Original Paper

Bank Credit, Trade Credit, and Profit: Evidence from Agricultural Firms in Vietnam

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Abstract

This paper investigates the relationships between bank credit and trade credit with profit of 130 agricultural firms listed on Vietnam's stock exchanges in the period of 2008-2014. Using the GMM approach, the paper reveals inverted-U shaped (∩) relationships between bank credit and trade credit with profit. Specifically, the optimal threshold of bank credit and trade credit to total assets of the firms are 0.4173 and 0.2425, respectively. The findings mean that if the ratio of bank credit to total assets exceeds the benchmark of 0.4173, firms should consider restructuring debts to get them back to the benchmark. To do so, firms should withdraw from those business fields that are not of profession, in addition to liquiditizing unused assets to repay debts and not using short-term credit to invest in long-term projects. Firms may use of trade credit wisely when other sources of finance are lacking. In concrete, firms can increase trade credit use if the ratio of trade credit to total assets is below 0.2425. Yet, if this ratio goes beyond this benchmark, firms should get its back to this benchmark, e.g., keeping a suitable amount of inventory.

Keywords

agricultural firms, bank credit, profit, stock exchange, trade credit, Vietnam

1. Introduction

Bank credit and trade credit play a key role to profit of firms. Bank credit helps replenish funds, thus enabling firms to take up profitable opportunities. Trade credit is also an important source of finance for firms, especially those in transition economies where the economic and financial systems have inherited structural flaws from the former central planning regime that deter firms' access to external finance. In that case, firms have to resort to trade credit provided by suppliers in the form of deferred

payments to input purchase (accounts payable). Firms that are granted trade credit will be better able to mitigate production cost and expand market share to maximize profit. Nevertheless, depending too much on bank credit and trade credit may be harmful to profit of firms. Indeed, as interest rates somehow hike up, the obligation to repay due debts becomes unbearable because of increased user cost of capital, then profit may plummet. Trade credit has a similar impact. Specifically, if not knowing the exact purpose of the trade creditor, the trade credit receiver is not able to properly respond to unexpected changes, especially when the former no longer wants to proceed with generous trade credit policies as before. Then, profit of the latter would plunge.

The above argument seems to be applicable to agricultural firms in Vietnam. Indeed, although both bank credit and trade credit granted to those firms went up continuously in the period of 2008-2014, their profit started to deteriorate in 2012 and recovered very slowly afterwards (Table 1). This fact would imply that those sources of credit may not always benefit those firms. Put it differently, bank credit and trade credit may have non-linear relationships with firm profit, meaning that there exist optimal levels of those sources of credit to which firms should comply to maximize profit. However, this appealing issue has not been got sufficient awareness of researchers in transition economies so as to help firms use these valuable financing sources wisely to trigger profit. Therefore, this paper is deliberately conducted to bridge the gap, using a data set of 130 agricultural firms listed on Vietnam's stock exchanges in the period of 2008-2014.

This paper is structured as follows. Section 1 introduces the paper. The background of Vietnam's economy and listed agricultural firms of this country in the period of 2008-2014 is provided in Section 2. Section 3 reviews the related literature. Section 4 specifies the empirical model out of the literature reviewed. Section 5 is about the data and methodology. Section 6 analyzes the findings. Section 7 concludes the paper.

2. Research Context

2.1 Overview of Vietnam's Economy

Vietnam has made significant progress in transitioning from a centrally planned economy to a market-oriented one. The economic reform launched in 1986 when Vietnam's per capita income was just USD 437 has helped the country achieve a lower middle-income status and reach a per capita income of USD 1,770 in 2016. Vietnam's Amended Constitution in 1992 recognized the role of private sector in the economy. The new Law of Foreign Investment passed in 1987 brought about a surge of first wave of Foreign Direct Investment (FDI) flowing to Vietnam. Land Law in 1987 (revised several times later on) granted farmers land use right for a certain duration of time. Corporate Law and Private Enterprise Law in 1990 unleashed the potential of the country's private economic sector. Vietnam also sought political and economic integration within the region and the world, thereby paving the way for local firms to enter foreign markets, especially those in developed economies. The country's stock market made debut trading in 2000. However, despite the rapid economic growth till 2007 as a result of

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the reform, Vietnam's economy has remained succumbed to the so-called resource curse problem as its growth has heavily relied on a prolonged overuse of physical assets and natural resources while innovation and productivity were not of the main policy focus, leading to a low competitiveness of the economy and its firms as well.

International integration has brought in new market opportunities but exposed Vietnam's economy to contagious risks. After two decades of strong growth, since 2008 the country's economic growth rate has slowed down remarkably (e.g., to a trough of 5.2 percent in 2012—the lowest in 13 years) due to large trade deficit, high inflation, declining foreign exchange reserves, mismanaged fiscal and monetary policies, overwhelming business closures, rampant corruption and sluggish commercial activities, intensified by the global economic crisis that has squeezed the demand for Vietnam's exports. In late 2008, Vietnam's government took action to revive the economy by adopting a large fiscal and monetary stimulus package. The stimulus, together with the relative resiliency of the country's financial sector and exports, helps contain the slowdown of economic activity. The real economy has bounced quickly. Exports have recovered back to the growth rate observed before the crisis. Meanwhile, the relocation by manufacturing firms from higher wage countries in East Asia began to benefit Vietnam, which with its relatively low wages and easy access to coast is well positioned to absorb such investments.

Since 2008, several segments of the corporate sector of Vietnam have exhibited poor performance and financial distress precipitated by macroeconomic instability, thus affecting the soundness of the country's banking system. A number of State-Owned Enterprises (SOEs) defaulted on their debt obligation and many others appeared to be over-leveraged. The banking system shouldered a substantial amount of Non-Performing Loans (NPLs), estimated at 12 percent of total outstanding loans at the end of 2012 (World Bank, 2014, p. 1). Small banks experienced serious liquidity and solvency problems. Meanwhile, there have existed a high degree of cross-ownership between banks and between banks and business groups whose structures are vague. Such a situation makes prompt interventions of the State Bank of Vietnam (SVB) inevitable to safeguard the banking system, curtail connected lending by joint-stock banks, cure weaknesses of the financial infrastructure and enhance financial reporting standards, deficiencies in financial regulation and supervision. As a consequence, credit growth slowed down due to concerns over Non-Performing Loans (NPLs), resulting in a credit crunch and decreasing growth rate of bank credit given to firms in general as well as agricultural firms in particular. This fact is coupled with the contractionary monetary policy mandated by the government to contain inflation to further constraint access of firms to bank credit. In such a circumstance, firms were inclined to resort to trade credit in the forms of deferred payments to input purchase as an alternative, pushing the type of credit in 2014 up to approximately three times of that in 2008 as for agricultural firms (Table 1).

Table 1. Fundamental Indicators of Listed Agricultural Firms in Vietnam

Indicators	2008	2009	2010	2011	2012	2013	2014
Sales (VND trillion)	818	911	1.086	1.379	1.475	1.594	1.698
	–	(11.4)	(19.2)	(27.0)	(7.0)	(8.1)	(6.5)
Labours (1,000 people)	1,030	1,080	1,119	1,173	1,253	1,319	1,343
	–	(4.8)	(3.6)	(4.8)	(6.1)	(5.9)	(1.3)
Profit (VND trillion)	50	84	120	131	118	124	127
	–	(68.0)	(42.9)	(9.2)	(–9.9)	(5.1)	(2.4)
Total assets (VND trillion)	627	764	961	1,197	1,352	1,485	1,663
	–	(21.9)	(25.8)	(24.6)	(12.9)	(9.8)	(12.0)
Bank credit (VND trillion)	157	189	228	286	318	347	380
	–	(20.4)	(20.6)	(25.4)	(11.2)	(9.1)	(9.5)
Accounts payable (VND trillion)	52	62	77	103	113	132	141
	–	(19.2)	(24.2)	(33.8)	(9.7)	(16.8)	(6.8)

Source: Own calculation from audited financial statements of the firms.

Note. Figures in bracket are annual change (percent).

2.2 Listed Agricultural Firms in Vietnam

Agricultural firms which produce, process, trade agricultural products or supply inputs to agricultural production constitute an important portion of Vietnam's economy and play a key role in freeing up the great potential of the agricultural sector. The average number of permanent labours of the agricultural firms under consideration is about 1,187 per firm, with a standard deviation of 1,991, divulging a big gap among those firms regarding this respect. Firms with more than 300 labours made up 75 percent of the total number of the surveyed firms in 2008 and increased slightly to 76.6 percent in 2014. Total assets of the firms was VND 1,145 billion on average and largely different across the firms. Like labours, total assets of the firms went up in the period of 2008-2014 as a result of the great potential of the country's agricultural sector that strongly supported their growth.

Average sales of the firms was VND 1,698 billion in 2014, about 2.1 times of that in 2008, due to the attempt of a number of firms to better serve traditional home markets while approaching new foreign markets. Yet, profit of the firms (i.e., VND 127 billion per firms) was quite modest, because of seasonality, small scale and agricultural production risk that made the supply and prices of agricultural products largely fluctuating. In addition, outlets for products of the firms, especially in foreign countries, seem to be squeezed because of increasing competition from firms in rival countries and stricter standards on product quality imposed by the importing countries. This fact reflects itself in a low ROE (returns on equity) during the period of 2008-2014, with an average ROE being 13.81 percent

(standard deviation of 31.28 percent). ROE of the firms seems to decline during that period, given the fact that their ROE in 2008 was 15.35 percent and dropped to a mere of 10.19 percent in 2014.

Bank credit and trade credit have remained principal sources of investment and business financing for the firms. In the period of 2008-2014, the average bank credit given to each firm is VND 270 billion per year, but there are firms that were denied access to bank credit. Growth rate of bank credit to the agricultural firms slowed down during this period because of their low profitability and policy revisions of commercial banks, in addition to prudent regulations imposed by the government on the banking system in response to the then economic risk and volatility. Despite that, the amount of bank credit given those firms had increased in the period of 2008-2014.

Beside bank credit, the firms also use trade credit in the form of deferred payment to input purchase (accounts payable) to develop business and make profit. The average of trade credit used by the firms is VND 104 billion per year, which is relatively low as compared to bank credit but increases rapidly (i.e., almost three times during the period of 2008-2014). The increase in trade credit use by the firms is mainly due to the demand on expansion that requires a larger amount of inputs and limited access to bank credit, as just clarified. Inputs of the firms are mainly agricultural products of which supplies and prices largely fluctuate, creating difficulties for them to get sufficient cash and other means of payments ready for that purpose. In that case, trade credit turns out to be an almost perfect solution for firms to have enough inputs for production in order to avoid interruption which has a very adverse consequence on the firms' profit.

3. Literature Review

3.1 Bank Credit and Firm Profit

Bank credit is a pivotal source of funds for firms to develop business and make profit. The presence of several banks with various policies concerning interest rate, loan term and collateral requirement enables firms to select the ones that best suit their profit target. This aspect even becomes more fruitful because banks possess professional skills in screening, monitoring and enforcing repayment that compel borrowers to use the credit given in a right way.

The MM theorems developed by Modigliani and Miller (1958, 1963) stress the role of tax deduction of bank credit that is meaningful for profit of firms. Since interest rate expenses are exempted from tax, profit would be enhanced for firms that borrow from banks since the deducted tax could be used to finance profitable investment projects and business activities. Moreover, firms use bank credit to invest in Research and Development (R&D) to upgrade technology in order to raise profit since updated technology enables firms to improve product quality, increase productivity and mitigate production cost (Hasan & Sheldon, 2016, p. 548). Firms that are denied access to credit must rely on backward technology, so both product quality and productivity are low. All this suppresses profit of firms.

In imperfect credit markets with a high degree of information asymmetry, limited liability and transaction cost, firms prefer internal funds thanks to its lower user cost (the pecking-order theory). Yet,

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internal funds may be insufficient to meet demand, so firms borrow from banks to finance business activities and ensure efficiency. Highly creditworthy firms that have created intimate relationships with banks are able to obtain credit at the right time with preferable interest rates and loan terms, allowing them to embark on profitable business opportunities. Meanwhile, given rich information and professional knowledge on a wide range of borrowers accumulated over a rather long period, banks can create business networks which link clients (i.e., depositors and borrowers) to help them improve profit via useful advices using that information and knowledge.

Despite its usefulness, if going beyond a certain limit, bank credit will be detrimental to profit of firms, as confirmed by researchers. According to Nkurunziza (2011, p. 465), if the economy falls into recession and lending activity turns out to be too risky, banks become more conscious of protecting themselves by strictly conforming to the Basel Core Principles and increasing risk provision. As a result, interest rates may go up, firms that have borrowed excessively will shoulder heavy unbearable burdens of repaying debts, so profit may drop. In transition economies, governments often pursue prudent policies of reforming financial and banking systems with a special intention of mitigating default risks and safeguarding commercial banks against NPLs and failures by imposing stringent regulations on capital adequacy, risk provision and deposit insurance. Because of that, banks may raise interest rates, suppressing profit of those firms that have heavily relied on bank credit due to increased user costs of capital. Empirically, Cheng et al. (2010, p. 2502) uses a data set of 650 firms in China to prove that high leverage squeezes their profit.

In some circumstances, managerial weaknesses lead banks to unwise decisions, thus depriving them of the ability to closely monitor default risk that gives rise to loss. In order to recover the loss, banks tend to raise interest rates, thus shouldering firms with higher costs and suppressing their profit (Le, 2015, p. 49). Hardships resulting from external factors (e.g., financial reforms, financial crises or exchange rate fluctuations) are other reasons why banks employ tight lending policies and may raise interest rates that inflates borrowing costs and reduces profit of firms (Agostino & Trivieri, 2013, p. 133). Inspired by profit in the past, firms may have borrowed too much to invest in scale and scope expansions regardless of output market uncertainty, especially in the period of economic recession that can happen unexpectedly. If output market declines, it is hard for firms to repay a substantial amount of bank debt because of constraints in fetching funds for that purpose (Le & Huynh, 2014, p. 24). Consequently, profit goes down. This explains why bank credit adversely affects firm profit. The aforementioned arguments imply an inverted-U shaped (∩) relationship between bank credit and firm profit.

3.2 Trade Credit and Firm Profit

Trade credit is a specific relationship in which suppliers provide a certain amount of credit to clients (trade credit receivers) by allowing them to defer the payment for the purchased good (Badu et al., 2012, p. 362). Given this attribute, trade credit helps firms tackle difficulties resulting from fund shortage, thereby pushing up their profit. The impact of trade credit on profit is of great concern of researchers since this is a common financing source for firms. Researchers ascertain that firms always

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have incentives to grant trade credit to customers, so if used wisely, trade credit will boost profit for the latter.

The financing advantage theory of trade credit contends that suppliers have an advantage over credit institutions with regard to evaluating and controlling the risks facing buyers. Indeed, the supplier obtains information needed for those activities at low costs via the normal course of business, visits to the buyer's premises and from other suppliers as business partners (Petersen & Rajan, 1997, p. 663). The supplier is also better able to influence the buyer's behaviour since it may be in the nature of the good being supplied that there are only few economical alternative sources other than the supplier. Then, the threat to cut off future supplies if the buyer acts in such a way that harms the possibility to repay is especially creditable as the buyer accounts for an unimportant portion of the supplier's sales. It is also effective for the supplier in salvaging value from the buyer's used assets. If the buyer defaults, the supplier can seize the good supplied to resell through her already established networks for selling goods. As a result, the cost of repossessing and reselling the good is much lower than that of a credit institution.

The theory of price discrimination argues that suppliers uses trade credit to discriminate price to allure customers. Buyers who rely on trade credit for funds are often credit rationed, so they constitute the most price elastic segment of the market (Petersen & Rajan, 1997, p. 664). In that case, trade credit is an effective means of price discrimination if suppliers lower the price of the good to entice higher demand (Brennan et al., 1988, p. 1128). Buyers with high profit margins who may be riskier find trade credit underpriced, thus being eager to use more of it. A supplier may apply price discrimination also because of the long-term concern of customers' survivals, especially when she has no potential substitutes for the customers.

According to the transaction cost theory, the seller uses trade credit as an effective means to mitigate transaction costs. Trade credit may reduce the transaction costs of paying bills since the buyer can cumulate obligations and pay them once instead of every time when the good is delivered (Ferris, 1981, p. 244). Moreover, there may be a seasonality in the demand pattern for the good the seller supplies. In order to maintain smooth production cycles, the seller may have to build up large inventories, which incurs high costs of warehousing and financing them. By offering trade credit selectively, both across buyers and over time, the seller better manages its inventory position and transaction costs.

At the other end, there are reasons why a producer resorts to trade credit. First, trade credit enables the buyer to check out the quality of the good supplied, which is important where the information asymmetry about the quality of goods is widespread and cheating behaviour prevails. Second, trade credit conveys reliable information about the creditworthiness of the buyer to credit institutions, which helps improve her access to formal credit. Third, the financing theory argues that trade credit is a perfect complement to formal credit for those who need capital for urgent needs but are denied access to formal credit. Finally, trade credit allows the buyer to mitigate transaction cost and better handle

risks. To make use of all the trade credit granting policies for profit maximization, trade credit receivers actively choose the most suitable deferred payment terms.

According to Burkart and Ellingsen (2004, p. 570), trade credit also enhances profit of firms since they tend to use the input purchased using trade credit in production instead of diverting it for some reasons. Firstly, trade creditors have a better position to supervise the behaviour of trade credit receivers, so they can impose outright and timely sanctions if the latter diverts the purchased input, which adversely affects the ability to repay loans. This threat is highly effective, so trade credit receivers tend to use the purchased input in production. Secondly, due to its specificity, the input purchased using trade credit is less possibly used for any purpose other than production or converted into cash.

As a matter of fact, firms not only have to sell goods of high quality but have also to promptly respond to market uncertainty, which requires them to hold a certain amount of inputs in warehouses well equipped with proper facilities to avoid stockout loss as well as instantaneous deterioration. This is costly for agricultural firms since agricultural products are normally so bulky that they occupy a spacious place if stored. In that case, trade credit helps firms mitigate costs by shortening the storage duration and the quantity of inventories by wisely using orders that best suit demand (Tiwari et al., 2016, p. 155). Trade credit receivers are not only allowed to defer payments for the purchased good but also preferably treated with lower prices to offset transportation costs if buying a sufficient amount of goods. In that case, saved transportation costs are positively related to the amount of goods ordered as well as the number of orders. This fascinating attribute is truly helpful for trade credit receivers to mitigate costs, e.g., those that have created lasting relationships with trade creditors (Priyan & Uthayakumar, 2014, p. 655).

However, trade credit implicitly contains risks since trade creditors may adjust their policy of granting trade credit (especially if having gained enough market power to curtail competition pressure), thus unexpectedly asking trade credit receivers to repay all the loans previously granted or totally stop giving trade credit later on. This policy may not be bad for firms that use trade credit with a proper amount but may have an increasingly adverse impact on those using too much of this type of credit. Moreover, if well treated in terms of being granted a large amount of trade credit, firms tend to use them in less profitable activities. In spite of not facing severe information asymmetry like commercial banks, trade creditors may bear a substantial credit risk and confront challenges if granting too much trade credit since clients are normally subject to moral hazard—a problem that can go beyond the control of trade creditors due to limited skills and experience.

All the aforementioned arguments would imply an inverted-U shaped (∩) relationship between trade credit and firm profit. Differently speaking, as the volume of trade credit increases from a minor level, it will enhance profit of firms. Yet, if going beyond a certain limit, trade credit will curtail firm profit.

3.3 Empirical Model

Based on the literature previously reviewed, this paper adopts the quadratic function that is popularly used by several studies (e.g., Banks et al., 1997; Yabu & Kessy, 2015) to investigate the non-linear relationships between bank credit and trade credit with profit of listed agricultural firms in Vietnam:

$$
\begin{aligned}
profit_{it} = {}& \beta_0 + \beta_1 bankcredit_{it} + \beta_2 bankcredit_{it}^2 + \\
& + \beta_3 tradecredit_{it} + \beta_4 tradecredit_{it}^2 + \varepsilon_{it}
\end{aligned} \tag{1}
$$

In Model (1), $profit_{it}$ is profit of firm i in year t, measured by ROE (i.e., returns on equity).

ROE is used to measure profit of the firms due to its advantage over ROS (returns on sales) and ROA (returns on assets). Indeed, ROS is a poor proxy for profit of agricultural firms because the business of agricultural firms is strongly affected by seasonality, making their input prices and sales largely fluctuating. Moreover, ROA of listed firms substantially varies and is much dependent on the industry, meaning that it is only feasible to use ROA as a measure to compare ROA of the same firm over time or with that of a similar firm.

$Bankcredit_{it}$ is the ratio of bank credit to total assets of firm i in year t. $Bankcredit_{it}^2$ is squares of $bankcredit_{it}$. As explained previously, coefficient β_1 is supposed to be positive and β_2 to be negative due to the presence of an inverted-U shaped (∩) relationship between bank credit with firm profit. $Tradecredit_{it}$ is the ratio of accounts payable to total assets of firm i in year t and $tradecredit_{it}^2$ is squares of $tradecredit_{it}$. As expected, coefficient β_3 is positive and β_4 is negative because of the inverted U-shaped (∩) relationship between trade credit with firm profit.

However, according to other studies (e.g., de Haas & Peeters, 2006; Rahaman, 2011; Ferrando & Mulier, 2013; Nguyen & Tu, 2015), there are more determinants of profit of firms. Thus, the empirical model should be augmented to take account of those factors:

$$
\begin{aligned}
profit_{it} = {}& \beta_0 + \beta_1 bankcredit_{it} + \beta_2 bankcredit_{it}^2 + \beta_3 tradecredit_{it} + \\
& + \beta_4 tradecredit_{it}^2 + \beta_5 equity_{i(t-1)} + \beta_6 age_{it} + \beta_7 labour_{it} + \beta_8 cashflow_{it} + \\
& + \beta_9 profit_{i(t-1)} + \beta_{10} production_{it} + \varepsilon_{it}
\end{aligned} \tag{2}
$$

$Equity_{i(t-1)}$ is the ratio of equity to total assets of firm i in year $t-1$. Equity that may have an advantage of low user cost is a preferred source of funds for firms, especially those in transition economies with less developed banking systems where the information asymmetry between firms and banks is largely widespread (de Haas & Peeters, 2006, p. 135; Rahaman, 2011, p. 712). Borrowers, including firms, in these economies also incur substantial transaction cost due to cumbersome procedures and immoral (even corrupt) bank staffs. This problem is pervasive for firms that are

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information opaque. Firms would also prefer equity over debt because it is not obligatory and they can flexibly adjust their dividend policy because in most cases investors are not really concerned with a firm's dividend policy since they can sell a portion of their portfolio of equities if they want cash (i.e., the so-called the dividend irrelevance theory). However, firms may sometimes misuse this valuable financing resource (e.g., investing in business fields that are not of their profession), resulting in loss that reduces profit of firms. Thus, coefficient β_5 of $equity_{i(t-1)}$ can be either positive or negative, depending on the economic and business environments in which firms operate and their attributes as well.

Age_{it} is the number of years elapsed since the firm was established. This variable is an almost perfect proxy for experience—a factor that positively affects profit of firms (Rahaman, 2011, p. 709). Therefore, coefficient β_6 is expected to be positive. However, firms operating in saturate environments would become conservative to changes, resulting in a lack of creativeness and low profit. This would mean that coefficient β_6 is negative.

$Labour_{it}$ is the number of permanent labours of firm i in year t. Economies of scale argue that firms of larger size (proxied by the number of permanent labours) have an advantage over smaller ones regarding production costs since long-term average costs decline as output accumulates over time. This advantage brings about higher profit for those firms (Ferrando & Mulier, 2013, p. 3039). Therefore, coefficient β_7 of $labour_{it}$ is expected to be positive. However, for those firms that are too big, profit may be low since it is hard for them to find promising opportunities so as to best deploy all potentials. This is especially true for agricultural firms that do business on traditional products instead of innovative ones like high-tech firms. If that is the case, coefficient β_7 of $labour_{it}$ should be negative.

$Cashflow_{it}$ is the ratio of operational cash flows to total assets of firm i in year t. Cash flows convey information on financial capacity of firms. If cash flows are in shortage, there exist increased threats that emanate bad signals about the financial soundness of firms. Firms can only survive if cash flows are mainly created from business activities and able to meet own needs. If having sufficiently surplus cash flows, firms will be able to utilize good investment and business opportunities because internal funds are the first choice for firm financing, according to the pecking-order theory. Otherwise, firms will face with liquidity harshness or even go bankrupt. This implies that cash flows are positively related to firm profit and coefficient β_8 of $cashflow_{it}$ is expected to be positive.

$\Pr ofit_{i(t-1)}$ is ROE of firm i in year $t-1$. As for joint-stock firms, part of profit will be used to invest after paying dividend to shareholders. Therefore, the inclusion of this variable aims to test for the

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stability of profit of firms over time. $\Pr oduction_{it}$ takes a value of 1 for firms that produce, process or trade agricultural products and 0 for those supplying inputs to agricultural production. Coefficient β_{10} may be positive or negative. ε_{it} is the random error of the model.

4. Methodology

In order to test for the relationship between bank credit and trade credit with firm profit, we use a panel data set retrieved from audited financial statements of 130 agricultural firms listed on Vietnam's stock exchanges in the period of 2008-2014. Strength of this data set lies in its accuracy and reliability that enable us to come up with precise conclusions and propose pragmatic recommendations for firms to take up.

We first use descriptive statistics to describe the status quo of the firms that underpins the explanation of the estimation results. In order to figure out the relationship between bank credit and trade credit with profit of the firms, we first try Random Effect (RE) and Fixed Effect (FE) estimation methods. As a matter of fact, firms use bank credit and trade credit to boost profit. Then, inspired by high profit firms tend to use more bank credit and trade credit since it is easier for them to get access to those sources of finance. Differently stating, there exist causal effects between bank credit and trade credit with profit of the firms. As a result, $bankcredit_{it}$ and $tradecredit_{it}$ are correlated with the model's error, giving rise to the problem of endogeneity in the empirical model. The problem of endogeneity will make the results estimated by RE and FE methods virtually biased and unreliable.

In order to tackle the problem of endogeneity, we use the Generalized Method of Moments (GMM) developed by Arellano and Bond (1991) to estimate Model (2) in order to make the estimation result unbiased and more statistically reliable as well, especially in the case of panel data. This estimation method requires instrumental variables for the two endogenous variables (i.e., $bankcredit_{it}$ and $tradecredit_{it}$). In this case, we use time-lagged (one year) variables as instruments for these two endogenous variables as often done by those studies that utilize the GMM approach (e.g., Rahaman, 2011).

5. Result and Discussions

The statistical summary of the independent variables of Model (2) is shown in Table 2. The results for the test of the relationship between bank credit and trade credit with profit of the firms are revealed in Table 3. Columns 2, 3 and 4 of Table 3 present the results of RE, FE, and GMM estimation methods, respectively. Despite being unable to tackle the issue of endogeneity, since RE and FE are common estimation methods for a panel data set, we present their results as a reference.

Prior to conducting the regression of Model (2) using the GMM method, we perform a check for multicorrelation between the independent variables described in Table 2. The result shows that all the coefficients between the independent variables are much smaller than 0.8, implying no multicorrelation problem in the empirical model (Yazdanfar & Ohman, 2015). We have also been concerned with the

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problem of heteroskedasticity, but this problem is automatically corrected by the GMM itself (Cragg, 1983; Wooldridge, 2001). Sargan test shown in column 4 of Table 3 confirms the robustness of the instrumental variables as exogenous variables (i.e., being not correlated with the model's error). Moreover, Wald test rejects H_0 hypothesis (i.e., all coefficients of the independent variables being equal to zero). Differently speaking, all the coefficients of the independent variables of Model 2 have explanatory powers.

Table 2. Statistical Summary of the Independent Variables

Variables	Mean	Median	Max	Min	S.D.
$BANKCREDIT_{it}$	0.284	0.258	1.048	0.000	0.234
$BANKCREDIT_{it}^2$	0.137	0.066	1.379	0.000	0.171
$TRADECREDIT_{it}$	0.075	0.055	0.610	0.000	0.071
$TRADECREDIT_{it}^2$	0.017	0.003	0.654	0.000	0.057
$EQUITY_{i(t-1)}$	0.522	0.518	7.968	−0.478	0.340
Age_{it}	24.385	22.000	62.000	2.000	12.701
$LABOUR_{it}$	1,186.870	579.500	24.111	22.000	1,992.050
$CASHFLOW_{it}$	−0.025	0.003	1.987	−28.537	0.965
$PROFIT_{i(t-1)}$	0.135	0.137	0.552	−0.134	0.311
$PRODUCTION_{it}$	0.612	1.000	1.000	0.000	0.487

Source: Own calculation from audited financial statements of the firms.

The GMM estimation method shows that $bankcredit_{it}$ has coefficient $\beta_1 = 1.5410$ and $bankcredit_{it}^2$ has coefficient $\beta_2 = -1.8464$ at significance levels of 5 percent and 1 percent, respectively. This result confirms the inverted-U shaped (∩) relationship between bank credit with profit of the firms as explained in the literature review. Taking a partial derivative of $profit_{it}$ of

Model (2) with respect to $bankcredit_{it}$ gives:

$$\frac{\partial profit_{it}}{\partial bankcredit_{it}} = \beta_1 + 2\beta_2 bankcredit_{it} \tag{3}$$

From Expression (3), it is possible to identify the optimal ratio of bank credit to total assets corresponding to the highest profit of the firms that satisfies:

$$\beta_1 + 2\beta_2 bankcredit_{it} = 0 \quad \text{or} \quad bankcredit_{it} = -\beta_1 / 2\beta_2 \tag{4}$$

The value of β_1, β_2 given in Table 3 and Expression (4) allow us to come up with $credit_{it} = 0.4173$. Differently speaking, if the ratio of bank credit to total assets is below 0.4173, an

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increase in bank credit will raise profit of firms and vice versa, for the reasons discussed in the literature review.

$Tradecredit_{it}$ has coefficient $\beta_3 = 4.0606$ and $tradecredit_{it}^2$ has coefficient $\beta_4 = -8.3735$ at the same significance level of 1 percent. This outcome confirms the inverted-U shaped (∩) relationship between trade credit and profit of the firms. Using similar approach to bank credit, we can estimate the optimal ratio of trade credit to total assets of the firms that is 0.2425. This means that if the ratio of trade credit to total assets is below 0.2425, trade credit will boost profit of the firms and the effect reverses if the ratio goes beyond that benchmark.

It is interesting that $\beta_3 > \beta_1$, implying the more important role of trade credit to profit of the firms, other things being equal. This finding is quite understandable, since during the period of 2008-2014 banks had used contracted lending policies (especially to those firms that are financially unsound) while the government curtails the growth rate of credit given to the economy. Differently speaking, this is an advocate of the reality of credit crunch emerging as a consequence of prudent policies maintained by banks and the government of Vietnam.

In addition to bank credit and trade credit, firms also use equity to exploit the advantage of lower user costs. In the period of economic recession, equity positively affects profit of the firms as coefficient β_5 of $equity_{i(t-1)}$ has positive value at significance level of 5 percent. This is evidence of the fact that the firms had used equity to maintain and develop business as the access to bank credit had been squeezed.

Table 3. Estimation Results Using RE, FE and GMM Methods (Dependent Variable: Profit (%))

Variable	RE method	FE method	GMM
(1)	(2)	(3)	(4)
$BANKCREDIT_{it}$	0.3985***	0.4491***	1.5410**
	(0.000)	(0.0034)	(0.0321)
$BANKCREDIT_{it}^2$	−0.7601***	−0.9885***	−1.8464***
	(0.000)	(0.0000)	(0.0058)
$TRADECREDIT_{it}$	0.1026	0.1027	4.0606***
	(0.6741)	(0.8120)	(0.0030)
$TRADECREDIT_{it}^2$	−0.3880	0.9976	−8.3735**
	(0.6577)	(0.5019)	(0.0484)
$EQUITY_{i(t-1)}$	0.0304**	0.5109***	0.7286**
	(0.0379)	(0.0000)	(0.0290)
Age_{it}	−0.0002	−0.0401***	−0.0861***
	(0.7646)	(0.0000)	(0.0000)
$LABOUR_{it}$	0.0010	0.0064	−0.0368
	(0.8077)	(0.3947)	(0.7213)

$CASHFLOW_{it}$	0.1169	0.0545	0.4804
	(0.0330)	(0.3470)	(0.3127)
$PROFIT_{i(t-1)}$	0.3518***	−0.1129**	−0.3150**
	(0.0000)	(0.0151)	(0.0170)
$PRODUCTION_{it}$	0.0249	−0.1481	−4.9370*
	(0.0689)*	(0.2953)	(0.0962)
C	−0.3224*	−4.6088***	
	(0.0566)	(0.0000)	
R^2	0.1634***	0.4955***	
F statistics	13.5963	4.1159	
p-value	(0.0000)	(0.0000)	
Wald test (χ^2)	199.2587***	160.7400***	58.6027***
p-value	(0.0000)	(0.0000)	(0.0000)
Hausman test (χ^2)	306.7004***		
p-value	(0.0000)		
AR(1)			0.0172
AR(2)			0.4619
Sargan test			0.2062

Note. (***), (**) and (*) corrensponds to 1 percent, 5 percent and 10 percent significance levels, respectively.

Source: Estimated out of the data set.

As seen from Table 3, coefficient β_6 of age_{it} is negative at a significance level of 1 percent. This result reflects the status quo of aging agricultural firms that lack creativeness and have a low degree of efficiency. Coefficient β_9 of $profit_{i(t-1)}$ has a negative value at a significance level of 5 percent, divulging the instability of profit of the firms. Finally, firms that supply inputs to agricultural production seem to have higher profit as compared to those that produce, process or trade agricultural products since coefficient β_{10} of $production_{it}$ has a negative value at a significance level of 10 percent.

6. Conclusion

This paper uses a data set of 130 Vietnamese listed agricultural firms in the period of 2008-2014 to figure out the relationship between bank credit and trade credit with their profit. Using the GMM approach, the paper reveals inverted-U shaped (∩) relationships between bank credit and trade credit with profit of the firms. According to the estimates, the optimal threshold of bank credit to total assets of firms is 0.4173 and that for trade credit is 0.2425. Moreover, trade credit seems to be more important

than bank credit in terms of boosting profit of the firms. However, since the data used in this paper covers the period of 2008-2014, the results of this paper should be taken with a caution.

The paper also shows that equity plays an positive role to profit of the firms as bank credit growth rate tends to decline because of the economic downturn and the financial crisis in the period of 2008-2014, in addition to managerial weaknesses of Vietnam's commercial banks. Age is inversely related to profit of the firms, which is consistent with the practice that a number of agricultural firms have operated quite long but lacked creativeness. Finally, firms that supply inputs to agricultural production enjoy higher profit than their counterparts since their output markets are more stable since farmers who produce an overwhelming portion of agricultural products always need a lot of inputs.

The findings of this paper would mean that if the ratio of bank credit to total assets exceeds the benchmark of 0.4173, firms should consider restructuring debts to get them back to the benchmark. To do so, firms should withdraw from those business fields that are not of profession, in addition to liquiditizing unused assets to repay debts and not using short-term credit to invest in long-term projects. Moreover, firms should use of trade credit wisely when other sources of finance are lacking. In concrete, firms can increase trade credit use if the ratio of trade credit to total assets is below 0.2425. Yet, if this ratio goes beyond this benchmark, firms should get its back to this benchmark, e.g., keeping a suitable amount of inventory. Firms need to use efficiently equity to take advantage of lower user cost of capital as compared to bank credit and trade credit that are adversely affected by asymmetric information and transaction cost.

However, it is not without limitation because of the limitation of the data used. Further research may be necessary to cover longer period after 2014 because Viet Nam has signed (multi-) bilateral trade agreement, e.g., EVFTA, CPTPP so that the increased trade flows among the trading partners with commitment of tariff reduction could influence the concerning results of this paper.

References

Agostino, M., & Trivieri, F. (2013). Does Trade Credit Play a Signalling Role? Some Evidence from SMEs Microdata. *Small Business Economics*, *42*, 131-151. https://doi.org/10.1007/s11187-013-9478-8

Arellano, M., & Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies*, *58*(2), 277-297. https://doi.org/10.2307/2297968

Badu, E., Edwards, D. J., & Owusu-Manu, D. (2012). Trade Credit and Supply Chain Delivery in the Ghanaian Construction Industry. *Journal of Engineering, Design and Technology*, *10*(3), 201-212. https://doi.org/10.1108/17260531211274729

Banks, J., Blundell, R., & Lewbel, A. (1997). Quadratic Engel Curves and Consumer Demand. *Review of Economics and Statistics*, *LXXIX*(4), 527-539. https://doi.org/10.1162/003465397557015

Brennan, M., Maksimovic, V., & Zechner, J. (1988). Vendor Financing. *Journal of Finance*, *43*, 1127-1141. https://doi.org/10.1111/j.1540-6261.1988.tb03960.x

Burkart, M., & Ellingsen, T. (2004). In-Kind Finance: A Theory of Trade Credit. *American Economic Review*, *94*(3), 569-590. https://doi.org/10.1257/0002828041464579

Cheng, Y., Liu, Y., & Chien, C. (2010). Capital Structure and Firm Value in China: A Panel Threshold Regression Analysis. *African Journal of Business Management*, *4*(12), 2500-2507.

Cragg, J. G. (1983). More Efficient Estimation in the Presence of Heteroscedasticity of Unknown Form. *Econometrica*, *51*(3), 751-763. https://doi.org/10.2307/1912156

De Haas, R., & Peeters, M. (2006). The Dynamic Adjustment towards Target Capital Structures of Firms in Transition Economies. *Economics of Transition*, *14*(1), 133-169. https://doi.org/10.1111/j.1468-0351.2006.00237.x

Ferris, J. S. (1981). A Transactions Theory of Trade Credit Use. *Quarterly Journal of Economics*, *96*(2), 243-270. https://doi.org/10.2307/1882390

Ferrando, A., & Mulier, K. (2010). Do Firms Use the Trade Credit Channel to Manage Growth? *Journal of Banking and Finance*, *37*, 3035-3046. https://doi.org/10.1016/j.jbankfin.2013.02.013

Hasan, S., & Sheldon, I. (2016). Credit Constraints, Technology Choice and Exports: A Firm-level Study for Latin American Countries. *Review of Development Economics*, *20*(2), 547-560. https://doi.org/10.1111/rode.12248

Le, K. N., & Huynh, H. T. (2014). Profit and Investment Decisions under Market Uncertainty: An Empirical Study of Non-state Firms in the Mekong River Delta. *Review of Banking Technology*, *104*, 24-35 (in Vietnamese).

Le, K. N. (2015). Causes of Failures of Commercial Banks: Theory and Empirics. *Banking Review*, *20*, 47-52 (in Vietnamese).

Modigliani, F., & Miller, M. H. (1958). The Cost of Capital: Corporate Finance and the Theory of Investment. *American Economic Review*, *48*, 261-297.

Modigliani, F., & Miller, M. H. (1963). Corporate Income Taxes and the Cost of Capital: A Correction. *American Economic Review*, *53*, 433-443.

Nguyen, T. U. U., & Tu, T. K. T. (2015). Estimating Revenue Using Operational Cash Flows: Evidence from Listed Firms in Vietnam. *Journal of Development and Integration*, *20*, 34-42.

Nkurunziza, J. D. (2010). The Effect of Credit on Growth and Convergence of Firm Size in Kenyan Manufacturing. *Journal of International Trade and Economic Development*, *19*(3), 465-494. https://doi.org/10.1080/09638190802617670

Petersen, M. A., & Rajan, R. G. (1997). Trade Credit: Theories and Evidence. *Review of Financial Studies*, *10*(3), 661-691. https://doi.org/10.1093/rfs/10.3.661

Priyan, S., & Uthayakumar, R. (2014). Trade Credit Financing in the Vendor-Buyer Inventory System with Ordering Cost Production, Transportation Cost, and Backorder Price Discount When the

Received Quantity Is Uncertain. *Journal of Manufacturing Systems*, *33*(4), 654-674. https://doi.org/10.1016/j.jmsy.2014.06.003

Rahaman, M. M. (2011). Access to Financing and Firm Growth. *Journal Banking and Finance*, *35*, 709-723. https://doi.org/10.1016/j.jbankfin.2010.09.005

Tiwari, S., Cardenas-Barron, L. E., Khanna, A., & Jaggi, C. (2016). Impact of Trade Credit and Inflation on Retailer's Ordering Policies for Non-instantaneous Deteriorating Items in a Two-warehouse Environment. *International Journal of Production Economics*, *176*, 154-169. https://doi.org/10.1016/j.ijpe.2016.03.016

Wooldridge, J. M. (2001). Applications of Generalized Method of Moments Estimation. *Journal of Economic Perspectives*, *15*(4), 87-100. https://doi.org/10.1257/jep.15.4.87

World Bank. (2014). *Financial Sector Assessment: Vietnam*. June.

Yabu, N., & Kessey, N. J. (2015). Appropriate Threshold Level of Inflation for Economic Growth: Evidence from Three Founding EAC Countries. *Applied Economics and Finance*, *2*(3), 127-144. https://doi.org/10.11114/aef.v2i3.966