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Featured Article

Do Cottage Food Laws Reduce Barriers to Entry for Food Manufacturers?

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Abstract *States have increasingly adopted cottage food laws across the United States. The laws allow small-scale food entrepreneurs to produce nonrefrigerated foods in home kitchens and sell them via direct-to-consumer outlets. Research has not yet established if the policies are, as intended, supporting start-up food manufacturing businesses nationally. We estimate a differences-in-differences model using state-level panel data to evaluate whether the passage of cottage food laws impacted the number of manufactured baked good establishments. We find a positive impact on the number of both employer and nonemployer businesses, with a relatively greater proportional impact for nonemployer businesses.*

Key words: Direct to consumer marketing, Cottage foods, Food entrepreneurship.

JEL codes: L26, O17, Q18.

Introduction

There has been a surge in nonemployer food manufacturers in the United States (US) in recent years. Since states have passed cottage food laws throughout the US concurrently, they could have contributed to this phenomenon. In general, cottage food laws allow small-scale food entrepreneurs to produce nonrefrigerated foods in their home kitchen and market them via direct-to-consumer (DTC) channels (e.g., farmers markets, fairs, and home sales). However, it is unclear whether there is a relationship between the growth of food manufacturing businesses and cottage food laws. This is because previous research examining the effects of cottage food laws has focused on producers already in business, instead of the entire sector, and

has not occurred at the national level (Gwin, Brekken, and Trant 2018; McDonald 2019).

We undertake one of the first national-level evaluations of state cottage food laws by examining whether the laws changed the number of firms in relevant food manufacturing sectors. Specifically, we calculate differences-in-differences (DD) estimates by regressing establishment counts on a binary variable that is equal to one for states and years for which food manufacturing sectors are eligible for cottage food production. We estimate separate regressions for both employer establishments (businesses with employees) and nonemployer establishments (businesses without employees). The estimates for employer businesses may be indicative of the longer-term impacts of cottage food laws, while nonemployer businesses are the most likely to be immediately impacted by laws intended to lower barriers to entry and encourage entrepreneurship.

We find that cottage food laws have a significant and positive impact on the number of manufactured baked good establishments. While the effect is qualitatively the same for employer and nonemployer businesses, we find that the magnitude of the impact is proportionally greater for nonemployer businesses. Our results are consistent with a scenario in which cottage food laws lower barriers to entry and thus induce the creation of nonemployer businesses. The increase in employer businesses could occur if some of the nonemployer businesses subsequently increase in scale and hire people. This interpretation is plausible because we find that the laws on employer businesses affect those with fewer than ten employees. We do not find that cottage food laws affect the number of establishments for other pertinent food manufacturing sectors.

Our study draws attention to a gap in how economic activity at DTC marketplaces is collected and reported. While the U.S. Department of Agriculture (USDA) collects DTC market data from farmers and ranchers, it does not do so from food manufacturers. This lack of data is an impediment to understanding market trends and evaluating the impact of local food technical assistance programs. Our results, in combination with a companion paper in this issue that finds a linkage between direct farm sales and food manufacturing start-ups (Low et al. 2020), suggest that the participation of food manufacturers in DTC markets may be significant enough to warrant expanding data collection efforts to include them. These data would help policymakers with estimating the size of the sector and allow researchers to study which characteristics of these businesses lead to greater sales levels. The data could also help inform policymakers of the regions where market development programs to assist cottage food producers may be most needed.

Background

Cottage Food Laws

States have the primary responsibility to develop food safety laws that govern in-state commerce. Many states use the U.S. Food and Drug Administration's (FDA) "Food Code" in developing best practices for kitchens. The standards include regulatory requirements like obtaining permits, being subject to inspections, and using certain equipment and materials. The FDA Food Code exempts the production of low-risk foods for sale at religious or charitable fundraisers from food establishment regulations. Low-risk foods are those that do not require "time/temperature control" (e.g., refrigeration) to prevent

bacteria growth and foodborne illnesses. HLSFLPC (2018) provides more detailed background information.

The exemption for low-risk foods provides a point of departure for states to develop cottage food laws. The basic rationale behind the laws is that if there are not food safety concerns associated with someone, for instance, selling homemade brownies at a school fundraiser, then there should not be food safety concerns if that home baker instead sold those brownies at a neighborhood farmers market. Analogously, some argue that smaller agricultural operations pose fewer risks when processors and consumers are familiar with each other and build trust through direct interactions (Holloway and Kneafsey 2000; Sage 2003; Paxson 2008).

Cottage food laws are intended to assist small-scale aspiring food entrepreneurs with establishing their business. In table 1, we show that only four of the states we examine had a cottage food law prior to 2007. We describe how we create this table in the Appendix. However, many states have adopted cottage food laws in more recent years. The laws align with similar farm-level size and market exemptions in the Food Safety Modernization Act (FSMA). The national-level FSMA provides these exemptions since otherwise the law is disproportionately burdensome to small producers relative to large ones (Bovay and Sumner 2018). Like the FSMA, state-level cottage food laws specify food safety regulations based on the size of the enterprise (Gwin, Brekken, and Trant 2018).

The specifics of cottage food regulations vary by state, but there are common themes. Policymakers typically restrict cottage food sales to DTC markets to help ensure that the food is consumed within the state it is produced. Almost all states with cottage foods laws allow vendors to sell products at farmers markets, and most states also allow sales to occur via

Table 1 Year Food Manufacturing Sectors Eligible for Cottage Food Production

Year	States
Pre-2000	VT (1978), ME (1980)
2000	MA
2001	
2002	
2003	NE
2004	
2005	
2006	
2007	NH, TN, UT
2008	MS
2009	AL, IN, WV, WY
2010	MI, NM, SD, WI
2011	AZ, AR, FL, WA
2012	AK, CO, GA, IL, MD, NY, SC
2013	CA, DC, LA, NV, OK, TX
2014	
2015	MN, MT
2016	DE, ID, OR

The eligibility year is pertinent for all four sectors except for: AZ, OK, OR, VT: 3114 (fruit and vegetable processing) not eligible. WA: 3113 (confectionery) not eligible until 2015. WI: 3113 and 3118 (confectionery and baked goods) not eligible.

other DTC market channels, including directly from home and at community events (e.g., fairs). The percentages of vendors that sell via these three DTC market channels are 49%, 33%, and 26%, respectively (McDonald 2019). Some states allow cottage food vendors to make direct sales to retailers and restaurants.

Cottage food laws also specify which food products are eligible; training, permitting, and licensing requirements; sales limits; and labeling requirements. Some states have "tiered" laws that vary within the state depending on the operation's size, the products they produce, the market channels they use, and whether they are a farmer or not (HLSFLPC 2018). Approximately half of the states with cottage food laws also have sales limits. While the specific details vary, in general, annual sales of cottage food products are restricted in states with limits to $50,000 or less (HLSFLPC 2018). States may implement sales limits to (a) contain the size of an outbreak that could occur from a business not using a commercial kitchen and (b) ensure the regulations lower barriers to entry for start-ups and that scale-appropriate food safety requirements become applicable once sales surpass a threshold.

Measuring the Cottage Food Sector

In 1976, the U.S. Congress passed the Farmer-to-Consumer Direct Marketing Act (FCDMA) to "encourage the direct marketing of agricultural commodities from farmers to consumers." Due to the FCDMA, USDA began collecting DTC agricultural sales data from farms in the 1978 Census of Agriculture (Low and Vogel 2011). Presumably because of the FCDMA's emphasis on agricultural commodities, farms only reported DTC sales of unprocessed commodities, like fresh fruits and vegetables, in the Census of Agriculture through 2012. USDA began collecting direct sales data of value-added agricultural products; as well as direct sales made by farms to retailers, institutions, and local distributors; in the 2015 Local Food Marketing Practices Survey (LFMPS) and 2017 Census of Agriculture. Direct sales of value-added agricultural products (e.g., cheese, meat, wine, and jam) that USDA reports are restricted to those processed on-site by vertically integrated farming operations.

Neither USDA nor other federal government agencies collect analogous DTC sales data from nonfarmers like food manufacturing businesses, of which cottage food producers are a subset. So, the value of cottage food sales and the number of such producers in the US is unknown. Perhaps due to this lack of data, the role of food manufacturing businesses in DTC markets has been overlooked in local foods research. The terms "producer" and "farmer" have been used synonymously in USDA local food reports, and DTC market size estimates in these studies do not consider that food manufacturing businesses also sell products at these outlets (Low and Vogel 2011; Low et al. 2015). USDA's focus on the participation of farms and ranches in DTC marketing is consistent with how DTC markets are popularly conceptualized. As the term "farmers market" suggests, DTC market channels are sometimes defined as venues for farmers without considering other types of vendors (Merriam-Webster 2019).

DTC sales data for nonfarmers may be unavailable due to an emphasis on improving farm viability stipulated in the FCDMA and because the passage of cottage food laws has been recent. Also, it is difficult to collect data from cottage food producers. More than half of the states with cottage food laws,

like Texas, do not have licensing or permitting requirements for at least some operators (HLSFLPC 2018). Further, state, county, and local government agencies with registration requirements do not make the lists of eligible producers publicly available. McDonald (2019) submitted public records requests to develop lists of cottage food vendors in states with registration requirements, but experienced challenges in obtaining both the lists and survey responses from vendors. So, our approach of using business establishment data is one of the only feasible ways to evaluate cottage food laws at the national level.

Characteristics of Cottage Food Operators

We compare the attributes of farmers that sell locally with cottage food vendors, since both use DTC market channels for selling food products. There is no comprehensive national-level survey of cottage food vendors that is analogous to USDA's LFMPS (USDA NASS 2018). Therefore, we use the results from a survey of 775 cottage food producers in twenty-two states by McDonald (2019), which is perhaps the most expansive survey of cottage food producers to-date.

The age profile and business income levels between farmers that sell locally and cottage food vendors are similar. Half of cottage food producers work full-time or part-time at other jobs, while another 23% are retirees (McDonald 2019). Similarly, local farmers are also older (the average age is 57), and farming is the primary occupation for less than half of local farm operators (USDA NASS 2018; O'Hara and Lin 2019). The average local food revenue for DTC farms is $37,169 (O'Hara and Lin 2019), which is of a comparable magnitude to cottage food sales limits in states that have them.

There are also differences in the profiles of the two types of producers. Cottage food operators are predominantly female (McDonald 2019), while 38% of local farm operators are female (USDA NASS 2018). Also, DTC agricultural production is concentrated in or near metropolitan areas (O'Hara and Lin 2019). In contrast, cottage food businesses tend to be rural, and operators in rural areas that want to sell products prohibited under existing cottage food laws are less likely to expand their business than urban or suburban operators (McDonald 2019). This finding suggests that increasing the product scope of cottage food laws could boost entrepreneurship in rural communities.

The median household income of cottage food producers is $36,000 (in 2016 US dollars), which is 61% of the national median income, and for retired cottage food producers it is $30,000 (McDonald 2019). Cottage food producers typically use their personal savings to finance start-up costs and tend to reinvest their sales proceeds back into their business. Sales also contribute to staple household purchases, savings, medical expenses, and mortgage payments (McDonald 2019).

Economic Contribution of DTC Marketing

A growing array of local food products that require some level of manufacturing are appearing in DTC, intermediated, and retail markets (Richards et al. 2017). Some nascent food manufacturing businesses participate in DTC markets to introduce and refine their products, their merchandising strategy, and their business model before scaling up to intermediated and retail markets (Feenstra et al. 2003; Triguero, Corcoles, and Cuerva 2013; Hardesty et al. 2014; Thilmany McFadden et al. 2016). Farmers markets are

particularly critical for small-sized vendors since they represent one of the only market outlets that is appropriately sized and available to them (Feenstra et al. 2003).

As the companion paper in this issue by Low et al. (2020) highlights, the structure of the food manufacturing sector is changing and spatially diverse. Since 2000, there have been approximately 10,000 manufactured baked good employer establishments in the United States annually (figure 1). More manufactured baked good employer establishments exist when compared to the other three sectors relevant to cottage food laws combined. In contrast to employer establishments, there have been pronounced increases in the number of nonemployer establishments (figure 2). There are three times more nonemployer establishments in 2016 than in 2000 in the US baked goods manufacturing sector. There have also been analogous increases in the number of nonemployer establishments for the other relevant food manufacturing sectors.

It is conceivable that these nonemployer food manufacturing businesses proliferated by collaborating with local farms in creating products, promoting local market demand, and establishing DTC marketplaces. This interpretation is consistent with Low et al. (2020), who found places with direct sales by farms also have seen a greater number of food manufacturing entrants. DTC agricultural sales by farms likewise doubled throughout the 1990s and 2000s in response to a greater consumer interest in purchasing local farm products (O'Hara and Low 2016).

The importance of food manufacturing nonemployer businesses to the economy can be inferred from research on self-employment. Greater levels of self-employment can increase per capita income and wage and salary employment in the economy, and reduce poverty rates (Goetz, Fleming, and Rupasingha 2012; Rupasingha and Goetz 2013). While self-employment represents a modest component of the total economy, self-employment leads

Figure 1 Trends in food manufacturing employer establishments (2000–2016)

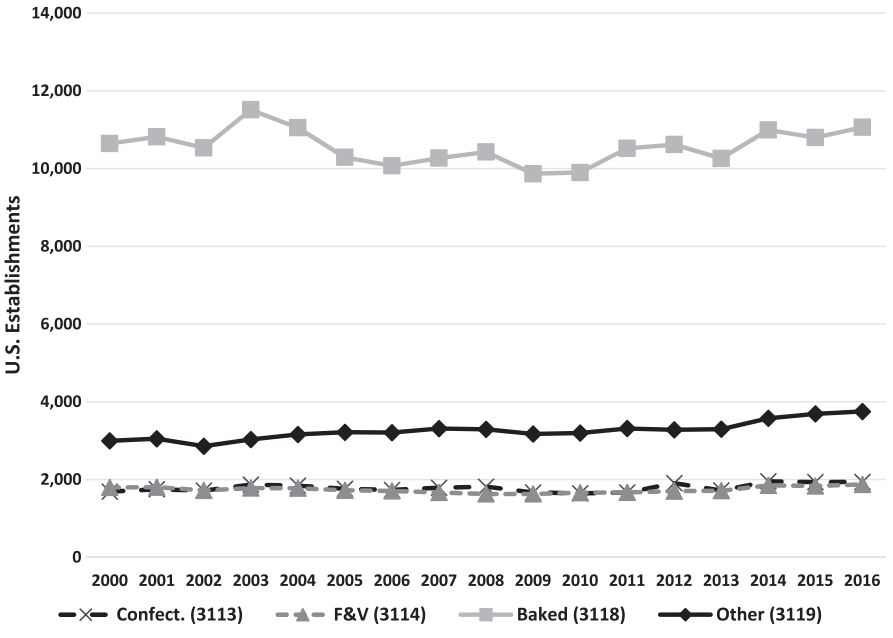
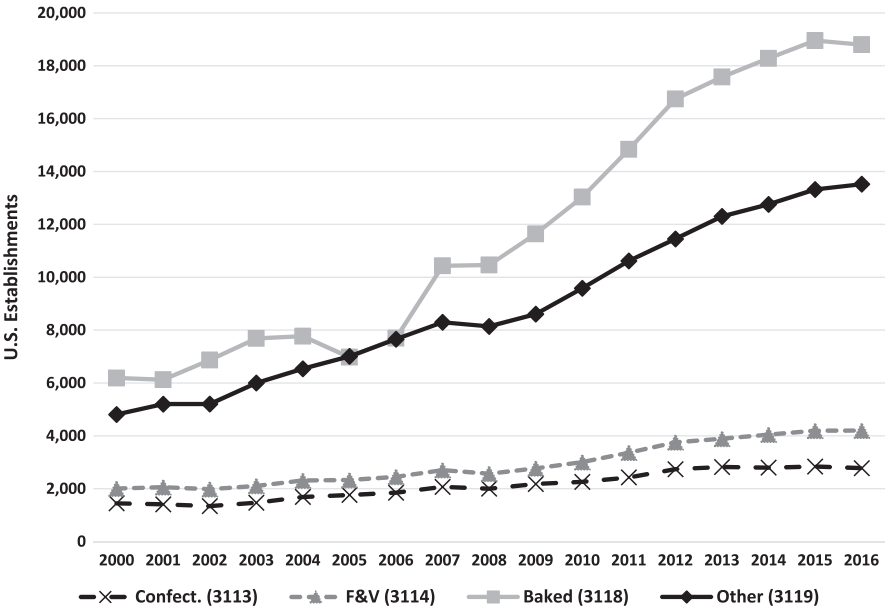


Figure 2 Trends in food manufacturing nonemployer establishments (2000–2016)



to higher economic growth than wage and salary employment (Tsvetkova, Partridge, and Betz 2019). These self-employment studies complement research that has documented the importance of local agricultural marketing for economic development objectives (Hardesty et al. 2014; Thilmany McFadden et al. 2016; Bauman and Thilmany McFadden 2017; O'Hara and Shideler 2018; Low et al. 2020). Moreover, jobs that target local markets may be economically important given that wage rates at farms that sell locally are higher than at farms that do not (Jablonski, Bauman, and Thilmany McFadden 2020).

The Effect of Cottage Food Laws on Market Structure

Food safety protocols that are disproportionately burdensome to small firms could inhibit innovation in food manufacturing (Antle 1999; Klapper, Laeven, and Rajan 2006; Adalja and Lichtenberg 2018; McDonald 2019). Knudson et al. (2004) found that entrepreneurial innovators focus on getting their product to market, while the management burden of regulatory compliance may be a barrier to entry. Although not in the context of cottage food laws, other studies have found that relaxing marketing and distribution laws for food and beverage manufacturers can increase the number of establishments in the sector (Malone and Lusk 2016).

Our approach of examining the effects of cottage food laws on different sectors allows us to evaluate which types of food manufacturing businesses are most directly impacted. If food manufacturing processes have cost structures that vary by sector, then they would have different thresholds for the number of firms their market could support (Bresnahan and Reiss 1991). The demand for home-produced food may also differ by sector. For example, if the quality of bread declines steeply over time, consumers may place a relatively high value on home-baked bread if short supply chains enable them to purchase the product when it is fresh.

Another insight of our model is that we evaluate how cottage food laws impact the composition of firms in a sector by size. If consumers reallocate purchases such that larger-sized manufacturers are adversely impacted by cottage food laws that support sales by smaller-size manufacturers, then we may expect to see fewer large firms. However, even if we do not find negative impacts of cottage food laws on larger-sized establishments in our regressions, that does not imply cottage food laws are not displacing sales. First, our methodology does not account for displaced sales that could occur outside of the food sector impacted by cottage food laws. For example, a consumer may purchase a cookie from a cottage food vendor instead of buying a smoothie. Second, our independent variable only captures the state-level impacts of the laws. For instance, while bread sales by a cottage food vendor in state A could displace sales from a bread manufacturer of a national brand located in state B, this could be uncorrelated with whether state B has a cottage food law. Third, the displaced sales may not appear in the data due to the coarseness of the size definitions for larger-sized firms and the relatively small size of the cottage food sector. In the CBP data, the largest-sized establishment category for firms is for those with 1,000 employees or greater. So, if a firm with 1,200 employees let go of 150 workers due to displaced sales, this would not be reflected in the number of firms with 1,000 employees or greater.

Policy Support for DTC Markets

The 2018 Farm Bill established an umbrella program called the Local Agriculture Market Program (LAMP) that annually provides $50 million in mandatory funding for local food practitioners. LAMP encompasses the pre-existing Farmers Market Promotion Program (FMPP), Local Food Promotion Program, and Value-Added Producer Grant program; as well as a new Regional Food System Partnerships Program. LAMP allows food safety technical assistance to be an eligible activity within these programs, which Buckley (2015) found to be valuable.

FMPP is the most relevant of these grant programs for cottage food vendors since DTC markets are such a critical outlet for them. FMPP can complement cottage food laws by supporting the operational needs of DTC markets at which start-up processed food vendors participate. Small-sized food manufacturers may have good culinary skills, but could have DTC technical assistance needs with marketing, pricing, labeling, and merchandising (O'Hara and Coleman 2017). In Oregon, farmers market managers and farmers identified several impediments in attempting to implement a cottage food law: a lack of clarity about eligible ingredients and products, requirements written in legal jargon, a lack of food safety education, and a lack of resources for Spanish-speaking vendors (Gwin, Brekken, and Trant 2018). In summary, clearer guidance from state agencies about cottage food laws and improved dissemination of technical assistance resources could be beneficial across the country (HLSFLPC 2018).

Since cottage food laws are relatively new, researchers have undertaken few studies examining the effectiveness of technical assistance on these producers. However, Buckley (2015) found in Michigan that food safety inspectors work collaboratively with processors and are akin to technical assistance providers. Thus, the inspectors help small-scale food processors improve the efficiency and safety of their operation. Also, Rupasingha,

Pender, and Wiggins (2018) evaluated the economic impacts of the Value-Added Producer Grant (VAPG) program. VAPG provides financial support to farmers and ranchers that seek to increase the value of agricultural commodities through activities like processing, developing source-identification systems, and local branding. The VAPG businesses studied by Rupasingha, Pender, and Wiggins (2018) were likely larger than typical cottage food businesses, since they had fourteen employees on average. Nonetheless, they found that VAPG recipient businesses had a reduced risk of failure and more employees than similar nonrecipients. They also found that the risk of failure decreased, and the number of jobs increased, as the size of the VAPG award became greater.

Methodology

Empirical Model

We estimate the state-level impact of cottage food laws on establishment outcomes during the period from 2000 to 2016. We estimate separate regressions for sectors that are relevant to cottage food laws using ordinary least squares (OLS). We use DD regression models of the form:

$$y_{st} = \gamma_s + \lambda_t + \delta D_{st} + \mu' X_{st} + \varepsilon_{st} \quad (1)$$

In (1), y_{st} represents the number of establishments in state s in year t. γ_s and λ_t are state and year fixed effects, respectively. The error term is ε_{st}. We cluster robust standard errors at the state-level. X_{st} represents control variables that we use to test whether our results are robust to the inclusion of state-specific linear trends and state-level labor market conditions.

The main coefficient of interest, δ, is the effect of cottage food laws on establishment counts. It is associated with an indicator variable, D_{st}, that is equal to one if the sector is eligible for cottage food production in that state and year, and equal to zero otherwise. McDonald (2019) found that the degree to which states implement most regulatory aspects of cottage food laws has little effect on firm sales, household income, or plans to expand the firm. This finding provides justification for our discrete categorization of cottage food laws with administrative differences. Our identification assumption (the standard "common trends" assumption in DD models) is that the trends in establishment counts would have been the same in all states in the absence of cottage food laws.

Baked goods were eligible under cottage foods laws 31% of the time throughout the sample period. We provide further details about our cottage foods classification scheme, robustness checks, alternative dependent variables, and descriptive statistics in the Appendix.

Industry Establishment Data

We obtain annual data on establishment counts for employer businesses from the Census Bureau's County Business Pattern (CBP) data. CBP employer data encompass virtually all nongovernment employer businesses, including sole proprietorships that have payroll employees.[1] For our study, an

[1]*The Census Bureau constructs CBP employer data from Internal Revenue Service and Social Security Administration lists of all known businesses in the United States, which it supplements with data from the Economic Census. The number of employees in the business represents both full-time and part-time*

advantage of CBP data is that it provides establishment counts by size. We report regression results separately for establishments of the following sizes: 1 to 9 employees, 10 to 49 employees, 50 to 249 employees, 250 to 999 employees, and 1,000 employees or greater.

Since we hypothesize that cottage food laws are more impactful on smaller businesses than on larger ones, our regression results for larger-sized establishments provide insight on two issues. One, they provide a falsification test against the possibility that our results may be attributable to overall establishment trends (irrespective of size) that vary between treated and untreated states. So, if the coefficients for both smaller-sized and larger-sized establishments are positive, then there could be spurious correlation. Second, the regressions could indicate if larger-sized firms within the state are adversely impacted by the laws. If the coefficients for smaller-sized establishments are positive and for larger-sized establishments are negative, then this would suggest that larger-sized establishments could be losing market share to smaller-sized operators. However, for reasons we summarized previously, a statistically insignificant coefficient for larger-sized establishments would not necessarily imply that they are not impacted by cottage food laws.

We are also interested in whether cottage food laws impact the total number of firms that are not large enough to employ additional workers. Since the CBP data omits establishments that do not employ workers, we also estimate regressions using the Census Bureau's Nonemployer Statistics (NES) data. NES data represent all businesses with taxable income but no employees.[2] Relative to private-sector databases, the Census Bureau's CBP and NES data are the best available data for studying business dynamics because they record statistics on a specified date each year, have well-documented and transparent data collection methodologies, and have been administered consistently over time (Barnatchez, Crane, and Decker 2017).

The description by states of allowable cottage food products is at a more granular level than sector-level CBP and NES data. While product eligibility varies at the state level, typical foods that are permissible include confectionary products like chocolate or candy; specialty or preserved fruit and vegetable products like jam, jelly, salsa, pickles, ketchup, or barbeque sauce; baked goods like bread, crackers, cookies, pasta, or tortillas; and snack foods like honey, popcorn, granola, dry goods (e.g., spices or tea), or condiments. At the four-digit NAICS level, these categories of low-risk foods correspond to sectors 3113 (sugar and confectionery product manufacturing), 3114 (fruit and vegetable preserving and specialty foods), 3118 (bakeries and tortilla manufacturing), and 3119 (other foods manufacturing), respectively. We describe in the Appendix that our results are robust to using five-digit NAICS classifications.

McDonald (2019) found that 69% of cottage food producers made nonrefrigerated baked goods. So, the baked good sector is the most pertinent for evaluating cottage food laws. The percentage of vendors that produce confectionary goods, pastries, condiments, dry goods, and preserves are

wage and salary employees. CBP data excludes self-employed workers, private households, agricultural employees, and government employees (Barnatchez, Crane, and Decker 2017).

[2]*The Census Bureau excludes nonemployer businesses that are: connected to multi-unit employer businesses, have less than $1,000 in revenue, or have revenues above certain thresholds. In the latter instance, these thresholds are $1 million for nonservice corporations, $2 million for service corporations, and are sector dependent for sole proprietors (Barnatchez, Crane, and Decker 2017).*

16%, 15%, 9%, 5%, and 4%, respectively (McDonald 2019). The findings by McDonald (2019) imply that the foods predominantly sold by cottage food producers do not need to be associated with a farming enterprise. Thus, we examine the impacts of cottage food laws on food manufacturing businesses even though in some states the laws are applicable to farms.

Results

The cottage food coefficient has a positive impact on the number of manufactured baked product employer establishments with statistical significance in both columns 1 and 2 of table 2. In column 1, we show our baseline results that include only state and year fixed effects as controls. The OLS coefficient estimate implies that the implementation of a cottage food law increases the number of state-level manufactured baked product employer establishments by 8.61, on average. In column 2, the estimated cottage food coefficient magnitude remains stable at 7.56 when we include the previously mentioned set of controls. Relative to the average number of state-level establishments, the parameter estimates in both columns 1 and 2 correspond to a 4% increase.

Cottage food laws similarly have a positive impact on nonemployer establishments with statistical significance in columns 3 and 4 ($P < 0.05$). In column

Table 2 Differences-in-Differences Regression Results—Baked Good Employers and Nonemployers

	Employer Establishments (CBP 3118)		Nonemployer Establishments (NES 3118)	
Dependent Variable	**1**	**2**	**3**	**4**
Treatment Variable	8.61*	7.56*	71.00**	24.89**
	(4.45)	(4.43)	(35.09)	(9.95)
State Income/National Income Ratio × 100		0.05		−2.77**
		(0.46)		(1.20)
% of Females in Labor Force × 100		−0.91		11.08**
		(1.16)		(5.40)
% of Age 65+ in Labor Force × 100		1.07		2.23
		(2.34)		(6.76)
% of Bach. Degree + in Labor Force × 100		0.70		0.11
		(0.80)		(1.63)
% of Non-Hispanic White in Labor Force × 100		0.60		3.47
		(1.31)		(2.99)
% of Labor Force to Population × 100		2.38		−1.30
		(1.43)		(3.62)
% of Employed that are Self-Employed × 100		−1.30		−6.98
		(1.17)		(4.07)
Intercept, State F.E., Year F.E.	YES	YES	YES	YES
State-Specific Time Trends	NO	YES	NO	YES
Regression	OLS	OLS	OLS	OLS
Observations	799	799	782	782

Notes: *Parameter estimate (robust standard error). Robust standard errors clustered at state-level.*
***Statistically significant at 0.05 level.*
**Statistically significant at 0.1 level.*

3, our baseline estimate of seventy-one corresponds to a 30% increase in the average number of state-level manufactured baked product nonemployer establishments. The treatment coefficient magnitude for nonemployer establishments declines when we include additional variables in the regression to a greater degree than in the employer establishment regressions. In column 4, the magnitude of the treatment effect coefficient is 35% of the baseline parameter estimate. The coefficient magnitude of twenty-five corresponds to an 11% increase in nonemployer establishments. The parameter estimates associated with the state-level control variables vary between the employer and nonemployer regressions. A one-percentage-point increase in the ratio of workers that are females in the labor force leads to an additional eleven state-level nonemployer establishments, while a relative increase in state income decreases the number of nonemployer establishments.

Cottage food laws have a positive and statistically significant impact on the number of employer establishments with one to nine employees (table 3). The coefficient magnitude of 6.85 is 91% of the value of the treatment coefficient in column 2 in table 2. This suggests that 91% of the increase in employer establishments from cottage food laws is occurring among firms with fewer than ten employees. The treatment variable coefficients in the regressions with a greater number of employees are statistically insignificant, and the magnitudes of the coefficients are close to zero. Thus, cottage food laws are not impacting the number of baked good establishments that have ten employees or greater from within the same state according to our specifications.

We find that cottage food laws do not significantly impact employer and nonemployer establishment counts in other food manufacturing sectors that produce foods also commonly deemed eligible. We present these results in the Appendix.

Discussion

We find that cottage food laws have positive impacts on both employer and nonemployer baked good manufacturing establishments, but do not impact other eligible sectors. A conservative interpretation of our results is that, during our sample period, cottage food laws induced a 4% increase in employer establishments and 11% increase in nonemployer establishments at the state-level. Following Bresnahan and Reiss (1991), the nonemployer treatment

Table 3 Regression Results for Baked Good Employer Establishments by Size Class

	NAICS Sector 3118				
Employees	**1 to 9**	**10 to 49**	**50 to 249**	**250 to 999**	**1,000 or more**
Treatment Variable	6.85*	−0.05	0.85	−0.08	0.00
	(3.96)	(1.86)	(0.65)	(0.28)	(0.48)
Other Controls	YES	YES	YES	YES	YES
Intercept, State F.E., Year F.E.	YES	YES	YES	YES	YES
State-Specific Time Trends	YES	YES	YES	YES	YES
Regression	OLS	OLS	OLS	OLS	OLS
Observations	799	799	799	799	799

Notes: *Parameter estimate (robust standard error). Robust standard errors clustered at state-level.*
**Statistically significant at 0.1 level.*

coefficient may be larger than the employer coefficient if cottage food laws lower entry barriers for establishments with low fixed costs, such as those without payroll, to a relatively greater degree. Over time, some of the nonemployer establishments may hire employees as they refine their products, business strategies, and increase in scale.

Our coefficients indicate that cottage food laws are creating opportunities for small, start-up businesses in the way they are conceptualized (McDonald 2019). They also reinforce other evidence that allowing food and beverage firms to undertake their own marketing and distribution can increase establishments within the sector (Malone and Lusk 2016). However, a caveat with using state-level data is that we are unable to track firms over time. So, we cannot verify that cottage food operators are increasing to a scale at which they are too large to be exempted from commercial kitchen requirements. Subsequent studies with a panel of establishment-level data are needed to corroborate our interpretation.

The magnitude of the employer establishment parameter estimate is robust to the inclusion of control variables and is approximately 4% of the state-level average. In contrast, the magnitude of the nonemployer establishment coefficient is more sensitive to which control variables we include in the specification. During the study period, the change in nonemployer establishments was more volatile than that of employer establishments (figures 1 and 2). Perhaps due to this greater volatility, more of the labor market variable coefficients are statistically significant in the nonemployer than in the employer regression. If these control variables influence establishment counts, then the coefficient magnitudes associated with the treatment variable could be reduced by their inclusion in the regression.

We find cottage food laws affect the number of baked good employers only among establishments with less than ten employees. While it is possible that larger-sized baked good manufacturers lose sales from cottage food laws, our results do not indicate that the increase in small-sized establishments causes a significant decline in the number of large establishments. This effect might not emerge in the data if only a few larger-sized bread manufacturers are losing sales or the change in the number of employees at larger establishments is sufficiently modest that it is not discernible from CBP establishment categories. Also, affected larger establishments (that perhaps produce nationally branded goods) may be in different states than the smaller establishments.

The lack of a positive coefficient associated with larger-sized employers is corroborating evidence that spurious trends between treatment and control states are not influencing our results. Because it is unlikely that cottage food laws increase the number of larger-sized food manufacturing establishments, we would interpret a positive effect on this subgroup as a possible violation of the common trends identification assumption.

The negative influence of relative income on nonemployer establishments could arise if higher income levels disincentivize people from developing cottage food businesses. Another possible explanation is if higher incomes increase consumer purchases at DTC markets (O'Hara and Low 2016), and sales by nonemployer businesses subsequently increase to a level at which they hire employees. The share of females in the labor force has a positive impact on the number of nonemployer establishments. This result is consistent with evidence that cottage food operators are predominantly female (McDonald 2019). The labor market control variables are correlated with each

other, so other evidence that supported these interpretations would be valuable before drawing definitive conclusions.

One plausible explanation as to why cottage food laws do not impact establishments in the three nonbakery sectors is that relatively few cottage food producers make these products (McDonald 2019). The economics of producing baked goods may be more amenable to home kitchens than the other pertinent sectors. Baked goods entail relatively low ingredient and packaging costs. Furthermore, producers may schedule frequent production batches given the relatively short shelf life of baked goods. In contrast, since producers can store preserved fruit and vegetables for a longer time, they can be prepared less frequently. So, gaining access to commercial kitchen space for larger and infrequent production runs may have a smaller impact on the costs for such operations.

Measurement error is also possible, since establishment counts for these three other sectors may include both establishments that make products directly affected by cottage food laws and establishments that make products that are not affected. Most laws are more specific about qualified products than the NAICS categories for which data are available. However, we do not believe that measurement error is the main cause of the statistically insignificant coefficients in these other sectors. As we describe in the Appendix, we also estimate regressions for employer establishments at the five-digit NAICS level for the pertinent subsectors as a robustness check and likewise found statistically insignificant impacts.

Conclusion

While economic development policy at the regional level in the US has historically been premised on attracting large employers, particularly in the manufacturing sector, more recent evidence is finding that self-employment is important for rural economies (Goetz, Partridge, and Stephens 2018). Our study evaluates whether one recent initiative, the passage of cottage food laws, provides entrepreneurship opportunities for households that McDonald (2019) found are predominantly of a lower socioeconomic status in rural areas. We show that cottage food laws have provided an opportunity for start-up food manufacturers to engage in the consumer interaction and business incubation activities that DTC marketplaces can provide. Our results suggest that broadening both the measurement and conceptualization of DTC marketplaces to include food manufacturers, in addition to farms and ranches, is warranted.

Since cottage food laws are relatively nascent, the longer-term extent to which the laws support businesses sustainably over time is unclear. Subsequent research at the establishment level could track the survival of cottage food enterprises and examine the characteristics of nonemployers that increase their level of economic activity so that they become employers. For some of these businesses, this growth could result in them "graduating" to commercial kitchens (i.e., reaching a level of commercialization such that cottage food laws are no longer relevant).

Do rural cottage food producers travel short distances to market their products, like DTC farmers (O'Hara and Lin 2019)? If so, the consumers of cottage food products may also predominantly live in rural areas. Or do rural cottage food vendors travel further distances to reach urban markets? Further research on the consumers of cottage food products would provide insight

into their socioeconomic characteristics and motivations in purchasing cottage food products. This information, in turn, would be valuable in assessing the welfare and distributional implications of using public resources for DTC technical assistance for aspiring food manufacturing businesses.

Supplementary Material

Supplementary material is available online at *Applied Economic Perspectives and Policy* online.

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