

Lines of Credit in Corporate Finance: The Case of Turkey

by

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Abstract

This paper investigates the liquidity choice between line of credit and cash for Turkish public firms. I find that firms with high cash flow rely more on bank lines of credit in their liquidity management. Nevertheless, the significance of liquidity choice differs with cash holding levels. While firms with high cash holdings and low cash flow rely more on credit lines, firms with high cash holdings and high cash flow do not. I also find, using a cash flow sensitivity of cash analysis, that reliance on bank lines of credit is a viable financial constraint measurements that distinguishes financially constraint firms from unconstrained ones.

Keywords: Line of credit, Liquidity choice, Cash flow sensitivity, Financial constraint.

Özet

Bu çalışma, Türkiye'deki halka açık firmaların kredi limiti ve nakit arasındaki kurumsal likidite seçimlerini incelemektedir. Bulunan sonuçlar, yüksek nakit akışı olan firmaların likidite yönetimlerinde banka finansmanını tercih ettiklerini göstermektedir. Bununla birlikte, likidite seçimindeki anlamlılık düzeyi nakit seviyelerine göre değişiklik göstermektedir. Düşük nakit seviyelerine sahip firmalardan düşük nakit akışı olanlar banka finansmanını tercih ederken, nakit akışı yüksek olanlarda net bir tercih yönü görülmemektedir. Nakit akışı duyarlılığı analizinin sonuçları, kredi limitiyle yaratılan ölçeklerin finansal açıdan kısıtlı olan firmaları kısıtlı olmayanlardan ayırt etmede kullanılabileceğini göstermiştir.

Anahtar Sözcükler: Kredi limiti, Likidite seçimi, Nakit akışı duyarlılığı, Finansal Kısıt Ölçeği.

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1. Introduction

In a world with perfect capital markets, firms can raise liquidity when profitable investment projects arise, and thus corporate cash holdings are irrelevant. However, if external financing costs arise due to transaction costs, asymmetric information, or incentive problems, it might be beneficial for firms to reserve cash for their future liquidity needs.

Theoretical literature in corporate finance has long emphasized the role of cash holdings as a liquidity buffer against shocks to availability of external liquidity. Firms hold cash in order to secure their operational needs and seize profitable investment opportunities during market-wide liquidity shocks. Thus, cash serves as a form of liquidity insurance. Similar opinion also brought forward for line of credit literature as cash and credit lines theoretically serve the same objective in liquidity. Nevertheless, cash and credit lines have distinct features due to the conditional structure of credit lines by nature. Credit lines provide conditional liquidity as they are available as long as banks willing to supply lending, while cash provides unconditional liquidity that is available for anytime use for firms. Therefore, it may be the case that firms utilize these two sources of liquidity for different purposes in their corporate liquidity management.

Sufi (2009) investigates the firm choice between line of credit and cash for the first time in literature. He finds that firms with high cash flow rely more on credit lines relative to cash in their liquidity management. This finding suggests that these two sources of corporate liquidity are not perfect substitutes. This paper follows in the footsteps of Sufi (2009) and analyzes the liquidity choice between line of credit and cash for Turkish public firms. Empirical construction focus on the relation between bank liquidity to total liquidity ratio and firm characteristics variables using a dataset that contains line of credit and financial statement items for 116 Turkish public for the period between 2006-2014. The most prominent feature

of firm characteristics is that the average public firm in Turkey have line of credit to asset ratio above one. It appears that the Turkish banks appetite to fund public firms beyond the book value of their assets.

The key characteristic variable that draws the most attention in empirical specifications is lagged cashflow. Evidence from empirical models suggest that firms', which retain high cashflow levels prefer of lines of credit relative to cash in their liquidity management. This finding of this analysis is in parallel with Sufi (2009), who suggests that maintenance of high cash flows is a critical determinant of whether a firm uses lines of credit or cash in their liquidity management. In-depth analysis of this finding carried out by dividing sample into firms with low and high financial distress. The two financial distress variables used in the analysis are Altman (1968) zscore credit rating of firms assigned by banks. The results suggest that there is no significant relation between casflow and use of credit lines for the firms with high distress likelihood. Diversified results obtained when firms are split into two groups according to their cash holding levels. The significance between lagged cash flow and bank liquidity to total liquidity ratio vanished for high cash holding firms, whereas the significance prevailed at low cash holding levels.

In the second part of this analysis, Turkish public firms' liquidity management decision investigated conditional to financial constraints. The impact of financial constraints is captured by the firms' propensity to save cash out of their cashflows using the cashflow sensitivity of cash framework of Almeida et al. (2004). In this analysis, three financial constraints measurements created using line of credit items, in addition to financial constraint measurements of dividend, index inclusion, external dependence. The empirical results using the line of credit measurements of financial constraints show that firms that are constrained by any line of credit constraint measurement save cash out of cashflow, whereas firms that are

unconstrained by any line of credit constraint measurement do not save cash out of cashflow. None of the other financial constraint criteria give significant differentiation between constrained and unconstrained samples. This finding suggests that line of credit financial constraints adds valuable information to traditional measures for Turkish firms.

The rest of this study proceeds as follows. Section 2 focuses on the existing literature on cash as well as line of credit, Section 3 describes the line of credit and financial statement data used in empirical analysis, Section 4 provides empirical results for the liquidity choice of the firms, Section 5 analyzes the line of credit as a measure of financial constraint along with other measures, and Section 6 concludes.

2. Literature Review

2.1. Cash Literature

The existing literature related to the corporate cash holding determinants is extensive. Although there are several theoretical explanations supported by empirical data, the scope of those studies is either limited to US firms or relies upon limited international data. The most commonly studied work in the field is Keynes' (1936) transaction cost and precautionary motive for holding cash, in which firms that may face future financial constraints start to hold more cash today. There has been a lot of contribution to the topic since that time; however, recent studies also refer to Keynes' work on cash holding motives. For example, Almeida et al. (2004) argue that the link between financial constraints and a firm's demand for liquidity can help identify whether financial constraints are a considerable determinant of firm behavior. They model firms' liquidity demand using Keynes' precautionary motive for holding cash. Their findings on a particularly large sample of publicly traded manufacturing firms between 1971-2000 suggest that financially unconstrained firms do not respond to macroeconomic shocks by

changing their propensity to save cash out of cash inflows; on the contrary, financially constrained firms respond macroeconomic shocks by increasing their holdings of cash out of cash flows. Their work in the field opened new areas of inquiry regarding the responses of financially unconstrained firms' behavior in different countries and different sectors in times of macroeconomic shock.

The trade-off theory of capital states that firms decide on their debt and equity financing by considering both costs and benefits. There is a tax benefit of debt financing; however, there is also a bankruptcy cost of debt financing. The static and dynamic trade-off theories draw attention in the literature. In static trade-off theory, corporate cash holding is determined by a single period trade-off between the tax benefits of debt and the deadweight costs of bankruptcy. In dynamic trade-off theories, which have found empirical support in Opler et al. (1999), corporate cash holding is determined by an adjustment towards a targeted cash level over more than one period.

In pecking order theory, firms prioritize their financing sources according to the cost of financing, preferring to raise equity as a financing means of last resort. The order of financing sources is as follows: internal funds are used first, and when those are depleted, debt is issued until it is no longer convenient to do so, at which point equity is issued. The pecking order theory postulates that the cost of financing increases with asymmetric information. Myers and Majluf (1984) claim that equity financing is a less preferred way to raise capital because when managers, who are assumed to know the true condition of the firm better than investors, issue new equity, investors believe that managers think the firm is overvalued and try to take advantage of this overvaluation. As a result, investors will assess a lower value to the new equity issuance.

The target adjustment model is a dynamic trade-off theory that predicts firms adjust their leverage level towards an optimum level. Opler et al. (1999) examine the determinants of corporate holdings of cash and marketable securities among publicly traded US firms from 1971–1994, as well as how firms change their holdings over time. They find evidence supportive of a target adjustment model. Their finding is consistent with the view that management accumulates excess cash when they have the opportunity to do so. They deduce that this behavior is consistent with Keynes' (1936) precautionary motive for holding cash. Additionally, their results indicate that firms with growth prospects, riskier firms, small firms, and firms with limited access to capital markets hold more cash than other firms.

Researchers have also investigated economies of scale in cash holdings. For example, Mulligan (1997) shows that cash balances decrease with respect to sales and that US firms with higher wages hold more cash. His evidence supports economies of scale in cash holdings and the hypothesis that time can substitute for money in transaction services. Baskin (1987) argues that corporate cash holdings may be used to take advantage of competition. John (1993) argues that when firms face high financial distress costs, they tend to hold cash extensively. Testing his argument with cross-section data of 223 large firms in 1980, he finds that firms with high market to book ratios and low tangible asset ratios tend to hold more cash. Harford (1999) investigates the acquisition policy and liquid asset holdings relation of firms. He finds that cash abundant firms make more acquisitions, most likely diversifying acquisitions, which, in turn, probably decreases shareholder wealth. This evidence supports free cash flow theory. Dittmar, Mahrt-Smith, and Servaes (2003) study cash holdings across countries and conclude that firms hold more cash in countries with lower investor protection, whereas firms are restrained to hold less cash in countries with robust investors. Alternatively, Harford, Mansi, and Maxwell (2008) show that firms with more entrenched managers actually hold less cash

than otherwise similar firms and conclude that managers would prefer to overinvest rather than maintain observably high cash levels.

A more recent work uses transaction cost motive to test whether better institutions result in lower transaction costs related with adjusting a firm's leverage. Oztekin et. al. (2009) examine the capital structure adjustment speeds in an international framework of 37 countries over 16 years. They investigate whether institutional differences help explain the differences in adjustment speeds and find that firms from countries with solid financial institutions adjust 50% faster to their targeted capital levels. They also suggest that a firm's capital structure reflects not only its own characteristics, but also the environment and traditions in which it operates.

2.2. Line of Credit Literature

Lines of credit literature in corporate finance recently gained interest in the last decades and become increasingly apparent in the studies that focus on liquidity choice of firms. Earlier studies in the field explored liquidity insurance aspect of credit lines. Boot et al. (1987) find that fixed rates on credit lines provide investment insurance against possible interest increases in their three period model with moral hazard. Similarly, Holmstrom and Tirole (1998) present line of credit as an insurance instrument against future liquidity shocks. Their model includes moral hazard between depositors, financial intermediaries and firms. In the model, firms save cash or receive credit lines from financial intermediaries to cope with the liquidity needs when they encounter idiosyncratic liquidity shocks. They find that saving cash is more expensive than credit line agreements in equilibrium. Thus, firms prefer to obtain lines of credit whenever they are available, which means that financial intermediaries can insure firms against liquidity shocks by means of credit line. More recently, Acharya et al. (2014) argue that line of credit provides monitored liquidity insurance that prevents firm from

liquidity decreasing behavior by bank monitoring and line of credit withdrawal. They find evidence for the existence of lower liquidity risk of firms rely on bank financing than the ones that rely on cash financing in their liquidity management.

Sufi (2009) is the first to empirically investigate the liquidity preference decision of firms between line of credit and cash with a dataset that contains 4503 non-financial US based firms from 1996 through 2003. He examines the factors which causes firms to prefer bank lines of credit in their corporate liquidity management. He finds strong relationship between lagged cashflow and line of credit, and suggest that high cashflow firms rely more on bank financing while firms with low cashflow or high cashflow volatility rely more on cash financing. Sufi (2009) finds that firms with high distress likelihood are able to obtain line of credit only if they also have high cashflows. He also examines violation of cashflow based financial covenants among firms and reveals that declines in cashflow result in reduction of line of credit, thus line of credit is not a substitute of cash for low cashflow firms. Additionally, Sufi (2009) provides evidence that access to line of credit is a statistically powerful measure of financial constraints than traditional measures in the literature by using the cashflow sensitivity of cash framework of Almeida et al. (2004) that is explained above in cash literature section.

Demiroglu et al. (2012) examine the impact of the changes in bank lending standards on line of credit access for public and private firms. They find private firms access to lines of credit is more contingent on market conditions than public firms and suggest that private firms face more difficulty to extend their credit lines in troublesome market conditions. Lins et al. (2010) show the areas of usage for line of credit and excess cash differs with respect to hedging targets with a survey data contains 29 countries. They find that excess cash is utilized as an insurance instrument against possible low cashflow periods, whereas firms reserve line of credit for to make use of possible future investment opportunities.

Another work in the field which uses survey data conducted by Campello et al. (2011), shed light on the role of line of credit in corporate investment during financial crisis. They find that the firms with restricted access to credit lines substitute cash for investment, while the firms with easier access to line of credit increase their investment along with cash. They also reveal that financial crisis did not fully prevent access to line of credit and investment decisions are less affected with the help of available credit lines. Ivashina and Scharfstein (2010) examine role of credit lines on bank lending during financial crisis. They show that banks with limited access to deposits and high line of credit exposure decreased their credit supply. They also show that banks, which have large co-syndicated credit lines with Lehman, reduced their lending more than others. However, they suggest that driving force of lending reduction is not solely the relationship by Lehman as banks that have co-syndicated term loans did not cut their lending as much. Thus, Ivashina and Scharfstein (2010) indicate that it is the line of credit drawdowns or the threat of such drawdowns that drives the effect of lending declines.

3. Data

The dataset used in this analysis is composed of line of credit, balance sheet, income statement, cashflow and equity market data of 116 Turkish Public firms for 2006-2014 period. I restricted my sample to 116 public firms due to unavailability of line of credit data. All firms are operating under seven sectors namely; manufacturing, administrative, energy, construction, technology, transportation and wholesale. Financial institutions such as banks, insurance companies, leasing and factoring firms are kept out of the scope in this analysis as their unique and different structure of balance sheet items. The rest of this section is as follows:

- (i) Explains data collection process of line of credit and describes used line of credit variables.
- (ii) Explains data collection process and describes financial statement variables.

3.1. Line of Credit Data

In Turkey, financial institutions periodically report credit limit and credit risk information separately for each company to Risk Center of the Banks Association of Turkey. Risk Center prepares 3 different types of report, of which the “Credit Limits, Credit Risks, Receivables To Be Liquidated” report is of interest in this analysis. The report contains such information as Credit Type, Credit Limit and Credit Risk separately for short-term (0-12 months), medium-term (12-24 months) and long-term (above 24 months) maturities. Following credit types are reported under Risk Center report for local currency (TRY) and foreign currency separately: cash credit, non-cash credit, defaulted receivables, bonds, commercial papers, leasing and factoring risks.

Dataset in this analysis contains credit limit and risk information of 116 public Turkish firms for 2006-2014 period. Credit limit and risk data are collected and consolidated from two different sources. In order to ensure consistency of the obtained data, factoring and bonds risk types are excluded in this analysis. Furthermore, any inconsistent firm-year credit risk and limit data also excluded from the dataset. Also, unlike Sufi’s (2009) sample, which includes firms with and without access to line of credit, I only considered firms that have access to line of credit in my dataset due to data restrictions.

3.2. Financial Statement Data

Financial statement items are collected quarterly for the firms in the sample for 2006-2014 period using Rasyonet’s StockGround service. There are several different financial reporting types available in StockGround such as statutory, IFRS or GAAP. With the intent to prevent any discrepancies among those reporting types, all financial statement variables are collected from StockGround’s “Financial Summary” reporting type. Only the announced/calculated financial results are taken into consideration. Additionally, all of the

financial items in the sample are reported under the currency Turkish lira. So as to sustain uniformity of financial statement items, missing firm-year data points are not compensated from any other source and excluded from the dataset.

Balance sheet items that are used in this study are Cash and cash equivalents, Total assets, Tangible fixed assets, Total liabilities (short-term + long-term liabilities), Retained earnings / (Acc. Losses) and Working capital (Inventory + short-term trade receivable – short-term trade payable). Income statement items are Net sales and EBITDA (Gross Profits + Depreciation + Amortization – Operating Expenses). Equity market items used in this analysis are Market capitalization (quarterly average), Share price (quarterly average of closing prices), Shares outstanding (MCAP/Share price) and Initial Public Offering (IPO) year.

There are also several financial ratios used throughout the analysis in this study. Leverage ratio is taken as total debt to equity. Market-to-book, cash adjusted is the market value of assets less cash divided by the book value of assets less cash balances. Net worth, cash adjusted is taken as non-cash total assets less total liabilities, divided by non-cash assets.

Sample selection related problems should be considered while analyzing the empirical findings of this study. First of all, the database in this analysis covers only the one third of publicly traded non-financial stocks in Turkey's stock exchange BIST. Generalization of the results from this restricted number of firms may cause bias towards the real financing preference of Turkish public firms. Secondly, stock exchange in Turkey, which started operating in 1985, is relatively young so, the earlier sample years in this analysis represents less firms than the last years. This in turn, may cause misinterpretation of results against younger firms due to restricted number of firm year observations available for them.

4. Line of Credit versus Cash

This section investigates the liquidity choice between line of credit and cash as in Sufi (2009) for the public firms in Turkey. Sufi (2009) state that the literature on lines of credit in liquidity management suggests that firms that have access to credit lines should utterly rely on bank financing in their liquidity management. Thus, the hypothesis for the liquidity choice is rejected in favor of line of credit by the cash literature. However, line of credit may not provide sufficient liquidity insurance for all firms in the economy. This analysis aims to test the determinants that causes whether firms use cash or lines of credit in their liquidity management. Liquidity management decision between credit lines and cash also tested for the firms with different cash holding levels to check the robustness of the main hypothesis results. This section proceeds with the descriptive statistics of the variables that are used in empirical models and the results of those empirical specifications.

4.1. Descriptive Statistics

This section summarizes line of credit and firm characteristics variables used in this analysis. Line of credit and financial statement items are already discussed under data section. Sufi (2009) created two measures of the bank liquidity to total liquidity ratio in attempt to assess the importance of lines of credit in corporate liquidity management. The first measure used in the analysis is total line of credit scaled by the sum of total line of credit and cash. This measure alleviates endogeneity concerns that some firms invariably drawdown most of their lines of credit. The second measure used in this analysis is unused line of credit scaled by the sum of unused line and cash. This measure captures the fraction of liquidity readily available to the firm use that is provided by banks.

There are two volatility measures used in this analysis namely, cashflow and industry sales volatility. Cashflow volatility calculated at firm level by taking the standard deviation of firm cashflow growth for the period between 2006-2014. Industry sales volatility is calculated by taking the median level of firm sales volatility that is the standard deviation of firm sales growth for the period between 2006-2014, for each industry. Information asymmetry indicator variables used in this analysis are analogical to the ones in Sufi (2009). Not in BIST100 index is a dummy variable, which takes value of 1 if the firm is not listed under the main index of Turkey Stock Exchange. Logically, firms that are not listed in BIST100 index receive less attention, thus are prone to information asymmetry problems. Firm age since IPO is used as another information asymmetry variable as older firms are more likely to be known to capital markets.

Table 1 gives the summary statistics for line of credit and firm characteristics variables. It is worthy of note that both total line of credit to asset and unused line of credit to asset ratios have a sample mean above 1. That is to say, some firms in the sample received very high amount of line of credit from banks relative to their assets, that cannot solely be explained by the asset based lending structure in Turkey. Used credit line is nearly one third of assets and does not seem to fluctuate among the firms in the sample. This information combined with the previous one, creates a suspicion about the financial covenant clauses on credit lines for Turkish public firms. Unfortunately, there is no specific information about financial covenants on credit lines in firms' financial reports.

Table 1: Summary Statistics

Variable	Obs.	Mean	Median	St.Dev.
<i>Line of credit variables</i>				
Total line of credit/assets	499	1.74	1.12	2.08
Unused line of credit/assets	499	1.44	0.83	1.9
Used line of credit/assets	499	0.31	0.25	0.28
Total Line /(Total Line +Cash)	499	0.93	0.97	0.09
Unused Line/(Unused Line+Cash)	499	0.91	0.95	0.11
<i>Firm characteristics</i>				
Book debt/assets	499	0.25	0.24	0.17
EBITDA/(Total Assets-Cash)	499	0.01	0.02	0.03
Tangible Assets/(Total Assets-Cash)	499	0.37	0.38	0.2
Net worth, cash adjusted	499	0.43	0.41	0.24
ln(Total Assets - Cash)	499	19.63	19.36	1.53
Market to book, Cash Adjusted	499	0.75	0.57	0.79
Industry Sales Volatility	499	0.22	0.2	0.06
Cashflow Volatility	499	1.57	1.37	0.99
Not in BIST100 index {0,1}	499	0.73	1	0.45
Firm age (years since IPO)	499	13.73	14	6.55

This table presents summary statistics of 116 publicly traded Turkish non-financial firms from 2006 through 2014. Book debt is sum of short term and long term financial loans. EBITDA is earnings before interest tax depreciation and amortization. Net worth, cash adjusted, is the net worth less cash balances divided by book assets less cash. Market to book, cash adjusted, is the market value of assets less cash divided by the book value of assets less cash balances. Industry sales volatility is the square root of the variance of industry sales. Cashflow volatility is the square root of the variance of industry operating cash flows. Not in BIST100 index takes value of 1 if the firm is not in BIST100 index. Firm age is the total number of years passed since the initial public offering of the firm shares on Istanbul Stock Exchange.

Table 2 displays the effect of liquidity preference on firm characteristics. The firm that have total line / (total line + cash) ratios that is above the sample median are considered as bank financing preference firms and the rest is considered as cash financing preference firms. Rationally, bank financing preference firms have higher debt to asset ratios than cash financing preference firms and the difference between the means is significant according to t-test results. Cash financing preference firms have higher casflows and the difference in mean cashflows is also significant. Bank financing preference firms have higher tangible asset to cash adjusted total asset ratios, which might be indication of asset based lending by banks. Cash financing preference firms on average have higher cash adjusted total assets than bank financing preference firms. This finding combined with above suggest that cash financing preference firms opt for holding more of the other asset types such as inventory or intangible assets. Bank

financing preference firms have higher cashflow volatilities. This finding signals that firms with high cashflow volatility are less reliant on cash in their liquidity preference.

Table 2: The effect of liquidity preference on firm characteristics

Variable	Bank Financing Preference Mean	Cash Financing Preference Mean	Difference Mean
<i>Firm characteristics</i>			
Book debt/assets	0.27	0.24	0.03*
EBITDA/(Total Assets-Cash)	0.01	0.02	-0.01**
Tangible Assets/(Total Assets-Cash)	0.39	0.34	0.05**
Net worth, cash adjusted	0.43	0.43	0
ln(Total Assets - Cash)	19.09	20.18	-1.09**
Market to book, Cash Adjusted	0.77	0.72	0.05
Industry Sales Volatility	0.22	0.22	0
Cashflow Volatility	1.7	1.44	0.26**
Not in BIST100 index {0,1}	0.83	0.62	0.21**
Firm age (years since IPO)	14.26	13.21	1.05

This table shows the mean of firms characteristics for the firms with different liquidity preferences. The firms that have above the sample median Total Line/(Total Line+Cash) ratios are considered as bank financing firms whereas, the firms that have Total Line/(Total Line+Cash) ratios below the sample median considered as cash financing firms. Difference mean column shows the difference between means of firms characteristics as well as statistical significance according to the mean comparison t-test results. **, * statistically distinct from 0 at the 1 and 5% level, respectively.

Table 3 offers additional information about line of credit for the firms included in this study. It is apparent that most of the firms in the sample operating in the manufacturing industry, whereas the least represented firms in the sample are from administrative and support service activities. It is important to mention that financial institutions kept out of the scope of this study due to their unique properties of financial statement variables. Debt to asset ratios varies between 56% and 17% among sectors. While the most indebted sector is energy, the least is service sector. The firms in the technology sector by far have the highest total line to asset ratio. Technology firms on average received credit lines from banks more than two times of their assets. Nevertheless, firms in technology sector have the least usage of their available lines among other firms with 14%. This statistic imply that Turkish banks are willing

to fund technological firms heavily even though the firms are reluctant to lean against credit lines and keep considerably low debt to asset ratio of 19%.

Table 3: Line of credit utilization by sector

Sector	Number of Firms	Debt / Assets	Total Line / Assets	Used Line / Total Line
Administrative and support service activities	2	0.17	1.02	0.34
Construction and public works	5	0.31	0.54	0.24
Electricity gas and water	4	0.56	1.02	0.3
Manufacturing industry	80	0.24	1.57	0.23
Technology	8	0.19	2.33	0.14
Transportation, telecommunication and storage	7	0.48	1.01	0.26
Wholesale and retail trade, hotels and restaurants	10	0.29	0.69	0.44

This table presents data on the use of lines of credit by 116 firms for 2006-2014 period. It reports cell means for subsamples by sectors. Firms are categorized under sectors according to the 6-digit Public Disclosure Platform (PDB) sector indicator. PDP is an electronic system through which electronically signed notifications required by the capital markets and Borsa Istanbul regulations are publicly disclosed.

4.2. Empirical Results

Regression results displayed in Table 4 are based on Sufi (2009) framework that relates bank liquidity to total liquidity ratio to lagged firm characteristics. This analysis only focuses on the models conditional of having line of credit in Sufi (2009), since the discrimination of firms which have access to line of credit cannot be made within the available data. In regression analysis, bank liquidity to total liquidity ratio taken as dependent variables, which captured by two different measures: total line of credit / (total line of credit + cash) and unused line of credit / (unused line of credit + cash). In all model specifications industry and time fixed effects give significant results. Therefore, I have used Pooled OLS regression including sector and year as dependent variables. In all models standard errors are clustered at industry level.

Using bank liquidity to total liquidity ratio as a dependent variable reduces the impact of omitted variables that may affect firm's demand for overall liquidity, which may in turn influence the positive correlation between line of credit usage and cash flow. Therefore, the

bank liquidity to total liquidity ratio controls for overall liquidity and insulates the relation between lines of credit and cash. Since banks may determine credit limits by the financial performance of the firms in related period, time variant explanatory variables in the models are lagged one period in order to alleviate endogeneity concerns.

Regression 1 and 2 in Table 4 corresponds to regression 4 and 6 in Table 3 in Sufi (2009) which shows the results for the firms with line of credit. In both regressions coefficients of lagged cashflow is positive and statistically significant. This result is line with Sufi (2009) and implies that high cashflow firms rely more on bank financing in their liquidity management. The result may also suggest cash based lending of Turkish banks. Coefficient estimates of tangible assets over cash adjusted assets also give positive and statistically significant results. Unlike Sufi (2009), who find no significant relationship between tangible assets and bank financing, Turkish firms with higher tangible assets seems to prefer line of credit versus cash. The result may also suggest asset based lending of Turkish banks. Sufi (2009) find positive relationship between cash adjusted asset size and bank financing in his sample. However, results for Turkish firms indicate negative relationship between size and line of credit. This finding implies that small public firms rely more heavily on bank financing than cash in Turkey. Direction of the coefficient of cash adjusted Net worth is parallel with the Sufi (2009) finding and points that financially healthy firms are less dependent on bank financing.

The coefficient of Industry sales volatility is negative and significant. It means that firms that are operating in high sales volatile industries prefer cash financing. This may be the natural result of the banks aversion to provide liquidity for volatile industries. Cashflow volatility measure gives no significant results although the direction of implies high volatility causes firms to rely on bank financing. In contrast with this finding, Sufi (2009) finds coefficient estimate on cashflow volatility is negative and statistically significant. He suggests that firms

with high cashflow volatility rely more on cash in their liquidity management. He also correlates this evidence with the notion that firms with high cashflow volatility may prefer to avoid cashflow based financial covenants. Unfortunately, there is no database that holds financial covenant information for Turkish firms. At the same time, there is no specific clause about cashflow based financial covenants in the annual reports of Turkish public firms. Therefore, the relationship between line of credit and cashflow based financial covenants remain unexplored for Turkish public firms.

Table 4: Bank lines of credit and firm characteristics

Dependent variable	Total Line / (Total Line +Cash) (1)	Unused Line / (Unused Line+Cash) (2)	Unused Line / (Unused Line+Cash) (3)	Unused Line / (Unused Line+Cash) (4)
[EBITDA/(Total Assets-Cash)] _{t-1}	0.216* (0.015)	0.180* (0.042)	0.0791 (0.733)	0.178 (0.112)
[Tangible Assets/(Total Assets-Cash)] _{t-1}	0.102* (0.012)	0.125* (0.021)	0.137* (0.025)	0.135* (0.049)
[ln(Total Assets - Cash)] _{t-1}	-0.0253*** (0.001)	-0.0327** (0.001)	-0.0326** (0.001)	-0.0369* (0.011)
[Net Worth, Cash Adjusted] _{t-1}	-0.0521 (0.067)	-0.0192 (0.562)	-0.0231 (0.502)	-0.025 (0.486)
[Market to book, Cash Adjusted] _{t-1}	0.0000726 (0.955)	0.000801 (0.494)	0.000619 (0.543)	0.00211* (0.030)
[Industry Sales Volatility]	-2.093 (0.155)	-4.937* (0.014)	-4.878* (0.022)	-4.229* (0.043)
[Cashflow Volatility]	0.00741 (0.181)	0.00868 (0.266)	0.0094 (0.217)	0.00938 (0.212)
[Not in BIST100 index {0,1}]	0.0161 (0.368)	0.00359 (0.885)	0.0105 (0.681)	-0.000165 (0.993)
ln[(Firm age (years since IPO)) _{t-1}]	-0.00292 (0.697)	-0.00119 (0.880)	-0.000554 (0.945)	-0.000115 (0.989)
[Low Distress Likelihood {0,1}] _{t-1}			0.0333* (0.032)	
[Low distress likelihood] _{t-1} *[EBITDA / (Total Asset - Cash)] _{t-1}			-0.0715 (0.836)	
[Credit Rating {0,1}]				0.00582 (0.709)
[Credit Rating]*[EBITDA / (Total Asset - Cash)] _{t-1}				0.295 (0.705)
Observations	499	499	499	448
R ²	0.312	0.288	0.304	0.284

This table presents coefficient estimates from regressions relating the use of a line of credit to various lagged firm characteristics. Coefficient estimates from Pooled OLS results. Columns 1 and 2 report the estimation relates two different measures of the bank liquidity to total liquidity ratio to lagged firm characteristics. Column 3 and 4 shows coefficient estimates from regression relating the use of a line of credit to various lagged firm characteristics, with a particular focus on how the likelihood of financial distress and credit rating affects the use of lines of credit respectively. Standard errors clustered at industry level. Low distress likelihood is an indicator variable that takes value 0 if the firm has an Altman's z-score below the sample median and 1 if the firm has an Altman's z-score above the sample median. Credit Rating is an indicator variable that takes value 1 if the firm has a credit rating that is above investible level. Regressions include year and 6-digit sector indicator variables. ***, **, * statistically distinct from 0 at the 0.1, 1 and 5% level, respectively.

Regression 3 in Table 4 introduces two new variables into the picture, lagged low distress likelihood and its interaction with lagged cashflow. Low distress likelihood is a dummy variable that takes value 1 if the firm has an Altman's (1968) z-score above the sample median. Z-score is used to predict the probability that a firm will go into bankruptcy within two years. Sufi (2009) follows Mackie-Mason (1990) methodology and calculates Altman's (1968) z-score excluding leverage, given that leverage is a direct function of the proportion of used and unused lines of credit. More specifically, z-score is calculated as:

$$ZSCORE = 3.3 * (EBIT / Total Assets) + 1.0 * (Net Sales / Total Assets) + 1.4 * (Retained Earnings / Total Assets) + 1.2 * (Working Capital / Total Assets)$$

I also followed Mackie-Mason (1990) methodology but replaced EBIT with EBITDA for convenience. Z-score in my sample has a mean of 1.19 and a standard deviation of 1.07. The results in regression 3 in Table 4 are analogical to results of Sufi (2009) regression 3 of Table 4. Coefficient of lagged low distress likelihood is positive and significant. That suggests high distressed firms prefer cash to bank financing, which may be due to high transaction cost of bank financing for distressed firms. Coefficient of cashflow is negative for low distress likelihood firms, which implies high cashflow low distressed firms rely more on cash rather than line of credit whereas, high cash flow high distressed firms rely less on cash in their liquidity choice.

Using the similar logic with low distress likelihood variable, I also used credit rating of a firm as an indicator of financial distress. The results of this specification presented in regression 4 in Table 4. Credit rating is a dummy variable, which takes the value of 1 if the firm has a credit rating assigned by bank that is above investment grade level. Neither credit rating nor its interaction with lagged cashflow gives significant results. Nevertheless, it is not quite fair to compare this result with the regression 3 of Table 4 because of the missing credit rating data for several firms in the sample.

To check the robustness of the models in Table 4 for the firms with different cash holding levels, separate results included in Table 5 for the firms that have above and below the median cash holding levels. Cash holding is taken as the ratio of cash and cash equivalents over total assets. Sufi (2009) also concerned about impact of cashflow on line of credit for different cash holding levels. He stated that the results of baseline regressions are not merely driven by changes in cash holding levels. Table 5 show the results for different corporate cash holding levels for the case of Turkish public firms. Regressions 1 through 4 present the result for the firms that have cash levels above median level in a sample year whereas, regressions 5 through 8 present the results for low cash holding firms.

The first thing needs to be mentioned is the change in the significance of the cashflow for high cash firms. The results show that high cash holding high cashflow firms are not necessarily prefer bank financing as opposed to cash although the relation remained positive. This result is not striking since high cash high cashflow firms are less dependent on banks for their liquidity management. Consistent with the previous findings, high cashflow firms rely more on bank financing if they have low levels of cash. The another result in Table 5 worth to mention is that coefficient of tangible assets to cash adjusted total assets ratio is only significant for high cash holding firms. That can be interpreted as high cash firms prefer bank financing versus cash when they also have high tangible assets. This finding may also suggest asset based lending structure of Turkish banks only if cash holding levels are also high. The coefficients of credit rating and its interaction with lagged cashflow are insignificant for the high cash holding sample. However, the coefficient of credit rating is significant for the firms with low cash holding levels. This means that high credit rating firms rely more on bank financing if they also have low cash holding levels.

Table 5: Bank lines of credit and firm characteristics for different cash holding levels

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total Line / (Total Line +Cash)	Unused Line / (Unused Line+Cash)	Unused Line / (Unused Line+Cash)	Unused Line / (Unused Line+Cash)	Total Line / (Total Line +Cash)	Unused Line / (Unused Line+Cash)	Unused Line / (Unused Line+Cash)	Unused Line / (Unused Line+Cash)
[EBITDA/(Total Assets-Cash)] _{t-1}	0.201 (0.087)	0.141 (0.179)	0.57 (0.522)	0.107 (0.549)	0.247** (0.008)	0.327* (0.030)	0.139 (0.315)	0.391* (0.012)
[Tangible Assets/(Total Assets-Cash)] _{t-1}	0.15 (0.052)	0.186* (0.046)	0.183 (0.070)	0.210* (0.028)	0.0253 (0.063)	0.03 (0.283)	0.0439 (0.127)	0.0218 (0.573)
[ln(Total Assets - Cash)] _{t-1}	-0.0400** (0.0070)	-0.0474* (0.015)	-0.0464** (0.004)	-0.0496* (0.028)	-0.0127* (0.011)	-0.0191** (0.004)	-0.0197** (0.003)	-0.0256*** (0.000)
[Net Worth, Cash Adjusted] _{t-1}	-0.137* (0.033)	-0.0833 (0.205)	-0.0766 (0.204)	-0.071 (0.293)	0.00448 (0.825)	0.0262 (0.342)	0.0226 (0.427)	0.0392 (0.130)
[Market to book, Cash Adjusted] _{t-1}	-0.000551 (0.842)	0.000841 (0.709)	0.000955 (0.973)	0.0012 (0.372)	0.000106 (0.898)	0.000581 (0.499)	0.000704 (0.421)	0.00384 (0.080)
[Industry Sales Volatility] _{t-1}	-7.999 (0.063)	-13.91** (0.009)	-11.96* (0.013)	-14.18* (0.016)	-0.743 (0.532)	-1.639 (0.228)	-2.912 (0.082)	-1.103 (0.339)
[Cashflow Volatility] _{t-1}	0.00841 (0.151)	0.0116 (0.198)	0.0107 (0.209)	0.0146 (0.103)	0.00169 (0.657)	0.00185 (0.688)	0.00267 (0.545)	0.000561 (0.820)
[Not in BIST100 index (0,1)]	-0.0133 (0.388)	-0.0323 (0.126)	-0.0273 (0.154)	-0.0501* (0.039)	-0.00082 (0.959)	-0.00877 (0.751)	-0.000549 (0.982)	0.00102 (0.942)
ln[(Firm age (years since IPO)) _{t-1}]	0.00524 (0.787)	0.0169 (0.422)	0.0169 (0.353)	0.0136 (0.528)	-0.00231 (0.605)	-0.00475 (0.367)	-0.00278 (0.642)	-0.000647 (0.854)
[Low Distress Likelihood (0,1)] _{t-1}			0.0601** (0.001)				0.0330*** (0.000)	
[Low distress likelihood] _{t-1} * [EBITDA / (Total Asset - Cash)] _{t-1}			-0.756 (0.487)				0.0316 (0.785)	
[Credit Rating (0,1)]				-0.0129 (0.484)				0.0444* (0.032)
[Credit Rating] * [EBITDA / (Total Asset - Cash)] _{t-1}				-0.0691 (0.940)				-0.177 (0.528)
Observations	251	251	251	237	248	248	248	211
R ²	0.362	0.348	0.382	0.368	0.264	0.229	0.278	0.26

This table presents coefficient estimates from regressions relating the use of a line of credit to various lagged firm characteristics for different levels of cash holdings. Coefficient estimates from Pooled OLS results. Columns 1, 2, 5 and 6 report the estimation relates two different measures of the bank liquidity to total liquidity ratio to lagged firm characteristics. Column 3 and 7 shows coefficient estimates from regression relating the use of a line of credit to various lagged firm characteristics, with a particular focus on how the likelihood of financial distress affects the use of lines of credit. Column 4 and 8 shows coefficient estimates from regression relating the use of a line of credit to various lagged firm characteristics, with a particular focus on how the likelihood of financial distress affects the use of lines of credit. Cash holding median takes the value of 1 if the firm has cash holdings above the median among other firms in a sample year. Coefficient estimates from Column 1, 2, 3 and 4 shows the result for the firms that have cash holdings above the sample median. Coefficient estimates from Column 5, 6, 7 and 8 shows the result for the firms that have cash holdings below the sample median. Standard errors clustered at industry level. Low distress likelihood is an indicator variable that takes value 0 if the firm has an Altman's z-score below the sample median and 1 if the firm has an Altman's z-score above the sample median. Credit Rating is an indicator variable that takes value 1 if the firm has a credit rating that is above investible level. Regressions include year and 6-digit sector indicator variables. ***, **, * statistically distinct from 0 at the 0.1, 1

5. Line of Credit and Cashflow Sensitivity of Cash

This section focuses on the notion of cash flow sensitivity of cash, which first analyzed by Almeida et al. (2004). They test the impact of financial constraints on firm policies by considering that firms deemed as financially constraint manage their liquidity to maximize value. Their theory insulates that cash holding patterns should vary over the business cycle. Above all, financially constrained firms need to increase their propensity to save cash following macroeconomic shocks, while unconstrained firms need not. Almeida et al. (2004) find empirical support for their hypothesis for majority of their financial constraint measurements using a sample of publicly traded manufacturing firms between 1971-2000 periods.

Sufi (2009) combined line of credit with financial constraint literature and examined whether access to a line of credit is a strong measure of financial constraints than the traditional measures in the literature such as payout ratio, size, bond rating and commercial paper rating. He created access to lines of credit as financial constraint criteria and considered a firm as unconstrained if it has access to line of credit in every year of the sample, and maintain cashflow above the median in every year of the sample. Sufi (2009) find that firms that have access to a line of credit are not financially constrained even if they classified as unconstrained by traditional measures in the literature.

In this analysis, I have created three additional financial constraints criteria to test using different line of credit measures. Since dataset used in this analysis contain only the firms that have access to line of credit, Sufi's (2009) line of credit criteria cannot be used to differentiate firms in this analysis. The first constraint measure added is the utilization of line of credit by a firm. This measure aims to separate firms that keep available credit lines as a safety net from the ones that may have trouble finding additional funds when financial frictions arise. Since

this measure does not take into account the difference in firm characteristics with respect to firm's investment projects within the sample period 2006-2014 or relationship with different banks, number of banks that provided line of credit introduced as second financial constraint criteria. This financial constraint criterion captures the available bank financing sources of firm and may act as hedging instrument when relationship between banks goes wrong, which potentially occurs in hard times. However, this financial constraint measure can give adverse information for the firms that rely on bank financing but cannot find a bank that willing to supply the liquidity need of firm so that firm applies for a loan whichever bank is available. In order to mitigate concerns of the first two financial constraint measurements, the final line of credit financial constraint criteria added in this analysis is the interaction of the first to two criteria, which captures both firm's bank financing funds buffer and bank alternatives. These three line of credit financial constraint criteria explained in detail below among the other financial criteria used in this analysis to test cash flow sensitivity of cash.

- Utilization: A firm is considered as unconstrained and takes the value of 0 if the firm (i) has less than 50% line of credit utilization in every year of the sample, and (ii) maintain cash flow above the median in two thirds of the sample years. The latter part of the definition partially comes from Sufi (2009) and reflects the fact that low cashflow firms are likely to save more cash out of their cashflows as they are in danger of violating a covenant and losing access to their line of credit.
- # of banks worked: A firm is considered as unconstrained and takes the value of 0 if the average number of banks the firm worked through the sample years above the median.
- Line of Credit: A firm is considered as unconstrained and takes the value of 0 if it is deemed as unconstrained with regard to the alternative measures of bank and utilization constraints.

- Dividend: A firm is considered as unconstrained and takes the value of 0 if it paid dividend in more than half of the sample years. This constraint includes intuition of pecking order theory, which suggests constrained firms should retain internal funds to build financial slack in order to smooth future investment. Thus, financially constrained firm is not expected to pay dividends.
- BIST100: A firm is considered as unconstrained and takes the value of 0 if it is among the firms in BIST100 index. Denis et al. (2003) show that inclusion to S&P500 index is information event which result in the increase in earnings forecasts and realized earnings for firms. This analysis considers BIST100 index, the most prominent index of Turkey's stock exchange, as equivalent of S&P500 index in a sense that inclusion of the index provides financial opportunities.
- External dependence: An industry is considered as unconstrained and takes the value of 0 if the firms operates in an industry that has external dependence level below the 0.3 industry median. This financial constraint measurement takes into account Rajan and Zingales (1998) classification for the median levels of external financing for industries.

5.1. Descriptive Statistics

Table 6 shows summary statistics for the financial constraint measurements that used in this analysis. Financial constrained measures take the value of 1 for unconstrained firms and 0 for constrained firms. The number of firms varies for different financial constraint measure in a range between 56 and 90. While # of banks worked measure contains the least number of financially constraint firms, line of credit measure contains the highest number of financially constrained firms.

Table 6: Summary statistics of financial constraint measures

Financial Constraint Measures	Number of Firms	Mean	Median	St.Dev.
Utilization	85	0.8	1	0.4
# of Banks Worked	56	0.5	1	0.5
Line of Credit	90	0.9	1	0.4
Dividend	78	0.7	1	0.5
BIST100	84	0.7	1	0.5
External Dependence	65	0.6	1	0.5

This table presents summary statistics for the financial constraint measurements that are used to test cash flow sensitivity of cash in this analysis. All of the financial constrained measurements are assumed as dummy variables that takes the value of 0 or 1 for unconstrained and constrained firms respectively. Number of firms column gives the number of constrained firms in the sample by financial constraint measures.

Table 7 gives the correlations between the financial constrained measures based on line of credit and the measured based on other firm characteristics. External dependence constraint measure has negative correlation with most of the other firm characteristics constraint measure. This may be due to the uneven representation of sectors among the sample. It is also possible that industries in Turkey have different external financial dependence structure than suggested by Rajan and Zingales (1998), however it is not a focal point to test this assumption in this analysis.

Table 7: Correlation with other measures of financial constraints

	Utilization	# of Banks Worked	Line of Credit	Dividend	BIST100
Dividend	0.36	0.07	0.27		
BIST100	0.02	0.07	0.00	0.35	
External Dependence	0.09	0.05	0.06	0.12	-0.16

This table presents correlations between various measures of financial constraints used in the literature. Utilization takes on the value 0 if the firm (i) has less than 50% line of credit utilization in every year of the sample (ii) maintains cash flow above the median in two thirds of the sample years. # of Banks Worked takes on the value 0 if the average number of banks the firm worked with above the median of the sample firms. Line of credit takes the value of 0 if the firm is considered as unconstrained for number of bank and utilization criterias. Dividend takes on the value 0 if the firm paid dividends more than half of the sample years. BIST100 takes on the value 0 if the firm is indexed in BIST100. External Dependence takes on the value 0 if the firm operates in an industry that has median external dependence of less than 0.3 according to Rajan & Zingales (1998) Table 1.

5.2. Empirical Results

Empirical specification used in this analysis to test cash flow sensitivity of cash is remained faithful to the equation (8) written by Almeida et al. (2004). Cash holdings is equal to ratio of balance sheet items cash and cash equivalents over total assets. The change in cash holdings is calculated as subtracting cash holding of a period from the previous period's cash holding of a firm. Cashflow formula used in this section of analysis is taken as EBITDA over total assets also abiding by Almeida et al. (2004). Q is cash adjusted market to book ratio. Q is included in the model in order to capture long-term growth opportunities available to firm, which is otherwise unobservable. Size is the natural log of total assets. Almeida et al. (2004) control for the firm size to control economies scale. The model used in the test written as follows:

$$\Delta CashHoldings_{i,t} = \alpha_0 + \alpha_1 Cashflow_{i,t} + \alpha_2 Q_{i,t} + \alpha_3 Size_{i,t} + \varepsilon_{i,t}$$

Table 8 displays the results for Pooled OLS estimations of the baseline regression model for above equation specified by Almeida et al. (2004). The estimations include year and industry fixed effects and cluster standard errors at industry level. The table contains 16 different regressions, which test cashflow sensitivity of cash for 8 financial constraint measures for unconstrained firms and constrained firms separately. The first three constrained criteria are based on line of credit are the focus of this analysis and as explained in detail above whereas, the rest of the financial constraint criteria are based on other firm characteristics presented for comparison purposes. The positive and significant coefficients on cashflow signals the presence of cash saving out of cashflow.

Table 8: Availability of bank lines of credit and the cashflow sensitivity of cash

Dependent Variable	Independent Variables		
	<i>Cashflow</i>	<i>Q / '000</i>	<i>Size / '000</i>
Financial Constraints Criteria			
1. Utilization			
<i>Unconstrained Firms</i>	-0.090 (0.274)	1.520 (0.688)	-1.020 (0.388)
<i>Constrained Firms</i>	0.281** ⁺ (0.006)	-0.069 (0.938)	1.260 (0.376)
2. # of Banks Worked			
<i>Unconstrained Firms</i>	0.0219 (0.801)	-0.327 (0.561)	3.38* (0.045)
<i>Constrained Firms</i>	0.249* ⁺ (0.041)	0.118 (0.965)	-0.555 (0.441)
3. Line of Credit			
<i>Unconstrained Firms</i>	-0.500 (0.068)	-2.260 (0.138)	-0.895 (0.405)
<i>Constrained Firms</i>	0.239* ⁺ (0.027)	0.520 (0.773)	1.320 (0.285)
4. Dividend			
<i>Unconstrained Firms</i>	0.351*** (0.001)	-3.68* (0.016)	5.65*** 0.00
<i>Constrained Firms</i>	0.0965 (0.367)	2.100 (0.465)	-0.965 (0.309)
5. BIST100			
<i>Unconstrained Firms</i>	0.240 (0.060)	-2.230 (0.056)	2.440 (0.181)
<i>Constrained Firms</i>	0.147 (0.089)	1.160 (0.597)	0.668 (0.364)
6. External Dependence			
<i>Unconstrained Firms</i>	0.118* (0.020)	0.078 (0.868)	0.088 (0.088)
<i>Constrained Firms</i>	0.248 (0.060)	0.281 (0.918)	1.690 (0.336)

This table presents coefficient estimates from regressions relating the change in cash holdings to cash flow. The estimation follows that of Almeida et al. (2004) equation (8) and Table 3. Each reported coefficient is the effect of cash flow on cash holdings from a separate regression. Coefficient of Q represents market to book ratio divided by 1000. Coefficient of Size represents log value of total assets divided by 1000. All regressions include period and sector fixed effects. Standard errors are clustered at industry level. **, * statistically distinct from 0 at the 1 and 5% level, respectively. + distinct from unconstrained sample at 10% or better according to seemingly unrelated regression coefficient comparison results.

According to the regression results of first three criteria, firms considered as constrained based on a line of credit measure save cash out of their cash flows. For all three line of credit constraint measurement, coefficient of cashflow is positive and significant, while coefficient of cashflow is insignificant for unconstrained for firms. In addition, the coefficients of cashflow significantly differs for constrained and unconstrained firms based on line of credit constraint measures. This result is in line with Sufi (2009) and suggest that firms which unconstrained by line of credit not necessarily save cash out of their cashflow as they are less likely to face a high external cost of capital. However, firms that are constrained by line of credit measure, save cash out of cash flow as they are likely to face a high external cost of capital.

Regressions based on other financial constraint measures give variety of result for unconstrained and constrained firms. The coefficient of cashflow for unconstrained firms based on dividend is positive and statistically significant. This finding is not very staggering since customary dividend payer firms may have tendency to save more cash out of their cashflow to distribute cash to their shareholders instead of spending money on various projects. Firms that are not indexed under BIST100 does not necessarily save cash out of their cashflows. Interestingly, firms that are unconstrained based of external dependence seem to save cash out of their cashflows. This supports the arguments mentioned when explaining negative correlation between external dependence and other financial constraint measurements. The coefficients of Q and size varies considerably among the regression models.

6. Conclusion

Liquidity management decision of Turkish firms between line of credit and cash investigated in this analysis using the dataset that contains public firms in Turkey. Following

the methodology that is similar to Sufi (2009), empirical findings shows that there is a positive and significant relationship between lagged cashflow and bank liquidity to total liquidity ratio. The main finding of this study is that cashflow is a strong indicator of whether a firm relies on bank financing or cash financing in their liquidity management. This finding is parallel to Sufi (2009) and suggests that firms with high cashflow levels are more likely to utilize line of credit.

The relationship between bank liquidity to total liquidity ratio and tangible assets to total assets ratio also give significant results for the Turkish firms' data. This finding partly differentiates from Sufi (2009), who finds insignificant relationship between these variables for the sample of firms that have access to line of credit. The reason for this discrepancy may be due to Turkish banks asset based lending structure. However, the average firm in the sample has line of credit to asset ratio above one. Thus, the significance cannot solely be explained by asset based lending structure. It appears that the public firms in Turkey are found trustworthy by banks and are able to receive very high amount of credit lines, which even exceeds the magnitude of all potential asset-based collaterals.

The choice between line of credit and cash further investigated for the firms with high and low cash holding levels separately. The results display that there is a statistically significant relationship between cashflow and bank financing preference for the firms with low cash holdings. On the other hand, high cash holding firms in Turkey not necessarily rely on bank financing when they have high cashflow levels. The evidence in Sufi (2009) is consistent with this finding at the very high end of cashflow distribution. Significance of tangible assets to total assets ratio also differs with cash holding levels. It seems that high cash holding firms rely on bank financing when they have high tangible asset to total asset ratios. However, there is no statistical support for the liquidity choice of low cash holding firms when they have high tangible asset to total asset ratio, although direction is in favor of bank financing.

The validity of line of credit items as financial constraint measurements also investigated in this analysis. The three additional financial constraint measurements introduced in this analysis are line of credit utilization, number of banks that give line of credit to firm and the interaction of both. This analysis uses the Almeida et al. (2004) framework of cashflow sensitivity of cash to measure the link between financial constraints and corporate liquidity demand. The findings suggest that firms that are constrained by a line of credit measure saves cash out of their cashflow while, unconstrained firms do not. Unfortunately, other financial constraint measurements considered in this analysis fail to give similar results. Overall, the results in financial constraints section suggest that the line of credit measures introduced in this analysis are accurate measures of financial constraints for Turkish firms and worth consideration in literature.

Several suggestions can be made for the further research on the liquidity management of Turkish firms. First, the data in this study contain only the public firms in Turkey, therefore it may come short at explaining the overall liquidity choice behavior of Turkish firms. Distinctive results can be obtained with an extended data that combines both public and private firms in Turkey. Second, existing literature investigate the relationship between financial covenants and credit lines provide insight about the role of credit lines in liquidity management of firms, however, such a dataset for Turkish firms is lacking in this analysis, which might be fruitful for the future research about liquidity choice behavior of Turkish firms. Third, this analysis considers only the firms that have access to credit lines in Turkey, thus the impact of having an access to line of credit on liquidity choice is remain unsolved for the firms in Turkey. Finally, this analysis falls short on explaining high line of credit to total asset ratios of Turkish public firms. An analysis that focuses on the supply side dynamics for the bank lines of credit may assist for understanding high line of credit levels of Turkish public firms.

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