Received: 21 April 2018 | Revised: 2 July 2018 | Accepted: 21 July 2018

DOI: 10.1002/agr.21574

WILEY Agribusiness An International Journal

RESEARCH ARTICLE

The impact of brand equity on the financial performance of marketing cooperatives

Jasper Grashuis

Division of Applied Social Sciences, University of Missouri, Columbia, Missouri

Correspondence
Jasper Grashuis, Division of Applied Social Sciences, University of Missouri, 143C Mumford Hall, Columbia 65211, MO.
Email: grashuisj@missouri.edu

Abstract

Because of inherent constraints, few farmer cooperatives use branding to pursue differentiation and competitiveness in the agri-food industry. Considering the complete lack of applied research on the brand–performance relationship for farmer cooperatives, it is unknown if branding is even profitable. This paper addresses the gap in our understanding with a novel panel study of 707 US marketing cooperatives for the 2005–2011 period. Informed by lagged observations of trademark and service mark data, the empirical analysis indicates a positive relationship of brand equity to the financial performance of marketing cooperatives. Specifically, 1% increases in the total stock of trademarks and service marks have a positive impact of $130,441 and $141,921, respectively, on the net sales of the mean marketing cooperative. The corresponding impact on net income is estimated at $3,815 and $17,286, respectively. Following the estimation of further specifications, there is also indication most of the impact is facilitated by older trademarks (>3 years) in the stock, which implies a delayed impact of brand equity on financial performance. Overall, the reported evidence serves as motivation to directors and managers of marketing cooperatives to pursue opportunities to build brand equity. To do so, however, may first require a solution to the equity constraint which appears at the foundation of most farmer cooperatives.

KEYWORDS
agricultural cooperative, brand equity, panel analysis, trademark

JEL CLASSIFICATION
M31, O34, Q13

1 | INTRODUCTION

Cooperatives in the agricultural sector have been successful (Cooperatives Europe, 2016; United States Department of Agriculture, 2017). However, farmer cooperatives face many challenges in the internal as well as the external environment which impact survival and longevity (Grashuis, 2018). In addition to widespread consolidation across the agri-food industry (Saitone & Sexton, 2017), one prominent challenge is the ongoing segmentation of consumer preferences (Grunert, 2005). The ability to respond to different wants and needs by means of product or process differentiation requires a strong market orientation.

As user-owned and user-controlled business organizations, farmer cooperatives do not often possess a market orientation (Beverland, 2007; Challita, Aurier, & Sentis, 2018; Grashuis, 2017; Grashuis & Magnier, 2018; Hardesty, 2005; Kontogeorgos, 2012). Instead, the strategic orientation of most farmer cooperatives is toward the objectives and preferences of its users, which is problematic as cooperative performance is more likely to be impacted by strategic characteristics as opposed to ownership or governance characteristics (Benos, Kalogeras, Verhees, Sergaki, & Pennings, 2016; Kyriakopoulos, Meulenberg, & Nilsson, 2004; Sisay, Verhees, & van Trijp, 2017).

The latent construct of market orientation is often indicated by brand equity, a marketing term to describe the value of an intangible or market-based asset which is not evident on the balance sheet (e.g., Christodoulides & De Chernatony, 2010). In general, brand equity is observed to relate positively to long-term business performance (e.g., Belo, Lin, & Vitorino, 2014; Chang, Wang, & Arnett, 2018). However, it is uncertain if the brand–performance relationship is also existent in farmer cooperatives. Addressing the uncertainty about potential ex post outcomes may alleviate ex ante reservations to make investments in brand equity (Grashuis, 2017; Hardesty, 2005). Thus, instead of asking if farmer cooperatives invest in brand equity (e.g., Grashuis & Magnier, 2018), perhaps the question ought to be if farmer cooperatives should invest in brand equity? Consequently, this paper addresses the following research question: What is the economic impact of brand equity on the financial performance of marketing cooperatives?

The research question is approached by means of empirical analysis of an unbalanced panel of 707 US marketing cooperatives for the 2005–2011 period. Brand equity is proxied by trademark data, which is relatively new but increasingly common in the recent empirical literature (e.g., Crass, Czarnitzki, & Toole, 2016; Grashuis & Dary, 2017; Greenhalgh & Rogers, 2012; Krasnikov, Mishra, & Orozco, 2009; Sandner & Block, 2011). In fact, the empirical literature with trademark data is growing as its strong ability to proxy intangible asset ownership is increasingly apparent (Schautschick & Greenhalgh, 2016). Trademark data are thus used to inform variability in the financial performance of US marketing cooperatives.

The contribution to the literature is two-fold. First, the empirical analysis of the brand–performance relationship in farmer cooperatives is novel. While the prior literature is biased toward public corporations (e.g., Belo et al., 2014; Grashuis & Dary, 2017), academic attention is hereby expanded to an organizational form which continues to be of significance in many sectors of the European and North American agri-food industries. Second, the panel analysis indicates a positive impact of brand equity on the financial performance of US marketing cooperatives. Per the estimates, 1% increases in trademark ownership and service mark ownership have a positive impact of $130,441 and $141,921, respectively, on the net sales of the mean cooperative. The corresponding impact on net income is estimated at $3,815 and $17,286, respectively. The evidence thus serves as motivation to the directors and managers of marketing cooperatives to pursue opportunities to build brand equity.

The paper proceeds as follows: Section 2 describes the background of the empirical study, including a discussion of branding by agri-food producers and cooperatives; The methodology is presented in Section 3 with a description of the data and the empirical model; Section 4 presents and discusses the results of the panel analysis; and Section 5 contains a summary and conclusion with a discussion of the weaknesses and limitations of the study, as well as its implications for academics and practitioners.

2 | BACKGROUND AND FRAMEWORK

2.1 | Brands and agri-food products

The segmentation of food consumer preferences is ongoing (Grunert, 2005). The food marketplace is fragmented by the emergence of specific wants and needs in terms of nutrition, taste, convenience, and other product and process attributes. In response, agri-food industry stakeholders seek differentiation to create or capture economic value (Johnson, Dibrell, & Hansen, 2009). However, the marketing of differentiated food products is not straightforward as some product or process attributes are not observable to food consumers before or even after consumption (e.g., free range, organic, sustainable, fair trade). Market failures may arise if producers do not signal the presence or absence of such attributes by means of labels, brands, certifications, or other mechanisms to reduce the asymmetry of information with consumers (Lassoued & Hobbs, 2015).

According to the strategic management literature, a brand is an intangible asset or resource which relates consumer perception to firm value (Srivastava, Fahey, & Christensen, 2001). To consumers, a brand comprises a perception of the identity of the producer or the safety and quality of the product (Grunert, 2005; Lassoued & Hobbs, 2015). To producers, a brand drives or supports differentiation in the minds of consumers. A brand is used to shape or address consumer preferences and thus impact demand. If rare, inimitable, and nonsubstitutable, the brand may facilitate a price premium or a positive willingness to pay (Davcik & Sharma, 2015). By extension, a brand may serve as the source behind competitive advantage over industry competitors, which implies superior firm value. Belo et al. (2014), for example, observed US firms with relatively strong brand equity have a 5.1% higher annual stock return as compared with other firms.

2.2 | Brands and farmer cooperatives

As noted by various researchers around the world, farmer cooperatives in general do not have substantial brand equity. In the United States, Wills (1985) only found a cooperative brand in approximately half of 145 product categories. Cooperatives owned the leading brand in only 15 categories. More recently, Grashuis (2017) also observed US farmer cooperatives do not brand as much as non-cooperatives in the same agri-food sectors. In Greece, Kontogeorgos (2012) determined 51 of 88 cooperatives did not own a brand. In the French wine sector, Challita et al., (2018) observed cooperatives are more likely to use labeling than branding to pursue a market orientation.

The general lack of brand equity possessed by farmer cooperatives is explained by several conditions. First, most farmer cooperatives have a traditional policy of open membership. With a pooling structure, open access facilitates a problem of adverse selection as low-quality producers can supply the cooperative at the expense of high-quality producers. Therefore, cooperatives are less able to pursue differentiation as compared to non-cooperatives (e.g., Mérel, Saitone, & Sexton, 2015). Second, brand equity has long-term payoffs which cannot always be captured by members with a limited horizon (Hardesty, 2005). Also, members who join cooperatives in the future can free ride on members who made prior investments in brand equity (Sykuta & Cook, 2001). Third, cooperatives are often perceived as an extension of the farm as opposed to an independent firm with its own objectives (Soboh, Lansink, Giesen, & Van Dijk, 2009). Cooperatives thus maintain a user orientation and primarily seek market access to sell commodities. To many members, there is limited incentive to invest in an intangible asset which is owned and controlled with other producers.

Nonetheless, some farmer cooperatives have overcome inherent challenges and built brand equity. Examples in the United States are Ocean Spray (cranberries), TreeTop (apples), Florida's Natural (oranges), Blue Diamond (almonds), Land O'Lakes (butter), and Riceland Foods (rice). Elsewhere, there also exist cooperatives with strong brand equity, including Danish Crown (meat), Fonterra (milk), Aviko (potatoes), Granarolo (milk), Arla (milk), and Royal Cosun (sugar). However, these farmer cooperatives are exceptions to the rule (Grashuis, 2017).

2.3 | Brands and trademarks

In the recent economic literature, brand equity is often indicated by trademark data (Schautschick & Greenhalgh, 2016). In the United States, "Under the federal Lanham Act, a trademark is any word, name, symbol, device, or any combination thereof that is used to identify and distinguish goods of one source from those of another source. In short, a trademark indicates the source of the goods" (O'Donnell, O'Malley, Huis, & Halt, 2008). In addition, a trademark is the legal manifestation of intellectual property, such as an image or brand, and facilitates the protection of any associated value which may otherwise be susceptible to imitation or misappropriation. Trademarks and brands are not only correlated but also often perceived as synonymous (e.g., Castaldi, 2018; O'Donnell et al., 2008).

2.4 | Brands, trademarks, and financial performance

In the past 10-year period, at least seven studies investigated the empirical relationship of brands and trademarks to the financial performance of business organizations.[1] In each case, the empiricists used panel analysis as the method. In most instances, the panel comprised public corporations.

First, with a sample of 108 US public corporations, Krasnikov et al. (2009) estimated a positive impact of trademark registrations on various measures of financial performance, including cash flow, market value, and stock return. In Australia, Griffiths, Jensen, and Webster (2011) observed a positive relationship of patent and trademark ownership to the gross profits of 2,689 companies from 1990 to 2006. Sandner and Block (2011) used a selective sample of 1,216 large public corporations from the industrialized world for the 1996–2002 time period. At the median, a doubling of the trademark stock from five to ten yielded an increase in firm value of 8.1% (€81.4 million). In the United Kingdom, Greenhalgh and Rogers (2012) accumulated a similar sample of large public corporations in service and manufacturing. With comprehensive data for the 1996–2000 period, the authors observed a 25% higher valuation of firms with trademark ownership in comparison with firms with none. In Iran, Mehrazeen, Froutan, and Attaran (2012) reported an estimated impact of the number of trademarks of approximately 0.07% on the net sales of public corporations in the food and beverage industry. For small and medium-sized enterprises in the Italian fashion industry, Agostini, Filippini, and Nosella (2014) made a contrary and interesting observation as the stock of trademarks did not exhibit a significant impact on net sales until the fourth year of the study period. Put differently, the relationship of trademark ownership to financial performance only became significant upon consideration of a 4-year lag. Similarly, using a distributed-lag model, Crass et al. (2016) determined the relationship of brand equity to performance for both public and private business organizations in Germany is characterized by an ∩-shape with its peak at 11 years. Also, for the median company with a nonzero stock of trademarks, brand equity contributed €265,000 to its annual net income.

3 | METHODS

3.1 | Data sources

Financial information is provided through a Cooperative Research Agreement with United States Department of Agriculture (USDA) Rural Development-Cooperative Programs. USDA conducts an annual survey of the full population of farmer, rancher, and fishery cooperatives in the United States. In 2005 (2011), there existed 2,896 (2,285) such cooperatives in the United States (USDA, 2006; 2012). The information is reported in aggregate form in its annual report (e.g., USDA, 2017). The data set is composed of unaggregated data for the marketing

[1]The review of the empirical literature on the brand–performance relationship is not intended to be comprehensive. For more detail, see Schautschick and Greenhalgh (2016).

cooperatives among the largest 1,000 farmer cooperatives by sales in each year of the 2005–2011 period. Together, these cooperatives are responsible for approximately 98% of the sales generated by all US farmer cooperatives, which indicates the sample is representative of the majority of the economically active marketing cooperatives. Because of survey nonresponse, sales variability, and exit, the panel is unbalanced with 707 marketing cooperatives and 3,120 total observations. Table 1 illustrates the regional and functional heterogeneity in the sample. Conforming to the overall population of US farmer cooperatives, the majority of the sample is composed of grain marketing cooperatives in the Midwest.

The financial information is matched with trademark ownership data collected from the online database of the United States Patent and Trademark Office (USPTO).[2] Following Krasnikov et al. (2009), Sandner and Block (2011), and Greenhalgh and Rogers (2012), for each observation in the data set the total stock of trademarks is recorded to proxy brand equity.[3] The total stock of service marks is also recorded to reflect possible differences in the value of the legal and economic protection of products and services (Schmoch, 2003). Service marks are a subset of trademarks and, as the name suggests, relate to services as opposed to products.[4] However, the term "trademark" often refers to both types (O'Donnell et al., 2008).

3.2 | Summary statistics, data transformations, and correlations

Table 2 reports the summary statistics for the raw financial data and the raw trademark ownership data for the full sample of 707 US marketing cooperatives. In terms of total asset ownership, the size of the mean marketing cooperative is $93 million. At the mean, net sales are just over $250 million, and net income is approximately $5 million. For each of the three variables, the coefficient of variation is high and the mean also surpasses the median. The distributions of the variables are thus characterized by non-normality and positive skewness, which provides motivation to perform some type of power transformation to allow robust statistical or causal inferences (Fox, 2016). Following the Box–Cox transformation method, logarithmic transformation is applied to both total assets and net sales to achieve near-normality in the distributions. Because of the presence of negative values in net income (175 observations), cube root transformation is applied.

The trademark ownership data are also characterized by non-normality. As reported in Table 2, the median cooperative has zero trademarks. Throughout the study period of 2005–2011, 612 (667) marketing cooperatives did not own a registered trademark (service mark), which corresponds to prior findings by Grashuis (2017). For 16% (7%) of the 3,120 observations, the cooperative had a stock of one or more trademarks (service marks). The mean cooperative has a larger stock of trademarks (1.89) as compared to service marks (0.18), which is of course influenced by the large number of cooperatives which do not have brand equity. When excluding such cooperatives, the mean increases to 12.01 for the stock of trademarks and 2.65 for the stock of service marks. To facilitate easy empirical interpretations, natural logarithmic transformation is also applied to the trademark ownership data (Fox, 2016).[5]

Table 3 contains the correlation matrix for the raw financial data and trademark ownership data. The magnitude of the coefficients is not unexpected. While the relatively strong correlation of certain variables such as net sales and total assets is indicative of possible causal relationships, it is evident multicollinearity must be addressed in the empirical model specification.

[2]http://tmsearch.uspto.gov/.

[3]The stock includes trademarks owned by any subsidiaries.

[4]For example, the name of the fast food restaurant McDonald's is registered as a service mark, while its food product McNugget is registered as a trademark. If registered, both types of marks are defined by the symbol ®.

[5]In accordance with common conventions in the empirical literature in the field of economics, the integer 1 is added to prevent deletion of zeros.

TABLE 1 Regional and functional sample heterogeneity

	Number of observations	%
Region		
New England	23	0.74
Middle Atlantic	88	2.82
East North Central	599	19.20
West North Central	1,620	51.92
South Atlantic	101	3.24
East South Central	50	1.60
West South Central	225	7.21
Mountain	102	3.27
Pacific	312	10.00
Total	3,120	100
Commodity		
Grain	2,090	66.99
Rice	25	0.80
Cotton	75	2.40
Tobacco	10	0.32
Nuts	26	0.83
Sugar	92	2.95
Bean	8	0.26
Fruit and vegetable	258	8.27
Dairy	354	11.35
Poultry	29	0.93
Livestock	53	1.70
Other	100	3.21
Total	3,120	100

3.3 | Empirical model

Panel analysis is conducted by means of pooled regression, fixed effects, or random effects. Following the results of the Baltagi test (pooled regression vs. fixed effects), the Breusch–Pagan test (pooled regression vs. random effects), and the Hausman test (random effects vs. fixed effects), the appropriate model is determined to be random effects. In general, a random effects model has three advantages as compared with a fixed effects model, including the ability to (a) make cross-sample comparisons, (b) generalize findings and conclusions, and (c) include time-invariant predictors (Bell & Jones, 2015; Greene, 2011).

Considering the general ambiguity of cooperative performance (Soboh et al., 2009), this empirical study emphasizes two financial indicators: Net sales and net income (see Table 4). As the first item on the income statement, net sales represents the ability of marketing cooperatives to sell member supplies at the best price possible. By comparison, net income is more ambiguous as an indicator of financial performance as it is in part determined by the cost of sales, which constitutes the total of member payments for supplies. As such, the objective function of marketing cooperatives is not characterized by either cost minimization or profit maximization. However, net income is nonetheless an outcome variable of interest as some portion is usually

TABLE 2 Summary statistics of financial and trademark data

Variables	*N*	Mean	*SD*	Median
Net sales ($ million)	3120	251.21	1378.39	51.17
Net income ($ million)	3120	5.34	32.57	0.97
Total assets ($ million)	3120	92.69	462.27	19.82
Trademark ownership	3120	1.89	11.12	0.00
Service mark ownership	3120	0.18	1.02	0.00

TABLE 3 Correlation matrix

	Net sales	Net income	Total assets	Trademarks	Service marks
Net sales	1.00				
Net income	0.76	1.00			
Total assets	0.97	0.82	1.00		
Trademarks	0.43	0.29	0.39	1.00	
Service marks	0.43	0.26	0.39	0.78	1.00

TABLE 4 Overview of model variables

Variables	Measurement	Source
Outcome variables		
Net sales (natural logarithm)	Natural logarithm of net sales in period *t*	US Department of Agriculture
Net income (cube root)	Cube root of net income in period *t*	US Department of Agriculture
Predictors		
Trademark stock (natural logarithm)	Total stock of trademarks owned in period *t*−1	US Patent and Trademark Office
Service mark stock (natural logarithm)	Total stock of service marks owned in period *t*−1	US Patent and Trademark Office
Control variables		
Total assets (natural logarithm)	Natural logarithm of total assets in period *t*−1	US Department of Agriculture
Year	0 if 2005; 1 if 2006; 2 if 2007; 3 if 2008; 4 if 2009; 5 if 2010; 6 if 2011	US Department of Agriculture
US Census Region	0 if New England; 1 if Middle Atlantic; 2 if East North Central; 3 if West North Central; 4 if South Atlantic; 5 if East South Central; 6 if West South Central; 7 if Mountain; 8 if Pacific	US Census Bureau
Commodity sector	0 if grain and oilseed; 1 if rice; 2 if cotton; 3 if tobacco; 4 if nut; 5 if sugar; 6 if bean and pea; 7 if fruit and vegetable; 8 if dairy; 9 if poultry; 10 if livestock; 11 if other	US Department of Agriculture

distributed as patronage refund in the form of cash and stock. Also, as opposed to net sales, net income considers the expense of establishing and enforcing the legal and economic protection of brand equity.

With net sales as the outcome variable, the panel random effects model is defined as:

$$\ln y_{it} = \alpha + \beta_1(\ln x_{it-1}) + \beta_2(\ln z_{it-1}) + \beta_3(\ln w_{it-1}) + \sigma + \lambda + \tau + \mu_{it} + \varepsilon_{it}, \quad (1)$$

where ln y is the natural logarithm of net sales of marketing cooperative i in period t (t = 2005, 2006, … , 2011), ln x is the natural logarithm of trademark ownership, ln z is the natural logarithm of service mark ownership, ln w is the natural logarithm of total assets, σ indicates the year, λ indicates the geographic region, τ indicates the commodity sector, β_i are the unknown parameters to be estimated by maximum likelihood, μ is the between-entity disturbance, and ε is the within-entity disturbance. The model enables estimation of Huber–White variances and disturbances to address cross-sectional heteroscedasticity and within-cluster correlation (Wooldridge, 2010). Each of the main predictors is lagged to avoid simultaneity.

With net income as the outcome variable, the panel random effects model is defined as:

$$y_{it}^{1/3} = \alpha + \beta_1(\ln x_{it-1}) + \beta_2(\ln z_{it-1}) + \beta_3(\ln w_{it-1}) + \sigma + \lambda + \tau + \mu_{it} + \varepsilon_{it}, \quad (2)$$

where $y^{1/3}$ is the cube root of net income of marketing cooperative i in period t (t = 2005, 2006, … , 2011), and the other symbols and subscripts are the same as in Equation (1). Both Equations (1), (2) are estimated by means of the xtreg command in STATA.

4 | RESULTS

4.1 | Net sales

Table 5 reports the results of three models based on Equation (1). In all three models, the outcome variable is the natural logarithm of net sales. In Model 1, trademark ownership is included as the main explanatory variable of

TABLE 5 Results of panel regressions: Impact of brand equity on net sales

	Model 1	Model 2	Model 3
Intercept	11.053*** (0.437)	10.986*** (0.432)	11.044*** (0.432)
ln trademark ownership$_{t-1}$	0.166*** (0.038)		0.144*** (0.040)
ln service mark ownership$_{t-1}$		0.181*** (0.053)	0.110* (0.057)
ln total assets$_{t-1}$	0.415*** (0.014)	0.427*** (0.013)	0.417*** (0.014)
Year controls	Included	Included	Included
Region controls	Included	Included	Included
Sector controls	Included	Included	Included
Observations	2,190	2,190	2,190
Groups	539	539	539
R^2 overall	0.760	0.765	0.766
χ^2	3408.800	3395.850	3427.130
Prob > χ^2	0.000	0.000	0.000

Note. Standard errors are shown in parentheses. ***, **, and * denote statistical significance at confidence intervals of 1%, 5%, and 10%.

interest. In Model 2, service mark ownership is included, and Model 3 contains both trademark ownership and service mark ownership.

Before addressing the brand–performance relationship, there are some noteworthy observations in relation to the control variables.[6] First, with New England as the base category, there appears to be limited regional heterogeneity in terms of the net sales of marketing cooperatives. The exceptions are marketing cooperatives in the Middle Atlantic region and the East South Central region, where the net sales at the mean is estimated to be approximately 42–49% lower. Second, with fiscal year 2006 as the base category,[7] net sales are estimated to be significantly higher in each subsequent year. The positive trend is not linear, however, as the coefficients for 2009 and 2010 are lower as compared with 2008, which corresponds to the aggregated data reported by USDA (2012). Third, there is much functional heterogeneity across the panel. With grain marketing cooperatives as the base category, the financial performance of tobacco marketing cooperatives is significantly lower, while the financial performance of rice, sugar, dairy, and livestock marketing cooperatives is significantly higher. These observations again correspond to the public reports of USDA (2012).

Model 1 includes trademark ownership and excludes service mark ownership to address potential multicollinearity. The estimated coefficient of trademark ownership is 0.166, which indicates net sales increases by 0.17% as the total stock of trademarks increases by 1%. The coefficient is characterized by strong practical and statistical significance. For the mean cooperative in the regression sample,[8] the percentage translates to $130,441 in net sales. The positive impact in general corresponds to findings in the prior literature (e.g., Agostini et al., 2014; Crass et al., 2016; Greenhalgh & Rogers, 2012). Specifically, the finding is most comparable with Mehrazeen et al. (2012) and Agostini et al. (2014), who reported estimates of approximately 0.07% and 0.02%, respectively, on net sales. Some caution is warranted, however, as both Mehrazeen et al. (2012) and Agostini et al. (2014) used different samples and methodologies.[9]

In comparison with trademark ownership, the estimated impact of service mark ownership in Model 2 is larger in magnitude at 0.181. As such, a 1% increase in the total stock of service marks facilitates a $141,921 increase in net sales for the mean marketing cooperative in the regression sample. The difference in the coefficients of trademark ownership and service mark ownership on net sales is approximately 0.015, and the result of the Z test indicates the null hypothesis of equality between the two coefficients cannot be rejected (Clogg, Petkova, & Haritou, 1995). While the estimate cannot be compared with other studies as empirical attention to service mark ownership by itself is nonexistent, the result indicates the positive brand–performance relationship is not only evidenced by the term "trademark" but also its subcategory "service mark." When combined in the same model (Model 3), the estimated impact of trademark and service mark ownership on net sales decreases to 0.14% and 0.11%, respectively.[10]

4.2 | Net income

Now with the cube root of net income as the outcome variable, Table 6 reports the results for three models based on Equation (2). As before, Models 4 and 5 include trademark and service mark ownership separately. Model 6 contains both variables. As net income is cube root transformed, the reported coefficients in Table 6 correspond to the impact of a 1% increase in the predictor variable on the cube root of net income. To translate the coefficient into a level interpretation, it must be raised to its third power.

[6]The results for the control variables are not included in the interest of space. Full results are available upon request.

[7]2005 is dropped because of the inclusion of lagged values of trademark and service mark ownership.

[8]The number of observations in each of the panel regressions is different as compared with the full sample because of the inclusion of lagged predictors. Therefore, the summary statistics for the regression sample and the full sample do not align.

[9]Mehrazeen et al. (2012) did not regress net sales on lagged observations of trademark ownership, which implies simultaneity may have affected the results. Agostini et al. (2014) did not measure the accumulated stock of trademarks until 2 years before the beginning of the study period.

[10]Although STATA did not detect multicollinearity, the coefficients and the standard errors may have been affected nonetheless. For panel analysis with random effects, there is no postregression diagnostic test to determine if multicollinearity is present or not.

TABLE 6 Results of panel regressions: Impact of brand equity on net income

	Model 4	Model 5	Model 6
Intercept	−257.834*** (40.986)	−266.213*** (40.913)	−247.206*** (41.427)
ln trademark ownership$_{t-1}$	15.625*** (4.034)		12.213*** (4.522)
ln service mark ownership$_{t-1}$		25.856*** (8.019)	14.642 (9.009)
ln total assets$_{t-1}$	30.203*** (1.784)	31.658*** (1.672)	29.919*** (1.791)
Year controls	Included	Included	Included
Region controls	Included	Included	Included
Sector controls	Included	Included	Included
Observations	2,190	2,190	2,190
Groups	539	539	539
R^2 Overall	0.420	0.417	0.4198
χ^2	675.560	674.680	686.01
Prob > χ^2	0.00	0.00	0.00

Note. Standard errors are shown in parentheses. ***, **, and * denote statistical significance at confidence intervals of 1%, 5%, and 10%.

As before, a brief discussion of the control variables is in order before advancing to the brand–performance relationship. The unreported coefficients give indication of some regional and functional heterogeneity in net income. The net income of dairy and livestock marketing cooperatives is significantly lower as compared with grain marketing cooperatives, which is in contrast to the previous scenario with net sales as the outcome variable. The net income of marketing cooperatives included in the "other" category is significantly higher. As compared with marketing cooperatives in New England, net income is estimated to be significantly lower in all other regions.

In Model 4, the impact of trademark ownership is isolated by excluding service mark ownership as a predictor variable. Per the estimate, a 1% increase in the trademark stock of the mean marketing cooperative facilitates a $3,814.91 (15.625^3) increase in net income. For the mean marketing cooperative in the regression sample, $3,814.91 represents an increase of 0.23%. With service mark ownership as the predictor variable in Model 5, the impact of a 1% increase on net income is estimated at $17,285.98 (25.856^3), which is 1.03% of the net income of the mean marketing cooperative in the regression sample. Although the *Z* test again failed to reject the null hypothesis of equality between the two coefficients, there appears to be merit in distinguishing between trademark and service mark ownership. Statistically, the estimated impact of service mark ownership on the net income of marketing cooperatives is larger, but so is the standard error and the confidence interval. As reported in Model 6, the economic and statistical significance of both types of brand equity decreases when included together to explain the variability in net income. Importantly, the coefficient of service mark ownership is just outside the 90% threshold of statistical significance.

4.3 | Long-term brand–performance relationship

Following the findings of Agostini et al. (2014) and Crass et al. (2016), a long-term perspective of the brand–performance relationship is adopted by implementing a longer lag. As there is not enough time series information to construct a distributed-lag model, the same model specification is adopted but the lag is increased from one to two, three, four, and five periods. Because the probability of trademark ownership in period *t* is in part determined by trademark ownership in period *t*−1 (e.g., Grashuis & Dary, 2017), only a single lag is included each time to avoid

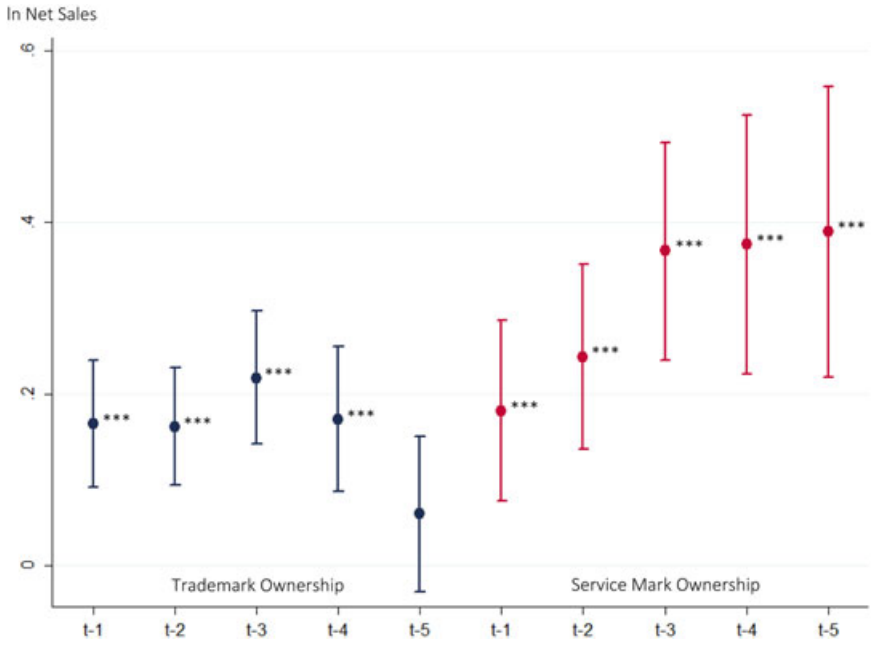

FIGURE 1 Estimated impact of trademark and service mark ownership on net sales. Dot = point estimate, bar = 95% confidence interval. Plot is generated by means of the coefplot command in STATA (Jann, 2014). Statistical significance is denoted by ***$p < 0.01$

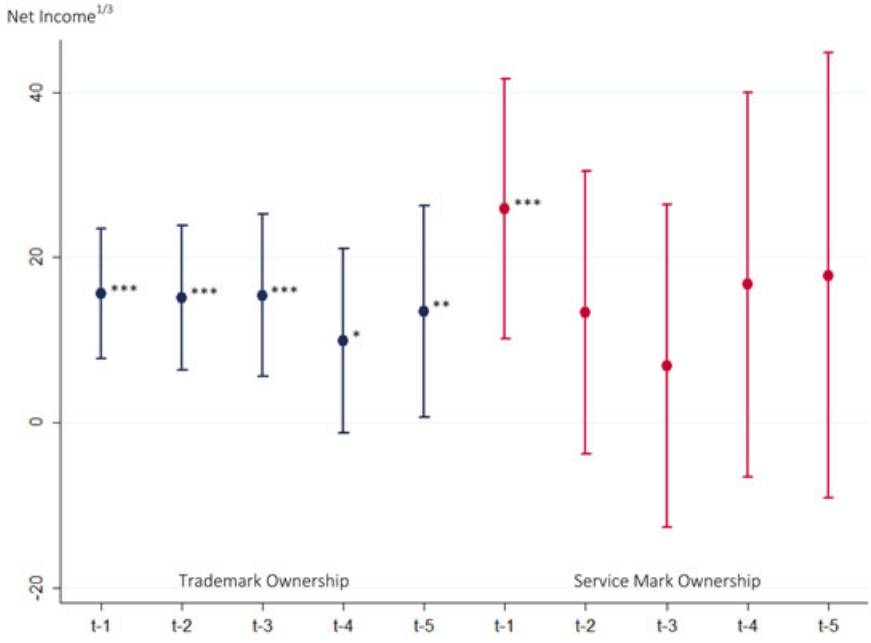

FIGURE 2 Estimated impact of trademark and service mark ownership on net income. Dot = point estimate, bar = 95% confidence interval. Plot is generated by means of the coefplot command in STATA (Jann, 2014). Statistical significance is denoted by *$p < 0.10$, **$p < 0.05$, and ***$p < 0.01$

severe multicollinearity. As each subsequent lag decreases the total number of observations by several hundred, the results ought to be interpreted with considerable caution.

The estimated impact of trademark and service mark ownership on net sales is illustrated in Figure 1. When increasing the lag from one to two periods, the impact of a 1% increase in trademark ownership on net sales is estimated at 0.162. The estimated impact is 0.219 with another increase in the lag length, and then decreases and becomes nonsignificant with a lag of five periods. The same trend is visible with service mark ownership as the predictor, although the coefficient never loses statistical significance. The result indicates a long-term perspective of the brand–performance relationship is appropriate. Without consideration of recent additions, variability in net sales is still explained significantly by trademark and service mark ownership. The rising magnitude may even suggest the impact of older trademarks is greater as compared with newer trademarks, which would correspond to the findings of Agostini et al. (2014) and Crass et al. (2016). Again, there is not enough time series information to explore if there exists an exponential or an ∩-shaped relationship.

The narrative is similar as net income replaces net sales as the outcome variable (Figure 2). When trademark ownership is lagged by two periods, its impact on net income is estimated at 15.119, which corresponds to an increase of (15.119^3) $3,455.84 for the mean cooperative. The estimates do not change significantly up to the third lag. The estimated impact of service mark ownership lost statistical significance upon replacement of the first lag with the second lag.

5 | DISCUSSION AND CONCLUSION

Although farmer cooperatives remain successful and even dominant in many sectors of European and North American agri-food industries, various developments in the agri-food industry (e.g., consumer segmentation, price volatility, industry consolidation) may negatively impact survival and longevity. Various researchers have indicated a strong relationship of strategic characteristics (user or market orientation) to cooperative performance, yet few farmer cooperatives use brand equity to pursue differentiation and competitiveness in the agri-food industry.

While conforming to the findings in the empirical literature (e.g., Belo et al., 2014; Crass et al., 2016; Schautschick & Greenhalgh, 2016), this paper is the first to produce evidence of the positive brand–performance relationship in relation to farmer cooperatives. The panel analysis indicates a positive impact of trademark and service mark ownership on net sales as well as net income through the creation of price premiums, which implies a departure from price-based competition in the commodity sector. The superior financial performance is expected to have individual and collective long-term benefits by means of increases in member payments, cash patronage refunds, and allocated equity distributions.

5.1 | Managerial implications

For directors and managers of marketing cooperatives, the obvious implication of the findings is to actively pursue opportunities to invest in brand equity. There are two considerations. The first consideration is the design or perception of the brand. Given functional and geographical heterogeneity, the obvious denominator for farmer cooperatives is its unique ownership structure. As exemplified by Florida's Natural, TreeTop, Welch's, and other marketing cooperatives, the "farmer-owned" or "grower-owned" characteristic may provide a marketing advantage as compared to non-cooperatives. Consumers may associate cooperatives with democracy, equality, solidarity, independence, and cooperation (Brown, 2006; Spear, 2000), and there may exist a positive willingness to pay for its products (Altman, 2016; Grashuis & Magnier, 2018). The second consideration is the presence of equity constraints, which inhibit investment in long-term activities such as brand development. There exist various solutions to the collective action problems which appear at the foundation of the equity constraints (Cook & Iliopoulos, 2016). For example, exit payments may address the horizon problem, and multiple stock options may

allow superior alignment of risk preferences to risk decisions. The objective is to create a balance between the short- and long-term individual and common objectives (Puusa, Hokkila, & Varis, 2016).

5.2 | Weaknesses and limitations

Arguably the most important limitation of the empirical study is the length of the time period. At 7 years, the length is comparable with other panel studies in the empirical literature on the brand–performance relationship, but the inclusion of lagged variables decreased the total number of observations by several hundred. A longer time period is needed to facilitate a full conceptualization of the lagged impact of trademark ownership on cooperative performance. Another limitation is the exclusive consideration of marketing cooperatives from the United States. It is difficult, if not impossible, to generalize the findings and conclusions to marketing cooperatives in Europe or elsewhere. Brand equity may have a differential impact across the world, in part because of explicit differences in the protection of intellectual property. For example, the legal concept of service mark ownership is almost exclusive to the United States. Finally, financial performance is not the only aspect of cooperative performance (Franken & Cook, 2015). As two items on the income statement, the two outcome variables in the panel analysis (net sales and net income) are thus limited in their ability to indicate cooperative performance. It is unknown if increases in brand equity also relate positively to other indicators of cooperative performance, such as member satisfaction, product quality, or service provision.

5.3 | Future research agenda

Recent advances notwithstanding (e.g., Grashuis, 2017; Grashuis & Magnier, 2018; Kontogeorgos, 2012), there remain many open questions to be addressed. For example, how long is the lag between investment and the return on investment? Is brand investment and development better suited in the cooperative or a subsidiary business organization? What is the capacity of marketing cooperatives in commodity sectors (e.g., grain, sugar) to use branding to improve performance? What is the consumer awareness of cooperative brands? As usual, the ability to address such questions is constrained by the poor availability of data on farmer cooperatives.

ORCID

Jasper Grashuis http://orcid.org/0000-0002-5075-4439

REFERENCES

Agostini, L., Filippini, R., & Nosella, A. (2014). Corporate and product brands: Do they improve SMEs' performance. *Measuring Business Excellence*, *18*(1), 78–91.

Altman, M. (2016). Is there a co-operative advantage? Experimental evidence on the economic and non-economic determinants of demand. *Journal of Co-operative Organization and Management*, *4*(2), 66–75.

Bell, A., & Jones, K. (2015). Explaining fixed effects: Random effects modeling of time-series cross-sectional and panel data. *Political Science Research and Methods*, *3*(1), 133–153.

Belo, F., Lin, X., & Vitorino, M. A. (2014). Brand capital and firm value. *Review of Economic Dynamics*, *17*(1), 150–169.

Benos, T., Kalogeras, N., Verhees, F. J. H. M., Sergaki, P., & Pennings, J. M. E. (2016). Cooperatives' organizational restructuring, strategic attributes, and performance: The case of agribusiness cooperatives in Greece. *Agribusiness*, *32*(1), 127–150.

Beverland, M. (2007). Can cooperatives brand? Exploring the interplay between cooperative structure and sustained brand marketing success. *Food Policy*, *32*(4), 480–495.

Brown, L. (2006). *Innovations in co-operative marketing and communications* (Report) Saskatoon, Saskatchewan, Canada: Centre for Cooperative Studies at the University of Saskatchewan.

Castaldi, C. (2018). To trademark or not to trademark: The case of the creative and cultural industries. *Research Policy*, *74*(3), 606–616.

Challita, S., Aurier, P., & Sentis, P. (2018). Linking branding strategy to ownership structure, financial performance and stability: Case of French wine cooperatives. *International Journal of Entrepreneurship and Small Business*.

Chang, Y., Wang, X., & Arnett, D. B. (2018). Enhancing firm performance: The role of brand orientation in business-to-business marketing. *Forthcoming in Industrial Marketing Management*, *72*, 17–25.

Christodoulides, G., & De Chernatony, L. (2010). Consumer-based brand equity conceptualization and measurement: A literature review. *International Journal of Research in Marketing*, *52*(1), 43–66.

Clogg, C. C., Petkova, E., & Haritou, A. (1995). Statistical methods for comparing regression coefficients between models. *American Journal of Sociology*, *100*(5), 1261–1293.

Cook, M. L., & Iliopoulos, C. (2016). Generic solutions to coordination and organizational costs: Informing cooperative longevity. *Journal on Chain and Network Science*, *16*(1), 19–27.

Cooperatives Europe (2016). The power of cooperation, Brussels, Belgium: Cooperatives Europe.

Crass, D., Czarnitzki, D., & Toole, A. (2016). The dynamic relationship between investments in brand equity and firm profitability: Evidence using trademark registrations. *Centre for European Economic Research (ZEW) Discussion Paper*, 16–004.

Davcik, N. S., & Sharma, P. (2015). Impact of product differentiation, marketing investments and brand equity on pricing strategies: A brand level investigation. *European Journal of Marketing*, *49*(5/6), 760–781.

Fox, J. (2016). *Applied regression analysis and generalized linear models* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Franken, J. R., & Cook, M. L. (2015). Informing measurement of cooperative performance. In J. Windsperger, G. Cliquet, Th. Ehrmann, G. Hendrikse (Eds.), *Interfirm networks* (209–226). Heidelberg, Germany: Springer International Publishing.

Grashuis, J. (2017). Branding by farmer cooperatives: An empirical study of trademark ownership. *Journal of Co-operative Organization & Management*, *5*(2), 57–64.

Grashuis, J. (2018). An exploratory study of cooperative survival: Strategic adaptation to external developments. *Sustainability*, *10*(3), 652–666.

Grashuis, J., & Dary, S. K. (2017). An empirical investigation of patent and trademark ownership propensity and intensity in the US food and drink industry. *International Food and Agribusiness Management Review*, *20*(5), 747–764.

Grashuis, J., & Magnier, A. (2018). Product differentiation by marketing and processing cooperatives: A choice experiment with cheese and cereal products. *Agribusiness*.

Greene, W. H. (2011). *). Econometric Analysis* (7th Ed.). New Jersey, NJ: Prentice Hall.

Greenhalgh, C., & Rogers, M. (2012). Trade marks and performance in services and manufacturing firms: Evidence of Schumpeterian competition through innovation. *Australian Economic Review*, *45*(1), 50–76.

Griffiths, W., Jensen, P. H., & Webster, E. (2011). What creates abnormal profits. *Scottish Journal of Political Economy*, *58*(3), 323–346.

Grunert, K. G. (2005). Food quality and safety: Consumer perception and demand. *European Review of Agricultural Economics*, *32*(3), 369–391.

Hardesty, S. D. (2005). Cooperatives as marketers of branded products. *Journal of Food Distribution Research*, *36*(1), 237–242.

Jann, B. (2014). Plotting regression coefficients and other estimates. *Stata Journal*, *14*(4), 708–737.

Johnson, A. J., Dibrell, C. C., & Hansen, E. (2009). Market orientation, innovativeness, and performance of food companies. *Journal of Agribusiness*, *27*(1/2), 85–106.

Kontogeorgos, A. (2012). Brands, quality badges and agricultural cooperatives: How can they co-exist. *The TQM Journal*, *24*(1), 72–82.

Krasnikov, A., Mishra, S., & Orozco, D. (2009). Evaluating the financial impact of branding using trademarks: A framework and empirical evidence. *Journal of Marketing*, *73*(6), 154–166.

Kyriakopoulos, K., Meulenberg, M., & Nilsson, J. (2004). The impact of cooperative structure and firm culture on market orientation and performance. *Agribusiness*, *20*(4), 379–396.

Lassoued, R., & Hobbs, J. E. (2015). Consumer confidence in credence attributes: The role of brand trust. *Food Policy*, *52*, 99–107.

Mehrazeen, A. R., Froutan, O., & Attaran, N. (2012). Establishing the relationship between trademark valuation and firm performance: Evidence from Iran. *International Journal of Economics and Finance*, *4*(6), 181–186.

Mérel, P., Saitone, T. L., & Sexton, R. J. (2015). Cooperative stability under stochastic quality and farmer heterogeneity. *European Review of Agricultural Economics*, *42*(5), 765–795.

O'Donnell, R. W., O'Malley, J. J., Huis, R. J., & Halt, G. B. (2008). Intellectual property in the food technology industry: Protecting your innovation, New York, NY: Springer Science & Business Media.

Puusa, A., Hokkila, K., & Varis, A. (2016). Individuality vs. communality: A new dual role of co-operatives. *Journal of Co-operative Organization and Management*, *4*(1), 22–30.

Saitone, T. L., Sexton, R. J., & Sexton Ward, A. (2017). Concentration and consolidation in the US food supply chain: The latest evidence and implications for consumers, farmers, and policymakers. *Federal Reserve Bank of Kansas City, Economic Review*, *102*, 25–59.

Schautschick, P., & Greenhalgh, C. (2016). Empirical studies of trade marks–the existing economic literature. *Economics of Innovation and New Technology*, *25*(4), 358–390.

Schmoch, U. (2003). Service marks as novel innovation indicator. *Research Evaluation*, *12*(2), 149–156.

Sisay, D. T., Verhees, F. J. H. M., & van Trijp, H. C. M. (2017). The influence of market orientation on firm performance and members' livelihood in Ethiopian seed producer cooperatives. *Agrekon*, *56*(4), 366–382.

Soboh, R. A. M. E., Lansink, A. O., Giesen, G., & Van Dijk, G. (2009). Performance measurement of the agricultural marketing cooperatives: The gap between theory and practice. *Review of Agricultural Economics*, *31*(3), 446–469.

Spear, R. (2000). The co-operative advantage. *Annals of Public and Cooperative Economics*, *71*(4), 507–523.

Srivastava, R. K., Fahey, L., & Christensen, H. K. (2001). The resource-based view and marketing: The role of market-based assets in gaining competitive advantage. *Journal of Management*, *27*(6), 777–802.

Sykuta, M. E., & Cook, M. L. (2001). A new institutional economics approach to contracts and cooperatives. *American Journal of Agricultural Economics*, *83*(5), 1273–1279.

United States Department of Agriculture (2006). Cooperative statistics 2005. Rural development service report 65, Washington D.C.: Author.

United States Department of Agriculture (2012). Cooperative statistics 2011. Rural development service report 72, Washington D.C.: Author.

United States Department of Agriculture (2017). Cooperative statistics 2015. Rural development service report 80, Washington D.C.: Author.

Ter Wal, A. L., Alexy, O., Block, J., & Sandner, P. G. (2011). The market value of R&D, patents, and trademarks. *Research Policy*, *40*(7), 969–985.

Wills, R. L. (1985). Evaluating price enhancement by processing cooperatives. *American Journal of Agricultural Economics*, *67*(2), 183–192.

Wooldridge, J. M. (2010). Econometric analysis of cross section and panel data. Cambridge, MA: MIT Press.

J. G. is assistant research professor at the University of Missouri, where he earned his PhD in Agricultural and Applied Economics in 2016. His position is affiliated with the Graduate Institute of Cooperative Leadership, which provides executive education to leaders of farmer cooperatives around the world. In addition to the strategy and performance of farmer cooperatives, his current research interests are collective action, firm survival, industrial organization, and food and drink innovation.

How to cite this article: Grashuis J. The impact of brand equity on the financial performance of marketing cooperatives. *Agribusiness*. 2018;1–15. https://doi.org/10.1002/agr.21574