Income Tax Credits to Assist Beginning Farmers and Ranchers: A Look at State-Level Policies

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Abstract

Purpose This research estimates the impact of state-level income tax credit programs that were designed to assist beginning farmers and ranchers gain access to farm assets.

Design/methodology/approach The authors construct a pooled time series of nationally representative cross-sections of data from the USDA's Agricultural Resource Management Survey (ARMS) for years 2003-2014. The model estimated measures the predicted probability of observing a beginning farm. Using the variation in the generosity of tax credits for beginning farmers across time and states, and employing limited-dependent variable methods, the authors are able to control for a host of farm business and farm household-specific factors, as well as time-invariant and state-level fixed effects to identify an effect of the program on the predicted probability of observing a beginning farmer and rancher.

Findings The authors find that, all else equal, when a state raises the value of an income tax credit for income generated from a share lease agreement by 10 percentage points, the predicted probability of observing a beginning farm in that state increases by between 0.4% and 0.6%. We do not find any statistically significant effects of a tax credit based on a cash lease agreement.

Implications The estimates suggest there is a modest effect of the tax credit provision for the share lease, but not the cash lease, on overall participation of beginning farmers and ranchers. Share agreements may encourage collaboration and knowledge sharing from established farmers to beginning farmers and ranchers, and this may increase the odds of a beginning farm or ranch surviving.

Originality/value To the authors' knowledge, this is the first research to examine the impact of state-level income tax credits designed to assist beginning farmers and ranchers. The findings provide evidence of the provisions' impact on beginning farmer and rancher participation.

Keywords: Beginning Farmers and Ranchers, Income Tax Credit, Farm Finance, Agricultural Resource Management Survey.

JEL Codes: Q1, Q14, H25, D24.

1. Introduction

Starting a farm or ranch requires access to land and equipment, and this can present a formidable hurdle in terms of cost and availability. Although there is no one measure that can describes the total cost of starting a farm, the farm's net worth (the value of total farm assets less total farm debt) offers insight into the resources necessary to enter farming. The average farm in 2014 had a net worth of $885,800, and the average beginning farm had a net worth of just under $500,000.[1] For typical commercial farms, those with gross cash farm income over $350,000, the average net worth is over to $2.3 million. On average, a farm operates 437 acres, and about two-thirds of these are owned. And since farm real estate accounts for 82% of farm asset value on the farm sector balance sheet[2], it is not surprising then that beginning farmers and ranchers cite the difficulty in acquiring land as one of their biggest concerns to becoming a financially viable operation (Shute 2011).

While the number of total farms and ranches has been declining over time, the number of beginning farms and ranches has been declining at an even faster pace. Based on Census of Agriculture data, there were 6 percent fewer farms in 2012 than there were in 1982.[3] In 1982, nearly 36 percent of farms were headed by a farmer with 10 or fewer years of experience; by 2012, only 27 percent of principal operators were classified as beginning famers (Figure 1). Moreover, the aging of principal operators in the sector is reflected in demographics of the operators of beginning farms and ranches as well. On average, in 2012 the principal operator of a beginning farm is 50 years old, an increase of 1 year since the 2007 Census. However, the average beginning

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[1] Author's calculations from USDA's 2014 Agricultural Resource Management Survey.
[2] USDA Economic Research Service, Farm Income and Wealth Statistics, 2016. http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/balance-sheet.aspx
[3] Source: Authors' calculations from various Agricultural Census reports: http://www.agcensus.usda.gov/Publications/

farmer or rancher is only 8 years younger than the average principal operator of an established farms, 58 years old, and this is due in large part to the declining trend in the participation of younger operators in farming. As noted by Ahearn and Newton (2009), in the 2007 Census of Agriculture, 16% of all principal operators were under the age of 35; in the latest 2012 Census of Agriculture, less than 6% were under the age of 35 and a large majority of them (80%) were farmers with no more than 10 years of experience.

[INSERT FIGURE 1 HERE]

To help beginning farmers and ranchers overcome obstacles to entrance, states and the federal government have created programs to assist beginning farmers and ranchers. In 1992, the USDA began providing targeted assistance directly to beginning farmers and ranchers, including through direct loans and loan guarantees (Ahearn and Newton 2013). Most recently, the 2014 Agriculture Act reauthorized and expanded funding for beginning farmers and rancher programs, as well as offering incentives to beginning farmers and ranchers to participate in programs such as the Federal Crop Insurance Program (Williamson 2014).

States have their own programs to financially assist beginning farmer and ranchers. In the early 1980s, the "Aggie Bond" program was established to provide beginning or low-equity farmers with access to capital. The bonds, which are issued by states, pay tax-exempt interest and may be used for purchases of farm real estate and equipment by farmers to start or expand an operation (Williamson and Katchova 2013). Other state finance programs generally take the form of direct loans and grants, and many are tailored to the unique agricultural production in the state.[4]

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[4] See the National Council of State Agricultural Finance Programs website for a comprehensive list of state agricultural finance programs: http://www.stateagfinance.org/.

In this article we examine a relatively new form of assistance to beginning farmers and ranchers: state-level income tax credit provisions available to assist beginning farmers and ranchers.[5] To our knowledge, only three states—Iowa, Nebraska, and Wisconsin (the "tax credit states")—have or have had a tax credit program that provides direct assistance to owners of assets who lease them to beginning farmers and ranchers.[6,7] The economic intuition behind such a program is that it increases the after-tax income of program participants (the lessors of farm assets) by off-setting tax liability, while providing them with an incentive for them to engage with beginning farmers and ranchers (the lessees); beginning farmers and ranchers benefit from the tax credit by gaining access to land and perhaps receiving a discount on the lease fee or lease terms, depending on market conditions.

The objectives of this research are to 1) describe the beginning farmer tax credit programs, and 2) measure the effect of the income tax credits on the predicted probabilities of observing a beginning farm or ranch. Each state sets a credit percentage amount that can be applied to the value of the lease or contract for the use of agricultural assets, and these percentages vary. To test for effects of the programs we use plausibly exogenous variation in the generosity of the tax credits across time and between states. We employ the US Department of Agriculture's *Agricultural Resource Management Survey* (ARMS), for years 2003-2014. The ARMS are nationally representative cross-sectional data, designed to solicit information from farm operators about production practices, costs of production, business finances, and operator and household characteristics.

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[5] A recommendation was made in 1998 by the National Commission on Small Farms to amend the Federal tax code to exempt the first $10,000 of income from the lease of land, facilities, or equipment to a beginning farmer (USDA 1998).

[6] Nebraska's Nextgen program: http://www.nextgen.nebraska.gov/

[7] Iowa's beginning famer tax credit program: http://iowafinanceauthority.gov/Public/Pages/PC204LN48

We find, all else equal, that when a state increases a tax credit for income from a share lease agreement by one percent, the predicted probability of observing a beginning farm in that state increases by between 0.04 and 0.06, which means a 10% increase in the share lease agreement tax percentage increases the probability of a beginning farm by 0.4% to 0.6%. We find the results are robust to multiple specifications, including using different definitions of a beginning farm. We do not find any statistically significant effects of a tax credit based on a cash lease agreement.

In the next section we outline the current tax credit programs beginning farmers may benefit from to access farmland and other assets. In Section 3, we discuss our estimating equation and the use of a linear probability model to estimate the probability of observing a beginning farmer. In Section 4 we discuss the data, followed by the results in section 5. This is followed by a broader discussion of the results in context in Sections 6 and the conclusion in section 7.

2. Background on Beginning Famer Tax Credit Programs

The beginning farmer and rancher programs in Iowa, Nebraska, and Wisconsin offer tax credits against individual income tax or corporation income tax to the owners of agricultural assets who make lease agreements with qualified beginning farmers. In all three states, the tax credit equals a percentage of the value of a lease or contract for the use of agricultural assets and is awarded to the asset owner rather than to the beginning farmer to whom the assets are leased.[8] Iowa and Nebraska offer tax credits for the leasing of comparable kinds of agricultural assets, including land, livestock, and farm machinery. Wisconsin's tax credit, however, applied to the

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[8] Nebraska also offers an additional one-time tax credit of up to $500 to lessee-beginning farmers for the cost of an approved financial management program. To be eligible for this $500 tax credit, beginning farmers are required to have a lease agreement for which a tax credit under the broader state program is awarded. In addition, completion of the financial management program is required of beginning farmers participating in the tax credit program.

leasing of machinery, facilities, and livestock, but not to the leasing of agricultural land. Table 1 summarizes key aspects of the three tax credit programs as of 2015.

Nebraska's Beginning Farmer Tax Credit program is the longest-standing of the three programs, having begun with the 1999 tax year. It was the only tax credit of its kind in the country until 2007, the initial year of Iowa's Agricultural Assets Transfer Tax Credit. In 2011, Wisconsin's Beginning Farmer and Farm Asset Owner Tax Credit Program became the third. However, that state's tax credit program was repealed effective in 2014 and was thus applicable only for leases in effect in years 2011 through 2013.

Tax credit rates vary among the beginning farmer tax credit programs in Nebraska, Iowa, and Wisconsin. Both Iowa and Nebraska offer a higher credit rate for crop share agreements than for cash lease agreements. The higher tax credit rate for crop share agreements presumably represents lawmakers' intent to provide an additional incentive to asset owners to engage in such lease agreements, perhaps in recognition that the established farmer is shouldering more risk through this lease type, but also because it could be a way to encourage established farmers and ranchers to work closely with beginners. Nebraska's tax credit is equal to 10% of cash lease agreement amounts and 15% of crop share agreement amounts. In Iowa, the tax credit rate applicable to cash lease agreements is 7%, somewhat lower than the comparable rate in Nebraska. However, Iowa's rate for crop share agreements is 17%, two percentage points higher than Nebraska's. The Wisconsin Farm Asset Owner tax credit was not awarded for leases based on crop share agreements; it equaled 15% of the cash lease amount received by the established farmer. The Iowa Beginning Farmer Tax Credit Program is distinct among the three states' programs in that it provides for an additional 1% for the tax credit rate when the beginning farmer is a veteran; however this additional percent applies only in the first year of the lease or contract.

Like the credit percentages, the total annual aggregate credit amounts vary by state. Iowa's Beginning Farmer Tax Credit Program is subject to an annual overall cap of $12 million. Nebraska does not impose a limit on aggregate awards made under its programs, nor did Wisconsin while its program was in effect. The required length of contracts also varies by state. Nebraska requires that lease agreements be three years in length; Wisconsin had the same requirement; and Iowa allows leases to be of two to five years in length.

Tax credits awarded by the program in Nebraska are refundable. This was true of Wisconsin's program as well. A refundable tax credit provides a net payment, or refund, to the taxpayer in the event that the credit amount exceeds tax liability. Tax credits awarded under Iowa's Beginning Farmer Tax Credit Program are nonrefundable but have a ten year carryforward. In none of the three states with a beginning farmer tax credit program are such tax credits transferable and they may not be sold or given by the awardee to another taxpayer.

Both Nebraska's and Iowa's tax credits are allowed for taxpayers and qualified beginning farmers who are related, including familial relations, members of partnerships, and shareholders in the same business entity. In the case of a familial relationship between the taxpayer and qualified beginning farmer, Nebraska requires that a written succession plan be completed by the parties.

For purposes of their tax credit programs, the three states have defined beginning farmers along similar lines. Specifically, the current programs in Nebraska and Iowa, as well as the former program in Wisconsin, define beginning farmers primarily in terms of financial net worth, length of farming experience, and the beginning farmer's plans to engage directly in farming. Despite these broad similarities, the particulars of eligibility criteria for beginning farmers are different among the three states in important ways.

The Nebraska tax credit program initially required that the lessee (beginning farmer or rancher) have a net worth of no more than $100,000. A legislative change doubled this threshold to $200,000 in 2006. Nebraska's net worth limit is subject to annual adjustment as prescribed by Nebraska Revised Statute 77-5209 using a formula based on the Bureau of Labor Statistics Producer Price Index. Nebraska law requires that any adjustment to the net worth limit as a result of indexation be a multiple of $25,000 such that any prospective adjustment of less than this amount is rounded to the next lowest $25,000.[9] Since 2006, the net worth limit of the Nebraska program has never exceeded $200,000. The Wisconsin program likewise limited net worth to less than $200,000, but was not indexed to inflation. Iowa's tax credit program is the least restrictive in terms of the net worth criterion. Iowa law requires that participating beginning farmers have a financial net worth that is not "greater than necessary to adequately support a beginning farmer." The financial threshold is set by administrative rule by the Iowa Finance Authority, and since 2008, is coupled to annual changes in the United States' Department of Agriculture (USDA) Prices Paid by Farmers index.[10] Originally set at $500,000, Iowa's net worth threshold for beginning farmers has increased to $703,844 in 2015.

Nebraska and Iowa require that the participating beginning farmer be a state resident and that the beginning farmer has farming or ranching experience or education. Uniquely among the three states with beginning farmer tax credit programs, Nebraska also requires that the beginning

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[9] The Nebraska Revised Statute 77-5209 reads, in part, as follows: "The qualified beginning farmer or livestock producer net worth thresholds […] shall be adjusted annually beginning October 1, 2009, and each October 1 thereafter, by taking the average Producer Price Index for all commodities, published by the United States Department of Labor, Bureau of Labor Statistics, for the most recent twelve available periods divided by the Producer Price Index for 2008 and multiplying the result by the qualified beginning farmer's or livestock producer's net worth threshold. If the resulting amount is not a multiple of twenty-five thousand dollars, the amount shall be rounded to the next lowest twenty-five thousand dollars."

[10] The Prices Paid by Farmers index is included in Agricultural Prices, a regular monthly report by the National Agricultural Statistics Service. This report is published at http://usda.mannlib.cornell.edu-/MannUsda/viewDocumentInfo.do?documentID=1002.

farmer has participated in an approved financial management educational program. The Nebraska and Wisconsin programs require that the beginning farmer has farmed for fewer than ten of the previous fifteen years. Iowa does not stipulate any maximum length of experience for the beginning farmer.

2.1 Cash versus crop share leases

As we described above, the programs do not just cover land rental—the programs cover many types of assets leased—however, land is likely to be a large part of the assets rented because it is importance major input for agricultural production. To provide further perspective about the likely difference in the use of tax credits by lease type (cash or crop share), we note that nationally in 2014, 30% of all acres *operated* by family farms were leased through a cash arrangement.[11] A cash lease is far more common than other types of leases, and a majority of land leased falls under the cash arrangement. In 2014, on average about a quarter of family farms leased-in land with a cash lease—though not at the exclusion of other types of leases—and of the total acres leased, nearly 75% were leased for cash. Crop share leases, on the other hand, are relatively less common nationally. In 2014, only 6.4% of family farms reported leasing acres with a crop share lease, and the total acres leased under this arrangement were 15.8% of all acres leased.[12]

Among beginning farmers and ranchers nationally, the crop share lease agreement is even less common. Only 4.9% of beginning farmers or ranchers reported a crop share lease in 2014, and it accounted for only 12.6% of the total acres leases. On the other hand, cash leases accounted for 75% of leased acres operated, identical to the figure for all farmers, and cash-leased acres accounted for 38% of *total* acres operated.

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[11] Authors' calculations from 2014 Agricultural Resource Management Survey data.
[12] The remainder of leases are of a hybrid cash-crop share lease or for no remuneration.

2.2 Leasing in the Tax Credit States

Overall, in the three states offering the tax credits in our study—Iowa, Nebraska, and Wisconsin—the crop share lease agreement was more common than it was nationally in 2014. Farms located in Iowa, Nebraska, and Wisconsin were more likely than farms nationally to report using a crop share lease (12.6%), and 16.4% of all acres are leased under a crop share agreement. The same is true for beginning farms in the three state sample. Among beginning farms and ranches in the states offering tax credit, 9% reported a share lease agreement (33% reported a cash agreement), and 10.8% of the total acres leased were covered under a crop share agreement (85.5%) were covered under a cash agreement).

3. Model and Estimation

We model the predicted probability of observing a beginning farm or ranch. The probability is conditional on explanatory variables in **x,** is the response probability $P(y=1|\mathbf{x})$. The simple formulation,

(1) $P(y=1|\mathbf{x})=b_0 + b_1 x_1 + \ldots + b_k x_k + u,$

describes the probability that y=1 is a linear function of x. And since the probabilities must sum to one,

(2) $P(y=0|\mathbf{x})=1-P(y=1|\mathbf{x}).$

We use the variation in the generosity of tax credits for beginning farmers and ranchers across time and states to identify the effect of the tax programs. Equation (3) is the reduced-form estimating equation where Y represents the predicted probability farm i is a beginning farm in state r at time t. The exogenous beginning farmer and rancher tax credit policy variables TC^{share} and

TC^{cash} are the value of the statutory percentage values of the crop share credit and cash credit, respectively, available to farm i in state r at time t. The vector $\mathbf{X}$ is a set of independent variables that includes characteristics of the operator, and farm operation, including farm size, total output, and financial health; the disturbance term is represented by ε.

$$(3) \qquad Y_{irt} = \beta_0 + TC_{irt}^{share}\beta_1 + TC_{irt}^{cash}\beta_2 + \mathbf{X}_{irt}\beta_3 + \phi_r + \upsilon_t + \varepsilon_{irt}$$

There may be country-wide secular trends over time that affect the probability of being a beginning farmer. For example, perhaps in response to underlying changes in the agricultural sector, national educational or funding programs to increase participation in farming, or other such programs that communicate the benefits of starting a farm or ranch, attitudes about starting a farm or ranch change over time. We control for these potential time trends in beginning farm and ranch participation rates with a time effect term, υ_t. As well, participation might also differ across states due to state-level BFR programs, or other state-specific factors correlated with BFR participation; therefore we also add a state fixed effect term, ϕ_r, to our model.

We use a least squares regression to estimate a linear probability model (LPM). The advantage of the LPM is the ease of estimation: it has the well-known properties of ordinary least squares regressions (OLS) models, and the estimated coefficients are the marginal effects and no post-estimation transformation is needed. The drawbacks are that it can estimate predicted probabilities that are negative (predicted probabilities that are outside the unit interval), and if the true relationship between the expected value of the dependent variable and controls is nonlinear, the distributional properties of OLS do not hold (Horrace and Oaxaca 2006). The estimates may also be sensitive to the range of data observed in the sample. Because we are primarily concerned

with the marginal effects, the effects over a narrow range of values for the policy variables, we argue as others have that LPM perform well in this situation (Wooldridge 2009, p. 249).

3.1 Heterogeneity and serial correlation

The OLS estimator may be inefficient in the LPM, because the binary nature of the outcome means the variance will depend on values of the independent variables.[13] In addition, pooling cross-sections over time may create two notable and undesirable characteristics related the data's error structure: heteroskedasticity and serial correlation. This arises because there may be correlation among error terms both across time and within cross-sections of data.[14] It is likely that errors are not independent from year to year because farm characteristics and management behavior may not be independent over time, for example, because lease contracts cover multiple years, acres leased in time t may be correlated with leased acres in time $t \neq s$. As well, there is likely contemporaneous correlation among farms with the cross-section. Heteroskedasticity could arise in our estimation for reason beyond the use of an LPM. For instance, the discrete nature of capital investment, that is farm equipment, machinery and structures are bought in discrete, means many large purchases must be made in whole units. Another cause is based on the different needs of farms based upon farm size. Smaller farms, as measured by gross cash income, may need and purchase a smaller amount of farm machinery compared to larger farms; they may operate fewer acres, and lease fewer acres as well. Larger farms on the other hand may make a larger purchase in one year, while make a small purchase in another. Large farms generally operate more acreage than small farms and may or may not lease a large percentage of these acres. Together, these issues could lead to non-constant disturbance terms in our estimation.

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[13] $Var(y|x) = p(x)[1-p(x)]$.
[14] For the error term U, the condition that $cov(U_{it}, U_{js})=0$ is likely to fail when $i=j$ for $t \neq s$ (correlated errors within cross-sections across time).

To test for heteroskedasticity, we perform two tests. The first is a Breusch-Pagan/Cook-Weisberg test for heteroskedasticity, which detects linear forms of heteroskedasticity present in the data. The null under this test is that the variances are equal across observations. The alternative hypothesis is that the variance is a function of one of the variables and thus correlated with the dependent variable of interest. When applying this to the model we obtain a chi squared estimate of 38,872.20 and probability of $p<0.001$.

The second test is a modified Wald test for group-wise heteroskedasticity. This tests the null hypothesis that the variances across cross-sectional units over time are equal against the null that variances differ for units across time but are homoscedastic within cross-sectional units. The procedures applied account for unbalanced cross sections as well as make adjustments for potential non-normality of errors (Baum 2001). We reject the assumption of a stationary error term and thus estimate our results with robust standard errors.[15].

4. Data

The survey data for individual farms in our research are cross-sectional and come from the US Department of Agriculture's *Agricultural Resource Management Survey* (ARMS). ARMS is an annual series of interviews with farm operators designed to solicit information about production practices, costs of production, business finances, and operator and household characteristics. Each year, a new sample of different farms is chosen for the survey. We pool data for 2003 through 2014, with 124,758 observations of individual farm households. Pooling the data is preferable to a single cross-section for several reasons: first, pooling several years of survey data allows for more variation in the policy variables we are concerned with; second, it also allows for variations within and across beginning farms; and third, pooling allows us to control for time-variant factors

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[15] We obtain a test statistic of chi2 (11) = 740.24 and prob>chi2 = < 0.00001

that influence beginning farms, as well as the sector in general. A drawback of pooling data of individual time-series is that it assumes the errors are constant throughout the set of pooled data, an assumption we will test for. If in fact they are not, the estimated disturbance terms will be invalid. The tax credit states, Iowa, Nebraska, and Wisconsin, account for 13,284 observations. The information about and parameters of the state tax programs are gathered from the respective state agencies responsible for administering the program.[16]

Although there is no one definition of a beginning farmer or rancher, for our purposes and for the purpose of qualifying for many of the USDA's beginning farmer and rancher programs, a beginning farmer or rancher is an operator who has no more than ten years of experience operating a farm. How we define a beginning farm or ranch is based on the operating experience of all the farmers or ranchers on the operation: The definition of a beginning farm we use is: each operator on the farm or ranch has no more than ten years of experience.

To predict the probability of being a beginning farmer or rancher we control for a host of farm and farmer characteristics, including the age of the principal operator, years of education, whether farming is the principal occupation, and marital status (see Table 2 for a full list). Farm characteristics include farm acreage and total value of production, as well as financial health of the farm business, given by asset turnover ratio, return on equity (ROE), return on assets (ROA), and the debt to asset ratio. We include the absolute values of debt, non-real estate assets, farm real estate, and investment in machinery and equipment (Annual Capital Investment).

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[16] For example, see the Iowa Finance Authority, which administers the Iowa Beginning Farmer Tax Credit. http://www.iowafinanceauthority.gov/IADD.

Under a crop share lease agreement, the value of the tax credit is based on the value of the beginning farmer or rancher's production. To derive the value, the harvested acres are multiplied by published county-level transition yields (T-yield) and the previous year's USDA Risk Management Agency fall price. Therefore, we include the number of corn and soybean acres harvested, the two crops for which T-yields are published.

4.3 Summary Statistics

Table 2 presents a summary of means of variables used in our model, both for all farms and for beginning farms. Roughly 22 percent of the farms in the sample are beginning farms (15,551 unweighted observations). It should come as no surprise that beginning farms are on average half the size of farms in general, and therefore have lower values of production, revenue, expenses, and capital investment. Overall, the average principal operator is 58 years old, while the average age of principal operators of beginning farms in 48. The average annual capital purchase was $15,610 for all farms, $10,924 for beginning farms.[17] All farms on average produced $150,796 worth of product on 418 acres, and the farm household held farm real estate worth $845,230 and capital stock worth $324,001.

[INSERT TABLE 2 HERE]

Beginning farms on the other hand had more income from off-farm endeavors; the average beginning farm had off-farm income of $116,074, while all farms in general had $96,258. This partly explains why these farms paid an average marginal tax rate of 15.7%, while the average of all farms was 13.9%. Also contributing to the lower marginal tax rate is that beginning farms had lower expenses and capital investment, and these can generate losses than can be used to reduce

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[17] All dollar figures are in 2014$.

the total income of the household. In terms of financial health, beginning farms have a lower asset turnover ratio on average, a lower ROE and ROA, and a higher debt-to-asset ratio.

5. Results

Table 3 presents the predicted probabilities of observing a beginning farmer using a linear probability model on the full sample of farms, as well as a sample of farms from three USDA-defined farm production regions that contain states that have the tax credit. The data have been transformed by the natural logs of the values and the coefficients are interpreted as elasticities.[18] As shown in Column 1, the estimates for our full sample of data, we find evidence that the tax credit associated with the crop share lease increases the probability of observing a beginning farm, all else equal (coefficient = 0.0558), and it is statistically significant at the 1% level significance. In other words, a 10% increase in the crop share credit increases the probability of observing a beginning farm by 0.6%. The coefficient for the cash lease credit is -0.00774, but it is not statistically significant different from zero.

When we restrict our sample to just the three USDA production regions that contain the tax credit states (the Corn Belt, Lake States, and Upper Plains), we find a smaller coefficient on the share lease variable, though still statistically significant (Column 2). In this case, we find a 10% percent increase in the value of the share lease increases the probability of observing a beginning farm by 0.39%. As in the full sample, we do not find a statistically significant effect of the cash lease variable. Leaving out all states but the tax credit states from the sample (Column 3), we estimate a coefficient on the share lease of 0.0505 and statistically significant at the 1% level.

[INSERT TABLE 3 HERE]

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[18] We add a small constant to the binary variable in order to perform a log transform.

The other control variables show that characteristics of the farm and farmer are significant predictors of beginning farms, and the signs of the coefficients are fully consistent with the relative position of beginning farmers. Beginning farms and ranches are smaller in terms of revenue (gross cash farm income), acreage operated, and the value of assets held, for instance. Therefore it is not surprising we find that as gross cash farm income increases, the probability of observing a beginning farm decreases, though the magnitude is small. For a one percent increase in the gross cash income, we find a decline of only 0.0118% in predicted probability. Beginning farms are also less likely to receive government payments. The larger a farm, measured by total acreage operated, the lower the probability of observing a beginning farm; as well, if a farm harvests more corn acres, they are less likely to be a beginning farm. We do not find a statistically significant effect for the soy harvested variable.

In general, beginning farms operate fewer acres, and we find the probability of observing a beginning farm is negatively related to aces leased, either for cash or a share of production. As well, the greater the value of farm real estate owned, the less likely we are to observe a beginning farm.

With regard to farm profitability and farm financial efficiency, we find that although we are less likely to observe a beginning farm as total farm debt increases, beginning farm probability increases with the debt-to-asset ratio (coefficient of 0.0879). This is a reflection of the nature of the startup phase of the farm, namely, that they have fewer assets in the form of real estate (agricultural land), which accounts for the bulk of farm assets. The coefficient on the asset-turnover ratio is also negative (-0.00233) and statistically significant at the 1% level.

Reflecting the aging of the farm principal operator population, the impact of farmer age on the probability of observing a beginning farm is 3.49—or for every 1% increase in the age of the

principal operator of the farm the probability falls by about 3.49%. This is by far the strongest effect of all the control variables. We include dummies for education category (less than high school is the excluded dummy) and find that the predicted probability is also increasing in principal farmer's education. If the principal operator has a high school degree, they are less 18% less likely to be a beginning farmer. On the other hand, the coefficient on the dummy representing a four-year college degree tell us that those with a college degree are 16.9% more likely to be a beginning farmer than those without a high school degree, and this is statistically significant at the 10% percent level.

Finally, the controls for commodity specialization show that overall, relative to row crops, a specialization in other commodities is negatively related to beginning farm predicted probability. For example, farms specializing in nursery and greenhouse-related production are 60% less likely to be beginning farms, relative to row crop farms; Hog farms are 39% less likely than row crop farms to be beginning farms.

The results of a subset of the national sample in column 2 of Table 3. The data include only the three USDA-defined farm production regions that contain tax credit states.[19] Like the full sample, we find a statistically significant result for share lease policy variable. The coefficient on the share lease tax credit variable is 0.0391 for the three-region sample, while the coefficient on the cash lease tax credit is -0.0152. For the control variables, the same pattern holds for other predictors beginning farm or ranch probability: beginning farms and ranches are associated with fewer operated acres, harvested acres of soybean and corn; have fewer assets and total production, but higher off-farm income. We also find the older the principal operator, the less likely the farm

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[19] The three production regions are the Corn Belt, Lake States, and Upper Plains.

is to be a beginning farm. The education controls are also similar to those for the full sample. As well, all else equal, other commodity specializations except peanuts, cotton, tobacco, hogs and poultry farms are less likely to be beginning farms than row crops farms.

6. Discussion

The results for the policy variables suggest the tax credit for the cash lease agreement does not have an effect that is statistically different from zero; the crop share lease tax credit has a positive effect on the probability of observing a beginning farm, all else equal, but the effect is small. In fact, if we were to double the credit percentage amount for the crop share lease in Iowa (currently 17%) to 34% we could expect to see the probability of observing a beginning farm in the state increase by only 4%. Overall, we find that the principal operator's age and commodity type are the strongest predictors of observing a beginning farm.

There are several factors that may be influencing the results. The first of which could be that only a small percentage of beginning farms, as we have defined them, are covered under the tax credit programs, because the definition of a beginning farm under the USDA's programs and the state tax programs do not necessarily overlap. On the one hand, the state-level programs use a net worth test to define who is a beginning farmer. In Iowa it is a net worth of $703,844, for example (Table 1). However, for its purposes, the USDA uses the number of years of experience of the operator as the test, as well as a farm size limit; generally, if an operator has no more than 10 years of experience operating the farm or ranch, he or she is considered a beginning farmer or rancher.[20] In our regression model, we control for elements of the farm's balance sheet, elements correlated with net worth such as total debt and value of land owned. However, from Table 3 it is

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[20] http://www.fsa.usda.gov/programs-and-services/farm-loan-programs/beginning-farmers-and-ranchers-loans/index

evident that the average beginning farm has nearly $550,000 of net worth; therefore making the average beginning farmer qualified for the program in Iowa, but not in Nebraska or Wisconsin. As a robustness check, we modify the definition of a beginning farm to include only principal operators with no more than 5 years of experience farming. Under this definition, the average net worth of a beginning farm is still far above the net worth limit of Nebraska and Wisconsin: $505,202. And when we re-run the linear probability model with the modified group of beginning farms, we find the results for the policy variables are smaller in magnitude than those using the 10-year definition, though neither coefficient is statistically significant (Table 4).[21] Therefore, while the tax credit may help some beginning farmers start farms or stay in business, the net worth limit in two of the three states, effectively removes many beginning farmers from the program.

[INSERT TABLE 4 HERE]

On the other hand, if we relax the definition to include farmers with no more than 15 years of experience, we include not only beginning farmers and ranchers, but also operators who are transitioning from the beginner phase to the established phase. We find the impact of the share lease agreement is relatively strong ranging from between 0.0556 and 0.0764, and statistically significant at the 1% level. The cash lease tax credit, on the other hands, appears to have the opposite effect. The negative coefficient on the variable are now statistically significant.

A second concern is that the policy could be endogenous to the level of beginning farms in the respective states. It is not hard to imagine that state policy makers might perceive the declining level of beginning farmers in their states as something that needs to be addressed. In general, the

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[21] Limiting the definition of a beginning farms to those with a principal operators with no more than 5 years of experience reduces the number of observations of beginning farms to 6,313, about half of the original number of observations. Summary statistics and regression results are available from the authors.

number of beginning farms has been declining for two decades and the tax credit legislation could be in direct response to this fact. Although we control for state secular effects and time variants effects, if we fail to control for changing latent attitudes of lawmakers about beginning farmers or propensity to assist them, the coefficients on the tax credit variables could be biased. In a perfect world, we would estimate the policy effect by randomly providing tax credits of various levels of generosity to farmers across the US; however, random assignment is rarely the case in such a policy. One way to look at this is to ask: How alike are the conditions in the treatment and controls states? Were they experiencing similar trends in beginning farms similar to the rest of the US before the policies took effect? As such, if the trend with regard to beginning farms is diverging from the other states, then the effect of the policy will be muted and the coefficients will be smaller. Table 5 shows that prior to 2003, on average, the treatment states—those with a tax credit—had significantly slower growth in the percentage of beginning farms, though it was positive. After 2003, though the non-tax credit states have a greater percentage of beginning farms overall, they experienced a larger decline in the percentage of beginning farms. Therefore, the change suggests that the coefficients could be negatively affected by the pre-2003 trends across tax credit and non-tax credit states, and understate the effect of the policy on beginning farm probability.

[INSERT TABLE 5 HERE]

The final reason for finding a small effect is that admittedly, the variation in the policy variable is small, given that only three states have had the program during the time period under study. However, we overcome this deficit with a large sample of data created from a national surveys pooled over 11 years, which provides us with the variation we need to consistently estimate the effects of the tax policy. Further, the three states that provided the credit are large agricultural states. Combined, the total number of farms in Iowa, Nebraska, and Wisconsin represent 10% of

all farms in the US, as well as equal percentage of land in farms according to the 2012 Census of Agriculture, but together they account for 16% of gross receipts from farming.[22]

7. Conclusion

We present the first analysis of a unique program offered by states that allows owners of farm assets to receive income tax credits when they lease assets to beginning farmers. We use pooled cross-sections of nationally representative data from the USDA's Agricultural Resource Management Survey (ARMS) for years 2003-2014. In terms of impact on beginning farmers, the estimates suggest there is a modest positive effect of the tax credit provision for the share lease, but not the cash lease on overall participation of beginning farmers and ranchers. Share agreements may encourage collaboration and knowledge sharing from established farmers to beginning farmers and ranchers, and this may increase the odds of a beginning farm or ranch surviving. Future research could focus on the long-term effects of the tax credit. For example, does the credit increase the likelihood that the beginning farm or ranch will survive, or improve the financial performance of beginning farms and ranches?

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[22] There were 2,109,303 farms reported in the Agricultural Census of 2012; 208,360 farms in Iowa, Nebraska and Wisconsin. Gross receipts for 2014 are sourced from the USDA's Economic Research Service, Farm finance indicators, state ranking, 2014 Nominal (current dollars).

References

Ahearn, Mary, and Doris Newton. *Beginning Farmers and Ranchers*, EB -22, U.S. Department of Agriculture, Economic Research Service, January 2013. Available at: http://www.ers.usda.gov/media/988138/eb-22.pdf (accessed January 19, 2016).

Baum, Christopher F. "Residual diagnostics for cross-section time series regression models." *The Stata Journal* 1.1 (2001): 101-104.

Girardi, A. G. 2015. Beginning Farmer Tax Credit Program. Iowa Department of Revenue. Available at https://tax.iowa.gov/report-type/evaluations-0.

Horrace, W.C. and Ronald L. Oaxaca. 2006. "Results on the Bias and Inconsistency of Ordinary Least Squares for the Linear Proababilty Model" Economics Letters (90): 321-327.

Iowa Finance Authority. 2015. *Beginning Farmer Loan Program*. Retrieved July 15, 2015, from http://iowafinanceauthority.gov/Public/Pages/PC202LN48.

Mishra, A.K. and H.S. El-Osta. 2016. "Determinants of Decisions to Enter the U.S. Farming Sector" Journal of Agricultural and Applied Economics (January: Published online first): 1-26.

Nebraska Department of Agriculture. 2014. *Beginning Farmer Tax Credit Act Annual Report July 1, 2013 – June 30, 2014.* Beginning Farmer Program. Retrieved July 15, 2015, from http://www.nextgen.nebraska.gov/reports/annual_report_13_14.pdf.

Nickerson, Cynthia, Mitchell Morehart, Todd Kuethe, Jayson Beckman, Jennifer Ifft, and Ryan Williams. Trends in U.S. Farmland Values and Ownership. EIB-92. U.S. Dept. of Agriculture, Econ. Res. Serv. February 2012. http://www.ers.usda.gov/media/377487/eib92_2_.pdf (accessed January 19, 2016).

Shute, Lindsey Lusher. 2011. *Building a Future with Farmers: Challenges Faced by Young, American Farmers and a National Strategy to Help Them Succeed*, Tivoli, NY: National Young Farmers Coalition, (November).

Williamson, James M. and Ani Katchova. 2013. "Tax-Exempt Bond Financing for Beginning and Low-equity Farmers: The Case of Aggie Bonds" *Journal of Agricultural and Applied Economics* 45, 3:485-496.

Williamson, James M. 2014. "Beginning Farmers and Ranchers and the Agricultural Act of 2014," *Amber Waves (feature)*, U.S. Department of Agriculture, Economic Research Service (June), online. http://www.ers.usda.gov/amber-waves/2014-june/beginning-farmers-and-ranchers-and-the-agricultural-act-of-2014.aspx#.Vp5X-U0UVv4 (Accessed January 19, 2016).

Wisconsin Department of Agriculture, Trade and Consumer Protection. (2015). *Beginning Farmer and Farm Asset Owner Tax Credit Program.* Tax Credits. Retrieved from http://datcp.wi.gov/Business/Tax_Credits/Beginning_Farmer_and-_Farm_Asset_Owner_Tax_Credit_Program/.

Wisconsin Department of Revenue. 2013. *Beginning Farmer and Farm Asset Owner Credit.* Retrieved from ttps://www.revenue.wi.gov/taxpro/news/2010/101207.html.

Wooldridge, Jeffrey M. 2009. Introductory Econometrics: A Modern Approach, 4th Edition, South Western, Cengage Learning: Mason, OH.

United States Department of Agriculture. National Commission on Small Farms. 1998. "A Time to Act: A Report of the USDA National Commission on Small farms" (January): Washington, DC.

Figure 1. Percent of farms by experience of the principal operator.
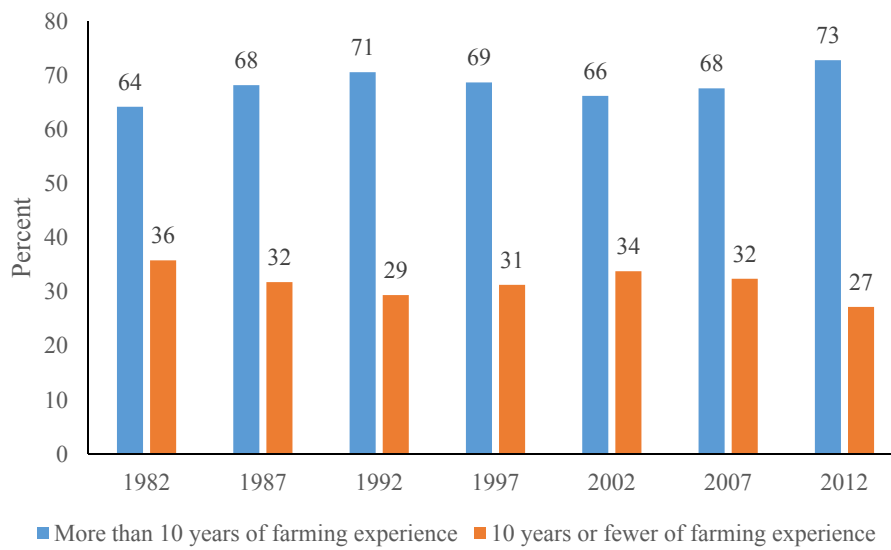
Source: US Department of Agriculture, National Statistical Service, Census of Agriculture, years 1982-2012.

Table 1. Beginning Farmer and Rancher Tax Credit Parameters as of 2015*

State	Iowa		Nebraska	Wisconsin
Program/Tax Credit	Beginning Farmer Tax Credit Program		Beginning Farmer Tax Credit Program	Beginning Farmer and Farm Asset Owner Tax Credit Program
	Agricultural Assets Transfer Tax Credit	Custom Farming Contract Tax Credit		
Tax Types to which Tax Credit Applies	Corporation Income Tax Individual Income Tax	Corporation Income Tax Individual Income Tax	Corporation Income Tax Individual Income Tax	Corporation Income Tax Individual Income Tax
Key Requirements for Beginning Farmer	1. State resident 2. Has farming or ranching experience or education 3. Has access to adequate working capital and production items 4. Will materially and substantially participate in farming 5. Net worth is less than $703,844 in 2015 (adjusted annually for inflation)		1. State resident 2. Has farmed for fewer than 10 of the preceding 15 years 3. Net worth is less than $200,000 (subject to annual adjustment) 4. Has farming or ranching experience or education 5. Has participated in an approved financial management educational program	1. Net worth is less than $200,000 2. Has farmed for fewer than 10 of the preceding 15 years 3. Has entered into a lease for a term of at least three years with an established farmer 4. Uses the leased agricultural assets in farming
Credit Amount to Asset Owner	7 percent for cash lease agreements. 17 percent for crop share agreements. In either case, an additional 1 percent in the first year when the beginning farmer is a veteran.	7 percent of the value of the contract for custom farm work. An additional 1 percent in the first year when the beginning farmer is a veteran.	10 percent for cash lease agreements. 15 percent for crop share agreements.	15 percent of lease amount. No tax credit for crop share agreements.

Program Benefits Available to Beginning Farmer	None	None	A qualified beginning farmer may receive a one-time state income tax credit for the cost of participation in an approved financial management program up to a maximum of $500.	A qualified beginning farmer may receive a one-time state income tax credit for the cost of participation in an approved financial management program up to a maximum of $500.
Other Limitations	Agreement may be with close relative.	Agreement may *not* be with close relative.	Agreement may be with close relative.	Agreement may be with close relative. Claimant must be state resident.

Applicable Agricultural Assets	Agricultural land
	
	Depreciable machinery or
	  equipment
	
	Breeding livestock
	
	Buildings
		N/A	Land
			
			Livestock
			
			Farm equipment and
			  machinery
			
			Grain storage
			
			Livestock facilities
				Machinery
				
				Equipment
				
				Facilities
				
				Livestock

Required Lease Term	2-5 Years	Up to 2 Years	3 Years	3 Years
Tax Credit Limit	Tax credit certificates may not exceed $50,000 for an individual taxpayer over all eligible contracts under the two tax credits.		None	None
Tax Credit Program Cap	$8 million	$4 million	Not capped	Not capped
Transferability	No	No	No	No
Refundability	No	No	Yes	Yes
Carryforward	10 years	10 years	NA	NA
Initial Award Year	2007	2013	1999	2011
Ending Year	NA	2017	NA	2013

Note: Adapted from Girardi, 2015. *Wisconsin's program was inactive in 2015; rules and rates apply to the last year the program was active, 2013.
Sources: Iowa Finance Authority; Nebraska Department of Agriculture, (2015); Wisconsin Department of Revenue, (2013); Wisconsin Department of Agriculture, Trade and Consumer Protection, (2015); Wisconsin State Legislature, (2015).

Table 2. Summary Statistics for All farms and Beginning Farms, 2003-14

	All Farms		Beginning Farms	
	Mean	S.E.	Mean	S.E.
Beginning farms	0.22	0.020	--	--
Share lease TC ($)	0.0072	0.0001	0.0055	0.0005
Cash lease TC ($)	0.0046	0.00004	0.0035	0.0003
Gross cash farm income ($)	139,488	2,0	56,093	3,184
Government payments ($)	5,936.24	222.79	2,394.18	91.52
Total acres operated	418.40	8.51	198.5	23.9
Acres leased in, cash agreement	144.0	18.0	77.1	13.9
Acres leased in, share agreement	33.6	1.1	13.1	1.4
Corn acres harvested	40.38	0.44	12.9	1.2
Soybean acres harvested	35.25	0.49	11.3	1.1
Rental Expenses ($)	9,538	263	4,389	283
Value of farm real estate ($)	845,230	16,752	502,644	36,563
Annual capital investment ($)	15,610	680	10,924	541
Total value of equipment ($)	324,001	5,467	244,678	10,921
Total debt ($)	96,506	3,551	78,904	5,352
Net worth ($)	994,263	22,912	546,569	33,253
Total value of production ($)	150,796	3,138	69,882	4,994
Marginal tax rate	0.139	0.00	0.157	0.002
Asset turnover ratio	28.04	10.43	19.7	1.7
Return on equity	55.16	64.17	-31.3	8.3
Return on assets	-7.13	1.89	-15.7	3.2
Debt to asset ratio	9.61	0.54	14.1	0.9
Farming is primary occupation	0.75	0.03	0.72	0.05
Total off-farm income ($)	95,258	3,838	116,074	7,555
Years of experience farming	25.4	0.6	5.68	0.07
Operator Age	57.7333	0.2050	48.35	0.37
Education of principal operator				
Less than high school	0.10	0.00	0.08	0.006
High school or some college	0.67	0.02	0.65	0.009
Four-year college degree or more	0.23	0.02	0.27	0.011
Married	0.76	0.02	0.76	0.01
Observations	124,758		15,551	

Source: The data are from the Agricultural Resources Management Survey, USDA ERS/NASS, 2003-2014.
Note: All dollars are adjusted to 2014$.

Table 3. Predicted Probability of Being a Beginning Farmer or Rancher

Variables	(1) Full Sample coeff	(2) 3 Regions coeff	(3) 3 States coeff
Share lease TC	0.0558***	0.0391**	0.0505**
	(0.0184)	(0.0190)	(0.0227)
Cash lease TC	-0.00774	-0.0152	-0.00945
	(0.0110)	(0.0113)	(0.0134)
Gross cash farm income ($)	-0.0118***	-0.0191***	-0.0529***
	(0.00273)	(0.00491)	(0.0108)
Government payments	-0.00708***	-0.00558***	-0.00293
	(0.000917)	(0.00147)	(0.00283)
Total acres operated	-0.129***	-0.0990***	-0.0517***
	(0.00613)	(0.0109)	(0.0190)
Corn acres harvested	-0.0110***	-0.0162***	-0.0190***
	(0.00151)	(0.00241)	(0.00504)
Soy acres harvested	-0.000970	-0.00570**	-0.00660*
	(0.00162)	(0.00224)	(0.00360)
Acres leased for cash	-0.0105***	-0.0103***	-0.0231***
	(0.00217)	(0.00377)	(0.00738)
Acres leased for share of production	-0.0164***	-0.0164***	-0.0239***
	(0.00132)	(0.00174)	(0.00339)
Rental expenses	-0.00854***	-0.00457	0.00149
	(0.00171)	(0.00293)	(0.00557)
Value of farm real estate	-0.0146***	-0.0174***	-0.0154***
	(0.00147)	(0.00242)	(0.00424)
Total value of equipment and machinery	0.00253	-0.00107	-0.00946
	(0.00212)	(0.00332)	(0.00639)
Total debt	-0.0560***	-0.0608***	-0.0616***
	(0.00705)	(0.0121)	(0.0238)
Total value of production	-0.0157***	-0.0134***	-0.00631
	(0.00187)	(0.00291)	(0.00556)
Asset turnover ratio	-0.0233***	-0.0171*	-0.0145
	(0.00572)	(0.0101)	(0.0206)
Return on equity	-0.00543	0.00526	0.00815
	(0.00393)	(0.00598)	(0.0108)
Return on assets	0.00003	-0.00482	0.000751
	(0.00405)	(0.00620)	(0.0113)
Debt-to-asset ratio	0.0879***	0.0887***	0.0847***
	(0.00787)	(0.0133)	(0.0262)
Total off-farm income	0.00249**	0.00151	0.00239
	(0.00127)	(0.00204)	(0.00360)
Operator age	-3.494***	-3.488***	-3.710***
	(0.0336)	(0.0524)	(0.0975)
Operator education			
Less than high school	---	---	---
High school degree	-0.0479*	-0.0932**	-0.212***
	(0.0255)	(0.0397)	(0.0764)

Some college	0.129***	0.162***	0.0618
	(0.0263)	(0.0419)	(0.0813)
4-year college degree or graduate degree	0.169*	-0.0469	-0.176
	(0.0954)	(0.176)	(0.355)
Commodity Specialization			
Gains, wheat, corn, soy, rice	---	---	---
Tobacco, cotton, peanuts	-0.324***	-0.203	-1.569***
	(0.0367)	(0.283)	(0.369)
Fruit, nuts, vegetables	-0.193***	-0.140*	-0.0578
	(0.0320)	(0.0719)	(0.136)
Nursery and greenhouse	-0.601***	-0.569***	-0.706***
	(0.0403)	(0.0794)	(0.158)
Beef cattle	-0.205***	-0.266***	-0.241***
	(0.0208)	(0.0290)	(0.0507)
Hogs	-0.390***	-0.371***	-0.419***
	(0.0444)	(0.0539)	(0.0867)
Poultry	-0.132***	-0.109	-0.247
	(0.0350)	(0.0912)	(0.195)
Dairy	-0.267***	-0.280***	-0.265***
	(0.0273)	(0.0376)	(0.0587)
Other crops and livestock	-0.136***	-0.190***	-0.289***
Observations	124,758	48,248	14,615
R-square	0.193	0.219	0.236

Source: The data are from the Agricultural Resources Management Survey, USDA ERS/NASS, 2003-2014. All models includes dummies for year, state, and commodity specialization. Net worth is excluded from the model do to collinearity with debt and assets variables. All dollars are adjusted to 2014$. Robust standard errors in parentheses are estimated using the Huber-White sandwich estimator. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 4. Predicted Probability of Being a Beginning Farmer or Rancher, Alternative Definitions

Beginning farmers with three years of experience or less	(1) Full Sample coeff	(2) 3 Regions coeff	(3) 3 States coeff
Share lease tax credit	0.00857	0.00669	.00567
	(0.0102)	(0.0105)	(0.0124)
Cash lease tax credit	0.00866	0.00789	0.00123
	(0.00577)	(0.00594)	(0.007)
R-square	0.057	0.064	0.074
Beginning farmers with five years of experience or less			
Share lease tax credit	0.00710	-0.0027	0.00716
	(0.0141)	(0.0145)	(0.017)
Cash lease tax credit	0.00737	0.00129	0.00468
	(0.0076)	(0.00782)	(0.00939)
R-square	0.099	0.112	0.131
Beginning farmers with fifteen years of experience of less			
Share lease tax credit	0.0764***	0.0566**	0.0701***
	(0.0218)	(0.0225)	(0.0266)
Cash lease tax credit	-0.00273**	-0.0313**	-0.0173
	(0.0218)	(0.0136)	(0.0161)
R-square	0.270	.304	.325
Observations	124,758	48,248	14,615

Source: The data are from the Agricultural Resources Management Survey, USDA ERS/NASS, 2003-2014. Robust standard errors in parentheses are estimated using the Huber-White sandwich estimator. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 5. Differences in trends of beginning farms in policy states versus non-policy states.

	Tax Credit States		Non-Tax Credit States		
	Mean	Std. err.	Mean	Std. err.	Difference
Percent beginning farms (mean) 2003-2014	0.18	0.022	0.22	0.020	-0.044‡
Percent change, 1996-2002	7.1%		48.3%		
Percent change, 2003-2014	-16.4%		-34.3%		

Notes: The data are from the Agricultural Resources Management Survey, USDA ERS/NASS, 1996-2014. Due to the limitation of the data, the measure of a beginning farm before 2003 is based on only the experience of the principal operator (whether he or she has no more than 10 years of experience operating the farm). In this table, to make the rates comparable across time, we use this definition for all years.