

Determining factors of financial performance of agricultural listed companies in China

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Abstract

This paper aims to analyze the determinants of financial performance of agricultural listed companies in China. Multiple regression approach is applied based on the sample of 39 agricultural listed companies during the six-year period (2013-2018). Financial performance is measured by return on sales (ROS), return on assets (ROA), and return on equity (ROE). Internal factors include firm size, current ratio, debt ratio, long-term liability ratio, sales growth rate, capital intensity, research and development (R&D) intensity, export intensity, and ownership, and external factors include gross domestic product (GDP) growth rate and consumer price index (CPI) growth rate. The results show that financial performance of China's agricultural listed companies is positively related to firm size, long-term liability ratio, and sales growth rate and negatively related to debt ratio, capital intensity, and export intensity. In addition, external factors have no significant impact on financial performance. This paper may provide useful information for managers as well as policymakers to improve financial performance and achieve corporate sustainable development.

Keywords: Determining factors. Financial performance. Agricultural listed companies.

1. Introduction

Agricultural sector has its own specificities due to high dependency on natural factors (Arisoy *et al.*, 2017; Fiala *et al.*, 2020). China is a country with the vast majority of rural population, and agriculture has a unique strategic position. It plays an essential role in China's national economy (Li *et al.*, 2017; Wagan *et al.*, 2018; Xu and Wang, 2019). According to

China's National Bureau of Statistics, in 2018, the total output value of agriculture was 6145.26 billion yuan, and the proportion of added value of agriculture occupied 7.04% of total gross domestic product (GDP).

Agricultural listed companies have the leading role in the development of China's agricultural modernization (Bugu and Yucheng, 2018). In recent years, these companies face a series of problems such as poor market performance and polarization trend in operation performance (Luo and Zhang, 2012), which attracts little concern of investors (Arisoy *et al.*, 2017).

Sustainable financial performance is the key factor in the success of any organization (Wei *et al.*, 2017). Corporate managers should continuously monitor and analyze performance indicators to prevent business failure. Compared with other industries, financial performance of agricultural listed companies is below the average (Huo, 2016). What's more, firm's financial performance is highly influenced by internal and external variables (Avdalović, 2018).

Understanding the determinants of financial performance is arguably one of the most fertile fields of analysis both for industrial economists and strategic management researchers (Pratheepan, 2014). Every sector does not have the same determinants due to their different operations and characteristics (Pathirawasam, 2011; Bayaraa, 2017). Therefore, in order to achieve long-term development, management of agricultural listed companies has to investigate which factors have a significant impact on financial performance.

The aim of this paper is to examine financial performance determinants of China's agricultural listed companies. This paper is restricted to the relationship among return on sales (ROS), return on assets (ROA), and return on equity (ROE) with the internal and external factors as determinants over the period of 2013-2018.

This paper contributes to the existing literature in the following aspects. First, among most used factors, we analyze the impact of export and external factors on financial performance that is attached less consideration in empirical studies. Second, most studies have focused on developed western countries, and little has been done in emerging countries like China. Finally, the findings will help managers make reasonable decisions to improve financial performance, and provide some guidelines for policymakers to understand how to improve these companies' performance using firm-specific factors.

The structure of this paper is as follows. Section 2 presents the literature review, and Section 3 focuses on the research methodology. Section 4 is empirical results, and Section 5 presents the conclusion and suggestions.

2. Literature Review

Many researchers have examined which variables can determine the firms' financial performance and obtained different results due to the difference in characteristics of samples selected.

An early study conducted by Chowdhury and Amin (2007) showed that working capital has a significant impact on financial management of pharmaceutical firms operating in Bangladesh. Kuntluru *et al.* (2008) analyzed financial performance of Indian companies and found a positive relationship between firm size and growth and profitability as well as a negative relationship between debt ratio and profitability. Chandrapala and Guneratne (2012) also found similar results. Taking 961 large Australian firms as the sample, Stierwald (2010) pointed out that lagged profit and firm's size have the largest contribution to performance improvement. Pathirawasam (2011) suggested that internal factors (firm size, quick ratio, inventory, and debt ratio) influence financial performance of listed companies by ROA. Azhagaiah and Deepa (2012) argued that volatility and growth in total assets are the major profitability determinants for small firms while growth is important for medium firms in Indian food industry. The findings of Pratheepan (2014) revealed that size positively affects the profitability of Sri Lankan manufacturing companies whereas leverage and liquidity have an insignificant impact.

Recently, Antoun *et al.* (2018) investigated the determinants of financial performance of banks in central and eastern Europe, finding that size, business mix, bank concentration, economic growth, and inflation rate determines financial performance measured with a performance index. In China's agricultural sector, there is a positive relationship between the degree of equity concentration and agricultural modernization and ROA and a negative relationship between debt ratio and ROA (Bugu and Yucheng, 2018). Jelena *et al.* (2018), based on the data of medium and large agricultural companies in Serbia, documented that current liquidity, market share, sales revenue growth, insurance, and export have a positive impact on ROA. Dakić *et al.* (2019) explored the determinants of business success of Serbian food processing companies. The results showed that company size, debt ratio, quick ratio, sales growth, and capital turnover ratio can affect firm profitability (measured by ROA). Vieira *et al.* (2019) analyzed the determinants of Portuguese firms' performance. They achieved the results that determinants are liquidity, public debt, and insider ownership when ROA is used to measure financial performance. According to Xuan (2020), seven main factors

can improve business performance of Vietnam technology and manufacturing enterprises, including solvency, firm size, sales growth rate, administrative procedures, access to credit institutions, labor qualifications, and firm age.

3. Research Methodology

3.1. Sample selection

The sample comprises agricultural companies listed on the Shanghai and Shenzhen stock exchanges over a six-year period (2013-2018). After screening and removing companies with missing variables, companies issuing other kinds of shares, and special treatment (ST) companies, 39 listed companies with 214 observations are left for estimation. Data are taken from the China Stock Market & Accounting Research (CSMAR) database and the Wind database.

3.2. Variables

We measure financial performance, the dependent variable, by using ROS, ROA, and ROE, which has been used in previous research (e.g. Hult *et al.*, 2008; Mijić *et al.*, 2014; Bayarara, 2017; Kumari and Kumar, 2018; Fiala *et al.*, 2020).

Firm size manifests capability from the aspect of production volume. Chhibber and Majumder (1999), Gschwandtner (2005), Kuntluru *et al.* (2008), Pathirawasam (2011), Pratheepan (2014), and Vu *et al.* (2019) argued that size has a positive impact on financial performance.

Current ratio measures the ability of the firm to meet its short-term obligations. A positive correlation has been found between current asset management and financial performance (Chowdhury and Amin, 2007; Jelena *et al.*, 2018).

There should be an appropriate capital structure that maximizes profit for the organization, as more debt leads to worse financial performance (Chhibber and Majumder, 1999; Kuntluru *et al.*, 2008; Pathirawasam, 2011; Bugu and Yucheng, 2018; Jelena *et al.*, 2018; Dakić *et al.*, 2019). In addition, if a company uses borrowed money for investment, it will bring future economic inflows (Jelena *et al.*, 2018).

Sales growth shows the company's ability to achieve a higher level of revenue in the current period compared to previous period. Jelena *et al.* (2018), Dakić *et al.* (2019), and Singh *et al.* (2019) found a positive correlation between sales growth and firm performance.

Capital intensity explains the amount of capital needed per unit of revenue. Harris (1988, 1994) provides evidence for a positive impact of capital intensity on performance. However, Singh *et al.* (2019) concluded that capital intensity has a negative impact on financial performance of U.S. agricultural cooperatives.

A positive relationship between research and development (R&D) investment and financial performance has been documented by several studies, such as Falk (2012), Zhu *et al.* (2017), Xu and Sim (2018), and Chen and Wu (2020).

Export intensity reflects international competitive structure of a firm (Sophia and Gayathri, 2018). Jelena *et al.* (2018) proved a positive relationship between export and the performance of agricultural companies.

In terms of ownership, stated-owned and private-owned firms coexist in the Chinese mixed market (Jin *et al.*, 2018). Chhibber and Majumder (1999) confirmed that different categories of ownership have varying influences on ROA. The findings of Wei and Tang (2019) revealed that private-owned firms outperform state-owned firms in manufacturing sector.

In addition, GDP growth rate and consumer price index (CPI) growth rate are included to control external influences. Our sample period (2013-2018) is characterized by economic transformation from high-speed growth to high-quality development. According to the World Bank, GDP growth rate in 2013 was 7.8 percent, and it dropped to 6.6 percent in 2018. Gan *et al.* (2006) and Kosmidou (2008) found a positive relationship between GDP and performance. Antoun *et al.* (2018) believed that CPI inflation rate has a significant positive impact on asset quality and earnings.

Table 1 lists the variable definition in this study.

Table 1: Variable definition

| Variables | Notation | Measurement | Predicted sign |
|---------------------------|----------|--|----------------|
| Return on sales | ROS | Earnings before interest and taxes/Net sales | |
| Return on assets | ROA | Net income/Average total assets | |
| Return on equity | ROE | Net income/Average shareholder equity | |
| Firm size | SIZE | Natural logarithm of total assets | + |
| Current ratio | CR | Current assets/Current liabilities | + |
| Debt ratio | LEV | Total liabilities/Total assets | - |
| Long-term liability ratio | LONG | Long-term liabilities/Total assets | + |
| Sales growth rate | SALES | (Current year's sales - Last year's sales) - 1 | + |
| Capital intensity | CAP | Total assets/Total sales | +/- |

| | | | |
|-------------------|-----|--|-----|
| R&D intensity | RD | R&D expenditure/Total sales | + |
| Export intensity | EXP | Export sales/Total sales | + |
| Company ownership | OWN | Dummy variable that takes 1 if a company is state-owned, 0 otherwise | +/- |
| GDP growth rate | GDP | Growth rate in GDP | + |
| CPI growth rate | CPI | Growth rate in CPI | + |

Source: Author's own illustration

3.3. Model specification

Ordinary least square (OLS) regressions are used for the purpose of analysis. Models (1)-(3) are used to examine financial performance determinants of China's agricultural listed companies in the current study.

$$ROS_{i,t} = \beta_0 + \beta_1 SIZE_{i,t} + \beta_2 CR_{i,t} + \beta_3 LEV_{i,t} + \beta_4 LONG_{i,t} + \beta_5 SALES_{i,t} + \beta_6 CAP_{i,t} + \beta_7 RD_{i,t} + \beta_8 EXP_{i,t} + \beta_9 OWN_{i,t} + \beta_{10} GDP_{i,t} + \beta_{11} CPI_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$ROA_{i,t} = \beta_0 + \beta_1 SIZE_{i,t} + \beta_2 CR_{i,t} + \beta_3 LEV_{i,t} + \beta_4 LONG_{i,t} + \beta_5 SALES_{i,t} + \beta_6 CAP_{i,t} + \beta_7 RD_{i,t} + \beta_8 EXP_{i,t} + \beta_9 OWN_{i,t} + \beta_{10} GDP_{i,t} + \beta_{11} CPI_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$ROE_{i,t} = \beta_0 + \beta_1 SIZE_{i,t} + \beta_2 CR_{i,t} + \beta_3 LEV_{i,t} + \beta_4 LONG_{i,t} + \beta_5 SALES_{i,t} + \beta_6 CAP_{i,t} + \beta_7 RD_{i,t} + \beta_8 EXP_{i,t} + \beta_9 OWN_{i,t} + \beta_{10} GDP_{i,t} + \beta_{11} CPI_{i,t} + \varepsilon_{i,t} \quad (3)$$

where $i = 1, \dots, n$ and $t = 1, \dots, t$ represent firm and year, respectively; β is the presumed parameter; ε denotes the disturbance.

4. Empirical Results

4.1. Descriptive statistics

Table 2 shows descriptive statistics of all variables. The mean value of ROS, ROA, and ROE is -0.0222, 0.0086, and -0.0190, respectively, which means that selected agricultural listed companies in China have relatively lower financial performance. The standard deviation of ROS is 1.2700, which shows that these companies vary greatly by their ROS. The mean value of CR is 2.5474, which implies that agricultural listed companies are liquid in observed period. LEV has a mean value of 0.4223, which suggests that the debt level of these companies is relatively high. The mean LONG of 0.0460 suggests that agricultural listed companies have a low degree of risk. The mean value of SALES is 0.1031, indicating 10% average annual growth in the revenue of the selected companies. For CAP, the mean value is 2.8117, suggesting that agricultural listed companies are generating positive revenues on their assets. The mean RD (0.0191) suggests that investment in R&D is at a very low level in agricultural sector. In addition, the mean value of EXP is 0.1054. In this study, about 45

percent of our selected sample consists of state-owned agricultural companies.

Table 2: Descriptive statistics

| Variables | N | Mean | Median | Max | Min | S.D. |
|-----------|-----|---------|---------|---------|----------|--------|
| ROS | 214 | -0.0222 | 0.0718 | 0.5894 | -18.2904 | 1.2700 |
| ROA | 214 | 0.0086 | 0.0187 | 0.3300 | -1.8591 | 0.1522 |
| ROE | 214 | -0.0190 | 0.0351 | 0.6236 | -6.8500 | 0.5051 |
| SIZE | 214 | 21.8121 | 21.6943 | 24.7113 | 19.4777 | 0.9465 |
| CR | 214 | 2.5474 | 1.5783 | 28.1765 | 0.1739 | 3.6086 |
| LEV | 214 | 0.4223 | 0.4041 | 0.8978 | 0.0496 | 0.1888 |
| LONG | 214 | 0.0460 | 0.0132 | 0.4170 | 0 | 0.0784 |
| SALES | 214 | 0.1031 | 0.0548 | 2.4844 | -0.6192 | 0.3785 |
| CAP | 214 | 2.8117 | 2.2005 | 13.3335 | 0.6981 | 1.9968 |
| RD | 214 | 0.0191 | 0.0053 | 0.5502 | 0 | 0.0491 |
| EXP | 214 | 0.1054 | 0 | 0.7722 | 0 | 0.1883 |
| OWN | 214 | 0.45 | 0 | 1 | 0 | 0.499 |
| GDP | 214 | 0.070 | 0.069 | 0.078 | 0.066 | 0.0040 |
| CPI | 214 | 0.019 | 0.020 | 0.026 | 0.014 | 0.0037 |

Source: Author's own calculation

Table 3 presents the evolution of financial performance indicators. In 2016, financial performance of agricultural listed companies reached the highest level because of China's supply-side structural reform. The reform aimed to adjust the relationship between supply and demand, optimize resource allocation, and lift the total factor productivity (Gao and Shao, 2018). However, there is a sharp decrease in the three indicators after 2016, and they became less than zero in 2018, reflecting that these companies suffered losses due to excess capacity in the process of replacing old growth drivers with new ones. The three performance indicators have the same trend in the observed period. Figure 1 shows a similar S-shaped curve.

Table 3: Year-wise means for ROS, ROA, and ROE

| Year | ROS | ROA | ROE |
|---------|---------|---------|---------|
| 2013 | 0.0681 | 0.0185 | 0.0212 |
| 2014 | 0.0542 | 0.0121 | 0.0097 |
| 2015 | 0.0262 | -0.011 | -0.0323 |
| 2016 | 0.0775 | 0.0385 | 0.0494 |
| 2017 | 0.0700 | 0.0125 | -0.0046 |
| 2018 | -0.4015 | -0.0187 | -0.1490 |
| Average | -0.0222 | 0.0086 | -0.0190 |

Source: Author's own calculation

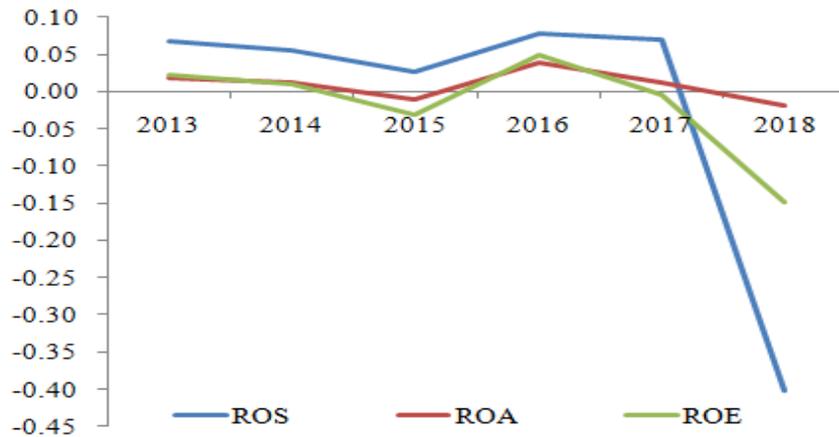


Figure 1: The trend of ROS, ROA, and ROE during 2013-2018

Source: Author's own illustration

Table 4 shows the results of normality tests. The Shapiro-wilk test suggests that all variables do not have the normal data distribution ($p < 0.05$). This implies that further analysis should use Pearson's correlation coefficient analysis.

Table 4: Normality tests

| Variable | Statistic | df | Sig. |
|----------|-----------|-----|-------|
| ROS | 0.116 | 214 | 0.000 |
| ROA | 0.432 | 214 | 0.000 |
| ROE | 0.246 | 214 | 0.000 |
| SIZE | 0.984 | 214 | 0.014 |
| CR | 0.474 | 214 | 0.000 |
| LEV | 0.987 | 214 | 0.044 |
| LONG | 0.636 | 214 | 0.000 |
| SALES | 0.859 | 214 | 0.000 |
| CAP | 0.797 | 214 | 0.000 |
| RD | 0.350 | 214 | 0.000 |
| EXP | 0.629 | 214 | 0.000 |
| OWN | 0.633 | 214 | 0.000 |
| GDP | 0.812 | 214 | 0.000 |
| CPI | 0.873 | 214 | 0.000 |

Source: Author's own calculation

4.2. Correlation analysis

Table 5 shows the results of correlation analysis. ROS, ROA, and ROE are positively correlated with SIZE and SALES, while these three performance indicators are negatively correlated with LEV and CAP. Variance inflation factors (VIFs) are calculated to be less than 2, which suggests that multi-collinearity is not a major issue (Kennedy, 2003).

Table 5: Correlation matrix

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|-----------|-----------|---------|-------|-------|----------|----|
| 1 ROS | 1 | | | | | | | | | | | | | |
| 2 ROA | 0.901*** | 1 | | | | | | | | | | | | |
| 3 ROE | 0.964*** | 0.965*** | 1 | | | | | | | | | | | |
| 4 SIZE | 0.073 | 0.146** | 0.091* | 1 | | | | | | | | | | |
| 5 CR | 0.053 | 0.060 | 0.063 | -0.429*** | 1 | | | | | | | | | |
| 6 LEV | -0.192*** | -0.328*** | -0.294*** | 0.259*** | -0.538*** | 1 | | | | | | | | |
| 7 LONG | 0.077 | -0.019 | -0.006 | 0.099* | -0.058 | 0.410*** | 1 | | | | | | | |
| 8 SALES | 0.126** | 0.217*** | 0.188*** | 0.049 | -0.033 | 0.010 | 0.045 | 1 | | | | | | |
| 9 CAP | -0.323*** | -0.355*** | -0.362*** | -0.106* | 0.257*** | 0.042 | 0.375*** | -0.244*** | 1 | | | | | |
| 10 RD | 0.003 | 0.005 | 0.014 | -0.064 | 0.069 | -0.171*** | -0.104* | -0.090* | 0.142** | 1 | | | | |
| 11 EXP | 0.009 | -0.009 | 0.004 | -0.051 | -0.090* | -0.003 | -0.051 | 0.035 | -0.273*** | -0.087 | 1 | | | |
| 12 OWN | 0.059 | -0.013 | 0.034 | -0.090* | 0.141** | 0.042 | 0.072 | -0.151** | -0.016 | -0.108* | - | 1 | | |
| 13 GDP | 0.067 | 0.033 | 0.059 | -0.176*** | 0.014 | -0.010 | -0.047 | -0.083 | -0.113** | 0.082 | 0.041 | 0.042 | 1 | |
| 14 CPI | -0.020 | 0.036 | 0.009 | -0.077 | 0.033 | -0.026 | -0.057 | 0.034 | -0.057 | 0.079 | 0.020 | 0.015 | 0.564*** | 1 |

Notes: *, ** and *** indicates significance at the 10%, 5% and 1% level, respectively.

Source: Author's own calculation

4.3. Regression results

Regression results are shown in Table 6, Table 7, and Table 8. The explanatory power of Models (1)-(3) is 22.5 percent, 32.7 percent, and 29.0 percent, respectively. When ROS is used as the dependent variable, long-term liability ratio (LONG) has a positive impact while debt ratio (LEV) and capital intensity (CAP) have a negative impact. Other variables have no significant impact on ROS. Bayaraa (2017) also argued that long-term debt to assets ratio, which has a positive impact, is a determinant for ROS in Mongolia's agricultural sector. In addition, it seems that excess debt increases financial distress cost of an organization and decreases financial performance.

The insignificant coefficients of GDP and CPI point out that macroeconomic environment does not improve financial positions of agricultural listed companies, contrary to Gan *et al.* (2006), Kosmidou (2008), Antoun *et al.* (2018), and Vieira *et al.* (2019).

Table 6: Regression results of Model (1)

| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|-------|---------------|-----------------------------|------------|---------------------------|--------------------|-------|
| | | B | Std. Error | β | | |
| 1 | Constant | -3.126 | 2.762 | | -1.132 | 0.259 |
| | SIZE | 0.139 | 0.092 | 0.103 | 1.500 | 0.135 |
| | CR | 0.020 | 0.029 | 0.056 | 0.672 | 0.503 |
| | LEV | -2.123 | 0.549 | -0.315 | -3.864 | 0.000 |
| | LONG | 6.056 | 1.202 | 0.374 | 5.039 | 0.000 |
| | SALES | 0.062 | 0.219 | 0.018 | 0.282 | 0.778 |
| | CAP | -0.302 | 0.049 | -0.475 | -6.205 | 0.000 |
| | RD | 1.442 | 1.634 | 0.056 | 0.882 | 0.379 |
| | EXP | -0.606 | 0.427 | -0.090 | -1.418 | 0.158 |
| | OWN | 0.114 | 0.161 | 0.045 | 0.705 | 0.482 |
| | GDP | 28.899 | 24.005 | 0.091 | 1.204 | 0.230 |
| | CPI | -28.233 | 24.991 | -0.083 | -1.130 | 0.260 |
| | $R^2 = 0.265$ | | | | $Adj. R^2 = 0.225$ | |

| | |
|--------------|---------|
| F = 6.628*** | N = 214 |
|--------------|---------|

Notes: *** indicates significance at the 1% level.

Source: Author's own calculation

In Model (2), SIZE, LONG, and SALES positively affect ROA, whereas LEV, CAP, and EXP have a negative impact. In addition, CR, RD, OWN, GDP, and CPI do not show statistically significant impact on ROA. ROA has more determinants than ROS and ROE.

The positive impact of SIZE means that when agricultural listed companies become larger, their ability to generate returns gradually improves. However, Jelena *et al.* (2018) and Dakić *et al.* (2019) found that firm size has a negative influence on ROA. Meiryani *et al.* (2020) argued that firm size has no impact on financial performance measured through ROA in Indonesia's manufacturing sector.

CR has a positive but insignificant impact on ROA, inconsistent with Jelena *et al.* (2018). The coefficient of LEV is negative and significant ($\beta = -0.392$, $t = -6.383$). Using data from Brazilian agribusiness, Hall *et al.* (2014) found that they have greater impact on the cost of debt to capital structure as well as higher returns. Long-term debt can positively impact financial performance, which signifies the relative strength of agricultural listed companies. The positive coefficient of SALES suggests that agricultural listed companies grow healthily. CAP negatively affects ROA, which is not in line with Harris (1988) who found a positive relationship between capital intensity and firm performance.

RD has a positive but insignificant impact on ROA. However, Wei and Huang (2015) concluded that agricultural listed companies accelerate business performance through the investment in R&D. Wang (2019) also pointed out that the current R&D investment stimulates financial performance of agricultural listed companies.

An and Kim (2019) confirmed a negative but insignificant relationship between ratio of export and financial performance of auto parts cooperative companies. However, the export of agricultural product can provide revenue collection in higher amount (Jelena *et al.*, 2018). For agriculture sector in Serbia, export significantly affects firm profitability (Jelena *et al.*, 2018). Munch and Schaur (2018) argued that export promotion increases sales and value added of Danish firms. Yildiz (2018) confirmed a positive relationship between export intensity and firm performance of listed firm in Borsa Istanbul.

In Mongolian agricultural sector, the impact of earnings per share and return on costs is reflected in the ROA (Bayaraa, 2017). Mijić and Jakšić (2017) concluded that profitability of agricultural firms is positively related to leverage, quick ratio, sales growth rate, and lagged profitability in Hungary and Romania. What's more, size and fixed assets ratio negatively

affect firm profitability. In another three countries (i.e. Serbia, Bosnia, and Herzegovina), quick ratio, growth, and lagged profitability positively influence ROA.

Table 7: Regression results of Model (2)

| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|-----------------|----------|-----------------------------|------------|---------------------------|--------|-------|
| | | B | Std. Error | β | | |
| 2 | Constant | -0.535 | 0.309 | | -1.732 | 0.085 |
| | SIZE | 0.031 | 0.010 | 0.194 | 3.023 | 0.003 |
| | CR | 0.0001 | 0.003 | 0.003 | 0.036 | 0.972 |
| | LEV | -0.392 | 0.061 | -0.486 | -6.383 | 0.000 |
| | LONG | 0.620 | 0.134 | 0.319 | 4.617 | 0.000 |
| | SALES | 0.041 | 0.024 | 0.101 | 1.669 | 0.097 |
| | CAP | -0.033 | 0.005 | -0.438 | -6.141 | 0.000 |
| | RD | 0.083 | 0.183 | 0.027 | 0.453 | 0.651 |
| | EXP | -0.086 | 0.048 | -0.106 | -1.802 | 0.073 |
| | OWN | 0.003 | 0.018 | 0.011 | 0.185 | 0.854 |
| | GDP | 1.258 | 2.682 | 0.033 | 0.469 | 0.639 |
| | CPI | 0.358 | 2.792 | 0.009 | 0.128 | 0.898 |
| $R^2 = 0.362$ | | | | $Adj. R^2 = 0.327$ | | |
| $F = 10.400***$ | | | | $N = 214$ | | |

Notes: *** indicates significance at the 1% level.
Source: Author's own calculation

In terms of ROE, the coefficients of SIZE and LONG are positive and significant ($\beta = 0.071, t = 2.018$; $\beta = 2.102, t = 4.593$). LEV and CAP exert a significantly negative impact on ROE ($\beta = -1.159, t = -5.540$; $\beta = -0.117, t = -6.313$). The coefficient of RD is positive but not significant at the 5% level ($\beta = 0.503, t = 0.808$), and the coefficient of EXP is negative but not significant at the 5% level ($\beta = -0.269, t = -1.651$).

Table 8: Regression results of Model (3)

| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|-------|----------|-----------------------------|------------|---------------------------|--------|-------|
| | | B | Std. Error | β | | |
| 3 | Constant | -1.381 | 1.051 | | -1.313 | 0.191 |
| | SIZE | 0.071 | 0.035 | 0.133 | 2.018 | 0.045 |
| | CR | 0.001 | 0.011 | 0.009 | 0.115 | 0.909 |
| | LEV | -1.159 | 0.209 | -0.433 | -5.540 | 0.000 |
| | LONG | 2.102 | 0.458 | 0.326 | 4.593 | 0.000 |
| | SALES | 0.109 | 0.083 | 0.081 | 1.307 | 0.193 |
| | CAP | -0.117 | 0.019 | -0.463 | -6.313 | 0.000 |
| | RD | 0.503 | 0.622 | 0.049 | 0.808 | 0.420 |
| | EXP | -0.269 | 0.163 | -0.100 | -1.651 | 0.100 |
| | OWN | 0.047 | 0.061 | 0.046 | 0.766 | 0.445 |
| | GDP | 9.130 | 9.139 | 0.072 | 0.999 | 0.319 |
| | CPI | -6.253 | 9.514 | -0.046 | -0.657 | 0.512 |

| | |
|-------------------|--------------------|
| $R^2 = 0.327$ | Adj. $R^2 = 0.290$ |
| $F = 8.911^{***}$ | $N = 214$ |

Notes: *** indicates significance at the 1% level.
 Source: Author's own calculation

4.4. Robustness check

We also use the ratio of earnings before interest and taxes to average total assets as an alternative measure of ROA to re-estimate Model (2). The results are similar to the findings in Table 7, suggesting that our conclusion is robust.

5. Conclusions

The study shows that determining factors influence financial performance of agricultural listed companies in China. By using data retrieved from 39 agricultural listed companies during 2013-2018, the conclusions can be summarized in three aspects. First, financial performance of China's agricultural listed companies has a fluctuating downward trend. Second, firm size, long-term liability ratio, and sales growth rate can improve financial performance. Third, debt ratio, capital intensity, and export intensity hinders financial performance.

The findings of this study offer several practical implications. First, agricultural listed companies should not pursue more profits by blindly expanding company size. Managers should consider whether size structure is compatible with the requirements of production level. Second, the insignificant impact of CR indicates that agricultural listed companies should take into account the optimal level of liquidity because excess cash flow that is not invested cannot contribute to performance improvement. Third, corporate managers should pay attention to capital structure and reasonably utilize long-term borrowings to maintain financial sustainability. Fourth, agricultural listed companies should pay attention to the relationship between sales revenue and cost of sales where an increase in sales growth can be achieved by enhancing product volume or sales price. Fifth, agricultural listed companies should increase investment in R&D and introduce advanced machinery and equipment in order to raise the level of modernization. Sixth, these companies should change their production structure for export and develop high-tech agricultural products through the utilization of advanced technology. Finally, for investor, they should take into account various factors to systematically assess a firm when making investment decisions.

There are some limitations in this study. First, we only focus on agricultural industry and other industries should be included. Second, other factors (e.g. board diversity, public support, and unemployment rate) influencing financial performance should also be taken into account in this study. These limitations signal the scope for future research.

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