)	(15.11)	(88.40)
Arizona	−7.574**	−16.19	−13.38	−30.16
	(3.664)	(17.45)	(18.00)	(100.1)
Arkansas	2.754	−125.2***	18.06	−133.0
	(3.429)	(16.63)	(16.52)	(84.89)
California	−12.05***	−32.80**	4.192	41.44
	(3.360)	(15.25)	(27.22)	(88.70)
Colorado	−2.180	−2.924	7.848	108.8
	(4.167)	(17.82)	(18.23)	(93.61)
Connecticut	−8.340**	−47.02***	−22.59	27.03
	(3.466)	(15.86)	(15.15)	(213.4)
Florida	0.939	9.580	37.46**	196.9**
	(3.284)	(19.61)	(15.31)	(99.00)
Georgia	−2.281	−86.49***	13.85	−168.9*
	(3.266)	(14.92)	(14.61)	(90.86)
Idaho	−15.99***	−163.7***	−43.61**	−333.9***
	(3.824)	(21.08)	(18.77)	(113.8)

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Table S1. – continued from previous page

Variables	Local VAFAB Establishments	All Establishments	Local VAFAB Employment	All Employment
Illinois	−9.142***	−66.19***	−14.65	−93.22
	(3.320)	(14.91)	(14.60)	(89.54)
Indiana	−1.875	−22.14	12.59	−12.27
	(3.214)	(14.66)	(17.95)	(86.37)
Iowa	−13.69***	−35.16**	−22.56	−208.7**
	(3.694)	(15.38)	(22.01)	(105.6)
Kansas	−6.673*	−119.8***	−11.41	−200.2**
	(3.916)	(15.71)	(15.87)	(93.18)
Kentucky	−0.814	−79.04***	4.994	−179.7*
	(3.349)	(15.15)	(14.54)	(104.4)
Louisiana	6.077*	184.1***	21.58	627.0***
	(3.414)	(18.18)	(14.79)	(96.39)
Maine	3.978	−75.52***	3.623	−270.5**
	(3.655)	(17.48)	(17.44)	(127.5)
Maryland	−7.149**	−77.06***	−26.35*	24.89
	(3.261)	(16.99)	(14.98)	(139.2)
Massachusetts	−5.206	−72.77***	−42.57	−200.5
	(3.885)	(24.52)	(26.76)	(132.3)
Michigan	−0.0980	−76.56***	7.549	−245.7***
	(3.229)	(14.88)	(14.04)	(78.60)
Minnesota	−8.080**	−80.18***	−22.63	19.68
	(3.575)	(15.49)	(19.57)	(104.9)
Mississippi	0.0798	−276.0***	3.798	−281.5***
	(3.497)	(20.84)	(17.95)	(104.5)
Missouri	0.696	−31.01**	12.73	−46.67
	(3.334)	(15.06)	(14.60)	(90.29)
Montana	−7.661	3.714	18.95	94.40
	(4.795)	(17.65)	(17.22)	(102.0)
Nebraska	−10.87**	−75.65***	−15.43	−16.74
	(4.489)	(16.70)	(19.97)	(138.6)
Nevada	3.015	−76.19***	22.33	−176.4
	(5.290)	(21.51)	(19.33)	(229.9)
New Hampshire	−0.208	−43.44***	7.915	−223.4*
	(3.705)	(15.99)	(15.40)	(123.5)
New Jersey	−8.566**	−59.64***	−24.59	−230.8**
	(3.336)	(16.05)	(15.55)	(101.5)
New Mexico	−1.350	−11.54	16.99	−84.60
	(4.175)	(16.53)	(16.23)	(106.7)
New York	−4.563	−65.63***	0.889	−139.4*
	(3.263)	(14.90)	(14.55)	(82.37)
North Carolina	−0.844	−15.57	5.926	−126.7
	(3.240)	(14.76)	(14.42)	(81.19)
North Dakota	−18.66***	−100.6***	−42.52*	6.766
	(5.616)	(18.02)	(25.38)	(135.3)

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Table S1. – continued from previous page

Variables	Local VAFAB Establishments	All Establishments	Local VAFAB Employment	All Employment
Ohio	0.813	3.389	5.513	−94.82
	(3.188)	(14.69)	(13.79)	(82.32)
Oklahoma	−1.927	−61.56***	9.262	59.41
	(3.466)	(16.53)	(15.57)	(94.80)
Oregon	−0.406	5.679	36.48	62.46
	(4.391)	(18.13)	(22.79)	(106.7)
Pennsylvania	0.375	50.94***	7.172	62.31
	(3.198)	(14.90)	(13.87)	(86.03)
South Carolina	−1.394	−35.43**	−5.045	−69.57
	(3.310)	(15.17)	(15.15)	(90.11)
South Dakota	−11.97***	−41.31**	−25.53	−7.284
	(4.188)	(17.23)	(20.60)	(102.7)
Tennessee	−7.742**	−106.9***	−0.732	−234.4***
	(3.260)	(15.00)	(14.44)	(81.92)
Texas	−2.464	−46.84***	12.51	26.94
	(3.315)	(14.82)	(16.68)	(101.1)
Utah	−3.445	−54.77***	−26.74	−146.2
	(3.742)	(16.31)	(22.18)	(106.9)
Vermont	3.098	−49.06***	21.72	−336.4***
	(4.093)	(16.59)	(17.05)	(124.2)
Virginia	3.498	1.887	8.021	−62.74
	(3.261)	(15.20)	(14.48)	(79.97)
Washington	1.485	21.61	44.74	541.3
	(4.059)	(16.42)	(32.87)	(377.6)
West Virginia	−0.856	14.99	6.225	2.348
	(3.451)	(15.87)	(15.63)	(95.14)
Wisconsin	−7.169**	−143.9***	−0.917	−181.4*
	(3.296)	(15.38)	(15.35)	(97.30)
Wyoming	−5.023	−134.2***	0.298	−356.1**
	(3.711)	(21.00)	(20.09)	(143.7)
Intercept	−8.180*	−43.02**	−29.27	161.2
	(4.568)	(17.78)	(22.49)	(156.1)
Observations	2,820	2,820	2,820	2,820
R-squared	0.519	0.652	0.187	0.114

Notes: *,**, *** indicate coefficient is statistically significant at the 10%, 5%, and 1% level, respectively. VAFAB stands for the value-added food and agriculture business sector. RUCC stands for rural-urban continuum code. Excluded RUCC category is RUCC 9 – nonmetro, not adjacent to a metro area, and completely rural. Excluded state category is Delaware. Alaska, Hawaii, and the District of Columbia were excluded from the study. There were no observations with all variables for Rhode Island.

Table S2. Lewbel Instrumental Variables Regression Results (Robust Standard Errors in Parentheses)

Dependent Variable: Change from 2010 to 2015 per 10,000 Population

Explanatory Variable	Local VAFAB Establishments	All Establishments	Local VAFAB Employment	All Employment
Built capital – Highway and broadband infrastructure	−0.088	16.62***	5.487*	73.51***
	(0.566)	(3.552)	(2.902)	(19.26)
Cultural capital – Arts and cultural institutions	−4.823***	−6.405***	−13.19***	20.86
	(0.511)	(2.442)	(2.251)	(16.51)
Cultural capital – Creative capital	2.067**	3.680	1.795	54.67**
	(0.836)	(4.808)	(4.060)	(26.99)
Financial capital – Financial solvency	−0.241	3.206	3.015**	15.44
	(0.386)	(2.216)	(1.442)	(13.88)
Human capital – Health factors and outcomes	1.577***	3.353	1.773	39.21
	(0.568)	(3.693)	(2.915)	(22.08)
Human capital – Access to health insurance and health care	2.545***	5.811	1.881	−31.82
	(0.698)	(4.065)	(3.488)	(24.44)
Natural capital – Natural amenities and forestland	2.713***	6.056**	7.927***	−25.62
	(0.498)	(2.829)	(2.329)	(16.22)
Natural capital – Prime farmland	0.488***	−0.072	−0.038	−2.50
	(0.158)	(1.350)	(1.130)	(11.36)
Social/political capital – Social establishments and nonprofits, voter participation	−4.041***	−8.162**	−6.245	−12.97
	(0.779)	(3.359)	(3.918)	(18.80)
Real value of large foundation grants per capita, 2005−2010 ($ 2010)	−0.00111	−0.0063	−0.0013	−0.0825***
	(0.00076)	(0.0045)	(0.0031)	(0.0307)
Real value of Value-Added Producer Grants per capita, 2005−2010 ($ 2010)	−0.135**	−0.060	−0.359	−0.987
	(0.055)	(0.208)	(0.258)	(1.286)
Population, 2010 (10,000 persons)	−0.0165	−0.160*	−0.121*	−0.177
	(0.0159)	(0.082)	(0.064)	(0.480)
Percent population growth, 2010−2015	−0.967***	−2.536***	−1.985***	−21.71***
	(0.144)	(0.482)	(0.640)	(3.52)
Median household income, 2010 ($ 2010)	−0.000268***	0.000048	−0.00015	−0.00066
	(0.000064)	(0.000456)	(0.00032)	(0.00277)
2003 RUCC 1 (large metro)	8.358***	54.02***	34.64***	9.59
	(1.789)	(11.11)	(8.83)	(58.33)
2003 RUCC 2 (medium metro)	7.129***	53.41***	29.13***	46.63
	(1.523)	(8.91)	(7.60)	(49.15)
2003 RUCC 3 (small metro	6.970***	54.11***	33.76***	87.90*
	(1.467)	(7.85)	(7.17)	(45.42)
2003 RUCC 4 (nonmetro, adjacent to metro with large town)	6.957***	51.83***	32.73***	83.42*
	(1.432)	(7.94)	(7.02)	(45.87)

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Table S2. – continued from previous page

Explanatory Variable	Local VAFAB Establishments	All Establishments	Local VAFAB Employment	All Employment
2003 RUCC 5 (nonmetro, not adjacent to metro with large town)	4.237***	23.44***	23.57***	118.5**
	(1.557)	(8.67)	(7.48)	(50.44)
2003 RUCC 6 (nonmetro, adjacent to metro with smal town)	4.910***	41.36***	29.17***	110.2***
	(1.336)	(7.01)	(6.72)	(40.84)
2003 RUCC 7 (nonmetro, not adjacent to metro with small town)	2.168	8.55	21.75***	80.91**
	(1.365)	(7.13)	(6.84)	(39.85)
2003 RUCC 8 (nonmetro, adjacent to metro, completely rural	6.046***	32.77***	28.08***	19.89
	(1.436)	(8.04)	(6.63)	(42.03)
Constant	−0.665	−103.44***	−16.90	84.9
	(3.004)	(19.96)	(14.61)	(120.5)
Observations	2,820	2,820	2,820	2,820
Centered R^2	0.4448	0.2154	0.1505	0.0305
Underidentification test – Kleibergen–Paap rank LM statistic (*p*-value)	207.74*** (0.0000)	207.74*** (0.0000)	207.74*** (0.0000)	207.74*** (0.0000)
Weak identification test – Kleibergen–Paap rank F statistic	2.769	2.769	2.769	2.769
Overidentification test – Hansen J statistic (*p*-value)	117.40* (0.0884)	125.66** (0.0313)	131.59** (0.0133)	117.31 (0.0893)

Notes: *,**, *** indicate coefficient is statistically significant at the 10%, 5%, and 1% level, respectively. VAFAB stands for the value-added food and agriculture business sector. RUCC stands for rural-urban continuum code. Excluded RUCC category is RUCC 9 – nonmetro, not adjacent to a metro area, and completely rural. Model was not estimable with state fixed effects. The Lewbel models used two-step generalized method of moments (GMM) estimation.

Table S3. Ordinary Least Squares Regression Results (Robust Standard Errors in Parentheses)

Dependent Variable: Change from 2010 to 2015 per 10,000 Population

Variables	Local VAFAB Establishments	All Establishments	Local VAFAB Employment	All Employment
Built capital – Highway and broadband infrastructure	0.0448**	0.0915***	0.0177	0.0785***
Cultural capital – Arts and cultural institutions	−0.2519***	−0.0796***	−0.1441***	0.1015
Cultural capital – Creative capital	0.1122***	−0.0253	−0.0125	0.0155
Financial capital – Financia solvency	−0.0129	−0.0189	0.0334	−0.0141
Human capital – Health factors and outcomes	0.0550	0.1154***	0.0523	0.1231***
Human capital – Access to health insurance and health care	0.1402***	0.1077***	0.1434***	0.0490
Natural capital – Natural amenities and forestland	0.1347***	0.0016	0.0225	−0.0336
Natural capital – Prime farmland	0.0237***	0.0317***	−0.0154	0.0075
Social/political capital – Social establishments and nonprofits, voter participation	−0.1494***	−0.0779***	−0.1054**	−0.0718**
Real value of large foundation grants per capita, 2005−2010 ($ 2010)	0.0053	0.0147	−0.0252	−0.0154
Real value of Value-Added Producer Grants per capita, 2005−2010 ($ 2010)	−0.0474	−0.0016	−0.0248	−0.0091
Population, 2010 (10,000 persons)	0.0006	0.0290	−0.0179	0.0283
Median household income, 2010 ($ 2010)	−0.0490	−0.0112	−0.0199	−0.0331
Percent population growth, 2010−2015	−0.2751***	−0.1786***	−0.1595***	−0.2063***
2013 RUCC 1 (large metro	0.2023***	0.2057***	0.1966***	0.0695**
2013 RUCC 2 (medium metro)	0.1871***	0.1827***	0.1589***	0.0506
2013 RUCC 3 (small metro	0.2121***	0.1739***	0.1642***	0.0938***
2013 RUCC 4 (nonmetro, adjacent to metro with larg town)	0.1411***	0.1068***	0.1096***	0.0362
2013 RUCC 5 (nonmetro, not adjacent to metro with large town)	0.0937***	0.0615***	0.0669***	0.0412*

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Table S3. – continued from previous page

Variables	Local VAFAB Establishments	All Establishments	Local VAFAB Employment	All Employment
2013 RUCC 6 (nonmetro, adjacent to metro with sma town)	0.1900***	0.0985***	0.1138***	0.0822**
2013 RUCC 7 (nonmetro, not adjacent to metro with small town)	0.1237***	0.0261	0.0895***	0.0667**
2013 RUCC 8 (nonmetro, adjacent to metro, completely rural	0.1584***	0.0710***	0.1190***	0.0190
Alabama	−0.0033	−0.1404***	0.0163	−0.0589***
Arizona	−0.0277**	−0.0112	−0.0093	−0.0034
Arkansas	0.0230	−0.1978***	0.0288	−0.0341
California	−0.0909***	−0.0468**	0.0060	0.0096
Colorado	−0.0164	−0.0042	0.0113	0.0252
Connecticut	−0.0224**	−0.0239***	−0.0116	0.0022
Florida	0.0076	0.0146	0.0575**	0.0486**
Georgia	−0.0254	−0.1821***	0.0294	−0.0576*
Idaho	−0.0983***	−0.1904***	−0.0512**	−0.0630***
Illinois	−0.0909***	−0.1246***	−0.0278	−0.0284
Indiana	−0.0178	−0.0398	0.0228	−0.0036
Iowa	−0.1355***	−0.0659**	−0.0426	−0.0634**
Kansas	−0.0680*	−0.2309***	−0.0222	−0.0626**
Kentucky	−0.0084	−0.1537***	0.0098	−0.0567*
Louisiana	0.0450*	0.2581***	0.0305	0.1425***
Maine	0.0161	−0.0580***	0.0028	−0.0337**
Maryland	−0.0347**	−0.0709***	−0.0244*	0.0037
Massachusetts	−0.0167	−0.0442***	−0.0261	−0.0198
Michigan	−0.0009	−0.1315***	0.0131	−0.0685***
Minnesota	−0.0751**	−0.1410***	−0.0401	0.0056
Mississippi	0.0007	−0.4298***	0.0060	−0.0711***
Missouri	0.0071	−0.0600**	0.0249	−0.0146
Montana	−0.0546	0.0050	0.0258	0.0207
Nebraska	−0.0981**	−0.1292***	−0.0266	−0.0046
Nevada	0.0115	−0.0548***	0.0162	−0.0206
New Hampshire	−0.0007	−0.0264***	0.0049	−0.0220*
New Jersey	−0.0388**	−0.0512***	−0.0213	−0.0321**
New Mexico	−0.0072	−0.0117	0.0174	−0.0139
New York	−0.0347	−0.0945***	0.0013	−0.0325*
North Carolina	−0.0083	−0.0290	0.0111	−0.0383
North Dakota	−0.1304***	−0.1330***	−0.0567*	0.0015
Ohio	0.0076	0.0060	0.0099	−0.0273
Oklahoma	−0.0166	−0.1006***	0.0153	0.0157
Oregon	−0.0025	0.0065	0.0422	0.0116
Pennsylvania	0.0031	0.0788***	0.0112	0.0156
South Carolina	−0.0093	−0.0449**	−0.0064	−0.0143

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Table S3. – continued from previous page

Variables	Local VAFAB Establishments	All Establishments	Local VAFAB Employment	All Employment
South Dakota	−0.0845***	−0.0552**	−0.0344	−0.0016
Tennessee	−0.0723**	−0.1890***	−0.0013	−0.0672***
Texas	−0.0362	−0.1303***	0.0351	0.0122
Utah	−0.0160	−0.0482***	−0.0237	−0.0208
Vermont	0.0118	−0.0353***	0.0157	−0.0392***
Virginia	0.0343	0.0035	0.0150	−0.0189
Washington	0.0094	0.0258	0.0539	0.1048
West Virginia	−0.0061	0.0202	0.0085	0.0005
Wisconsin	−0.0611**	−0.2321***	−0.0015	−0.0474*
Wyoming	−0.0233	−0.1180***	0.0003	−0.0508**
Intercept	NE	NE	NE	NE
Observations	2,820	2,820	2,820	2,820
R-squared	0.519	0.652	0.187	0.114

Notes: *,**, *** indicate coefficient is statistically significant at the 10%, 5%, and 1% level, respectively. VAFAB stands for the value-added food and agriculture business sector. RUCC stands for rural-urban continuum code. Excluded RUCC category is RUCC 9 – nonmetro, not adjacent to a metro area, and completely rural. NE stands for not estimated. Excluded state category is Delaware. Alaska, Hawaii, and the District of Columbia were excluded from the study. There were no observations with all variables for Rhode Island.

Table S4. Spatial Durbin Error Model Regression Results (Standard Errors in Parentheses) Dependent Variable: Change from 2010 to 2015 per 10,000 Population

Explanatory Variable	Local VAFAB Establishments	All Establishments	Local VAFAB Employment	All Employment
Built capital – Highway and broadband infrastructure	0.875***	6.830***	0.950	43.791***
	(0.336)	(1.504)	(2.404)	(15.725)
Cultural capital – Arts and cultural institutions	−3.038***	−6.885***	−9.064***	37.448***
	(0.286)	(1.288)	(2.008)	(13.108)
Cultural capital – Creative capital	1.583***	−1.860	−2.268	10.692
	(0.362)	(1.627)	(2.570)	(16.800)
Financial capital – Financial solvency	0.037	−0.722	1.310	−3.728
	(0.500)	(2.244)	(3.539)	(23.115)
Human capital – Health factors and outcomes	0.256	7.136***	2.673	43.074***
	(0.275)	(1.233)	(1.974)	(12.915)
Human capital – Access to health insurance and health care	1.891***	8.151***	11.310***	25.329
	(0.343)	(1.544)	(2.409)	(15.724)
Natural capital – Natural amenities and forestland	1.132***	1.143	2.184	−16.201
	(0.414)	(1.836)	(3.029)	(19.834)
Natural capital – Prime farmland	0.357	4.043***	−1.886	3.815
	(0.271)	(1.209)	(1.974)	(12.924)
Social/political capital – Social establishments and nonprofits, voter participation	−2.122***	−5.522***	−8.517***	−41.202***
	(0.332)	(1.493)	(2.343)	(15.306)
Real value of large foundation grants per capita, 2005−2010 ($ 2010)	0.001	0.005	−0.010*	−0.025
	(0.001)	(0.004)	(0.006)	(0.041)
Real value of Value-Added Producer Grants per capita, 2005−2010 ($ 2010)	−0.139***	−0.030	−0.419	−0.642
	(0.038)	(0.170)	(0.263)	(1.717)
Population, 2010 (10,000 persons)	−0.004	0.079	−0.005	0.383
	(0.020)	(0.092)	(0.144)	(0.938)
Median household income, 2010 ($ 2010)	0.00003	−0.00002	−0.0003	−0.001
	(0.0001)	(0.0002)	(0.0004)	(0.002)
Percent population growth, 2010−2015	−0.738***	−3.522***	−2.251***	−27.886***
	(0.067)	(0.301)	(0.489)	(3.203)
2013 RUCC 1 (large metro)	9.113***	41.400***	34.794***	171.811**
	(1.672)	(7.465)	(12.057)	(78.884)
2013 RUCC 2 (medium metro)	8.565***	38.811***	26.227**	140.447**
	(1.454)	(6.499)	(10.471)	(68.501)
2013 RUCC 3 (small metro)	10.145***	45.915***	34.578***	264.686***
	(1.396)	(6.234)	(10.059)	(65.805)

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Table S4. – continued from previous page

Explanatory Variables	Local VAFAB Establishments	All Establishments	Local VAFAB Employment	All Employment
2013 RUCC 4 (nonmetro, adjacent to metro with large town)	8.778***	29.573***	27.252***	130.937**
	(1.442)	(6.479)	(10.198)	(66.614)
2013 RUCC 5 (nonmetro, not adjacent to metro with large town)	9.235***	33.212***	37.259***	149.567**
	(1.686)	(7.627)	(11.683)	(76.175)
2013 RUCC 6 (nonmetro, adjacent to metro with small town)	7.533***	15.841***	14.659*	175.617***
	(1.179)	(5.286)	(8.384)	(54.787)
2013 RUCC 7 (nonmetro, not adjacent to metro with small town)	6.088***	6.510	25.150***	126.972***
	(1.066)	(4.816)	(7.428)	(48.465)
2013 RUCC 8 (nonmetro, adjacent to metro, completely rural	10.117***	19.229***	34.026***	104.001*
	(1.323)	(5.945)	(9.367)	(61.189)
Alabama	−0.279	−87.812**	10.863	−314.243
	(7.874)	(35.723)	(52.838)	(342.502)
Arizona	−10.478	−26.455	−1.874	−96.880
	(8.854)	(40.483)	(58.057)	(375.555)
Arkansas	1.029	−115.993***	13.397	−252.952
	(7.908)	(35.881)	(53.026)	(343.693)
California	−12.029	−24.690	−0.593	27.270
	(7.983)	(36.343)	(53.208)	(344.763)
Colorado	−0.889	−4.837	18.920	36.085
	(7.877)	(35.739)	(52.871)	(342.746)
Connecticut	−5.009	−48.571	−24.948	39.919
	(9.384)	(42.876)	(61.566)	(398.249)
Florida	1.953	16.254	42.587	97.089
	(7.930)	(36.034)	(52.997)	(343.421)
Georgia	−2.734	−79.314**	13.616	−260.388
	(7.738)	(35.051)	(52.147)	(338.145)
Idaho	−14.338*	−155.167***	−39.715	−389.165
	(7.997)	(36.335)	(53.459)	(346.431)
Illinois	−6.480	−59.672*	−9.017	−111.690
	(7.701)	(34.869)	(52.000)	(337.271)
Indiana	0.074	−18.209	8.552	−37.563
	(7.713)	(34.932)	(52.037)	(337.490)
Iowa	−5.571	−32.001	−13.056	−238.103
	(7.797)	(35.331)	(52.529)	(340.642)
Kansas	−2.659	−120.847***	−6.075	−256.917
	(7.732)	(35.009)	(52.199)	(338.556)

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Table S4. – continued from previous page

Explanatory Variables	Local VAFAB Establishments	All Establishments	Local VAFAB Employment	All Employment
Kentucky	0.494	−75.851**	5.183	−274.213
	(7.736)	(35.015)	(52.228)	(338.725)
Louisiana	6.307	182.963***	17.665	530.890
	(7.949)	(36.109)	(53.150)	(344.417)
Maine	7.352	−77.826*	−2.602	−260.645
	(8.726)	(40.146)	(56.662)	(366.411)
Maryland	−3.207	−61.992*	−23.427	−5.871
	(7.743)	(34.682)	(53.937)	(350.818)
Massachusetts	0.489	−57.107	−35.185	−193.486
	(8.949)	(40.941)	(58.648)	(379.373)
Michigan	2.847	−71.136**	11.506	−300.318
	(7.738)	(35.080)	(52.097)	(337.823)
Minnesota	−1.019	−68.765*	−21.222	15.067
	(7.796)	(35.330)	(52.536)	(340.700)
Mississippi	0.657	−255.725***	3.311	−363.417
	(7.945)	(36.050)	(53.252)	(345.134)
Missouri	2.531	−23.497	15.103	−115.091
	(7.727)	(34.991)	(52.120)	(337.997)
Montana	−3.142	2.424	30.771	−2.386
	(7.961)	(36.180)	(53.222)	(344.916)
Nebraska	−7.052	−84.354**	−13.109	−89.412
	(7.789)	(35.285)	(52.506)	(340.504)
Nevada	3.646	−69.905*	34.845	−218.917
	(8.646)	(39.433)	(57.098)	(369.583)
New Hampshire	3.535	−47.818	9.554	−214.389
	(9.006)	(41.178)	(59.107)	(382.387)
New Jersey	−6.279	−57.289	−26.152	−232.692
	(7.975)	(35.901)	(54.740)	(355.565)
New Mexico	−1.679	−8.558	19.001	−177.349
	(8.207)	(37.331)	(54.600)	(353.633)
New York	−3.906	−67.203*	−6.190	−165.530
	(7.802)	(35.357)	(52.551)	(340.776)
North Carolina	1.089	−10.178	4.428	−194.240
	(7.778)	(35.243)	(52.370)	(339.563)
North Dakota	−6.269	−99.683***	−31.169	−107.823
	(8.160)	(37.112)	(54.409)	(352.513)
Ohio	3.571	9.004	6.567	−112.435
	(7.727)	(34.992)	(52.143)	(338.174)

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Table S4. – continued from previous page

Explanatory Variables	Local VAFAB Establishments	All Establishments	Local VAFAB Employment	All Employment
Oklahoma	−1.368	−50.019	9.344	−52.975
	(7.851)	(35.598)	(52.745)	(341.928)
Oregon	1.418	7.114	37.532	25.744
	(8.039)	(36.584)	(53.546)	(346.891)
Pennsylvania	2.468	53.805	3.111	48.729
	(7.704)	(34.790)	(52.252)	(338.971)
South Carolina	0.980	−27.204	−9.177	−145.824
	(8.001)	(36.358)	(53.446)	(346.303)
South Dakota	−5.730	−34.124	−21.998	−98.428
	(7.935)	(36.013)	(53.212)	(344.922)
Tennessee	−7.504	−97.830***	−3.731	−328.624
	(7.786)	(35.265)	(52.468)	(340.220)
Texas	−3.612	−45.380	17.844	−92.749
	(7.742)	(35.060)	(52.204)	(338.520)
Utah	−2.241	−58.075	−15.680	−251.952
	(8.342)	(38.101)	(55.029)	(356.234)
Vermont	6.340	−58.517	21.376	−345.685
	(8.746)	(39.961)	(57.567)	(372.554)
Virginia	5.756	14.478	9.364	−119.520
	(7.667)	(34.686)	(51.851)	(336.333)
Washington	3.681	19.233	53.909	488.043
	(8.001)	(36.400)	(53.387)	(345.937)
West Virginia	−2.245	7.883	1.226	−62.688
	(7.869)	(35.614)	(53.042)	(343.905)
Wisconsin	−1.365	−129.973***	2.832	−201.814
	(7.766)	(35.188)	(52.362)	(339.589)
Wyoming	−0.775	−118.156***	18.273	−374.498
	(8.252)	(37.555)	(54.871)	(355.412)
Spatial Lag of Variables				
Built capital – Highway and broadband infrastructure	−0.052	0.077	−0.596	−14.367
	(0.717)	(3.300)	(4.679)	(30.305)
Cultural capital – Arts and cultural institutions	−0.383	12.839***	−2.762	7.236
	(0.657)	(3.022)	(4.270)	(27.635)
Cultural capital – Creative capital	0.733	0.825	−3.213	24.606
	(0.780)	(3.586)	(5.097)	(33.017)
Financial capital – Financial solvency	−1.217	−9.118	9.985	8.897
	(1.246)	(5.701)	(8.218)	(53.252)

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Table S4. – continued from previous page

Explanatory Variables	Local VAFAB Establishments	All Establishments	Local VAFAB Employment	All Employment
Human capital – Health factors and outcomes	0.737 (0.549)	−2.922 (2.526)	4.028 (3.592)	10.847 (23.277)
Human capital – Access to health insurance and health care	−1.385* (0.755)	0.002 (3.467)	3.946 (4.929)	−18.327 (31.916)
Natural capital – Natural amenities and forestland	1.069* (0.644)	−3.723 (2.934)	−0.416 (4.348)	−11.762 (28.267)
Natural capital – Prime farmland	0.301 (0.718)	−2.019 (3.321)	1.357 (4.582)	24.696 (29.596)
lag. Social/political capital – Social establishments and nonprofits, voter participation	−2.771*** (0.721)	−9.214*** (3.324)	−5.377 (4.645)	−37.659 (30.042)
Real value of large foundation grants per capita, 2005−2010 ($ 2010)	0.004 (0.002)	0.021** (0.011)	0.050*** (0.015)	−0.089 (0.099)
Real value of Value-Added Producer Grants per capita, 2005−2010 ($ 2010)	−0.276*** (0.095)	0.650 (0.437)	−0.084 (0.623)	4.028 (4.032)
Population, 2010 (10,000 persons)	0.034 (0.049)	0.233 (0.226)	−0.379 (0.320)	−0.816 (2.072)
Median household income, 2010 ($ 2010)	−0.0002* (0.0001)	−0.0003 (0.0004)	−0.0003 (0.001)	−0.004 (0.004)
Percent population growth, 2010−2015	−0.865*** (0.119)	0.173 (0.551)	−1.911** (0.780)	10.303** (5.057)
2013 RUCC 1 (large metro)	2.216 (3.344)	47.745*** (15.355)	17.088 (21.947)	−170.034 (142.232)
2013 RUCC 2 (medium metro)	0.045 (2.953)	48.841*** (13.534)	13.241 (19.479)	−135.799 (126.300)
2013 RUCC 3 (small metro)	2.355 (2.919)	37.771*** (13.372)	−3.108 (19.283)	−270.687** (125.031)
2013 RUCC 4 (nonmetro, adjacent to metro with large town)	−0.013 (3.088)	16.679 (14.206)	−8.186 (20.062)	−269.931** (129.839)
2013 RUCC 5 (nonmetro, not adjacent to metro with large town)	−3.395 (4.141)	−4.141 (19.053)	−48.844* (26.746)	−199.358 (172.943)
2013 RUCC 6 (nonmetro, adjacent to metro with small town)	−0.965 (2.521)	−11.295 (11.600)	5.581 (16.354)	−285.213*** (105.826)
2013 RUCC 7 (nonmetro, not adjacent to metro with small town)	−3.901 (2.581)	1.690 (11.883)	−47.170*** (16.662)	−134.419 (107.750)

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Table S4. – continued from previous page

Explanatory Variables	Local VAFAB Establishments	All Establishments	Local VAFAB Employment	All Employment
2013 RUCC 8 (nonmetro, adjacent to metro, completely rural	2.129	−10.783	−0.590	−235.298*
	(2.978)	(13.674)	(19.428)	(125.777)
Constant	−6.614	−49.869	−0.186	500.694
	(9.289)	(42.462)	(60.797)	(393.132)
Observations	2,820	2,820	2,820	2,820
Lambda	0.287***	0.352***	0.040	0.0122
Log Likelihood	−11,076.760	−15,307.570	−16,584.630	−21,873.110
$sigma^2$	148.671	2,961.603	7,509.865	319,636.100
Akaike Inf. Crit.	22,339.520	30,801.140	33,355.250	43,932.220
Wald Test (df = 1)	107.841***	177.978***	1.685	0.391
LR Test (df = 1)	97.439***	159.780***	1.665	0.140

Notes: *,**, *** indicate coefficient is statistically significant at the 10%, 5%, and 1% level, respectively. VAFAB stands for the value-added food and agriculture business sector. RUCC stands for rural-urban continuum code. Lambda is the spatial error autocorrelation variable. SDEM model was not estimable with lags of state fixed effects, so these were not included. Excluded RUCC category is RUCC 9 – nonmetro, not adjacent to a metro area, and completely rural. Excluded state category is Delaware. Alaska, Hawaii, and the District of Columbia were excluded from the study. There were no observations with all variables for Rhode Island.

Table S5. Ordinary Least Squares Regression Results – Local Agricultural Production/Food and Beverage Manufacturing (APFBM) Subsector (robust standard errors in parentheses)

Dependent Variable: Change from 2010 to 2015 per 10,000 Population

Explanatory Variable	Local APFBM Establishments	Local APFBM Employment
Built capital – Highway and broadband infrastructure	0.481*	0.334
	(0.260)	(1.060)
Cultural capital – Arts and cultural institutions	−2.574***	−4.220**
	(0.894)	(2.065)
Cultural capital – Creative capital	1.770***	2.107
	(0.453)	(1.551)
Financial capital – Financial solvency	−0.117	0.652
	(0.248)	(0.932)
Human capital – Health factors and outcomes	0.0497	0.139
	(0.331)	(1.265)
Human capital – Access to health insurance and health care	1.671***	5.186***
	(0.363)	(1.664)
Natural capital – Natural amenities and forestland	2.112***	3.199
	(0.354)	(2.403)
Natural capital – Prime farmland	0.364***	−1.551
	(0.124)	(1.490)
Social/political capital – Social establishments and nonprofits, voter participation	−1.829***	−6.227***
	(0.544)	(1.958)
Real value of large foundation grants per capita, 2005−2010 ($ 2010)	0.000478	−0.00129
	(0.000663)	(0.00260)
Real value of Value-Added Producer Grants per capita, 2005−2010 ($ 2010)	−0.0896	−0.176
	(0.0735)	(0.219)
Population, 2010 (10,000 persons)	−0.00421	−0.0364
	(0.0111)	(0.0450)
Percent population growth, 2010−2015	−0.781***	−1.447***
	(0.0998)	(0.298)
Median household income, 2010 ($ 2010)	−5.03e−05	−7.68e−05
	(4.80e−05)	(0.000206)
2013 RUCC 1 (large metro)	5.936***	19.81***
	(1.504)	(5.704)
2013 RUCC 2 (medium metro)	5.670***	13.93***
	(1.471)	(4.534)
2013 RUCC 3 (small metro)	7.746***	24.05***
	(1.496)	(5.063)
2013 RUCC 4 (nonmetro, adjacent to metro with large town)	5.620***	15.41***
	(1.429)	(5.384)
2013 RUCC 5 (nonmetro, not adjacent to metro with large town)	6.457***	15.81***
	(1.606)	(4.857)
2013 RUCC 6 (nonmetro, adjacent to metro with small town)	5.451***	11.71**
	(1.329)	(4.898)
2013 RUCC 7 (nonmetro, not adjacent to metro with small town)	3.160**	12.20***
	(1.382)	(4.592)

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Table S5. – continued from previous page

Explanatory Variable	Local APFBM Establishments	Local APFBM Employment
2013 RUCC 8 (nonmetro, adjacent to metro, completely rural	8.406***	24.93***
	(1.632)	(5.241)
Alabama	1.611	3.910
	(2.626)	(7.024)
Arizona	−4.785	−16.24*
	(2.995)	(9.165)
Arkansas	4.711*	4.084
	(2.741)	(9.500)
California	−10.24***	−23.44**
	(2.646)	(10.04)
Colorado	−2.715	−5.778
	(3.245)	(9.959)
Connecticut	−6.615**	−12.74*
	(2.831)	(7.610)
Florida	−0.614	−3.161
	(2.586)	(6.709)
Georgia	−0.349	−0.192
	(2.570)	(7.134)
Idaho	−10.87***	−39.06***
	(2.945)	(11.36)
Illinois	−7.406***	−15.52**
	(2.648)	(7.794)
Indiana	−1.243	−1.014
	(2.528)	(6.789)
Iowa	−13.13***	−20.47**
	(3.049)	(9.423)
Kansas	−5.429*	−15.96*
	(3.231)	(8.866)
Kentucky	1.160	−1.153
	(2.618)	(6.760)
Louisiana	5.337**	11.14*
	(2.685)	(6.711)
Maine	4.919	7.561
	(3.002)	(8.661)
Maryland	−5.143**	−12.29*
	(2.506)	(6.715)
Massachusetts	−2.424	−11.26
	(3.064)	(10.37)
Michigan	1.492	9.655
	(2.529)	(6.805)
Minnesota	−5.698**	−12.92
	(2.866)	(12.62)
Mississippi	2.590	−5.223
	(2.806)	(12.64)

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Table S5. – continued from previous page

Explanatory Variable	Local APFBM Establishments	Local APFBM Employment
Missouri	1.441	2.842
	(2.619)	(6.668)
Montana	−11.73***	−9.085
	(4.105)	(9.937)
Nebraska	−10.57***	−17.44*
	(3.571)	(9.715)
Nevada	3.030	4.586
	(4.618)	(11.57)
New Hampshire	1.171	6.647
	(2.997)	(8.643)
New Jersey	−6.264**	−15.72**
	(2.590)	(7.770)
New Mexico	−0.930	−3.427
	(3.239)	(7.871)
New York	−2.352	−4.183
	(2.599)	(6.773)
North Carolina	0.874	5.862
	(2.573)	(6.332)
North Dakota	−18.30***	−39.00**
	(5.063)	(19.25)
Ohio	0.848	−0.897
	(2.515)	(6.770)
Oklahoma	−0.453	0.403
	(2.795)	(6.905)
Oregon	−1.928	3.876
	(3.816)	(12.36)
Pennsylvania	0.136	1.227
	(2.512)	(6.379)
South Carolina	0.708	−2.604
	(2.614)	(6.883)
South Dakota	−9.943***	−18.36
	(3.629)	(14.35)
Tennessee	−5.415**	−6.497
	(2.544)	(6.223)
Texas	−0.710	−12.03
	(2.600)	(10.40)
Utah	−2.559	−36.12*
	(3.189)	(20.79)
Vermont	2.288	3.250
	(3.495)	(9.099)
Virginia	3.624	1.416
	(2.566)	(7.472)
Washington	1.182	28.74
	(3.329)	(29.01)

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Table S5. – continued from previous page

Explanatory Variable	Local APFBM Establishments	Local APFBM Employment
West Virginia	0.529	−1.342
	(2.710)	(7.010)
Wisconsin	−4.660*	6.768
	(2.624)	(7.432)
Wyoming	−2.230	−1.046
	(3.372)	(10.27)
Constant	−6.022	−18.57
	(3.711)	(12.17)
Observations	2,820	2,820
R-squared	0.500	0.130

Notes: *,**, *** indicate coefficient is statistically significant at the 10%, 5%, and 1% level, respectively. VAFAB stands for the value-added food and agriculture business sector. RUCC stands for rural-urban continuum code. Excluded RUCC category is RUCC 9 – nonmetro, not adjacent to a metro area, and completely rural. Excluded state category is Delaware. Alaska, Hawaii, and the District of Columbia were excluded from the study. There were no observations with all variables for Rhode Island.

Table S6. Ordinary Least Squares Regression Results – Local Agricultural Production/ Food and Beverage Manufacturing (APFBM) Subsector (robust standard errors in parentheses)

Dependent Variable: Change from 2010 to 2015 per 10,000 Population

Explanatory Variable	Local APFBM Establishments	Local APFBM Employment
Built capital – Highway and broadband infrastructure	0.481*	0.334
	(0.260)	(1.060)
Cultural capital – Arts and cultural institutions	−2.574***	−4.220**
	(0.894)	(2.065)
Cultural capital – Creative capital	1.770***	2.107
	(0.453)	(1.551)
Financial capital – Financial solvency	−0.117	0.652
	(0.248)	(0.932)
Human capital – Health factors and outcomes	0.0497	0.139
	(0.331)	(1.265)
Human capital – Access to health insurance and health care	1.671***	5.186***
	(0.363)	(1.664)
Natural capital – Natural amenities and forestland	2.112***	3.199
	(0.354)	(2.403)
Natural capital – Prime farmland	0.364***	−1.551
	(0.124)	(1.490)
Social/political capital – Social establishments and nonprofits, voter participation	−1.829***	−6.227***
	(0.544)	(1.958)
Real value of large foundation grants per capita, 2005−2010 ($ 2010)	0.000478	−0.00129
	(0.000663)	(0.00260)
Real value of Value-Added Producer Grants per capita, 2005−2010 ($ 2010)	−0.0896	−0.176
	(0.0735)	(0.219)
Population, 2010 (10,000 persons)	−0.00421	−0.0364
	(0.0111)	(0.0450)
Percent population growth, 2010−2015	−0.781***	−1.447***
	(0.0998)	(0.298)
Median household income, 2010 ($ 2010)	−5.03e−05	−7.68e−05
	(4.80e−05)	(0.000206)
2013 RUCC 1 (large metro)	5.936***	19.81***
	(1.504)	(5.704)
2013 RUCC 2 (medium metro)	5.670***	13.93***
	(1.471)	(4.534)
2013 RUCC 3 (small metro)	7.746***	24.05***
	(1.496)	(5.063)
2013 RUCC 4 (nonmetro, adjacent to metro with large town)	5.620***	15.41***
	(1.429)	(5.384)
2013 RUCC 5 (nonmetro, not adjacent to metro with large town)	6.457***	15.81***
	(1.606)	(4.857)
2013 RUCC 6 (nonmetro, adjacent to metro with small town)	5.451***	11.71**
	(1.329)	(4.898)
2013 RUCC 7 (nonmetro, not adjacent to metro with small town)	3.160**	12.20***
	(1.382)	(4.592)

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Table S5. – continued from previous page

Explanatory Variable	Local APFBM Establishments	Local APFBM Employment
2013 RUCC 8 (nonmetro, adjacent to metro, completely rural	8.406***	24.93***
	(1.632)	(5.241)
Alabama	1.611	3.910
	(2.626)	(7.024)
Arizona	−4.785	−16.24*
	(2.995)	(9.165)
Arkansas	4.711*	4.084
	(2.741)	(9.500)
California	−10.24***	−23.44**
	(2.646)	(10.04)
Colorado	−2.715	−5.778
	(3.245)	(9.959)
Connecticut	−6.615**	−12.74*
	(2.831)	(7.610)
Florida	−0.614	−3.161
	(2.586)	(6.709)
Georgia	−0.349	−0.192
	(2.570)	(7.134)
Idaho	−10.87***	−39.06***
	(2.945)	(11.36)
Illinois	−7.406***	−15.52**
	(2.648)	(7.794)
Indiana	−1.243	−1.014
	(2.528)	(6.789)
Iowa	−13.13***	−20.47**
	(3.049)	(9.423)
Kansas	−5.429*	−15.96*
	(3.231)	(8.866)
Kentucky	1.160	−1.153
	(2.618)	(6.760)
Louisiana	5.337**	11.14*
	(2.685)	(6.711)
Maine	4.919	7.561
	(3.002)	(8.661)
Maryland	−5.143**	−12.29*
	(2.506)	(6.715)
Massachusetts	−2.424	−11.26
	(3.064)	(10.37)
Michigan	1.492	9.655
	(2.529)	(6.805)
Minnesota	−5.698**	−12.92
	(2.866)	(12.62)
Mississippi	2.590	−5.223
	(2.806)	(12.64)

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Table S5. – continued from previous page

Explanatory Variable	Local APFBM Establishments	Local APFBM Employment
Missouri	1.441	2.842
	(2.619)	(6.668)
Montana	−11.73***	−9.085
	(4.105)	(9.937)
Nebraska	−10.57***	−17.44*
	(3.571)	(9.715)
Nevada	3.030	4.586
	(4.618)	(11.57)
New Hampshire	1.171	6.647
	(2.997)	(8.643)
New Jersey	−6.264**	−15.72**
	(2.590)	(7.770)
New Mexico	−0.930	−3.427
	(3.239)	(7.871)
New York	−2.352	−4.183
	(2.599)	(6.773)
North Carolina	0.874	5.862
	(2.573)	(6.332)
North Dakota	−18.30***	−39.00**
	(5.063)	(19.25)
Ohio	0.848	−0.897
	(2.515)	(6.770)
Oklahoma	−0.453	0.403
	(2.795)	(6.905)
Oregon	−1.928	3.876
	(3.816)	(12.36)
Pennsylvania	0.136	1.227
	(2.512)	(6.379)
South Carolina	0.708	−2.604
	(2.614)	(6.883)
South Dakota	−9.943***	−18.36
	(3.629)	(14.35)
Tennessee	−5.415**	−6.497
	(2.544)	(6.223)
Texas	−0.710	−12.03
	(2.600)	(10.40)
Utah	−2.559	−36.12*
	(3.189)	(20.79)
Vermont	2.288	3.250
	(3.495)	(9.099)
Virginia	3.624	1.416
	(2.566)	(7.472)
Washington	1.182	28.74
	(3.329)	(29.01)

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Table S5. – continued from previous page

Explanatory Variable	Local APFBM Establishments	Local APFBM Employment
West Virginia	0.529	−1.342
	(2.710)	(7.010)
Wisconsin	−4.660*	6.768
	(2.624)	(7.432)
Wyoming	−2.230	−1.046
	(3.372)	(10.27)
Constant	−6.022	−18.57
	(3.711)	(12.17)
Observations	2,820	2,820
R-squared	0.500	0.130

Notes: *,**, *** indicate coefficient is statistically significant at the 10%, 5%, and 1% level, respectively. VAFAB stands for the value-added food and agriculture business sector. RUCC stands for rural-urban continuum code. Excluded RUCC category is RUCC 9 – nonmetro, not adjacent to a metro area, and completely rural. Excluded state category is Delaware. Alaska, Hawaii, and the District of Columbia were excluded from the study. There were no observations with all variables for Rhode Island.