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Economic Value Drivers for Brazilian Agricultural Cooperatives

Direcionadores de Valor para Cooperativas Agrícolas no Brasil

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Abstract: This article aims to identify the economic value drivers for Brazilian agricultural cooperatives. To this end, we analyzed the potential value drivers for agricultural cooperatives in Paraná and Rio Grande do Sul using panel data regression, considering data from 2008 to 2016. The results showed that net margin, basic purchasing power, investment in fixed assets, circulating assets X sales margin, fixed asset turnover, net revenue, and number of members are the economic value drivers for Brazilian agricultural cooperatives. Moreover, a dynamic panel based on generalized method of moments (GMM) was used to check the robustness of the relationships. With these results, managers and members of agricultural cooperatives can focus their efforts and decisions on maximizing economic value for associated farmers.
Keywords – Cooperatives; Agricultural Finance; Added Value; Value Drivers.

Resumo: Este artigo tem como objetivo identificar os direcionadores de geração de prêmio econômico, para as cooperativas agropecuárias brasileiras. Para tanto, analisou-se os potenciais direcionadores desse prêmio para cooperativas agropecuárias do Paraná

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e Rio Grande do Sul por meio da regressão de dados em painel, com dados de 2008 a 2016. Os resultados evidenciaram que margem líquida, poder aquisitivo básico, investimento em ativos fixos, análise de giro x margem, rotatividade dos ativos fixos, receita líquida e número de associados são direcionadores de prêmio econômico das cooperativas agropecuárias brasileiras. Ainda, para dar robustez as relações encontradas foram realizadas estimações por meio de um painel dinâmico robusto (GMM). De posse dos resultados é possível que gestores e associados concentrem seus esforços e decisões para a maximização da criação de prêmio econômico ao produtor rural associado.
Palavras-chave – Cooperativas; Fianças Agrícolas; Direcionadores de Valor.

Introduction

The value-based management (VBM) model has been gaining prominence in the literature on wealth generation by investors. Its main objective is to maximize the value of a company to its shareholders (Copeland et al., 2002; Martin & Petty, 2004; Cabello & Parisi 2008; Kumar, 2015; Russo & Parisi, 2017).

Management models contribute to decision making through value drivers, which are variables that have a significant influence on the value created by organizations (Rappaport, 2001; Hall, 2002; Copeland et al., 2002; Kazlauskiene & Christauskas, 2008; Assaf Neto, 2014; Kumar, 2015) and can be controlled by organizational management (MacDiarmid et al., 2017; L.E.K. Consulting, 2017).

Based on the VBM approach, this is the first study to analyze the relationship between value creation and drivers for agricultural cooperatives. It is noteworthy that most of the studies on VBM that have addressed this subject analyzed publicly-traded companies (Copeland et al., 2002; Hall, 2002; Kazlauskiene & Christauskas, 2008; Amorim et al., 2009; Silva et al., 2009; Aguiar et al., 2011; Corrêa et al., 2013; Tiwari & Kumar, 2015; Kiss, 2015; Kijewska, 2016; Galvão et al., 2018; Vítková et al., 2017; MacDiarmid et al., 2017).

The role of the associated farmer in agricultural cooperatives is similar to that of the shareholder in publicly-traded companies. Thus, based on the VBM approach, the main objective of agricultural cooperatives is to create economic value for the associated farmers. Hall and Geyser (2004) state that 21st-century cooperatives aim to maximize their value to members, and that the use of VBM in these organizations provides managers and members with the opportunity to direct their efforts and decisions toward the creation of economic value for associated farmers.

Agricultural cooperatives are considered intermediary economic organizations whose purpose is to supply the economic needs of their associated farmers. An agricultural cooperative is an organizational form that creates value to farmers and provides its inclusion in national and international markets (Bialoskorski Neto, 2012). The strength of the market that farmers confront individually provides motivation for collective action, which improves performance against the market and generates a redistribution of the economic surplus from input supply and intermediation sectors to the agriculture sector (Hueth & Reynolds, 2011). Thus, the importance of agricultural cooperatives to associated farmers is evident.

Agricultural cooperatives are inserted in the agribusiness sector, which is a representative sector for the Brazilian economy. The gross domestic product (GDP) of agribusiness, in 2019, was 20.9% about the total GDP of Brazil, which represents 1/5 of the total Brazilian GDP (Center for Advanced Studies in Applied Economics - CEPEA ESALQ / USP, 2020). So, highlights the importance of the sector referred to the Brazilian economy.

In Brazil, in 2019, there were 1,223 agricultural cooperatives (about 23% to the total of cooperatives) with more than 990,000 members, which generate jobs for approximately 207,201 people. The referred cooperatives have R$ 132 billion in assets, which resulted in a turnover of R$ 183.3 billion in 2019 and a surplus result for the year of R$ 5.5 billion (Organization of Brazilian Cooperatives - OCB, 2020). Also, the Brazilian Institute of Geography and Statistics (IBGE) points out that 48% of what is produced on Brazilian land passes, in some way, through a cooperative (OCB, 2020). Thus, the relevant participation of agricultural cooperatives in the agribusiness and, consequently, in the Brazilian economy is evident.

Therefore, considering the relevance of agricultural cooperatives in agribusiness, and consequently, in the Brazilian economy, and the importance of these organizations to farmers, it becomes relevant to measure economic value creation and how it can be maximized for these organizations through the identification of its drivers. To this end, this article investigates the following research question: *What are the economic value drivers for Brazilian agricultural cooperatives?*

To answer the research question, the panel data regression technique was applied to a sample comprising individual agricultural cooperatives in the states of Paraná and Rio Grande do Sul from 2008

to 2016, testing the association between economic value and cooperatives' financial indicators. The results showed how the value drivers for the Brazilian agricultural cooperatives included in our sample are distributed within the operational and investment decisions. The size of the cooperatives was also a determinant for this analysis.

Literature Review

The VBM approach is conceptualized as the "systemic process that guides all decision making of an organization in order to create value" (Cabello & Parisi, 2008, p. 115). It changes the perspective of business performance evaluation, as the investor becomes the focus of management.

Empirical studies have been identified in the literature on VBM with a quantitative and qualitative approach to value drivers. Few qualitative surveys (Wendee, 2011; Kijewska, 2016; Vítková et al., 2017), most surveys are quantitative, the object of study being publicly traded non-financial companies and aim to identify the value drivers and their relationship with the companies' value (Akalu, 2002; Hall, 2002; Amorim et al., 2009; Silva et al., 2009; Aguiar et al., 2011; Corrêa et al., 2013; Tiwari & Kumar, 2015; Kiss, 2015; MacDiarmid et al., 2017; Galvão et al., 2018).

In the studies that have analyzed the relationship between economic value creation and value drivers, different proxies have been used for the economic value of organizations: market value (Amorim et al., 2009; Aguiar et al., 2011; Tiwari & Kumar, 2015; MacDiarmid et al., 2017), cash flow (Akalu, 2002; Kazlauskiene & Christauskas, 2008; Kiss, 2015); company value (MacDiarmid et al., 2017) and Economic Value Added (EVA®) (Hall, 2002; Silva et al., 2009; Corrêa et al., 2013; Kijewska, 2016; Galvão et al., 2018).

One of the main methods used in the VBM approach is EVA® (Martin & Petty, 2004; Stewart, 2005; Assaf Neto, 2014; Russo & Parisi, 2017), which is based on the concept of residual income, in which profit is obtained only after the invested capital is returned based on its opportunity cost (Ehrbar, 2003; Assaf Neto, 2014; Bluszcz & Kijewska, 2016; Russo & Parisi, 2017).

Value drivers for agricultural cooperatives

Agricultural cooperatives are intermediate economic organizations and exist to meet the economic needs of their members. Given this purpose, the application of VBM in cooperatives provides managers and members with the opportunity to direct their efforts toward the creation of value for members. Therefore, the measurement of value drivers for these organizations is a relevant topic.

It should be noted that there is no consensus in the literature on VBM on what approach should be adopted to analyze value drivers (Kazlauskiene & Christauskas, 2008; Tiwari & Kumar, 2015). As already mentioned, there are no studies that address the relationship between economic value creation and value drivers in cooperatives. The empirical studies on this subject are focused on publicly-traded companies (Copeland et al., 2002; Hall, 2002; Kazlauskiene & Christauskas, 2008; Amorim et al., 2009; Silva et al., 2009; Aguiar et al., 2011; Corrêa et al., 2013; Tiwari & Kumar, 2015; Kiss, 2015; Kijewska, 2016; Galvão et al., 2018; Vítková et al., 2017; MacDiarmid et al., 2017).

It is justified to use empirical evidence of value drivers in public companies since agricultural cooperatives are inserted in the market and, often, in a competitive way. It is possible to observe this fact when verifying the presence of agricultural cooperatives in the ranking of the 400 Largest and Best Agribusiness Companies in Brazil by Exame Magazine. In 2017, there were 63 agricultural cooperatives in the ranking, which corresponds to 15.75% in relation to the total number of companies in this ranking.

Besides, there are nationally prominent cooperatives, such as the largest Brazilian sugar exporter at present is Coopersucar, the largest exporter in Paraná and one of the largest in Brazil is COAMO, from the meat sector AURORA is considered the 3rd largest industrial conglomerate, COPACOL is one of the largest chicken exporters in the country, etc. (Santos, 2020). Thus, it is evident the presence of agricultural cooperatives is inserted competitively in the market.

Given this lack of studies on value drivers in cooperatives, we considered that financial indicators could be used as potential value drivers (Silva et al., 2009; Corrêa et al., 2013; Vítková et al., 2017; MacDiarmid et al., 2017). This fact is justified since it is possible to observe studies that discuss and classify the value drivers in different categories, such as micro and macro value drivers (Rappaport, 2001), financial and non-financial (Young & O'Byrne, 2003), operational and financial (Koller et al., 2005), differentiation and financial strategies (Assaf Neto, 2014a). According to Rappaport (2001) and his

seminal studies on value drivers, value macrodrivers are financial performance evaluation measures, ie, the performance evaluation is performed from financial indicators.

As stated by Soboh et al. (2009) and Grashuis (2018), we highlight the difficulty in assessing the financial performance of agricultural cooperatives because associated farmers can serve more than one function within the cooperative—customer, employer, owner and/or member (Boland & Barton, 2013)—often making the analysis ambiguous. Moreover, there is little research on performance evaluation in agricultural cooperatives due to a lack of data (Melia-Marti & Martinez-Garcia, 2015; Grashuis, 2018).

However, by identifying the value drivers for agricultural cooperatives, it is possible to manage the cooperative business model from these drivers that affect the value of the business. Thus, drivers can assist in the decision process of users of information, especially managers and associated rural producers (owners of cooperatives). With regard to managers, it contributes to decision-making focused on financial strategies by highlighting the value drivers of cooperatives in terms of management's operational, financing and investment decisions (Rappaport, 2001; Assaf Neto, 2014a). With regard to associates, it contributes to the maintenance of the sustainable cycle of value creation (Martin & Petty, 2004) in cooperatives, specifically, in monitoring managers regarding the creation of value through the use of guidelines, as well as in alignment from their interests to the interests of their members.

Value drivers are present within organizations in terms of differentiation and financial strategies (Assaf Neto, 2014a). Corrêa, Assaf Neto and Lima (2013) mention that: "[...] several authors mention that some financial indicators reflect the results of the main strategies of the company and, if they are related to the generation of value, they can be considered drivers of this". (p. 16). It is noteworthy that this research did not address the value drivers of differentiating capabilities strategies, thus limiting itself to the study of the value drivers of financial strategies, which are divided into: operational, financing and investment financial strategies (Rappaport, 2001; Assaf Neto, 2014a).

Thus, we used the financial indicators traditionally used by agricultural cooperatives to identify the drivers. Then, some studies on agricultural cooperatives using financial indicators to evaluate their economic and financial performance have been identified (Hall & Geyser, 2004; Baourakis et al., 2002; Kalogeras et al., 2005; Carvalho & Bialoskorski Neto, 2008; Kalogeras et al., 2013; Pinto 2014; Londero & Figari, 2015; Grashuis, 2018; Ilha et al., 2018; Pokharel, Regmi, Featherstone & Archer; 2019).

Londero, Figari, Ferraz and Bortoleto (2019) point out, in general, these financial indicators for assessing the economic and financial performance of agricultural cooperatives are recognized by the literature and the market. However, it is necessary to recognize that in this research the focus of analysis is on the market and the associate, it is important to recognize that, according to Londero, Figari, Ferraz, and Bortoleto (2019) there is a need to consider the cooperative organization under a multidimensional approach. Given the above, the value drivers for agricultural cooperatives proposed in this study consider empirical evidence of value drivers in publicly-traded organizations and the indicators used to evaluate the economic and financial performance of agricultural cooperatives, as shown in Table 1.

Table 1
Potential value drivers of financial strategies for agricultural cooperatives

Acronyms	Potential value drivers	Evidence in the evaluation of economic and financial performance in cooperatives	Evidence of value driver in publicly traded companies	Expected signs
		Operational decisions		
SG	Sales Growth		(Rappaport, 2001; Assaf Neto, 2014)	+
NM	Net Margin	(Carvalho & Bialoskorski Neto, 2008; Baourakis et al., 2002; Kalogeras et al., 2005; Kalogeras et al., 2013; Londero & Bialoskorski Neto, 2014; Londero & Figari, 2015; Ilha et al. 2018)	(Corrêa et al., 2013; Assaf Neto, 2014; Tiwari & Kumar, 2015; Kiss, 2015)	+
C_AS	Circulating Assets	(Carvalho & Bialoskorski Neto, 2008; Kalogeras et al., 2013; Londero & Bialoskorski Neto, 2014; Londero & Figari, 2015)	(Corrêa et al., 2013)	+
S_TUR	Stock Turnover	(Baourakis et al., 2002; Kalogeras et al., 2005; Kalogeras et al., 2013; Londero & Bialoskorski Neto, 2014)	(Assaf Neto, 2014)	+
ST_LT	Short-term Liabilities Turnover	(Baourakis et al., 2002; Kalogeras et al., 2005; Kalogeras et al., 2013)		+
BPP	Basic Purchasing Power	(Baourakis et al., 2002; Kalogeras et al., 2005; Kalogeras et al., 2013)	(Rappaport, 2001; Caselani & Caselani, 2005; Silva et al., 2009; Aguiar et al., 2011; Kiss, 2015)	+

EITR	Effective Income Tax Rate		(Rappaport, 2001; Hall, 2002; Akalu, 2002; Amorim et al., 2009)	-
		Financing decisions		
IND	General Indebtedness	(Baourakis et al., 2002; Kalogeras et al., 2005; Carvalho & Bialoskorski Neto, 2008; Kalogeras et al., 2013; Pinto, 2014; Londero & Bialoskorski Neto, 2014; Londero & Figari, 2015; Grashuis, 2018; Ilha et al. 2018).	(Silva et al., 2009; Correa et al., 2013; Assaf Neto, 2014)	+
LT_D	Long-term Debt	(Baourakis et al., 2002; Kalogeras et al., 2005; Kalogeras et al., 2013)		+
FL	Financial Leverage		(Rappaport, 2001; MacDiarmid et al., 2017)	-
		Investment decisions		
IWC	Investment in Working Capital	(Lauermann, Souza, Moreira, & Souza, 2016)	(Rappaport, 2001; Akalu, 2002; Aguiar et al., 2011; Assaf Neto, 2014)	+
IFA	Investment in Fixed Assets	(Londero & Bialoskorski Neto, 2014)	(Rappaport, 2001; Akalu, 2002; Assaf Neto, 2014)	+
FAT	Fixed Assets Turnover	(Kalogeras et al., 2013)		+
CA_SM	Circulating Assets *x* Sales Margin Analysis	(Londero & Figari, 2014, Ilha et al., 2018)	(Assaf Neto, 2014)	+
		Size		
REV	Net Revenue	(Pinto, 2014; Grashius, 2018)	(Akalu, 2002; Amorim et al., 2009; Kiss, 2015; Tiwari & Kumar, 2015; Vítková & Veselý, 2017)	+

Source: The authors.

Methodology

Sampling and data processing

The sample was composed of the individual agricultural cooperatives of the states of Paraná and Rio Grande do Sul. The necessary information was made available by the Organization of Cooperatives of the State of Paraná (OCEPAR) and the Organization of Cooperatives of the State of Rio Grande do Sul (OCERGS). The economic variables SELIC and IPCA were obtained from the IPEADATA database.

The period of analysis was selected from the data provided by OCEPAR and OCERGS, covering the period from 2008 to 2016. In 2016, there were 60 and 129 individual active agricultural cooperatives associated with the OCEPAR and OCERGS systems, respectively. The database was winsorized at 99% to account for outliers.

Variables

The dependent variable corresponds to the measurement of economic value creation by Brazilian agricultural cooperatives, calculated by the difference between the average return on equity (ROE) and the average SELIC in the period, as presented in Equation (1).

$$Economic\ Value: \left(\frac{Surplus}{Average\ Shareholders'\ equity} - Average\ SELIC\ in\ the\ period \right) \quad (1)$$

The decision to use economic value instead of EVA was based on discussions on the topic in the finance literature (Assaf Neto, 2014) and the fact that there is no consensus on the most appropriate model (Echterling et al., 2015). This occurs, according to Assaf Neto (2014), both because of the difficulty of estimating the risk premium and the importance of this measure in the decision-making process regarding capital allocation in organizations.

Cooperatives face difficulties in estimating the cost of equity (Ke) as it cannot be derived directly from the market, as is the case of publicly-traded companies. Pederson (1998) states that the difficulty in estimating the Ke of cooperatives is even greater due to the ownership characteristics of cooperatives, as this cost should reflect the alternative investment options of members. Thus, the research in this area usually uses a fixed equity cost, which does not adequately reflect the business risk (Pederson, 1998; Santos, 2002; Hall & Geyser, 2004; Gimenes & Gimenes, 2006; Uliana & Gimenes, 2008, Londero & Figari, 2015; Canassa et al., 2015; Nascimento, 2015; Ilha et al., 2018).

The difference between the ROE and the official cumulative inflation in the period (IPCA) was also used to control the results. Equation (2) was used to evaluate the actual return of the cooperative.

$$Economic\ Value: \left(\frac{Surplus}{Average\ Shareholders'\ equity} - IPCA\ in\ the\ period\right) \qquad (2)$$

The independent variables refer to the potential value drivers for agricultural cooperatives focused on financial strategies in terms of operational, financing, and management investment decisions (Rappaport, 2001; Assaf Neto, 2014), in addition to the size of agricultural cooperatives, as shown in Table 2.

Table 2
Potential value drivers and respective formulas to calculate financial strategies

Potential value drivers	Formula	Expected signal
	Operational decisions	
SG	$\left(\frac{Net\ revenue_t}{Net\ revenue_t - 1}\right) - 1$	+
NM	$\frac{Net\ surplus}{Net\ revenue}$	+
C_AS	$\frac{Net\ revenue}{Total\ assets}$	+
S_TUR	$\frac{Stock}{Total\ assets}$	+
ST_LT	$\frac{PC * 360\ days}{Cost\ of\ sales}$	+
BPP	$\frac{EBIT}{Total\ assets}$	+
EITR	$\frac{IT\ Provision}{Profit\ before\ taxation}$	-
	Financing decisions	
IND	$\frac{(CL + NCL)}{Total\ liabilities}$	+
LT_D	$\frac{NCL}{(NCL + NE)}$	+
FL	$\frac{Interest\ bearing\ liabilities}{(Interest\ bearing\ liabilities + NE)}$	-
	Investment decisions	

IWC	$\frac{(CA - CL)}{Total\ assets}$	+
IFA	$\frac{(Investments + Fixed\ assets + Intangible\ assets)}{(NCL + NE)}$	+
FAT	$\frac{Net\ equity}{(Investments + Fixed\ assets + Intangible\ assets)}$	+
CA_SM	$\frac{Net\ surplus}{Net\ revenue} * \frac{Net\ revenue}{Total\ assets}$	+
Size		
LNREV	$Ln\ (REV)$	+
LNN_MEMB	$Ln\ (Number\ of\ members)$	
LNAGE	$Ln\ (Cooperative\ Age)$	

Source: The authors.

Models and statistical tests

The panel data methodology was used for data analysis. The models proposed here are:

$$Selic\ value_{i,t} = b_0 + b_1 sg_{i,t} + b_2 nm_{i,t} + b_3 c\_as_{i,t} + b_4 s\_tur_{i,t} + b_5 st\_lt_{i,t} + b_6 bpp_{i,t} + b_7 eitr_{i,t} + b_8 ind_{i,t} + b_9 lt\_d_{i,t} + b_{10} fl_{i,t} + b_{11} iwc_{i,t} + b_{12} ifa_{i,t} + b_{13} cc\_nm_{i,t} + b_{14} fat_{i,t} + b_{15} lnrev_{i,t} + b_{16} lnn\_memb_{i,t} + b_{17} lnage_{i,t} + a_i + \mu_{i,t} \quad (3)$$

$$IPCA\ value_{i,t} = b_0 + b_1 sg_{i,t} + b_2 nm_{i,t} + b_3 c\_as_{i,t} + b_4 s\_tur_{i,t} + b_5 st\_lt_{i,t} + b_6 bpp_{i,t} + b_7 eitr_{i,t} + b_8 ind_{i,t} + b_9 lt\_d_{i,t} + b_{10} fl_{i,t} + b_{11} iwc_{i,t} + b_{12} ifa_{i,t} + b_{13} cc\_nm_{i,t} + b_{14} fat_{i,t} + b_{15} lnrev_{i,t} + b_{16} lnn\_memb_{i,t} + b_{17} lnage_{i,t} + a_i + \mu_{i,t} \quad (4)$$

Two methods were used to estimate the proposed models. First, the panel data method was used, followed by the Chow, Breusch-Pagan, and Hausman tests and subsequent estimation by panel ordinary least squares (POLS) with fixed or random effects. Subsequently, to provide robustness to the estimates found in the first approach, the model was estimated using a dynamic panel based on the generalized

method of moments proposed by Arellano and Bond (1991). Two-step estimation was used in the dynamic panel, implementing the Windmeijer (2005) correction.

In addition to the tests described above, the Breusch-Pagan/Cook-Weisberg test was used to detect heteroscedasticity in the model, the VIF was used to test for multicollinearity, the Wooldridge test was used for autocorrelation in panel data, and a linear test was used to determine whether the time variable (years) required a control variable. All tests are presented in Table 4 together with the estimated model results.

Results and Discussion

First, the descriptive statistics of the variables included in the model are presented to determine the distributions of the variables (Table 3). Regarding the labor-dependent variables, it can be observed that between 2008 and 2016, the cooperatives had a SELIC value of 1.93% per year in relation to economic value and an IPCA value of 6.30% in relation to economic value. Both variables had a high standard deviation, suggesting a high variation of values among the cooperatives in the sample.

Table 3
Descriptive statistics of the dependent variable and potential value drivers for agricultural cooperatives

Variables	Observations	Average	Standard Deviation	Minimum	Maximum
SELIC Value	1,201	0.0193172	0.3372579	-1.41	1.53
IPCA Value	1,201	0.0630308	0.3376512	-1.39	1.57
SG	1,155	0.2154801	0.5292636	-0.714444	3.84969
NM	1,325	0.0172741	0.100258	-0.551683	0.443337
C_AS	1,325	1.785584	1.293206	0.134517	7.49918
S_TUR	1,295	74.40935	112.7555	0	876.709
ST_LT	1,313	204.6394	283.7767	4.67199	2083.17
BPP	1,332	0.0490282	0.1056385	-0.453238	0.436264
EITR	1,331	0.0452886	0.1012859	-0.397073	0.498525
IND	1,331	0.6899175	0.3383669	0.041968	2.38765
LT_D	1,331	0.3224549	0.3473357	-0.316547	2.11583
FL	1,321	0.414827	0.355492	-0.54	2.11
IWC	1,333	0.0897226	0.3412508	-1.83431	0.771377

IFA	1,331	0.7259839	0.9724572	-2.35363	6.16076
FAT	1,326	0.0319628	0.1044722	-0.453431	0.416721
CA_SM	1,338	21.18752	70.35196	0	565.922
LNREV	1,331	17.48827	2.509832	10.873	22.1534
LNN_MEMB	1,428	6.316905	1.957122	2.99573	9.89958
LNAGE	1,466	3.17144	1.044239	-0.082786	4.63489

Source: Results obtained from the STATA® software.

Thus, to answer the research question, the panel regression data and dynamic panel regression results are presented in Table 4.

Table 4
Panel data: Potential economic value drivers for agricultural cooperatives

Variables	**SELIC Value**				**IPCA Value**			
	Panel		**Dynamic Panel**		**Panel**		**Dynamic Panel**	
	Coef.	**t-stat.**	**Coef.**	**t-stat.**	**Coef.**	**t-stat.**	**Coef.**	**t-stat.**
SELIC Value (-1)			-0,064	-0,96				
IPCA Value (-1)							-0,076	-1,41
SG	0.031	1.21	0,012	0,83	0,031	1,22	0,015	1,21
NM	0.697	1.36	1,521	2,7***	0,752	1,46	1,595	3,58***
C_AS	0.008	0.80	-0,006	-0,51	0,007	0,70	-0,011	-0,81
S_TUR	0.000	0.98	0,000	1,56	0,000	0,88	0,000	0,95
ST_LT	0.000	-1.31	0,000	0,40	0,000	-1,15	0,000	0,53
BPP	-0.759	-1.71*	-0,681	-1,65*	-0,781	-1,75*	-0,990	-2,83***
EITR	0.045	0.51	-0,008	-0,34	0,046	0,51	0,019	0,83
IND	0.181	1.17	-0,087	-1,04	0,191	1,24	-0,061	-0,56
LT_D	-0.061	-0.46	0,074	1,01	-0,072	-0,54	0,044	0,40
FL	-0.054	-0.80	0,006	0,11	-0,057	-0,84	-0,005	-0,08
IWC	-0.157	-1.03	-0,074	-0,72	-0,148	-0,97	0,022	0,20
IFA	-0.063	-1.95*	-0,085	-3,73***	-0,063	-1,95*	-0,083	-3,67***
FAT	3.294	5.13***	2,509	3,94***	3,266	5,04***	2,653	5,48***
CA_SM	0.000	-0.20	0,001	1,96**	0,000	-0,03	0,001	1,82*
LNREV	-0.030	-1.08	0,057	1,96**	-0,025	-0,91	0,048	1,74*
LNN_MEMB	0.002	0.16	-0,022	-1,16	0,002	0,18	-0,034	-1,67*
LNAGE	-0.016	-0.18	-0,188	-1,16	-0,011	-0,13	-0,067	-0,47

Constant	0.466 1.61	-0,253 -0,56	0,405 1,40	-0,362 -0,92
Estimation	Robust EF	Robust Dynamic Panel	Robust EF	Robust Dynamic Panel
Breusch-Pagan/Cook-Weisberg Test for Heteroscedasticity				
F-statistics	2.89*		1.43	
Average VIF	2.87		2.87	
Wooldridge Test for Autocorrelation in Panel Data				
F-statistics	0.473		0.375	
Instruments		47		47
N	1,005	707	1,005	707
R^2	0.63623304		0,63448058	
Global R^2	0.62156696		0,62988213	
R^2 Between	0.70421482		0,71160885	
R^2 Within	0.63623304		0,63448058	
F-statistics	31.22616***		30,229031***	
chi^2		573.59***		590,07***
Linear Test for Determination of Control Variable Requirement				
F-statistics	1.47		0.98	
Chow Test				
F-statistics	2.4***		2.41***	
Breusch-Pagan Test				
Chi^2	19.23***		20.25***	
Hausman test				
Chi^2	47.99***		46.31***	

Legend:
Rejection of the null hypothesis: *** 1% significance level, ** 5% significance level, * 10% significance level.
Source: Prepared by the authors based on the results obtained in the STATA® software.

From the results of Table 4, we can determine whether the economic value created by cooperatives, measured by the SELIC and IPCA values, is associated with the potential value drivers for agricultural cooperatives found in the literature. Among the potential value drivers, seven are significantly associated with economic value at a 10% significance level: NM, BPP, IFA, FAT, CA_SM, LNREV, and N_MEMB. Similar to Aguiar et al. (2011), no statistically significant coefficients were obtained for the SG variable

among the cooperatives in the sample, diverging from the relationship proposed by Rappaport (2001) and Assaf Neto (2014).

The NM variable has a statistically significant relationship with the SELIC Value and IPCA Value variables at a 1% significance level, indicating that the higher the NM, the higher the economic value created by cooperatives. The identification of NM as a value driver agrees with the studies of Corrêa et al. (2013), Tiwari and Kumar (2015), and Kiss (2015) conducted in publicly-traded companies, as well as the study of Assaf Neto (2014).

NM corresponds to the ratio between the net surplus and the net revenue, indicating how much of the revenue was transformed into surplus for the cooperative in a given period, thus showing that NM uses the net surplus to measure the return/profitability of the cooperative. It is important to mention that returns offered to members of these organizations are not limited to the strategy of offering a return through the maximization of surplus. The cooperative, as an intermediate non-profit economic organization, has other types of returns, such as better prices for inputs and the acquisition of agricultural products from its members, subsidies for transport and storage, as well as technical assistance services and guidance, among others (Carvalho & Bialoskorski Neto, 2008; Bialoskorski Neto, 2012; Bialoskorski Neto & Pinto, 2012; Figari & Bialoskorski Neto, 2015).

These other types of returns result in a decreased surplus, which impacts the NM result. Therefore, caution is necessary when comparing the index among cooperatives that have different objective functions. Moreover, it is evident how inappropriate it can be to compare the NM result of a cooperative with that of publicly-traded companies whose only objective function is the maximization of profit.

In summary, NM does not measure all the returns offered by the cooperatives to their members. However, as these returns are difficult to measure using indices, studies on the evaluation of economic and financial performance use NM for this purpose (Carvalho & Bialoskorski, 2008; Baourakis et al., 2002; Kalogeras et al., 2005; Kalogeras et al., 2013; Londero & Figari, 2015; Ilha et al., 2018).

The C_AS variable did not have a significant relationship with SELIC Value and IPCA Value. This result does not corroborate the findings of Corrêa et al. (2013) in publicly-traded companies, which found a positive relationship in 9 of the 15 sectors of the Brazilian companies analyzed.

The S_TUR variable is used in studies on performance evaluation in agricultural cooperatives (Baourakis et al., 2002; Kalogeras et al., 2005; 2013) and consists of a variable suggested by Assaf Neto (2014), acting as a value driver of financial strategies of operational decisions of companies. However, this variable was not found to be positively associated with SELIC Value and IPCA Value.

The BPP variable does not have a statistically significant relationship with the SELIC and IPCA values. The negative impact contrasts with the findings of Baourakis et al. (2002), Kalogeras et al. (2005), and Kalogeras et al. (2013) and shows that an increase in the basic purchasing power of cooperatives reduces the economic value of cooperatives in the sample. The opposite results are justified by how the variable used is weighted by the company's total assets and the presence of negative EBIT values in the analyzed sample, which changes the sign of the variable. For the positive EBIT sample, the results are in line with previous studies.

The IFA variable also had a statistically significant relationship with SELIC Value and IPCA Value. The negative impact contrasts with the result of Londero and Bialoskorski Neto (2014) and shows that an increase in investment in fixed assets of cooperatives reduces the economic value of the cooperatives in the sample.

The CA_SM variable, which represents the circulating assets and sales margin analysis, had a significant positive relationship with SELIC Value and IPCA Value, as found by Londero and Figari (2014) and Ilha *et al.* (2018) in cooperatives and Assaf Neto (2014) in publicly-traded companies. The IWC variable did not have a statistically significant relationship with SELIC Value and IPCA Value, unlike the results of previous studies (Rappaport, 2001; Akalu, 2002; Aguiar et al., 2011; Assaf Neto, 2014).

In the estimation of the GMM using the robust dynamic panel, the FAT variable had a significant positive relationship with both dependent variables at a 1 significance level, indicating that the higher the fixed assets turnover, the higher the economic value created by the cooperatives in the sample. This same relationship was found and used in the study of Kalogeras et al. (2013) when evaluating the economic and financial performance of agricultural cooperatives.

The LNREV variable, which represents a proxy variable for size, had similar results to the studies of Pinto (2014) and Grashuis (2018), who found a positive and significant relationship between the size

of cooperatives and their respective economic value created. Moreover, N_MEMB had a significant negative relationship with IPCA Value, but not with SELIC Value.

Regarding the other variables, ST_LT, EITR, IND, LT_D, and AGE, no statistically significant relationship with SELIC Value and IPCA Value was found at a 10% significance level, showing that they do not contribute to the explanation for the value created by cooperatives in the sample.

In summary, this work answered the research question by measuring the economic value created by Brazilian agricultural cooperatives and defining the most relevant drivers for Brazilian agricultural cooperatives.

Final Considerations

This study explored the economic value drivers for agricultural cooperatives in Brazil. The sample was composed of individual agricultural cooperatives of the states of Paraná and Rio Grande do Sul. The period of analysis was from 2008 to 2016.

The economic value was defined as the difference between the cooperatives' profitability (ROE) and the average SELIC in the period. The difference between ROE and IPCA was used as a robustness test. The value drivers were defined according to studies on value creation in publicly-traded companies and those analyzing the financial situation of credit unions.

The results showed that net margin, basic purchasing power, investment in fixed assets, circulating assets X sales margin, fixed assets turnover, net revenue, and number of members are economic value drivers for Brazilian agricultural cooperatives. Thus, the drivers are distributed across operational and investment decisions, and the size of the analyzed cooperatives is also a determinant for this analysis.

The findings will help managers and members manage their cooperatives by focusing their efforts and decisions on maximizing value creation for the members, in addition to contributing to the analysis of performance evaluation and the process of defining remuneration and incentives for managers. Furthermore, the theoretical contribution of this article is to measure economic value creation and to define the value drivers for cooperatives.

It should be noted that the results presented in this study are not exhaustive. However, they may contribute to the literature and motivate future research. The results of the research are limited to the period of analysis, sample and methodology. Thus, we suggest that further studies test other proxies for economic value in cooperatives, as the measurement of the economic value is limited to only one type of return provided by the cooperatives to the associated farmers, which corresponds to the return of surplus. Therefore, a possible proxy corresponds to the "Net Value Added produced by the entity" information provided by the Value Added Statement, and that also considers a social approach in addition to an economic approach (Pinto, 2014; Londero and Bialoskorski Neto, 2014; Figari and Bialoskorski Neto, 2015).

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