TRADE VERSUS BANK CREDIT

by

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Abstract

This study analyzes the relationship between trade and bank credit, considering them as jointly determined variables. The relative sizes of bank and trade credit to sales are modeled in a two-equation system, allowing them to appear as explanatory variables in each other's equations. Utilizing the administrative panel data consisting of large firms in Kazakhstan, I carry out my estimations employing the 2SLS method treating exclusion restrictions as instruments. Short-term financial investments are used as the exclusion restriction for the trade credit equation, whereas the size of intangible assets and cash-on-hand are utilized as exclusion restrictions for the bank loans equation. The results suggest a complementary relationship between trade and bank credit. Additional analysis during the 2014-15 economic crisis period points out to a decrease in the effect of the size of the labor cost on trade credit on the onset till the middle of the 2014-15 economic crisis. I also find that the effect of the size of fixed assets on bank loans weakened in 2015-16.

Trade versus Bank Credit in Kazakhstan

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1 Introduction

Trade credit is a mechanism that allows non-financial firms to purchase intermediate goods and services from their suppliers on the promise of delayed payment, typically to be received within a period of one to two months. In contrast to bank loans, trade credit usually does not involve a formal contract. For the customer firms, trade credit serves as an option to obtain financing. The suppliers, on the other hand, can take an advantage of the trade credit mechanism by increasing their sales.

Early explanations of the reasons why non-financial firms extend trade credit include market frictions arising from taxes (Brick and Fung 1984) and transaction costs inherent in liquidity management (Emery 1984; Ferris 1981). Yet, these motives fall short of explaining the coexistence of trade and bank credit. Brennan et al. (1988) explain this coexistence via imperfect competition stating that non-financial firms offer the same credit

terms to all buyers under the assumption that buyer types are private information. As a result, trade credit is mainly taken up by low-credit quality customers whereas creditworthy firms, finding trade credit expensive, pay cash. The coexistence of trade and bank credit is explained in more recent literature via informational asymmetries. In contrast with financial institutions that incur monitoring costs to assess their customers' creditworthiness, trade credit suppliers can obtain a broader set of information about their customers by observing their activities during the normal course of the business relationship (Biais and Gollier 1997), or the credit terms they choose (Smith 1987). Burkart and Ellingsen (2004) discuss that informational advantage comes from the ability of trade credit suppliers to have better control over the actions of their customers. While trade credit suppliers can observe the productivity of their customers for free when they sell inputs, banks need to incur monitoring costs to confirm borrowers' accountability so that loans supplied will not be diverted away. According to Cunat (2007), suppliers also have a better ability to enforce debt payments due to the shared rents from a longstanding relationship.

The relationship between trade and bank credit has extensively been studied in the literature. Except for a few studies, the literature models a firm's decision to use trade versus bank credit as a sequential one, explicitly or implicitly referring to the pecking order theory. In this framework, the size of trade credit demand is determined after observing the size of the secured bank loans, sidestepping the simultaneity problem. This view might easily be challenged when one closely looks at the explanations behind the coexistence of trade and bank credit. If trade credit suppliers have informational advantages over firms and these advantages outweigh the expected costs due to delinquency (failure to pay for the

inputs purchased on trade credit) trade credit may be cheaper than bank credit, discrediting the pecking order theory. Even in imperfect markets, where the first dollar of bank loan is cheaper than the first dollar of trade credit for creditworthy firms the cost of an additional dollar of bank credit eventually exceeds the cost of the first dollar of trade credit, causing the external financing decision to be simultaneous rather than sequential.

This study aims to analyze the relationship between trade and bank credit considering the simultaneous nature of the problem. I model the relative sizes of bank and trade credit with respect to sales in a two-equation system, allowing them to appear as explanatory variables in each other's equations. The identification of the model requires exclusion restrictions. The estimation can then be carried out via the 2SLS method treating exclusion restrictions as instruments. I utilize short-term financial investments as the exclusion restriction for the trade credit equation. Trade credit suppliers, which are non-financial organizations, usually have limited information about the financial investments of their creditors. On the other hand, banks observe the amount of short-term financial investment in the process of screening the financial statements of their customers to assess their creditworthiness. As a result, short-term financial investment serves as a good signal of customer creditworthiness. For the bank loans equation, the size of intangible assets and cash-in-hand are used as exclusion restrictions. Intangible assets are the set of non-monetary assets with no physical substance, which can be used as inputs for production or operational activities. As such, they are specific to the activities of the firm and cannot be easily liquidated by banks, thereby should not alter the relative size of bank loans firms can secure. Due to the nature of trade credit, which is mainly associated with real inputs, firms using more intan-

gible inputs, controlling for other factors, should use relatively less trade credit with respect to their revenue. Cash-in-hand also cannot determine the size of bank loans obtained since they can easily be diverted away. On the other hand, due to their informational advantages over banks, trade credit suppliers may observe the operational activities of their customers, and the amount of cash can serve as a proxy for the number of operational activities of their creditors signaling a better ability to repay trade credit. These exclusion restrictions also satisfy the rank condition statistically. The fixed effect regressions of trade credit provide a joint F-statistic of 26.67 for the cash-in-hand and size of intangible assets, relatively higher than the cutoff of F-value of 10 as discussed by Staiger and Stock (1997) to conclude that instruments are not weak. The same is confirmed for the short-term financial investment as well since the F-statistic of this variable in bank loans regression is 303.05.

In this paper, I analyze the relationship between trade and bank credit utilizing the administrative panel data consisting of large firms in Kazakhstan covering the period of 2010-2016. The role of trade credit is enormous in the operations of large Kazakhstani firms compared with the rest of the world: While about 92% of large Kazakhstani firms obtained trade credit in 2016, this statistic is given by 23% in Europe and Central Asia, 21% in East Asia and Pacific, and about 50% in Latin America (World Bank 2016). This pattern extends to the intensive margin. The average size of accounts payable to total assets for large Kazakhstani firms was around 32% in 2016. The same statistic ranges from 11.5% to 17% in G-7 countries (Rajan and Zingales 1995), 25% to 27% in Belgium, Greece, and Spain (García-Teruel and Martinez-Solano 2010), is 10.5% in Sweden (Jacobson and Von Schedvin 2015) and 9% in China (Oh and Kim 2016). For unlisted companies in 8 developed European

countries, the average ratio of trade credit demand to total assets varies from 11% in the Netherlands to 42% in Portugal (Giannetti 2003). On the other hand, the percentage of large firms using bank loans in Kazakhstan in 2016, 35%, is on par with the levels observed elsewhere (World Bank 2016). Yet, this relationship does not extend to the intensive margin: While the average ratio of bank loans to total assets is only 12% for large Kazakhstani firms, this statistic is 61% in 13 European countries included in Amadeus (McGuinness et al. 2018), and 65.9% in Japan (Tsuruta 2015), and 27.6% in Spain (Canto-Cuevas et al. 2016).

One of the reasons behind the limited loan availability for Kazakhstani firms is the underdeveloped financial system in Kazakhstan. Regardless of the attempts of the government to solve the problems of the banking sector through aid provision in the years 2008, 2015, and 2017, several banks terminated their operational existence or got capitalized. According to the The National Bank of the Republic of Kazakhstan (2016), about 23.5% of the loan portfolio in the banking sector was non-performing in 2015. Another obstacle to access bank loans in Kazakhstan is high interest rates: According to World Bank, the real rate on business loans was higher than 6% in 2017.

The period under study covers the 2014-15 economic crisis in Kazakhstan. At the beginning of 2014, the government devaluated the currency, Kazakh Tenge (KZT), by 19% vis-a-vis the U.S. dollar, from 155.6 KZT/USD to 185 KZT/USD to offset the negative balance of payments. A substantial fall in oil prices from more than $100 per barrel to less than $36 at the end of 2014 deepened the crisis since the economy is highly dependent on the export of fuel and energy products, constituting about 70% of all exports according to the Statistics Committee of Kazakhstan. In the meantime, economic sanctions imposed on

Russia, the main trading partner of Kazakhstan, as a result of the Russo-Ukrainian conflict, amplified the uncertainty in the economy. Subsequently, the government transitioned to a free-floating exchange rate regime in 2015. By the end of the year, the exchange rate decreased by another 46% against the U.S. dollar, to 342.5 KZT/USD. The crisis indeed lasted in the first quarter of 2016.

The literature analyzing external financing decisions of firms jointly is sparse. Yang (2011) discerns that presence of trade credit in a firm's balance sheets reveals additional information to banks about its financial health, mitigating the problem of informational asymmetry for banks. This implies a causal relation going in both directions. To alleviate the endogeneity problem, Yang (2011) utilizes inventory as the exclusion restriction in the bank loans regression, and size, collateral, and debt to equity ratio as the exclusion restrictions in the trade credit regression. Using the data on manufacturing firms in the United States she finds a substitutional relationship between trade and bank credit. Palacín-Sánchez et al. (2019). utilize inventories as the exclusion restriction in the bank loans regression, and long-term assets in the trade credit regression. Using data on European SMEs, they discover a substitutional relationship between trade and bank credit. In contrast to Yang (2011) and Palacín-Sánchez et al. (2019), using the data on Japanese SMEs, Uesugi and Yamashiro (2008) find a complementary relationship between trade credit and bank loans. They address the simultaneity bias via sales and the change in payment terms of trade payables as the exclusion restrictions in the bank loans regression, and responses of the banks to loan applications and requests to change the terms of loans in the trade credit regression.

To the best of my knowledge, this is the first study modeling trade and bank credit

simultaneously for large firms. The results suggest a complementary relationship between trade and bank credit. Firms with a larger amount of short-term liabilities obtain both less trade and bank credit, while long-term liabilities are complements to trade credit and a substitute for bank loans. The results also reveal that a larger amount of liquidity other than cash and short-term investment signals a good ability of the firms to repay their debt to both trade credit suppliers and financial institutions. At the same time, profitability is negatively related to both sources of financing, suggesting that the firms use a larger portion of the profits obtained for further investment into their operational activities. The differences in the behavior of capital- and labor-intensive firms are also reflected by the estimates: capital-intensive firms use more trade credit than labor-intensive ones. The size of inventory has a positive effect on trade credit, but bank loans, reflecting the differences between banks and trade credit suppliers that can use inventories as collateral. Additional analysis of the trade credit and bank loans during the 2014-15 economic crisis period suggests a decrease in the effect of the size of the labor cost on trade credit on the onset till the middle of the 2014-15 economic crisis. In 2015-16, the effect of the size of long-term assets on bank loans decreased.

2 BACKGROUND

In this section, I examine the trends in the usage of trade credit and bank loans by large firms (more than 50 workers in the period of 2010-2014, and more than 100 workers later) in Kazakhstan. Trade credit demand is measured using short-term accounts payable while

demand for bank loans is measured by the sum of short- and long-term bank loans. The yearly percentage of large firms having access to trade and bank credit over 2010-2016 is presented in Figure 1. The patterns of access to either external financing source at the extensive margin remain stable over time except for a sizeable increase in the proportion of firms having access to bank loans following the 2014-5 economic crisis.

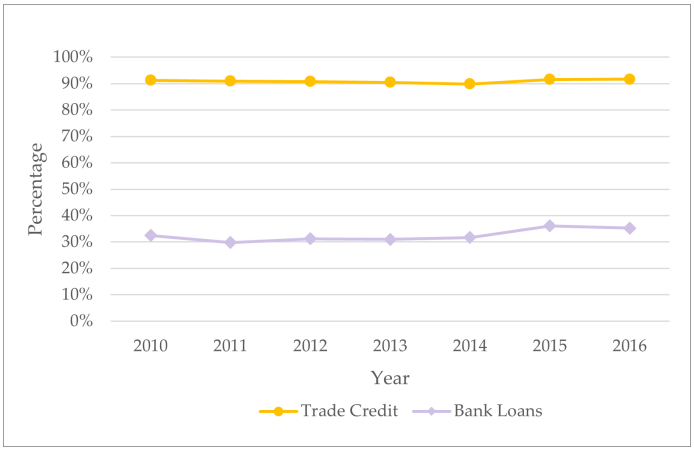

Figure 1: Percentage of Large Firms with Access to Trade and Bank Credit

The dynamics for the average sizes of trade and bank credit for the firms with access are presented in Figure 2. The data demonstrate that the average sizes of both sources of external financing remained virtually the same throughout 2010-2013. Yet, sizable increases are observed during the 2014-15 economic crisis: While the average size of the bank loans obtained increased from around 700 million KZT to almost 2 billion KZT the average size of the trade credit almost doubled over this short period.

To examine the relative role of trade and bank credit in firms' operations, I also present the dynamics of these two sources of external financing normalized by the sales of the firms in Figure 3. The proportion of the trade and bank credit decreased between 2010

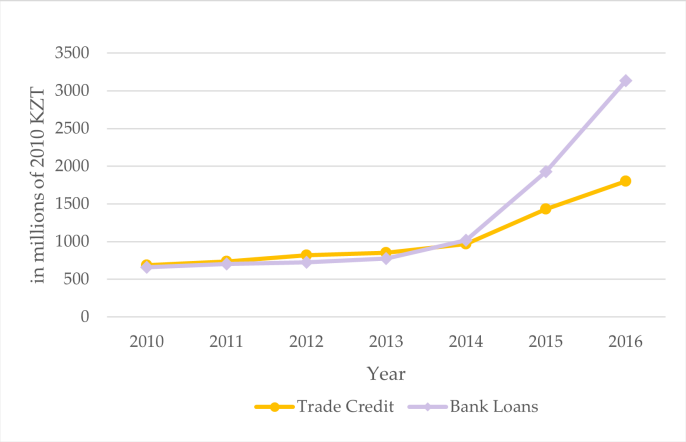

Figure 2: Average Sizes of Trade and Bank Credit for the Firms with Access

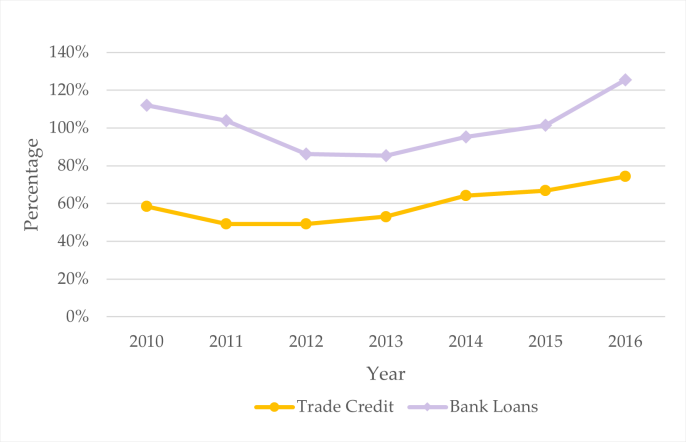

Figure 3: Average Sizes of Trade and Bank Credit with Respect to Sales for the Firms with Access

and 2012 followed by a steady increase. The numbers show that the firms with access to bank credit could secure an ample amount with respect to their revenues.

The non-parametric visualization of the conditional expectation function of the size of bank loans relative to sales given the size of trade credit relative to sales for the firms with access to both trade and bank credit is presented in Figure 4. To that end, I group the data into 100 equally sized bins with each point representing the mean of trade and bank credit

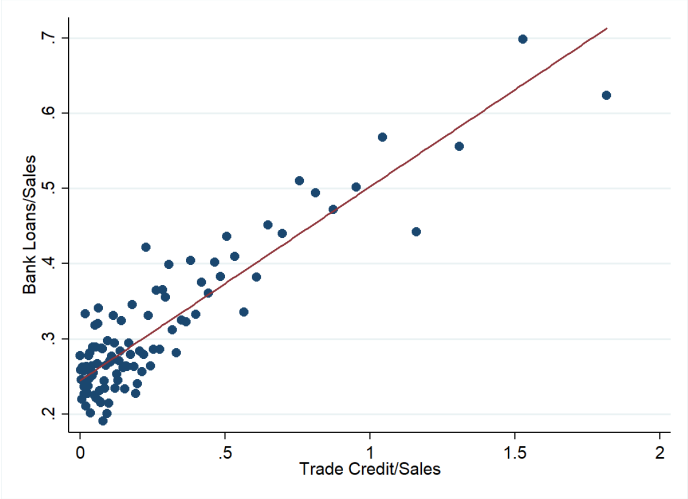

Figure 4: Trade vs. Bank Credit

over sales for that bin. Overall, there is a clear positive relationship between trade credit and bank loans.

3 DATA

For this study, I use the confidential administrative panel data of large firms provided by the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan. The data cover the period of 2010-2016 and exclude educational and medical organizations, banks, and public associations. Until 2014, large firms were defined as organizations with more than 50 employees. In 2015, the agency revised its cutoff for the definition of big firms to more than 100 employees. The data contain information on balance sheet components and some firm-level characteristics including firm size, industry, and location. There is a total of 38,211 firm-year observations out of 13,591 firms. I first drop 1015 firm-year observations including mainly inactive but still registered firms having revenue of less than 10 million the

year 2009 KZT, corresponding to around 65,000 USD. Additionally, I drop 465 observations with inconsistencies in the variables of interest. My working sample consists of 8,661 firms with a total of 35,435 observations.

The set of the determinants of the demand for trade and bank credit includes the ability of firms to obtain external and internal financing, creditworthiness, and inventory. Demand for trade credit is measured using the short-term (up to one year) accounts payable, which includes other sources of external financing such as leasing and outsourcing. The size of bank loans is measured via the sum of short- and long-term bank loans.

The potential of the firms to obtain external financing is controlled using three variables: bank loans or trade credit as the endogenous variables in each other's equations, short-term liabilities except for trade and bank credit (ST Liabilities), and long-term liabilities excluding bank credit (LT Liabilities). These variables also capture other informal financing, tax liabilities, social security payments, and dividends.

To measure the effect of the firm's ability to generate internal financing, I use Profitability and Liquidity. According to pecking order theory the firms generating higher profits tend to use it to finance the firm's operational activities and use less external financing. The liquidity is measured using 3 variables: cash-in-hand, short-term financial investment, and other liquidity. Among them, short-term financial investment is utilized as an exclusion restriction for the trade credit equation. As mentioned earlier, short-term financial investment is observed by banks in the process of screening debtors' financial statements and can signal a firm's creditworthiness. Yet, trade credit suppliers have limited information about the

financial investments of their creditors. Cash is utilized as an exclusion restriction for the bank loans equation. Since it can easily be diverted away the amount of cash does not have any informational value for banks, thus may not determine the size of bank loans obtained. At the same time, the cash in the customer's hands acts as a proxy for the amount of the operational activities of the firm, which can easily be observed by trade credit suppliers due to their informational advantages over financial institutions. Firms involved in a large number of operational activities have a better ability to repay trade credit on time. The variable Other Liquidity captures advance payments received for the supply of assets and input goods and services, deferred expenses for leasing and insurance, and other liquid assets of the firm. This variable might either negatively or positively affect the sizes of trade and bank credit secured. A negative association to both sources of financing might stem from the firms' willingness to finance their operational activities with their liquid resources rather than external financing. On the other hand, smaller size of Other Liquidity might signal that a firm is more prone to a default risk implying that it might find it difficult to attract both trade and bank credit.

Inventory is also used as a determinant of both sources of financing. This variable consists of the stock of the raw materials along with finished and unfinished goods. Inventory is expected to be either positively or negatively related to trade credit. A positive relationship is suggested by the fact that trade credit suppliers might consider inventories as collateral since they can be easily liquidated by trade credit suppliers in case of default of its customer. All variables mentioned above are normalized by the sales of the firm.

To control for the creditworthiness, I use the logarithms of the sizes of long-term

Table 1: Variable Definitions	
Variable	**Definition**
Accounts Payable	Short-term payables/Sales
Bank Loans	(Short-term bank loans + Long-term bank loans)/Sales
Short-Term Liabilities	(Short-term liabilities - Short-term bank loans and payables) /Sales
Long-Term Liabilities	(Long-term liabilities - Long-term bank loans)/Sales
Profitability	Gross profit/Sales
Cash	Cash-in-hand/Sales
Short-Term Investment	Short-Term Investment /Sales
Other Liquidity	Other Liquidity/Sales
Inventory	Inventory/Sales
Size (Long-term Assets)	log (Long-term assets – Intangible assets)
Size (Labor Cost)	log (Labor cost)
Size (Intangible Assets)	log (Intangible assets)

tangible assets excluding, labor cost, and intangible assets. Utilizing both the sizes of long-term assets and labor cost is required to examine the differences in the patterns of external financing of both capital- and labor-intensive firms. The size of intangible assets is used as an exclusion restriction for bank loans. This variable consists of the set of non-monetary assets with no physical form, which can be used as inputs for production or in operational activities of the firm. Being specific to firms' activities, intangible assets cannot be easily liquidated by banks, thereby should not alter the relative size of bank loans firms can secure. Since the trade credit mechanism is mainly related to the real inputs, firms using more intangible inputs, controlling for other factors should acquire relatively less trade credit with respect to their revenue. These variables are normalized to the value of KZT in the year 2010 using the consumer price index (CPI). The definitions of the variables of interest can be viewed in Table 1.

Table 2: Summary Statistics

Variable	Obs.	Mean	Std.Dev.	Min	Median	Max
Accounts Payable	35,435	0.530	2.160	0.000	0.100	88.610
Bank Loans	35,435	0.320	1.780	0.000	0.000	62.290
Short-Term Liabilities	35,435	0.260	1.400	0.000	0.040	68.840
Long-Term Liabilities	35,435	0.310	2.230	0.000	0.000	100.670
Profitability	35,435	0.250	0.500	-20.750	0.190	1.000
Cash	35,435	0.100	0.530	0.000	0.020	29.730
Short-term Investment	35,435	0.020	0.420	0.000	0.000	34.160
Other Liquidity	35,435	0.120	0.700	0.000	0.010	39.740
Inventories	35,435	0.280	0.790	0.000	0.090	31.870
Size (Long-term Assets)	35,435	11.450	3.180	0.000	11.830	21.460
Size (Labor Cost)	35,435	11.600	1.380	0.000	11.500	18.390
Size (Intangible Assets)	35,435	3.920	3.750	0.000	4.090	17.100

The summary statistics is presented in Table 2. It can be seen that the average ratio of accounts payable to sales is substantially larger than the mean of bank loans. The average sizes of short- and long-term liabilities and the average sizes of labor cost and long-term assets are almost identical. The size of intangible assets, on the other hand, is substantially smaller, with the largest figures being almost similar to other measures of size. The average size of cash-in-hand constitutes about 10% of firm sales while the average size of short-term financial investment is the only 2.3% of the sales.

I next provide the summary statistics for the observations deleted from the sample due to inconsistencies. Outlier values are compared to other items reported by the firm over the course of its existence and are dropped in case of their extreme divergence. I report the summary statistics of the observations excluding the inconsistent item responses for each variable of interest in Table 3. In contrast to the working sample, the average values of the variables reported as the ratio of a firm's sales are considerably larger in absolute terms from

Table 2b: Summary Statistics of dropped observations						
Variable	**Obs.**	**Mean**	**Std.Dev.**	**Min**	**Median**	**Max**
Accounts Payable	371	4.520	6.990	0.000	0.920	29.280
Bank Loans	355	1.520	4.140	0.000	0.000	19.990
Short-Term Liabilities	389	1.980	3.510	0.000	0.280	18.220
Long-Term Liabilities	352	1.350	3.630	0.000	0.000	19.290
Profitability	443	-0.250	2.030	-9.840	0.200	1.000
Cash	315	0.360	0.950	0.000	0.030	8.870
Short-term Investment	315	0.110	0.760	0.000	0.000	8.060
Other Liquidity	315	1.070	1.950	0.000	0.070	9.160
Inventories	409	2.230	3.800	0.000	0.570	19.780
Size (Long-term Assets)	465	13.590	2.960	0.000	13.740	21.570
Size (Labor Cost)	465	11.220	1.590	0.000	11.260	15.460
Size (Intangible Assets)	465	5.240	4.250	0.000	5.790	15.410

those in the working sample. On the other hand, the sizes of long-term and intangible assets along with the labor cost that is not scaled by the sales of the firm are close to the working sample figures. This suggests that a part of inconsistent data comes from the small size of sales reported. For a major part of observations, extreme values are reported at the beginning or the end of the firm's life. For this reason, these items are deleted from the sample without imputing them.

4 MODEL

To analyze the external financing decisions jointly, I model the decisions of the firms to obtain trade and bank credit in a simultaneous equations setting. The econometric model which consists of separate equations for trade credit and bank loans normalized by sales is presented below.

Model I:

$$\frac{Trade\ Credit_{it}}{Sales_{it}} = \theta^{BL}\frac{Bank\ Loans_{it}}{Sales_{it}} + \gamma^{TC}Z_{it}^{TC} + \underline{\beta_n}X_{it} + \underline{\beta_{yr}}YR_t + \alpha_i^{TC} + \varepsilon_{it}^{TC}$$

$$\frac{Bank\ Loans_{it}}{Sales_{it}} = \theta^{TC}\frac{Trade\ Credit_{it}}{Sales_{it}} + \gamma^{BL}Z_{it}^{BL} + \underline{\beta_n}X_{it} + \underline{\beta_{yr}}YR_t + \alpha_{it}^{BL} + \varepsilon_{it}^{BL}$$

The dependent variables, trade credit and bank loans scaled by sales, also appear as the regressors in each other's equations. X_{it} represents the vector of determinants of trade and bank credit capturing includes the measures of external and internal financing, firm size, and inventory. To capture the differential effect of firm size on the amount of trade (bank) credit obtained I include the interaction terms of firm size measures (long-term assets and labor cost) with the two external sources of financing. Since other sources of external financing also have an effect on the relationship between trade and bank credit, the interaction terms between trade (bank) credit and short- and long-term liabilities. The differential effect of inventory on trade (bank) credit is captured by the interaction term of either source of external financing with inventory. The effect of inventory might also depend on the firm size and other sources of external financing. To account for this effect, I utilize the interactions of inventory with sizes of long-term assets and labor costs and short- and long-term liabilities. The differential effect of firm size on other sources of external financing is captured by the interactions of long-term assets and labor costs with short- and long-term liabilities.

To account for the simultaneity problem, I introduce the exclusion restrictions represented by Z_{it}^{TC} and Z_{it}^{BL}. Z_{it}^{TC} represents the exclusion restrictions for bank loans equation and includes cash-in-hand and the logarithm of the size of intangible assets. Cash-in-hand

should have no impact on the size of the bank loans secured due to its low informational value for the financial institutions since it can easily be diverted away. On the other hand, the amount of cash in customers' hand have implications on their operational activities and their ability to repay trade credit on time. The second exclusion restriction, intangible assets consist of a set of non-monetary assets with no physical form which can be used as inputs for production or operational activities. These assets should not affect the size of the secured bank loans since they are very specific for firm activities and cannot be easily liquidated by banks. Moreover, a higher level of intangible assets makes it difficult for banks to assess the value of the firm (Nielen 2016). Since the mechanism of trade credit is mainly linked to the use of real inputs, firms with more intangible inputs, controlling for other factors, should obtain less trade credit with respect to their sales. Z_{it}^{BL} includes the size of short-term financial investment scaled by the sales of the firm. Since the firms supplying trade credit are not financial organizations, they have a limited set of information about the financial investments of their creditors. Therefore, the size of short-term financial investment does not alter the size of the secured trade credit. On the other hand, banks, observing the financial statements of their customers, view short-term financial investments as a good signal of creditworthiness.

The year dummies are captured by the vector YR with its parameters $\underline{\beta_{yr}}$. Since the data has a panel structure the analysis is performed using fixed-effects models, allowing to control for unobservable firm-level heterogeneity that is fixed over the years, $\alpha_i^{BL(TC)}$. $\varepsilon_{it}^{TC(BL)}$ represents the error terms in both regressions. Due to the unavailability of the tools for the estimation of the simultaneous equations accounting for the panel structure

Model II:

$$\frac{Trade\ Credit_{it}}{Sales_{it}} = \theta^{BL}\frac{Bank\ Loans_{it}}{Sales_{it}} + \underline{\theta^{BL}_{CY_j}} CY_j * BL_{it} + \gamma^{TC} Z^{TC}_{it} + \underline{\gamma^{TC}_{CY_j}} CY_j * Z^{TC}_{it} + \underline{\beta_{FI,CY_j}} CY_j * FI_{it} + \underline{\beta_{FS,CY_j}} CY_j * FS_{it} + \underline{\beta_n} X_{it} + \underline{\beta_{yr}} YR + \alpha^{TC}_i + \varepsilon^{TC}_{it}$$

$$\frac{Bank\ Loans_{it}}{Sales_{it}} = \theta^{TC}\frac{Trade\ Credit_{it}}{Sales_{it}} + \underline{\theta^{TC}_{CY_j}} CY_j * TC_{it} + \gamma^{BL} Z^{BL}_{it} + \underline{\gamma^{BL}_{CY_j}} CY_j * Z^{BL}_{it} + \underline{\beta_{FI,CY_j}} CY_j * FI_{it} + \underline{\beta_{FS,CY_j}} CY_j * FS_{it} + \underline{\beta_n} X_{it} + \underline{\beta_{yr}} YR + \alpha^{BL}_{it} + \varepsilon^{BL}_{it}$$

of the data, I estimate trade credit and bank loans performing 2 separate regressions for trade credit and bank loans, treating exclusion restrictions as instrumental variables. I next analyze the behavior of financially constrained, illiquid, and capital/labor-intensive firms during the 2014-15 economic crisis. Specifically, the analysis captures the changes in the patterns of trade and bank credit financing of such firms in 2014, 2015, and 2016. Let CY_j denote those years, FI denotes the vector of financial indicators including bank loans (trade credit, short- and long-term liabilities, and other liquidity) and FS denotes the vector of the firm size measures SizeLA and Size LC. To account for the changes in the behavior in crisis periods, I augment the existing econometric model by the interactions of bank loans (trade credit), financial indicators FI, and size measures FS with crisis years CY_j. $\theta^{TC}_{CY_j}$ and $\theta^{BL}_{CY_j}$ are the parameters for the interaction terms of trade or bank credit with economic crisis years and $\beta_{FI,CY_j}$and β_{FS,CY_j} are the vectors of parameters for the interactions of crisis years with other financial indicators and size measures. Only highly significant interaction terms are used for the estimation. To mitigate the endogeneity arising from the interactions of trade and bank credit with crisis years, I use the interactions of the exclusion restrictions Z^{TC}_{it} and Z^{BL}_{it}.

5 RESULTS

Table 4 provides the 2SLS estimates, taking the simultaneous nature of external financing decisions into account along with the regular fixed effects estimates, including the exclusion restrictions back in the equations, to provide evidence on the rank condition while exposing the consequences of ignoring the simultaneity bias. Panels A and B provide the estimates of the trade credit and bank loans regressions, respectively, along with non-trivial average marginal effects (AMEs).

The relationship between bank and trade credit is also estimated using a set of first-differences regressions. The regression model along with the results of the estimations are provided in Appendix. The estimates exhibit notable differences from the results of fixed effects regression, suggesting a substitutional relationship between trade and bank credit. A divergent implication of the exclusion restrictions is also reflected in the first-difference estimates. There is a qualitative and quantitative difference in the effects of other determinants of trade and bank credit including long- and short-term liabilities, profitability, other liquidity, long-term assets, and inventory.

These differences might stem from the violation of strict exogeneity assumption. Since the estimated results tend to have less bias in case of violation of strict exogeneity assumption, I choose to resort to the fixed effects model. To test it, I perform a set of fixed effect regressions, augmenting the existing model with the forward values of the variables of interest. The results indeed confirm the violation: the forward values of the size of long-term assets and long-term liabilities are statistically significant for trade and bank credit,

respectively. Along with this, I also test if there is a serial correlation in the change in idiosyncratic errors Δu for both trade credit and bank loans. The results confirm that the serial correlation in Δu is negative for both sources of financing, suggesting that using the fixed effects model is more efficient.

Comparing the estimated marginal effects of the trade (bank) credit determinants in the 2SLS regression to FE regression reveal no qualitative differences. Yet, there are sizeable changes in the estimated magnitudes. In the trade credit regression, while the marginal effects of bank loans and short-term liabilities are estimated to be around 50% less once the simultaneity is accounted for the magnitude of long-term liabilities is estimated to be three times larger. There are no sizable changes in the effects of other determinants when the simultaneity is accounted for. Mitigating simultaneity bias does also alter the magnitude of some estimates of the bank loan determinants. While the marginal effect of trade credit on bank loans doubles the magnitude of the estimate of short-term liabilities shrinks by about 43 %. A similar change is observed for the estimate of profitability. The marginal effects of the sizes of long-term assets and labor cost are affected as well: while the estimates of the size of long-term assets decrease by about 55% the coefficient of labor cost almost doubles. Such sizable changes in the magnitudes demonstrate the importance of accounting for the simultaneity bias. Due to the increase in the standard errors, which is a typical cost of performing 2SLS regressions the estimation is less precise. Short- and long-term liabilities lose their statistical significance in trade credit regression, whereas no interaction term remains significant in bank loan regression. The number of highly significant interaction terms also decreases substantially. Only the interaction of short-term liabilities

Table 4: Regression Results of Model 1

	Panel A: Trade Credit				Panel B: Bank Loans		
Variables	FE	AME	2SLS	AME	FE	AME	2SLS
BL (TC)	0.800***	0.303***	0.160		0.135***	0.069***	0.099
	(0.051)	(0.013)	(0.165)		(0.048)	(0.007)	(0.457)
ST Liabilities (STL)	-0.277***	-0.111***	-0.057	-0.062	0.748***	-0.212***	-0.130
	(0.057)	(0.015)	(0.038)	(0.038)	(0.061)	(0.013)	(0.083)
LT Liabilities (LTL)	-0.332***	0.022	0.071**		0.267***	-0.051***	-0.061
	(0.064)	(0.019)	(0.028)		(0.051)	(0.015)	(0.051)
Profitability (PR)	-0.167***		-0.187**		-0.122***		-0.089
	(0.029)		(0.075)		(0.023)		(0.108)
Cash	0.160***		0.173**		0.002		
	(0.024)		(0.079)		(0.018)		
Short-Term	-0.019				0.388***		0.404**
Investment (STI)	(0.029)				(0.022)		(0.178)
Other Liquidity (OLIQ)	0.439***		0.451***		0.444***		0.422
	(0.019)		(0.132)		(0.015)		(0.284)
Inventory (INV)	2.878***	0.831***	0.870***	0.865***	-0.742***	0.416***	0.346
	(0.130)	(0.027)	(0.140)	(0.139)	(0.087)	(0.021)	(0.360)
SizeLA (SLA)	0.022***	0.017**	0.021**		0.002	0.044***	0.022
	(0.007)	(0.007)	(0.009)		(0.006)	(0.006)	(0.014)
SizeLC (SLC)	-0.160***	-0.204***	-0.233***		-0.026	-0.073***	-0.127
	(0.022)	(0.021)	(0.047)		(0.017)	(0.017)	(0.125)
SizeINT (INT)	-0.015***		-0.015***		0.004		
	(0.006)		(0.006)		(0.004)		
BL (TC)*STL	0.003***				-0.006***		
	(0.001)				(0.001)		
BL (TC)*LTL	0.002***				0.004***		
	(0.001)				(0.000)		
BL (TC)*LA	-0.043***				0.022***		
	(0.004)				(0.003)		
BL (TC)*LC					-0.027***		
					(0.004)		
BL (TC)*INV	-0.037***				-0.014***		
	(0.003)				(0.001)		
STL*LA	0.015***				0.030***		
	(0.004)				(0.003)		
STL*LC					-0.112***		
					(0.005)		
STL*INV	-0.011***		-0.018***		-0.004***		
	(0.001)		(0.003)		(0.001)		
LTL*LA	0.017***				-0.018***		
	(0.004)				(0.004)		
LTL*LC	0.014***				-0.010***		
	(0.003)				(0.002)		
LTL*INV	-0.008***				-0.007***		
	(0.002)				(0.001)		
INV*LA					0.102***		
					(0.007)		
INV*LC	-0.175***						
	(0.012)						
year 2011	0.021		0.018		0.015		0.012
	(0.032)		(0.021)		(0.025)		(0.024)
year 2012	0.042		0.054**		0.011		0.014
	(0.032)		(0.024)		(0.025)		(0.039)
year 2013	0.081**		0.096***		0.021		0.027
	(0.032)		(0.030)		(0.025)		(0.058)
year 2014	0.206***		0.223***		0.050*		0.059
	(0.033)		(0.047)		(0.026)		(0.111)
year 2015	0.214***		0.231***		0.100***		0.108
	(0.037)		(0.045)		(0.029)		(0.125)
year 2016	0.261***		0.284***		0.208***		0.200
	(0.038)		(0.066)		(0.029)		(0.153)
Constant	1.751***		2.598***		0.400**		1.340
	(0.253)		(0.269)		(0.200)		(1.000)
Observations	35,435	35,435	35,435	35,435	35,435	35,435	35,435

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

with inventories in trade credit regression is highly significant.

The results of fixed effects regressions also stress the validity of chosen exclusion restrictions. While the effect of the cash-in-hand is sizable and significant in trade credit regression, it is estimated to barely impact bank loans. A similar result is obtained with respect to the size of intangible assets as well with a larger and significant effect on trade credit and almost no effect on bank loans. Regarding short-term investment, it has a positive and highly significant effect on bank loans and is estimated to have no effect on trade credit.

The estimates point out a positive relationship between the two main sources of external financing suggesting complementarity, which is in line with the results obtained by Cook 1999 in the context of the firms from Russia, one of the biggest transition economies. She states that this relationship between trade and bank credit confirms the signaling role of trade credit to financial institutions. The effects of other sources of external financing differ for trade and bank credit. While firms with a larger amount of other short-term financing use both less and bank credit, long-term liabilities are estimated to be complements with trade credit but substitute for bank loans.

The effect of profitability is negative for both sources of financing, with a higher magnitude in trade credit regression. This might suggest that the firms use a larger portion of the profits obtained for further investment into their operational activities. The same relationship of profitability is confirmed by Oh and Kim 2016 in the context of Chinese firms. A positive relationship with both sources of financing is estimated for other liquidity as well, suggesting that this variable reflects the ability of firms to repay their debt.

The results exhibit a positive effect of the size of long-term assets on both trade and bank credit, which are in line with the studies of the firms from the countries with transition economies (Oh and Kim (2016), Van Horen (2004)). Labor cost is estimated to have an opposite effect on both trade and bank credit. Once the simultaneity is accounted for the effects remain significant for trade credit only. The opposite effects of the sizes of long-term assets and labor costs can be explained by the nature of the trade credit mechanism. Since the trade credit is primarily based on the transactions involving real goods and services, labor-intensive firms are less likely to use trade credit mechanisms to finance their operational activities, which explains its positive association to trade credit.

Inventories are estimated to be positively related to both sources of financing. The results demonstrate that after simultaneity bias is accounted for the coefficient of inventory remains highly significant for only trade credit regression. The same relationship of inventory to trade credit is obtained by Oh and Kim 2016 in the context of Chinese firms. The relatively strong effect of inventories on trade credit in comparison with the effect of the variable on bank loans reflects the differences in the natures of trade and bank credit. The fact that trade credit is provided by the non-financial firms in terms of goods and services implies that both customer and supplier firms operate in related industries. Therefore, in case of a failure of the customer firm to repay its debt, inventories may be utilized by the supplier firms in further operations, either being resold or used in production. At the same time, financial institutions have fewer chances to take advantage of the collateral in the form of stocked or unfinished goods.

Table 5: Effect of Economic 2014-15 Crisis on Trade Credit and Bank Loans

	Panel A: Trade Credit				Panel B: Bank Loans			
Variables	FE	AME	2SLS	AME	FE	AME	2SLS	AME
TC (BL)	0.086***	0.129***	0.291*	0.128	0.057***	0.072***	0.233	0.250
	(0.011)	(0.008)	(0.157)	(0.194)	(0.008)	(0.006)	(0.328)	(0.264)
year2014*TC (BL)	0.080***		-0.642*		0.005		0.385	
	(0.015)		(0.376)		(0.009)		(0.375)	
year2015*TC (BL)	0.146***		0.193		0.037***		-0.346	
	(0.020)		(0.129)		(0.012)		(0.254)	
year2016*TC (BL)	0.131***		-0.716		0.097***		-0.107	
	(0.017)		(0.675)		(0.010)		(0.357)	
ST Liabilities (STL)	-0.154***		-0.146***		-0.300***	-0.175***	-0.096	
	(0.011)		(0.046)		(0.011)	(0.009)	(0.067)	
year2014*STL					0.426***			
					(0.016)			
year2015*STL					0.247***			
					(0.023)			
year2016*STL					0.258***			
					(0.015)			
LT Liabilities (LTL)	0.078***		0.075**		-0.070***	-0.068***	-0.067	
	(0.006)		(0.029)		(0.007)	(0.005)	(0.045)	
year2014*LTL					-0.014			
					(0.009)			
year2015*LTL					-0.000			
					(0.010)			
year2016*LTL					0.034***			
					(0.010)			
Profitability (PR)	-0.210***		-0.227***		-0.065***		-0.041	
	(0.030)		(0.081)		(0.023)		(0.082)	
Cash	0.249***		0.133		0.064***			
	(0.027)		(0.082)		(0.021)			
year2014*Cash	-0.207***				0.025			
	(0.049)				(0.038)			
year2015*Cash	-0.003				-0.364***			
	(0.087)				(0.067)			
year2016*Cash	-0.515***				-0.308***			
	(0.068)				(0.054)			
Short-Term Investment (STI)	0.037				0.451***		0.406**	
	(0.029)				(0.022)		(0.189)	
Other Liquidity (OLIQ)	0.464***		0.452***		0.675***		0.398*	
	(0.032)		(0.168)		(0.025)		(0.206)	
year2014*OLIQ	-0.189***				-0.441***			
	(0.046)				(0.037)			
year2015*OLIQ	-0.132***				-0.227***			
	(0.049)				(0.039)			
year2016*OLIQ	0.107***				-0.389***			
	(0.040)				(0.032)			
Inventory (INV)	0.728***		0.780***		0.365***		0.197	
	(0.019)		(0.158)		(0.015)		(0.210)	
SizeLA (SLA)	0.018**	0.029***	0.023**		0.018***	0.028***	0.011	0.008*
	(0.008)	(0.007)	(0.010)		(0.006)	(0.006)	(0.012)	(0.004)
year2014*SLA	0.041***				0.016**		-0.004	
	(0.010)				(0.007)		(0.016)	
year2015*SLA	0.017				0.026***		0.037***	
	(0.013)				(0.008)		(0.013)	
year2016*SLA	0.023				0.042***		0.047***	
	(0.014)				(0.009)		(0.016)	
SizeLC (SLC)	-0.223***	-0.262***	-0.240***	-0.037***	-0.121***		-0.077	
	(0.023)	(0.021)	(0.059)	(0.011)	(0.016)		(0.073)	
year2014*SLC	-0.107***		-0.098***					
	(0.022)		(0.034)					
year2015*SLC	-0.089***		-0.051*					
	(0.028)		(0.029)					
year2016*SLC	-0.106***		-0.149**					
	(0.028)		(0.072)					
SizeINT (INT)	-0.012**		-0.016**		0.003			
	(0.006)		(0.007)		(0.004)			
year 2011	0.019		0.022		0.013		0.008	
	(0.032)		(0.021)		(0.025)		(0.023)	
year 2012	0.060*		0.065***		0.015		0.002	
	(0.032)		(0.025)		(0.025)		(0.032)	
year 2013	0.109***		0.115***		0.034		0.008	
	(0.033)		(0.032)		(0.025)		(0.046)	
year 2014	1.031***		1.581***	0.233***	-0.169**		-0.159	-0.004
	(0.222)		(0.502)	(0.052)	(0.082)		(0.097)	(0.004)
year 2015	1.090***		0.775**	0.247***	-0.228**		-0.178	0.064
	(0.289)		(0.380)	(0.052)	(0.106)		(0.152)	(0.086)
year 2016	1.283***		2.380**	0.423***	-0.367***		-0.358**	0.123
	(0.293)		(1.146)	(0.134)	(0.116)		(0.148)	(0.100)
Constant	2.595***		0.022		1.346***		1.378	
	(0.260)		(0.021)		(0.191)		(1.016)	
Interactions	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
Observations	35,435	35,435	35,435	35,435	35,435	35,435	35,435	35,435

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The coefficients of the year dummies remain statistically significant for only trade credit regression, once the model accounts for the simultaneity bias. The results show an increase in the size of trade credit compared to the year 2010. It can also be noted that the firms were relying more on trade credit in the period of the 2014-16 economic crisis.

As mentioned, to assess the behavior of financially constrained, illiquid, and capital/labor-intensive firms during the periods of financial downturns, I perform another set of estimates including the interactions of financial indicators (bank and trade credit, short- and long-term liabilities, cash, short-term investment, and other liquidity) and size measures (SizeLA, SizeLC, and SizeINT) in economic crises periods on bank and trade credit. The results are presented in Table 5.

As can be seen, the majority of the estimates are not different from the previous ones, exhibiting a positive relationship between trade and bank credit. The results show a decrease in the effect of the bank loans on trade credit in the beginning and the final part of the 2014-15 economic crisis. In 2015, the complementarity effect was stronger, yet bank loans regression exhibit an opposite result with a decrease of the effect of trade credit in 2015 and strengthening of complementarity in 2014. The effect of the size of the labor cost on trade credit decreased from the onset till the middle of the 2014-15 economic crisis. There is also an increase in the effect of the size of long-term assets on the size of bank loans secured in the middle and the final part of the economic downturn.

6 CONCLUSION

The relationship of trade credit with bank loans has received special attention in the trade credit literature. In a wide array of studies, it is modeled as a sequential one with an explicit or implicit reference to pecking order theory, according to which the size of trade credit is determined only after observing the size of secured bank credit. Such reasoning suggests that bank loans serve as a determinant of trade credit, but not vice versa. Nevertheless, the joint existence of trade and bank credit can be grounded by few studies. Two sources may coexist because of informational asymmetries: comparing to financial institutions that incur monitoring costs, trade credit suppliers possess an ability to obtain a more extensive set of information about the debtors observing their activities during the normal course of the business relationship or the credit terms chosen. In this case, the two sources of financing may be determined jointly.

In this paper, I study the relationship between trade credit and bank loans accounting for the simultaneous nature of the problem, modeling them in a two-equation system that allows trade and bank credit to appear as the determinants of each other. The estimation is performed using the 2SLS method treating exclusion restriction as instruments. The exclusion restriction for the trade credit equation is the size of short-term financial investment. Since trade credit suppliers are non-financial organizations, they have limited information about the financial investments of their creditors, whereas the banks that can observe the financial statements of their customers view the short-term financial investment as a signal of creditworthiness. Cash-in-hand and the size of intangible assets are used as exclusion re-

strictions for the bank loans equation. Cash-in-hand should not alter the size of bank loans due to the possibility to be easily diverted away, thus it has no informational value for the financial institutions in the process of the assessment of the customer's creditworthiness. In contrast, the amount of cash reflects the scope of operational activities customer firms are involved in, which can easily be observed by trade credit suppliers due to their informational advantages. Regarding intangible assets, since they are very specific to the activities of a firm and cannot be easily liquidated by banks, they should not affect the size of bank loans obtained. At the same time, due to the nature of trade credit that is related to the use of real inputs, firms with a larger amount of intangible assets should use less trade credit.

For my analysis, I use confidential administrative panel data of large firms provided by the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan that covers the period of 2010-2016. The results show that the two sources of financing are indeed determined simultaneously: along with 2SLS regressions, I also obtain fixed effects estimates that differ from 2SLS. Accounting for the simultaneity bias alters the coefficients for external financing, increasing the magnitude of the estimates for short-term liabilities in trade credit and decreasing the one in bank credit regression. The effect of long-term liabilities changed only in the case of trade credit. The estimates of profitability and sizes of long-term assets and labor cost decrease for bank loans. The validity of the exclusion restrictions is also shown in the estimates as being statistically insignificant for the irrelevant and highly significant for the relevant regressions.

Overall, the results exhibit a complementary relationship between the two sources of financing. Accounting for simultaneity bias decreases the coefficient of trade credit in

bank loans regression, whereas the estimate for bank loans doubles. The effects of other external financing are different for both bank and trade credit: firms with more short-term liabilities obtain a larger amount of both sources of financing. At the same time, long-term liabilities are a complement to bank loans and substitute for trade credit. The firms with a higher amount of other liquidity obtain both more trade and bank credit, whereas more profitable are estimated to use a larger portion of the profits obtained for further investment into their operational activities.

The estimates for the sizes of fixed asset and labor cost and the estimates of inventory stress the differences in the natures of both sources of financing. The effects of sizes of long-term assets and labor cost remain significant for only trade credit regression once the simultaneity is accounted for. Moreover, the signs of these variables are opposite: highly labor-intensive firms use less trade credit relative to capital-intensive ones reflecting the nature of the trade credit mechanism. Regarding inventories, once the simultaneity bias is mitigated the coefficient has a statistically significant positive influence on only trade credit.

Since the dataset used covers the period of 2010-2016, it also includes the information of the 2014-15 economic crisis that happened due to a sharp drop in oil prices and sanctions against Kazakhstan's main trading partner Russia which resulted in an extreme devaluation of national currency. To examine the effect of this economic downturn on the behavior of financially constrained, illiquid, and capital/labor-intensive firms, I perform another set of estimations that include the interactions of financial indicators and size measures with the years of 2014-15 economic crisis. The results suggest a decrease in the effect of the size of labor cost on trade credit in 2014. The effect of the size of long-term assets increases

in 2015-16.

To capture the structural differences in the patterns of usage of trade and bank credit by Kazakhstani firms, the future analysis should consider the relationship between the two sources of financing for the firms from each economic sector or region. Additionally, since the data covers two major economic crises in Kazakhstan, the analysis might also have useful implications for the economic consequences of the COVID-19 pandemic. Therefore, this study should further be extended with the effects of the pandemic.

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7 Appendix

Model A1: First-Differences Model

$$\Delta \frac{Trade\ Credit_{it}}{Sales_{it}} = \theta^{BL} \Delta \frac{Bank\ Loans_{it}}{Sales_{it}} + \underline{\beta_n} \Delta X_{it} + \underline{\beta_{yr}} YR_t + \Delta \varepsilon_{it}^{TC}$$

$$\Delta \frac{Bank\ Loans_{it}}{Sales_{it}} = \theta^{TC} \Delta \frac{Trade\ Credit_{it}}{Sales_{it}} + \underline{\beta_n} \Delta X_{it} + \underline{\beta_{yr}} YR_t + \Delta \varepsilon_{it}^{BL}$$

The dependent variables are the first differences of trade and bank credit, which also appear as the regressors in each other's equations. ΔXit represents a vector of the first differences of the determinants of trade and bank credit and includes by the measures of external and internal financing, size, inventory, intangible assets, cash, and short-term investment. The first differences of interaction terms are also controlled for. The year dummies are captured by the vector YR with its parameters $\underline{\beta_{yr}}$. $\Delta \varepsilon_{it}^{TC(BL)}$ represents the error terms in both regressions.

Table A1: Results of First-Difference Models				
	Panel A: Trade Credit		Panel B: Bank Loans	
Variables	FD	AME	FD	AME
BL (TC)	0.085*		0.066***	0.065**
	(0.048)		(0.025)	(0.025)
ST Liabilities (STL)	-0.107**		-0.157***	-0.158***
	(0.042)		(0.056)	(0.056)
LT Liabilities (LTL)	0.084**		-0.078*	
	(0.036)		(0.047)	
Cash	0.224**		0.025	
	(0.096)		(0.103)	
Profitability (PR)	-0.199**		-0.058	
	(0.082)		(0.054)	
Short-Term	0.044		0.313**	
Investment (STI)	(0.064)		(0.142)	
Other Liquidity (OLIQ)	0.469***		0.523***	
	(0.117)		(0.123)	
Inventory (INV)	3.095***	3.097***	-0.917***	-0.896***
	(0.675)	(0.676)	(0.330)	(0.324)
SizeLA (SLA)	0.018**		0.009	0.012
	(0.007)		(0.008)	(0.008)
SizeLC (SLC)	-0.128**	-0.135**	-0.094***	
	(0.064)	(0.063)	(0.029)	
SizeINT (INT)	-0.002		0.007	
	(0.006)		(0.005)	
BL (TC)*STL			-0.018***	
			(0.006)	
BL (TC)*INV				
INV*LA			0.104***	
			(0.031)	
INV*LC	-0.216***			
	(0.059)			
year 2011	-0.036*		-0.028	
	(0.019)		(0.019)	
year 2012	-0.061***		-0.056**	
	(0.022)		(0.023)	
year 2013	-0.065**		-0.066**	
	(0.027)		(0.026)	
year 2014	0.016		-0.071**	
	(0.031)		(0.028)	
year 2015	-0.024		-0.066***	
	(0.033)		(0.024)	
Constant	0.055***		0.046***	
	(0.009)		(0.007)	
Observations	35,435	35,435	35,435	35,435

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A2: Test for Strict Exogeneity				
	Panel A: Trade Credit		**Panel B: Bank Loans**	
Variables	**FE**	**AME**	**FE**	**AME**
BL (TC)	0.559***	0.256***	0.253***	0.066***
	(0.062)	(0.016)	(0.053)	(0.007)
ST Liabilities (STL)	-0.314***	-0.134***	-0.464***	-0.124***
	(0.076)	(0.021)	(0.075)	(0.014)
LT Liabilities (LTL)	-1.047***	-0.127***	1.030***	0.034**
	(0.091)	(0.027)	(0.057)	(0.017)
LTL (f1)			0.044***	
			(0.004)	
Profitability (PR)	-0.192***		-0.022	
	(0.032)		(0.021)	
Cash	0.110***		-0.009	
	(0.027)		(0.017)	
Short-Term	0.065*		0.263***	
Investment (STI)	(0.037)		(0.024)	
Other Liquidity (OLIQ)	0.407***		0.534***	
	(0.027)		(0.017)	
Inventory (INV)	4.111***	0.944***	-0.941***	0.327***
	(0.161)	(0.038)	(0.091)	(0.023)
SizeLA (SLA)	0.029***	0.040***	0.006	0.019***
	(0.008)	(0.008)	(0.005)	(0.005)
SLA (f1)	-0.045***			
	(0.014)			
SizeLC (SLC)	-0.025	-0.086***	-0.074***	-0.083***
	(0.025)	(0.025)	(0.016)	(0.016)
SizeINT (INT)	-0.011*		0.003	
	(0.006)		(0.004)	
year 2011	0.038		0.000	
	(0.029)		(0.019)	
year 2012	0.031		-0.011	
	(0.030)		(0.019)	
year 2013	0.050*		0.003	
	(0.030)		(0.019)	
year 2014	0.199***		0.047**	
	(0.034)		(0.022)	
year 2015	0.152***		0.080***	
	(0.035)		(0.022)	
Constant	0.607*		0.899***	
	(0.313)		(0.188)	
Interactions	Controlled	Controlled	Controlled	Controlled
Observations	26,397	26,397	26,397	26,397

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$